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Adolescent outdoor life and well-being

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Cover: Really being with others completely and developing independence outdoors.
Photo: A participant in the study.

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Abstract

Outdoor environments have long offered adolescents opportunities for meaningful encounters, experiences and movements as part of everyday life, but technology and indoor attractions have changed adolescents' relationship with outdoor environments. This makes it important to re-examine the role of everyday outdoor life for adolescent well-being. This study adopts a mixed methods design to investigate the role of outdoor life for adolescent well-being in southern Sweden, across urban, rural and suburban settings. A strategic sample of adolescents, aged 12-15 years old, completed questionnaires in autumn/winter 2020 (n = 320) and spring/summer 2021 (n = 208), providing insights into their perceptions and use of outdoor environments in relation to their well-being. The findings revealed positive associations between adolescents' perceptions and use of outdoor environments and their well-being and self-esteem. Semi-structured and photo interviews were conducted with a sample of participants who had completed the autumn/winter questionnaire. The findings suggest multiple and overlapping outdoor pathways to well-being are active in the outdoor lives of adolescents, including opportunities for *really being with others completely; being in motion; being in sensory experiences; developing independence; developing mastery and capacities;* and *managing emotions and thoughts*. The study underscores the vital role of outdoor environments for adolescents' well-being and overall development. A recommendation is made for society to prioritise the everyday environments of adolescents, engaging a wide range of professionals in policy and planning to help ensure the presence of outdoor spaces supportive of adolescents' everyday practices across all types of living environments.

Keywords: Adolescent development, Health promotion, Landscape architecture, Mental health, Mixed methods, Nature, Outdoor environment, Public space, Urban planning, Youth-friendly environments

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Sammanfattning

Utomhusliv ger ungdomar möjlighet till meningsfulla möten, upplevelser och rörelser som är viktiga för deras välbefinnande, men ny teknik för umgänge och bekväma inomhusmiljöer har förändrat deras förhållande till vardagens utomhusmiljöer. Detta gör det viktigt att ompröva utomhuslivets roll för ungdomars välbefinnande. Studien använder sig av en mixad metod-design för att undersöka vilken roll utomhuslivet har för ungdomars välbefinnande i södra Sverige, i stads-, landsbygds- och förortsmiljöer. Ett strategiskt urval av ungdomar i åldern 12-15 år besvarade en enkät under hösten/vintern 2020 (n = 320) respektive våren/sommaren 2021 (n = 208) för att dokumentera deras upplevelser och användning av utomhusmiljöer, välbefinnande och självkänsla. Resultaten visade positiva kopplingar mellan ungdomars upplevelser och användning av utomhusmiljö och deras välbefinnande och självkänsla. Semistrukturerade intervjuer och fotointervjuer genomfördes med ett urval av de ungdomar som fyllde i höst/vinter-enkäten. Resultaten tyder på att det finns flera och överlappande kopplingar, eller pathways, till välbefinnande som är betydelsefulla i ungdomars utomhusliv, inklusive *möjligheter att verkligen vara helt och hållet tillsammans med andra; att vara i rörelse; att vara i sensoriska upplevelser; att utveckla självständighet; att utveckla färdigheter och förmågor;* samt *att hantera känslor och tankar*. Studien belyser den viktiga roll som utomhusmiljöer spelar för ungdomars välbefinnande och utveckling. En rekommendation är att samhället prioriterar ungdomars vardagsmiljö och engagerar yrkesverksamma i policy och planering för att säkerställa att det finns stödjande utomhusmiljöer för dem i alla typer av livsmiljöer.

Nyckelord: Ungdomars utveckling, Hälsofrämjande, Landskapsarkitektur, Psykisk hälsa, Mixad metod, Natur, Utomhusmiljön, Offentlig miljö, Stadsplanering, Ungdomsvänliga miljöer

Contents

List of publications

This thesis is based on the work contained in the following papers, referred to by Roman numerals in the text:

I. Wales, M., Mårtensson, F., Hoff, E., & Jansson, M. (2022). Elevating the Role of the Outdoor Environment for Adolescent Wellbeing in Everyday Life. Frontiers in Psychology, 13, 774592. https://doi.org/10.3389/fpsyg.2022.774592.

II. Wales, M., Hoff, E., Mårtensson, F., & Englund, J-E. (2024). The quality of Swedish adolescents' outdoor life and its relationship with self-esteem and well-being. Landscape & Urban Planning, 246, 100523. https://doi.org/10.1016/j.landurbplan.2024.105023.

III. Wales, M., Mårtensson, F., Jansson, M. & Hoff, E. Space for being, developing and managing: Outdoor pathways to adolescent well-being. (Manuscript)

The contribution of Mark Wales to the papers included in this thesis was as follows:

I. I am the first author of this paper. I developed the concept for the paper and shared responsibility for writing the paper together with co-authors.

II. I am the first author of this paper. I developed the research design and conducted data collection. I shared responsibility for data analysis and writing the paper together with co-authors.

III. I am the first author of this paper. I developed the research design and conducted data collection and analysis. I shared responsibility for writing the paper together with co-authors.

Abbreviations

CRC	The UN Convention on the Rights of the Child
DASS-21	Depression, Anxiety and Stress Scale 21 (short version)
MSLSS	Multidimensional Student Life Satisfaction Scale
QAOLS	The Quality of Adolescent Outdoor Life Scale
SLSS	Student Life Satisfaction Scale

1. Introduction

1.1 Background

The moment we step outside, outdoor life begins, offering diverse opportunities for social interaction, movement and relaxation. People go outdoors for different reasons and therefore need access to different environments to meet their needs and aspirations. The study of people-environment interactions is rooted in the understanding that such interactions are central to human well-being (Ward Thompson & Travlou, 2007). Through studying people's perceptions and experiences of everyday environments, the physical and social contexts of their well-being can be revealed (Cattell et al., 2008). Understanding how people perceive and experience their everyday environments is important, as it reflects the fit between the environment and their needs (Wallenius, 1999). This fit is essential to well-being (Uzzell & Moser, 2006). Moreover, the same environment can be perceived differently by different people, making it critical to understand how outdoor environments are perceived and used by different people and groups in support of their well-being (Abraham et al., 2010).

Adolescence is a phase of life bridging childhood and adulthood, spanning from around 10 to 24 years old (Sawyer et al., 2018). This thesis focuses on early to mid-adolescence, a time marked by profound biological, psychological and social changes. These changes equip adolescents to engage with the wider world and develop resources that shape their everyday lives and trajectories into adulthood (Patton et al., 2016). Central to this process is the plasticity that characterises this period, making adolescents adaptable to change, and particularly receptive to new experiences, and the

environments where they spend time (Laube et al., 2020; Sisk & Gee, 2022). This makes adolescence a vulnerable period for experiencing adverse environmental conditions, as well as developing various mental health disorders, such as anxiety and depression (Blakemore, 2019; Orben et al., 2020). A recent study found the global onset of the first mental disorder was before 14 years old for one-third, and before 18 years old for almost half of the population (Solmi et al., 2022). The determinants of adolescent mental disorders have received significant attention, including factors such as neighbourhood conditions (Leventhal et al., 2009; Visser et al., 2021) and socioeconomic status (McLaughlin et al., 2012; Reiss, 2013).

Research indicates a concerning rise in mental health problems among adolescents on a global scale (Bor et al., 2014; Collishaw, 2015; Patton et al., 2016; Patalay & Gage, 2019), a trend also observed in several countries in northern Europe (Bor et al., 2014; Collishaw, 2015) and more specifically Sweden (Löfstedt et al., 2020; Swedish Public Health Agency, 2023a, 2023b). Adolescents bear a disproportionate burden of mental illness (Mei et al., 2020), making it a global public health concern (Patton et al., 2016). Additionally, the recent COVID-19 pandemic has posed new challenges for adolescent well-being through the disruption of daily routines (Guessoum et al., 2020; Lee, 2020; Magson et al., 2021). Consequently, there is heightened interest in understanding the determinants of health and well-being during adolescence (Patton et al., 2016; Blakemore, 2019; Collins et al., 2024).

While adolescents' malleability makes them susceptible to unsupportive environments, it also presents a "window of opportunity" for experiences in supportive and nurturing environments (Sisk & Gee, 2022). During this phase, adopting healthy behaviours like exercising regularly can become a part of everyday practices (Inchley et al., 2020), promoting well-being throughout the lifespan (Patton et al., 2016). As a result, there is a burgeoning body of research investigating the health-promoting potential of environments, complementing existing literature on the determinants of poor health and risky behaviours during adolescence (Theokas et al., 2016; Knöll & Roe, 2017).

The outdoor environment holds significant potential for promoting well-being through multiple pathways, including social cohesion, physical activity and restoration (Abraham et al., 2010; Hartig et al., 2014; Kyttä & Broberg, 2014). Pathways can be defined as the underlying mechanisms through which the environment might influence well-being (Kuo, 2015).

Outdoor environments have been shown to foster social cohesion and social capital (Peters et al., 2010; Jennings & Bamkole, 2019), with public spaces vital for social interaction, maintaining bonds with others and alleviating feelings of loneliness (Cattell et al., 2008; Maas et al., 2009). Furthermore, outdoor environments serve as venues for various physical activities, offering a range of benefits for well-being (Brymer et al., 2014; Pasanen et al., 2018; Bélanger et al., 2019). Documented characteristics of public (Zuniga-Teran et al., 2017; Fathi et al., 2020) and greenspaces supporting physical activity (Schipperijn et al., 2013; Feng et al., 2021) are well-documented. Finally, the restorative potential of outdoor environments, in particular green and natural settings, is a well-studied pathway to well-being (Korpela et al., 2008; Grahn & Stigsdotter, 2010; Dzhambov et al., 2018; Hartig, 2021). Restoration involves the filling up of depleted resources, such as the capacity to concentrate, after spending time in an environment which has diminished said resources (Kaplan, 1995).

Outdoor life has long been integral to adolescent life, offering opportunities for socialising with friends, having fun and retreating from the challenges of everyday life (Owens, 1988; Korpela, 1992; Lieberg, 1995; Clark & Uzzell, 2002; Mäkinen & Tyrväinen, 2008; Owens, 2020). However, the changing context of adolescence suggests that recent and current generations of adolescents are having different outdoor experiences than previous generations (Chawla, 2020; Cox, 2020).

Adolescents are increasingly spending their time indoors, immersed in sedentary activities facilitated by digital devices (Nyberg, 2017; Oswald et al., 2020; Twenge et al., 2022). The internet and social media have transformed how adolescents interact, providing novel avenues for maintaining social connections and shaping identities away from the adult gaze, a role traditionally associated with the outdoor environment (Bell et al., 2003). Compounding these changes are parental concerns about safety, often relating to crime, strangers and traffic, which have restricted the independent mobility of adolescents, especially girls (Cox, 2020). Additionally, more adolescents are growing up in urban areas, potentially limiting their access to outdoor environments and contact with nature (Bishop & Corkery, 2017; Birch et al., 2020). Furthermore, mounting academic demands (Högberg et al., 2020) and increased involvement in extracurricular activities (Loebach & Gilliland, 2016) leave adolescents with

limited free time and fewer opportunities for spontaneous activities with peers.

As the allure of the indoor environment grows, research indicates the outward pull of outdoor environments has waned (Sandberg, 2012). Public spaces often fail to accommodate the needs of adolescents (Passon et al., 2008; Pickering et al., 2011; Owens, 2020; Martin et al., 2023) and adolescents are frequently excluded from them through policy and design (Woolley et al., 2011; Brunelle et al., 2018; Loebach, Little, et al., 2020). While adults typically take on the responsibility of providing suitable environments for younger children, adolescents, perceived as more self-reliant, must address their own spatial needs (Owens, 2017). At the same time, adolescent initiatives, such as congregating in schoolyards during evenings, are often met with disapproval or discouragement from adults (Owens, 2002; Woolley et al., 2011; Cele, 2013). Woodgate and Skarlato (2015, p.106) suggest that 'perhaps if built environments were friendlier for youth they would desire to go outside more.'

In the midst of the changing context of adolescence, it becomes imperative to reassess the role of outdoor life for adolescent well-being. The role of outdoor environments for the well-being of adolescents is not well understood, prioritised or exploited (Owens, 2020; Fleckney & Bentley, 2021), particularly in relation to placemaking processes (Knöll & Roe, 2017; Li et al., 2018; Seims et al., 2022; Jaffe & Loebach, 2023). The potential of urban planning and design to contribute to adolescent well-being warrants more attention (Roe & Knöll, 2018; Collins et al., 2024) and the identification of potential pathways linking outdoor life and adolescent well-being can help support this work (Knöll & Roe, 2017).

In the study of outdoor environments, it is common to group adolescents together with children, meaning adolescents' unique experience of everyday environments become less visible (Evans, 2008; Valentine, 2019; Zhang et al., 2024). This neglect is further compounded by research on the function of place during adolescence spanning multiple disciplines, with different approaches, scattering the literature in a way that poses challenges for synthesis (Smith & Mills, 2019) and the practical application of this knowledge. In the substantial body of research on child-friendly environments and their attributes (Johansson et al., 2020; Jansson et al., 2022), there is a need to identify and explore attributes characteristic of youth-friendly environments. Two pivotal concepts integral to child-friendly

environments, namely independent mobility and actualised affordances, hold relevance also for the study of youth-friendly environments (Kyttä, 2004; Horelli, 2007; Lopes et al., 2018). Independent mobility, or the ability to move around the local environment without adult supervision (Tranter & Whitelegg, 1994), plays a crucial role in adolescents' learning to navigate their local environment and what it offers in terms of affordances (Lopes et al., 2018; Cox, 2020). Affordances are defined as 'the functionally significant properties' of a specific environment as perceived by the individual through interacting with the environment (Heft, 1988, p.32). However, research suggests that because adolescence is a distinct phase of life, adolescents' everyday environments should offer distinct attributes (Clark & Uzzell, 2006; Owens, 2020).

Acknowledging the interdisciplinary nature of the inquiry underscores the importance of effective collaboration across disciplines. Interdisciplinary thinking is common practice in both landscape architecture (Jansson et al., 2019) and environmental psychology (Uzzell & Räthzel, 2009), and vital for improving the capacity of landscape architecture to address human needs (Owens et al., 2023; Collins et al., 2024). Moreover, the fusion of different perspectives not only enriches understanding, but also enhances the capacity to apply and put knowledge into practice (Saegert & Winkel, 1990). One example of an effort along these lines is a conceptual framework that brings together research from public health, planning and neurourbanism, to help explain the relationship between the urban environment and adolescent mental health (Buttazzoni et al., 2022).

Positioned at the intersection of environmental psychology, landscape architecture and developmental psychology, this thesis is set to integrate diverse perspectives and advance our understanding of the role of outdoor life for adolescent well-being. Given the complex and multifaceted nature of the topic, synthesising existing knowledge from across disciplines becomes paramount. Through exploring and explaining the interplay between adolescents and their outdoor environments, the study should contribute with theoretical insights that also inform strategies aimed at fostering adolescent-well-being through targeting their outdoor life and environments. The endeavour aligns with the United Nations' Sustainable Development Goals (United Nations, 2015), which emphasise the need to provide safe, inclusive and accessible green and public spaces (Goal 11) that are gender equal (Goal 5) and allow individuals to fulfil their needs and develop active and healthy

lifestyles that enhance their well-being (Goal 3). Likewise, this thesis recognises the Convention on the Rights of the Child through its contribution of knowledge to help ensure decisions are made in the best interests of adolescents (UN General UN General Assembly, 1989).

1.2 The outdoor life of everyday life

The outdoor life of adolescents' everyday lives is the subject for interrogation of this thesis. Everyday life can be viewed as the 'subjective experience of everyday' (Horelli, 2010, p.11) and as the space in which all life, with its interactions and activities, occurs (Lefebvre, 1947). It is in everyday life that well-being takes root (Bronfenbrenner & Morris, 2007; Schwanen & Wang, 2014). The places people actively seek to engage with in their daily lives hold specific meaning for them, making them of interest in the study of well-being (Gibson, 2003). Moreover, the places an individual has access to and engages with may contain opportunities to foster their well-being (Gestsdottir et al., 2011). Concepts such as 'life space' (Douma et al., 2021), 'activity space' (Villanueva et al., 2012; Browning et al., 2021), 'home range' and 'territorial range' (Woolley & Griffin, 2015) all look to capture the patterns of everyday movement and spaces of everyday life. The span of these spaces varies from person to person and generally increases in size from childhood into adolescence (Shaw et al., 2015; Marzi & Reimers, 2018). While during childhood the individual's everyday spaces are largely defined by adults, following the transition to adolescence these spaces take on new forms as adolescents begin to explore more freely on their own (Cox, 2020).

For the purpose of this thesis, outdoor life is defined as the full spectrum of everyday activities that take place outdoors across diverse environments. For example, walking home from school, sitting on a park bench, playing football or hanging out with friends on a schoolyard. By adopting a broad and encompassing approach, it should be able to contribute with new insights about the relationship between adolescents, outdoor life and their well-being across different settings and living environments. In practice, this entailed allowing adolescents' perceptions, experiences and actual use of outdoor spaces to dictate the scope of the activities and environments in focus.

A range of approaches have been used to incorporate the outdoor environment in studies on the relationship between the outdoor environment

and adolescent well-being. Differences in the conceptualisation and measurement of the outdoor environment may explain some of the mixed and inconsistent findings (Fleckney & Bentley, 2021; Mygind et al., 2021). The environments investigated might not be the actual environments individuals use and depend on for their well-being (Winkel et al., 2009; Li et al., 2018). Measures can vary in terms of geographical study area (e.g. predefined vs activity space), type of environment (e.g. greenspace, public open space) and exposure assessment (e.g. GPS vs subjective reports of greenspace use). The lack of homogeneity in approaches to define or measure the outdoor environment makes comparisons difficult (Zhang et al., 2020; Fleckney & Bentley, 2021). Calls for standardisation have therefore emerged to more clearly establish the relationship between the outdoor environment and adolescent well-being across different contexts, although the focus has primarily been on greenspace or nature (Tillmann et al., 2018; Zhang et al., 2020). Investigations into the perceived environment, common in the field of environmental psychology (Gifford, 2014), are required as they can serve as an important supplement to the documentation of objective characteristics.

In exploring the literature, there appears to be a lack of measures for assessing adolescents' perceptions and use of their everyday outdoor environments in general, in research as well as in practice. Such instruments can be valuable for planners, who often lack ways of understanding and catering for adolescents' place-related needs (Osborne et al., 2016; Loebach, Cox, & Little, 2020). Qualitative methods have proved effective in studying adolescents' perceptions and use of their everyday environments in relation to their well-being (Rose et al., 2016; Puhakka & Hakokõngäs, 2023). Better integration of qualitative and quantitative methods in research can give a more nuanced understanding of the relationship between adolescent well-being and the outdoor environment (Fleckney & Bentley, 2021).

Studies on adolescent outdoor environments vary in focus, ranging from the neighbourhood level to broader green and built environments (Lieberg, 1993; van der Burgt, 2006; Urban et al., 2009; Nordbø et al., 2020; Martin et al., 2023; Mueller et al., 2023). Additionally, they commonly target specific types of outdoor setting or activities, such as parks (Veitch et al., 2017; Owens, 2018; Fleckney, 2023), schoolyards (Chawla et al., 2014; Kerret et al., 2014; Jansson, Mårtensson, & Gunnarsson, 2018; van Dijk-Wesselius et al., 2018), outdoor adventures (Barton et al., 2016; Mutz & Muller, 2016)

and skateboarding (Weller, 2007; Stoodley et al., 2024). Specific concerns relating to adolescents' mental health often dictate the choice, for example a focus on green and natural environments due to their restorative qualities (Moll et al., 2022; Mueller et al., 2023; Puhakka & Hakokõngäs, 2023) and a focus on physical activity related to sedentary lifestyles (Van Hecke et al., 2018; Akpınar, 2019; Bélanger et al., 2019). While there are good reasons to focus on specific outdoor settings or activities, the study of the full range of outdoor settings and their uses in adolescents' everyday lives can offer important insights into the qualities they seek out across different settings.

In order to reveal and understand the complex range of pathways between outdoor life and adolescent well-being, it is important to acknowledge the behavioural and experiential variations across different contexts and user groups (Kyttä & Broberg, 2014). The adolescent experience of everyday life is not uniform and varies among individuals, as well as within and across cultures, countries and contexts (Sawyer et al., 2018; Smith & Mills, 2019). Access to and the quality of outdoor environments can also vary within and across different settings. For instance, a large city and a small rural village might differ in terms of the availability of places for getting together with friends and being alone (Clark & Uzzell, 2002), as well as the level of contact with nature (Lekies et al., 2015). Furthermore, people living in the same place may be living in different worlds (Blumer, 1986). While some may value the quietness of a natural setting, others may thrive amid the vibrancy of urban life. Additionally, age and gender can influence behaviour and perceptions (Malinowski & Thurber, 1996; Johansson et al., 2012; Cele, 2013).

In Sweden, the concept of "friluftsliv" or 'nature-based outdoor recreation participation' is linked to the Swedish identity (Beery, 2013). However, definitions and perceptions of nature can vary from person to person (Aaron & Witt, 2011; Hoyle et al., 2019), ranging from wilderness to small parks, alleyways and trees in urban areas (Berglund, 1998; Kowarik, 2018). Because the majority of people in Sweden live in urban areas, adopting a broad definition of nature that captures this variety is vital (Fredman et al., 2013). Urban and rural upbringings can also influence place preference (Malinowski & Thurber, 1996). Urban environments tend to dominate the research on the role of outdoor environments for adolescent health and well-being (Knöll & Roe, 2017; Fleckney & Bentley, 2021;

Mueller & Flouri, 2021; Zhang et al., 2022), making it important to study different contexts with varying levels of urbanness and ruralness.

The influence of seasonal variations on the relationship between outdoor life and adolescent well-being remains relatively unexplored. Particularly within the Scandinavian context, these seasonal changes can significantly shape both access to and perceptions of outdoor activities. A Finnish study revealed that during winter months, adolescent girls tended to spend a considerable amount of time indoors, while their engagement in outdoor activities increased notably during the summer (Wiens et al., 2016). Furthermore, a meta-analysis linked favourable weather conditions – such as warmer temperatures, low rainfall and longer days - with increased physical activity and decreased screen time, while colder temperatures and rain were associated with more screen time (Zheng et al., 2021).

By recognising the different ways in which adolescents living in different contexts might perceive and use outdoor environments, this thesis should provide insights into the role of outdoor life for adolescent well-being, including potential outdoor pathways across different sexes, living environments and seasons.

1.3 Reflecting on my own outdoor life

In any study, it is important to consider your own experiences, preconceptions and biases regarding the topic at hand. In the context of this doctoral thesis, my decision to focus on this phase of life and outdoor life was not coincidental; it was very much influenced and inspired by my own upbringing. Growing up in a suburb outside Manchester, England, during the 1980s and 1990s, outdoor life was a big part of my everyday life. Our semi-detached house was located in a neighbourhood full of families, and I spent countless hours outdoors. I had active parents who thought it was important to be outdoors and we would often go for walks outdoors. My friends and I spent most of our time on our block, often in the road, playing, riding bikes, building dens, playing football and exploring the local neighbourhood. I also developed a passion for running and competed for a local club.

As adolescence dawned, during a weekend visit to a local car boot sale, I bought a pair of rollerblades that would change my life. I rushed home and put them on and headed out onto the street. I fell over, I got up, I tried again and before I knew it, I had the hang of it. After seeing me skating on the

street we lived on, some friends quickly followed suit and we spent the whole summer skating around our block. One day one of us saw someone on a pair of rollerblades that looked a little different to the ones we had. They were aggressive inline skates, specifically designed for performing tricks such as grinds, which involves sliding along objects such as rails and benches. Before long we'd bought a pair, and in no time, skating had taken centre stage in our lives. It was all we thought about. It shaped not just our free time, but also the people we socialised with, the places we spent our time in, the way we dressed and talked, and the music we listened to. We were unmistakably "skaters."

While we spent plenty of time in indoor skateparks, especially during the winter months when it was too wet and cold to skate, we preferred street skating. Our street skating started outside our homes and expanded to include the local neighbourhood and beyond as we grew older and were given more freedom to venture farther from home. I still vividly remember the feeling I had the first time we took the bus into the city centre without our parents in search of new places to skate. We relished this newfound freedom and the sense of control we had over our time, and our days often stretched from morning until late into the evening. Over time, we became adept at navigating the urban landscape, establishing a network of skate spots within the city centre. Each spot offered something different. There were more relaxed spots that were easy-going, where everyone could join in, while other spots presented more of a challenge and the chance to try something new. It was a very supportive atmosphere and we would clap and cheer landed tricks and sit and talk while others skated. They were good times. As I entered late adolescence, I began to skate less and developed new interests as I started university. Nevertheless, the impact of that period in my life persists to this day. I still find myself sitting up late watching old skate videos on the internet, listening to songs from that period and can sometimes have dreams in which I am rollerblading.

Now, as a parent of two young children living in Sweden, I can see both similarities and differences in the everyday and outdoor lives of my children. Following our move to a small village from one of Sweden's largest cities, I feel less concerned about traffic and feel like they will have similar freedoms to those I had as a child. At the same time, I can already see the huge pull screens and the comfort of our home has on them. I think it is important for them to be outdoors, both in our garden, the local neighbourhood and in the

forest on our doorstep, and I try to set a good example. However, I am also keenly aware that their outdoor lives are and will be different from mine. I have also started thinking about how the outdoor environment we have access to in this small village will be able to cater for their needs and preferences as they enter adolescence. These experiences, both old and new, have fuelled my curiosity in understanding how today's adolescents, in an era dominated by digital devices, are seeking the outdoors for the same sense of well-being I once did and continue to do.

1.4 Aim and research questions

The aim of this thesis is to understand the role of outdoor life for adolescent well-being through the examination of adolescents' perceptions and use of their outdoor environments. A mixed methods study design with three overall phases was adopted, each having its subsequent questions:

Synthesis of research and theory

- How can the role of outdoor life and environments for adolescent well-being be understood? What research and theory can inform this endeavour?

Quantitative inquiry

- What are the associations between perceptions and use of outdoor environments and adolescent well-being and self-esteem?

- How do perceptions and use of outdoor environments differ between sexes, living environments and seasons?

Qualitative inquiry

- How does outdoor life play a role in adolescent well-being?

1.5 Overview of the papers

The three papers included each represent different, yet connected, parts of this thesis (see Table 1).

Table 1. Overview of the papers in this thesis

Paper	**Purpose**	**Approach and methods**
Paper I "Elevating the Role of the Outdoor Environment for Adolescent Wellbeing in Everyday Life"	Explore and synthesise research and theories from different domains of research in order to guide the continued examination of the role of outdoor life for adolescent well-being	Synthesis of research and theories from different research domains (see Section 3.1)
Paper II "The quality of Swedish adolescents' outdoor life and its relationship with self-esteem and well-being"	Examine the relationship between adolescents' outdoor life and well-being and perceptions and use of outdoor environments across sexes, living environments and seasons	Questionnaire (see Section 3.4)
Paper III "Space for being, developing and managing: Outdoor pathways to adolescent well-being"	Examine the role of everyday outdoor life for adolescents' well-being	Semi-structured interviews Photo interviews (see Section 3.5)

1.6 Outline of the thesis

In Chapter 1, the thesis is introduced, including the background, aim and research questions. Chapter 2 then presents the theoretical framework. Following this, Chapter 3 outlines the methodology, and Chapter 4 provides a summary of the aims, methods and findings from across the three papers. The three papers are attached at the end of the thesis. The findings are discussed in Chapter 5, together with reflections on the research approach, suggestions for further research and practical implications. Finally, Chapter 6 presents some concluding remarks.

2. Theoretical framework

In this chapter, I present the theoretical framework that has developed and become more elaborate during the course of this thesis. Central to this framework is the synthesis of research and theories from a range of disciplines, including developmental psychology, landscape architecture and environmental psychology.

2.1 Well-being

Well-being is recognised as a key goal for individuals, societies and nations, as exemplified by the United Nations' Sustainable Development Goals (Costanza et al., 2016; Coll-Seck et al., 2018). It is a dynamic and multidimensional concept, comprising both positive and negative dimensions across physical, social, mental and emotional aspects. Defining and measuring well-being often involves objective and subjective perspectives (Alatartseva & Barysheva, 2015). Objective well-being focuses on external aspects (e.g. education, health, income), while subjective well-being represents the individual's own perceptions and experiences in relation to their own standards of what constitutes a good life (Diener et al., 2018). Life satisfaction is seen as reflecting subjective well-being and measures of global life satisfaction are commonly used to assess an individual's evaluation of their life as a whole (Diener et al., 2002). Multidimensional measures of life satisfaction are also used to evaluate satisfaction with specific domains of life, such as school or family (Huebner & Gilman, 2002). Well-being also includes hedonic (i.e. feeling good and experiencing pleasure) and eudaimonic aspects (i.e. functioning well and experiencing purpose) (Ryan & Deci, 2001). Despite this divide, it is important to highlight that both perspectives are inherently subjective. To summarise, it

can be said that another way of thinking about these concepts is to consider objective well-being as agreed upon indicators of importance for human well-being, while subjective well-being places the focus on the subjective experience of the individual.

Well-being can also be seen as a person's ability to adapt to the constantly changing internal and external environment and meet their needs (Cloninger et al., 2012). It is a perpetual inner state of wholeness, achieved through harmonious interactions with the surrounding world (Alatartseva & Barysheva, 2015). This makes well-being dynamic and both positive and negative aspects of well-being can exist at the same time to varying degrees. For example, an individual may be happy most of the time, but sometimes feel sad, while a depressed individual may still find joy in some aspects of life. Well-being can thus be defined as the absence of illness and the presence of subjective well-being, making it important to study both (Keyes, 2006).

Another commonly used construct in relation to well-being is mental health, and the two are commonly used interchangeably (Keyes, 2013). Mental health can be used as an overarching construct, with mental well-being and mental illness as sub-constructs (Socialstyrelsen et al., 2020). According to this model, mental well-being is not only the absence of problems and illness, but also the balancing of positive and negative emotions, being satisfied with life, having good social relationships and developing inner potential.

Linked to subjective well-being, self-esteem has been found to be an important psychological resource strongly connected to social and mental well-being and the prevention of mental disorders (Mann et al., 2004). Self-esteem is defined as an individual's positive and negative self-evaluations, whereby high self-esteem indicates self-respect and feelings of worthiness, while low self-esteem indicates lack of self-respect and feelings of unworthiness (Rosenberg, 1979). Self-esteem is thought to have a bidirectional relationship with subjective well-being (Yang et al., 2019).

2.2 A socioecological framework

Ecological models have become more common in the study of environmental determinants of health and behaviour (Badland et al., 2015; Sallis et al., 2015; Hu et al., 2021). Socioecological models are particularly useful for understanding how people's transactions with their physical and social

environments contribute to individual and collective well-being (Stokols, 1992). Human development and behaviour are shaped by a multitude of influences operating across various levels (Sallis et al., 2015), with an individual's development and growth intricately entwined with an array of interconnected contexts. These contexts range from immediate, everyday surroundings (microsystems), such as home, neighbourhood and school, to connections between these microsystems (the mesosystem), and to the overarching socio-cultural landscapes in which the micro and mesosystems operate (the macrosystem) (Bronfenbrenner & Morris, 2007). Consequently, human development and behaviour unfolds as a dynamic outcome of ongoing reciprocal interactions between people and their physical and social environments (Lewin, 1946; Bronfenbrenner, 1994). Similarly, Heft (2012) emphasises how an approach grounded in ecological psychology attends to the reciprocal relations between person and environment, studying it as an outcome of human agency and the affordances of the environment. Understanding these complex interactions is essential for discerning the environmental factors shaping individual experiences (Evans, 2021). However, while acknowledging the ecologic context, it is an individual's interaction with their everyday environment that drives their development (Bronfenbrenner & Morris, 2007), potentially forming pathways to well-being.

2.3 Adolescence: a window of opportunity

Adolescence is recognised as a window of opportunity for fostering positive development and establishing healthy behaviours and lifestyles (Patton et al., 2016; Dahl & Suleiman, 2017; Clark et al., 2020). Early adolescence, marked by rapid physical and socio-emotional growth driven by hormonal changes at the onset of puberty (Dahl & Suleiman, 2017), equips individuals with the tools to navigate the challenges and opportunities they will face during adolescence. Of importance is their sensitivity and openness to environmental influences (Lerner et al., 2011; Sisk & Gee, 2022), which can have both positive and negative effects. The study of adolescent health and development often focuses on understanding "how things go wrong" and not "how things go right" (Morrissey & Werner-Wilson, 2005). Research can for example focus on the role of neighbourhood deprivation for depression or problem behaviour (Elliott et al., 1996; Leventhal et al., 2009). Pathological

approaches are still prevalent (Huang et al., 2020; Visser et al., 2021; Vijayakumar et al., 2023), but there is also a growing body of research examining the determinants of positive health and development.

While environments play a vital role in adolescent development, they do not define outcomes, as individual agency plays a major part in shaping developmental trajectories (Bandura, 2006). The emergence of new cognitive, behavioural, and social skills provide adolescents with capacity to play a more active role in their own development (Lerner et al., 2018). Central to this is the emergence of a sense of self and a growing ability for autonomous and independent action, which are fundamental developmental tasks of adolescence (Eccles, 1999). Developmental tasks are defined as age-specific tasks or social expectations that an individual has to cope with or achieve through the setting of goals (Havighurst, 1953; Hurrelmann & Quenzel, 2018). Other developmental tasks include achieving emotional independence from parents and other adults, learning to manage emotions, identity formation and the cultivation of positive relationships (Branje et al., 2021). It is crucial to recognise that, while the word "task" implies a sense of work, they represent behaviours typical for adolescence (Schulenberg et al., 2004). These behaviours have a significant impact on overall well-being and development, and influence success in tasks during adulthood (Havighurst, 1953).

Adolescents play a crucial role in their own development by actively engaging in intentional self-regulation. This involves adapting their thoughts, emotions and behaviours to accomplish specific goals or in response to changing circumstances (Gestsdottir et al., 2011). As they develop a clearer sense of self and vision for their future, this serves as a guide for their intentional actions (Brandtstädter, 2007). Setting meaningful goals of personal significance, adolescents' craft a roadmap for themselves, with the pursuit and eventual realisation of these aspirations intertwined with their overall well-being and sense of purpose (Massey et al., 2008; Linver et al., 2018). A central aspect of this process involves the establishment of behavioural patterns that can either safeguard or jeopardise their health and well-being (Fuhrmann et al., 2015). As part of this process, an individual develops environmental strategies in their use of particular places to regulate different types of challenges to self (Korpela, 1992; Korpela et al., 2018). For example, imagine an individual who, following an argument with a close

friend, feels overwhelmed and seeks out a favourite bench in a park where they can go to calm down and reflect.

Outdoor environments provide individuals the opportunity to contribute to their own health and well-being through their actions (Ward Thompson, 2016; Korpela et al., 2018). Of critical importance to adolescents' ability to do this is their growing independent mobility, which involves exploring the local environment without adult supervision (Tranter & Whitelegg, 1994), to meet their own needs and foster their well-being (Lopes et al., 2018; Cox, 2020). An international study of children's independent mobility revealed it had a positive correlation with well-being scores from UNICEF (Shaw et al., 2015). The same study found that by the age of 13, the majority of children were allowed to travel home from school alone, and by age 15, most children were allowed to move around independently. Moreover, Sweden, together with the other Nordic countries ranked highly on overall independent mobility, starting from a younger age. However, overall levels of independent mobility have declined in many countries (Kyttä, Hirvonen, et al., 2015), including in Sweden (Björklid & Gummesson, 2013).

As adolescents gain more independence and rely less on their guardians, their territorial range gradually expands (van Vliet, 1983) and they explore their everyday surroundings on their own terms, discovering all that it has to offer. The neighbourhood, including its playgrounds and schoolyards, has traditionally functioned as an important venue for children's mobility (Wales et al., 2020), and while it remains important during adolescence (Cox, 2020), increased independent mobility suggests the possibility to move beyond the local neighbourhood and its resources (Browning et al., 2021). It is through adolescents' active use and exploration of the local environment that they learn about its affordances (Kyttä, 2004) and how to engage with it through "acting-in-space" (Hart & Moore, 1973).

2.4 Person-environment fit

The quality of the relationship between the individual and their environment can be understood as the person-environment fit (Horelli, 2006). This theory posits that a good fit between an individual and their surroundings is essential for well-being (Moser, 2009), whereas a mismatch can lead to stress and negative outcomes. In a similar way, compatibility between a person and the environment is seen as a central component of a restorative environment

(Kaplan, 1995). Essentially, notions of fit examine how well the environment supports or hinders the ability of an individual to carry out their intended activities. People who like their living environment generally report higher overall quality of life (Kyttä, Broberg, et al., 2015), making person-environment fit a valuable concept for understanding the supportiveness or human-friendliness of environments (Kyttä, 2003; Horelli, 2006).

Individuals possess an inherent desire for healthy development and psychological growth, but for this to happen a supportive environment is required (Ryan & Deci, 2020). Definitions of well-being often include the presence of a supportive environment, enabling individuals to meet their needs and fulfil their potential (Stokols, 1992; Alatartseva & Barysheva, 2015; Chawla, 2015; Ross et al., 2020). Yet, it is important to acknowledge that a supportive environment does not guarantee the fulfilment of needs and goals. Instead, supportive environments can be seen as containing the qualities required to meet needs and work towards goals (Wallenius, 1999). Individuals generally work towards enhancing the fit between their needs and the environment in which they live (Moser, 2009). This process involves understanding, assessing and acting in places (Canter, 1992).

Given that not only fit but also action is pivotal to the developmental process, it becomes imperative to closely examine the nature of action associated with specific environments and their characteristics (Korpela, 1992; Heft, 2018). Action and activity are always situated (Heft, 2020), necessitating an understanding of the situation and context to uncover their function or meaning. Behaviour, therefore, is regarded as a function of both the individual and their environment (Lewin, 1946). This implies that individuals adapt their behaviours in relation to the characteristics of particular settings with specific behaviours becoming associated with specific places. These places are termed behaviour settings, each with its own norms and patterns of behaviour (Barker, 1963).

Person-environment fit allows for the examination of both actual (objective) and perceived (subjective) environmental characteristics (Uzzell & Moser, 2006). While the fit between an environment and an individual may appear good from an objective perspective, individual needs, attitudes and experiences shape their subjective evaluation of the environment, which is decisive for the outcome. Moreover, perceptions of fit are subject to change, making them dynamic. Consequently, individuals may experience different levels of fit in the same environment. Individual evaluations can

therefore serve as a measure of the perceived supportiveness of the environment in facilitating the fulfilment of personal goals in everyday life, thereby impacting overall well-being (Wallenius, 1999). Ultimately, a supportive environment can lead to the development of emotional bonds to place (Giuliani, 2003).

While person-environment fit is useful for understanding individual well-being, its application at an individual level has its limitations, particularly in the context of planning and design practices. Focusing solely on individual needs may overlook the importance of shared environmental needs among groups of people (Kaplan, 1983). By shifting the approach to collective environmental needs, it may help capture the specific environmental qualities supporting different groups, such as adolescents (Horelli, 2007). Kyttä (2003) employs person-environment fit in relation to the concept of affordances and child-friendly environments, arguing that the actualisation of affordances can be seen as a form of fit. However, while the concept of fit suggests comfort, Kyttä points out that part of this fit is the presence of challenges through which children can learn and improve themselves. For example, through working hard to get better at something they enjoy.

This perspective is in line with stage-environment fit theory, which specifically emphasises the relationship between the developmental needs of adolescents and their everyday environments (Eccles et al., 1993). The presence of defining characteristics specific to adolescence is significant because it suggests there may also be specific affordances adolescents seek out in their everyday lives. Research into adolescents' place preferences suggests that the environments they spend time in reflect their developmental needs and warrant particular attention from researchers (Korpela, 1992). Owens (2017) adopts the concept of "developmental affordances" to explore adolescents' specific environmental needs in relation to their developmental tasks, such as their need to manage their own time.

Drawing on the theory outlined above, it might be useful to look at an example, such as adolescents' use of preschool grounds during evenings to be with friends. During the school day, they are off-limits, meaning they only come into being during certain hours and following an agreement between individuals to meet at a specific time. This agreement is only possible through their friendship with each other and their shared need to work on their relationships and develop their independence away from parents. The preschool ground contains specific qualities, including its seclusion from the

adult world and the presence of benches and swings that afford opportunities to talk and have fun without being disturbed or disturbing others.

Viewed from this perspective, place preference becomes a manifestation of human needs (Wells & Evans, 2003). Consequently, places with qualities that fulfil these needs serve as mechanisms that can "pull" adolescents towards environments conducive for their learning and development (Kaplan & Kaplan, 2002). Understanding the motives behind an individual's (or group's) preference for specific places (and activities) over others is therefore crucial for understanding the complex dynamics between adolescents and their everyday environments, ultimately contributing to their overall health and well-being.

2.5 Outdoor pathways to well-being

Outdoor life has been linked with a range of health and well-being outcomes, including improved mental, physical and social well-being. This makes it important to identify and understand the pathways, or underlying mechanisms, through which the outdoor environment and associated activities might promote health and well-being. This understanding can support the ability of planners, landscape architects, policy makers and society at large to support potential outdoor pathways.

While the literature suggests there are a myriad of possible outdoor pathways, considerable attention has been directed towards physical activity, restoration and social cohesion (Abraham et al., 2010; Ward Thompson & Aspinall, 2011; Hartig et al., 2014; Kyttä & Broberg, 2014; Ajayi & Amole, 2022). Rather than a definitive list, these pathways can be seen as reflect of and a way of organising the primary concerns and interests of different disciplines (Markevych et al., 2017). Amid concerns about the consequences of urbanisation, environmental degradation and lifestyle changes for contact and connection with nature, the role of natural and green environments for health and well-being have received significant attention in research (Hartig et al., 2014).

While it is common to focus on the study of individual pathways, such as physical activity, outdoor pathways are often active simultaneously (Hartig et al., 2014). For example, talking with a friend on the phone while lying on the bed may provide social benefits, but talking with a friend while walking through a park may also offer sensory experiences and restorative benefits

thanks to the quiet, green surroundings. Outdoor pathways are therefore also likely to vary across time and space. For example, talking with a friend on a bench in a noisy schoolyard may lead to stress due to the presence of other students who make it difficult to talk about private issues. Identifying outdoor settings and activities that support multiple outdoor pathways therefore holds particular promise in fostering adolescent well-being.

To enhance understanding of the pathways and make them clearer, adopting conceptual models can be useful. However, there are few, if any, models focusing on the outdoor environment in its entirety. One framework of relevance for this study posits that pathways between greenspace and health and well-being can be comprehended as providing opportunities for reducing harm (mitigation of harm), restoring capacities (restoration) and building capacities (instoration) (Markevych et al., 2017). A central tenet of this framework is the acknowledgment of the interplay and interconnectedness inherent in these processes. Markevych and colleagues argue that the framework opens up the exploration of new pathways, extending beyond the parameters set by Attention Restoration Theory (Kaplan, 1995) and Stress Reduction Theory (Ulrich et al., 1991), and beyond physical activity and social cohesion, to focus on other forms of capacity development, such as hope (Chawla, 2020; Manner et al., 2020) and self-esteem (Barton & Pretty, 2010; Tillmann et al., 2018; Soga et al., 2021). Additionally, the framework has been used to examine pathways between biodiversity and health and well-being (Marselle et al., 2021), as well as the relationship between urban parks and adolescent well-being (Fleckney, 2023).

When exploring outdoor pathways to well-being, it is valuable to consider who might benefit the most (and the least) from specific pathways, encompassing different groups (Hartig et al., 2014). Adopting a lifecourse approach can be useful, recognising the diverse challenges, needs and preferences of specific age groups. This is important because different life stages may amplify particular needs and challenges, such as the emphasis on peers during adolescence (Orben et al., 2020). However, it is argued, that while it is common to link children's developmental needs with the environment, it is rare in the study of adolescents (Owens, 2017). Public spaces can provide opportunities for adolescents to develop their self-esteem and identity, manage their free time, and work on relationships with peers and their community (Owens, 2020). However, others argue that there is a

need focus more on being rather than solely on development, by prioritising how environments support adolescents in exercising their capacities and agency, and not just developing them (Jaffe & Loebach, 2023).

It has been highlighted that research into the significance of place for adolescents typically adopts one of three frameworks (Owens, 2017), including place preference (Owens, 1988; Korpela, 1992; Korpela et al., 2002), environmental affordances (Clark & Uzzell, 2002; Duzenli & Bayramoglu, 2010; Knöll & Roe, 2017; Lopes et al., 2018) and the benefits for adolescent development, health and well-being (Korpela et al., 2002; Taylor et al., 2002; Clark & Uzzell, 2006; Passon et al., 2008).

Within these frameworks, it becomes apparent that adolescents often seek out environments that offer opportunities for social interaction, as well as retreat and restoration (Korpela, 1992; Lieberg, 1995; Clark & Uzzell, 2006; Owens, 2009; Roe & Aspinall, 2012; Arvidsen & Beames, 2018). A recent study found that adolescents marked more social affordances in a mapping exercise, followed by leisure, functional (i.e. play) and emotional affordances (Lopes et al., 2018). This is in line with previous research emphasising the pivotal role of social affordances during adolescence (Lieberg, 1995; Clark & Uzzell, 2006; Owens, 2017). While exploring the outdoor pathways of social interaction, restoration and physical activity remains important for further investigation, considering the changing context of adolescence, it is imperative to identify and explore the presence of other pathways in order to understand the role of outdoor life for today's adolescents.

3. Methodology

This chapter presents the research approach adopted in this thesis, encompassing its positioning, research design, setting and sample, methods employed, data collection procedure, as well as reflections on these choices and ethical considerations.

3.1 Positioning the research

A pragmatic approach has informed this thesis, placing the research questions in focus and incorporating both quantitative and qualitative methods in order to answer them (Onwuegbuzie & Leech, 2005). Rather than dismissing specific worldviews, this approach integrates different assumptions and beliefs in a complementary manner, recognising the strengths and limitations of different approaches (Creswell & Clark, 2017; McKim, 2017). From this perspective, ontologies and epistemologies are viewed as important tools in the researcher's toolkit (Maxwell, 2011).

Central to this thesis is the acknowledgement that different approaches offer distinct vantage points for investigating research problems. I would say I have adopted an approach that encompasses both a postpositivist perspective, placing trust in statistical methods to uncover a reality with its associations between variables, and a constructivist perspective, which recognises participants as experts on their everyday lives. Additionally, it acknowledges my role as a researcher in interpreting meaning from their narratives.

In positioning the research within this thesis, an ongoing synthesis of research and theories related to adolescent outdoor life and well-being was undertaken. This synthesis spanned various disciplines and research domains, including developmental psychology, landscape architecture and

environmental psychology. The perspective paper (Paper I) offers an overview of key theories, concepts and issues pertinent to the study of outdoor life, its environments, and adolescent well-being. Furthermore, it identifies directions for research and theory development that have informed subsequent phases of the study and its design.

3.2 A mixed methods research design

Mixed methods research can generate new insights and perspectives on a research topic by engaging with diverse ideas and perspectives (Greene, 2008), thereby fostering a comprehensive and balanced exploration of a research topic (Morse & Chung, 2003). Integrating quantitative and qualitative methods should serve as a means to advance our understanding of person-environment relationships (Winkel et al., 2009).

The study was carried out in a series of interconnected steps, as illustrated in Figure 1. The first step focused on understanding how to approach the research topic, acknowledging the multidisciplinary nature of studying adolescent outdoor life and well-being. Throughout this process, a continuous synthesis of knowledge has occurred, drawing from various disciplines and domains of literature. The endeavour to adopt an interdisciplinary perspective has been pivotal in my efforts to transcend boundaries in approach, terminology and understanding of the research topic. Essentially, it involved exploring and understanding how different disciplines could contribute with insights and answers to the research questions at various stages of the research process (Jansson et al., 2019).

To operationalise this approach, a variant of a sequential explanatory mixed methods design was adopted (Creswell & Clark, 2017). This approach typically commences with collecting quantitative data, followed by a qualitative phase to explain the quantitative findings. Quantitative methods, employing a deductive approach, are commonly used to examine the strength of relationships between the environment and well-being, identifying interdependencies (Winkel et al., 2009). Qualitative methods are particularly valuable for investigating specific environmental qualities and activities of importance for well-being (Fleckney, 2023), and improving the understanding of the intricate relationships and mechanisms connecting the environment to well-being (Cummins et al., 2007; Buttazzoni et al., 2022).

In this study, questionnaire data was collected as part of the quantitative inquiry at two different points in time to capture potential seasonal variations. Meanwhile, interview data was collected as part of the qualitative inquiry between these instances. Questionnaire data was collected during the autumn/winter of 2020 and spring/summer of 2021 from a strategic sample of adolescents, representing variations in sex and living environment. This data encompassed adolescents' perceptions and use of the outdoor environment, as well as their well-being and self-esteem across seasons. The interview data, collected during the spring/summer of 2021, built upon preliminary findings from the autumn/winter questionnaire to examine the role of outdoor life in the well-being of a sample of adolescents who had completed the first questionnaire.

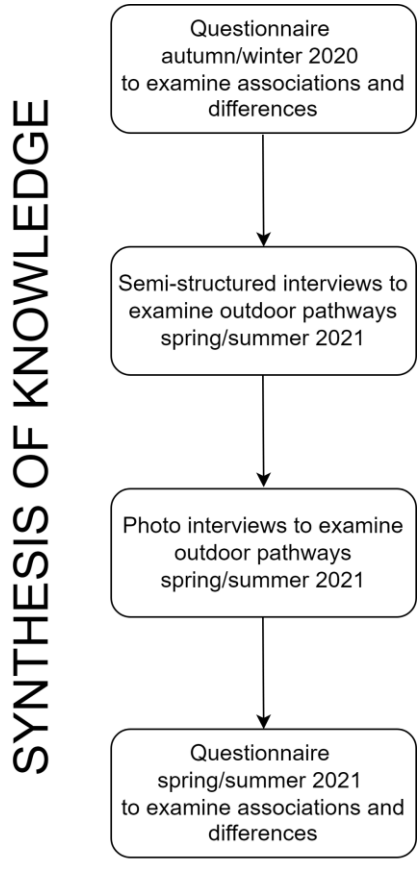

Figure 1. An overview of the mixed methods study design in this thesis

3.3 The living environments of participants

This thesis examines the outdoor lives of Swedish adolescents aged 12-15 years old across three different living environments in southern Sweden. Students from seven schools across the three municipalities were recruited through schools, with headmasters facilitating initial contact with class teachers, participants' guardians and the participants themselves. The strategic sample consisted of adolescents from three different living environments characterised as rural, suburban, and urban, aiming to represent a variety of everyday settings common for Swedish adolescents. These environments were chosen for their distinct demographic and structural characteristics, ensuring that the study represents a range of different outdoor environments, including forests and city centres.

Rural setting

Adolescents from a rural setting attended two different schools located in two different settlements within a municipality (population approx. 30,000) in southern Sweden. The municipality is inland, approximately 130 km from Sweden's second largest city. One settlement (see Figures 2 and 3) has a population of roughly 10,000 and is the largest settlement in the municipality. The school is centrally located in the settlement and has around 400 students in grades 7-9. The other smaller settlement (see Figure 4) has a population of around 4,500 and is the third largest in the municipality. The school in this settlement is also centrally located and has roughly 300 students.

The majority of dwellings in both settlements are detached houses with gardens, with some apartment buildings located centrally. The smaller of the two settlements is built in a linear pattern along a busy road and has its own centre with some smaller shops and restaurants. The larger of the two settlements also has a busy road passing through the centre, but is more sprawling with a larger central shopping area for pedestrians only. Both settlements are surrounded by forest, which accounts for 72% of the municipality's total land use. The forest is easily accessed on foot or bike from anywhere in both settlements. At the time of the study, the average person earned 27,067 SEK/month and 83% of adults aged 20-64 years old were employed, with 76% born in Sweden. The average age was 42 years old. Most participants who completed the questionnaire lived in these two

settlements, with some living in smaller settlements elsewhere in the municipality.

Figure 2. The larger rural settlement. Aerial photo from Lantmäteriet ©

Figure 3. The larger rural settlement and surrounding landscape. Aerial photo from Lantmäteriet ©.

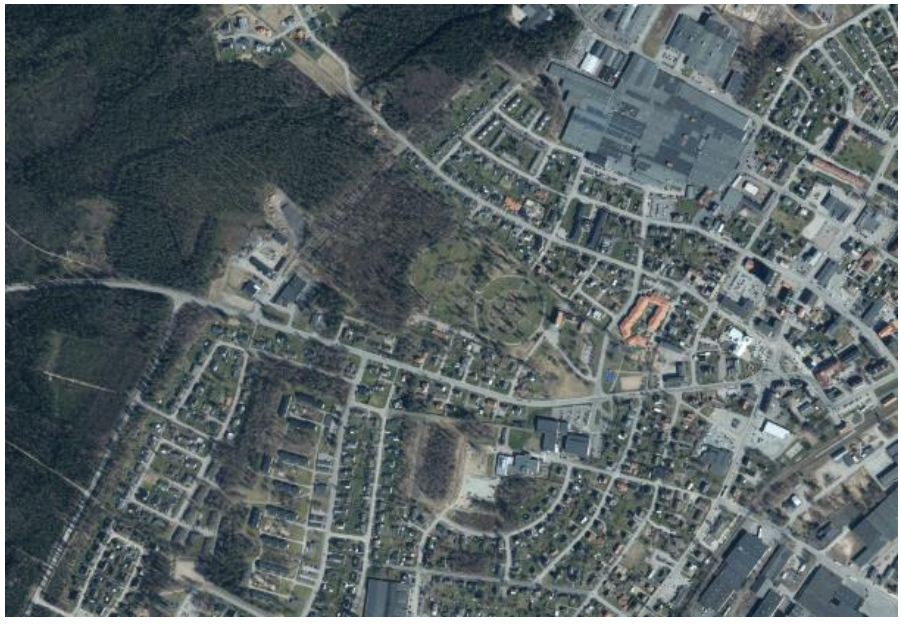

Figure 4. The smaller rural settlement. Aerial photo from Lantmäteriet ©

Suburban setting

Adolescents from a suburban setting attended a school in a municipality (population approx. 26,000) in southern Sweden. The school is located in the municipality's second largest settlement (population approx. 4,500) and is an upper secondary school with approximately 350 students in grades 7-9. The settlement is situated between two cities that can be accessed by train within a few minutes.

Detached houses with gardens dominate the settlement, with only some rental apartments and terraced houses (see Figure 5). Traffic is kept to the outskirts and there are foot and bike paths throughout. It is surrounded by agricultural land which accounts for 80% of the municipality's total land use (see Figure 6). At the time of the study, the average person earned 32,542 SEK/month and 85% of adults aged 20-64 years old were employed, with 86% born in Sweden. The average age was 40 years old.

Figure 5. The suburban settlement. Aerial photo from Lantmäteriet ©

Figure 6. The suburban settlement and surrounding landscape. Aerial photo from Lantmäteriet ©

Urban setting

Adolescents from an urban setting attended four different schools in a city in southern Sweden (population approx. 350,000). The schools are located in different neighbourhoods with distinctly different characteristics that represent typical living environments of the city's adolescent population. Three of the schools are large schools with 800-1000 students from preschool age up to Grade 9. The fourth school is an upper secondary school with grades 7-9 and only 80 students.

Central areas of the city are dominated by apartment buildings with courtyards, shops and restaurants, but as you move out from the centre there is a mix of apartments, detached and terraced homes (see Figures 7-8). The four schools were located between two and five kilometres from the city centre. The city is located by the coast, with access to a long beach and has several large parks. There are a number of noisy and heavily trafficked roads and parked cars along most streets. The city has an extensive cycle path network. At the time of the study, the average person earned 23,800 SEK/month and 68% of adults aged 20-64 years were employed, with 65% born in Sweden. The average age was 39 years old.

Figure 7. A typical neighbourhood in the urban setting. Aerial photo from Lantmäteriet ©

Figure 8. An urban neighbourhood a bit further out from the city centre with a combination of houses and apartments. Aerial photo from Lantmäteriet ©

3.4 The questionnaire

The questionnaire (see Appendix A1) was designed to investigate adolescents' perceptions and use of the outdoor environment, as well as the relationship between their outdoor life and their well-being and self-esteem. Questionnaires are commonly used to study the relationship between environment and health and well-being (Dzhambov et al., 2020; Fleckney & Bentley, 2021) because they allow for the collection of data on a wide range of dependent and independent variables from a large sample.

3.4.1 Measures

The following section presents the independent variables (demographic variables and measures of adolescents' outdoor lives) and dependent variables (well-being and self-esteem) included in the questionnaire that was developed and used in this study. The questionnaire also collected data about school travel and mobile phone use outdoors, as well as qualitative data about participants' favourite outdoor places and activities, but those parts are not presented in this thesis.

Demographic variables

Participants were asked to state their age, birth year and sex (based on the question "I am: boy/girl/other").

Adolescents' outdoor lives

Time spent outdoors was assessed by asking participants to report if they had been out more than one hour, 30-60 minutes or less than 30 minutes on weekdays and weekends, in recent weeks and during the previous season (i.e. the previous spring for the autumn/winter and the previous winter for the spring/summer). In order to capture possible changes in time spent outdoors due to the COVID-19 pandemic, participants were asked to report if they had been out more, less or about the same amount of time when compared to how it usually is at that time of the year.

The 20-item Quality of Adolescent Outdoor Life Scale (QAOLS) was developed specifically for this study to measure perceived environmental quality by investigating adolescents' perceptions and use of their everyday outdoor environments. Internal consistency reliability among items (i.e. scale reliability) was checked using Cronbach's alpha and was 0.88 for both autumn/winter and spring/summer. It employs a 6-point Likert scale that asks respondents to select how true different statements are for them (ranging from 'not true at all' to 'completely true'). Each item is scored from 1 to 6, with higher mean scores indicating a better quality outdoor life. The scale contains 5 subscales (see Table 2). After completing the scale respondents were asked to write which places they thought about (if any) when answering the questions. For example, the place where they live, their garden, the forest.

A 3-item scale was used to assess participants' perceived benefits of the outdoor environment for their lives: 'The outdoor environment where I live is…' 'good for me', 'my health' and 'my social life'. It uses a 6-point Likert scale and respondents selected how true it was for them (from "almost never true" to "almost always true"). A higher mean score indicates a more positive perception of the benefits of the outdoor environment for their lives.

Table 2: The five subscales that comprise the Quality of Adolescent Outdoor Life Scale

Subscale	**Items (translated from Swedish)**
Independent mobility	I can easily move around on my own outdoors There are places where I can be on my own There are places where I can be active There are places where I can be with my friends
Perceived affordances	There are lots of different things I can do There are places where I can do what I want to do There are plenty of greenspaces I can use There are beautiful places There are places where I can challenge myself
Perceived safety	I feel safe outdoors during the day I feel safe outdoors during the evening I feel safe in my schoolyard
Emotional affinity towards being outdoors	I like to be outdoors I like to be in nature I feel happy when I am outdoors Sometimes when I feel sad it is nice to be outdoors
Time spent outdoors	I spend a lot of time outdoors I spend a lot of time outdoors with my friends I spend a lot of time outdoors on weekends I spend a lot of time outdoors on weekdays

Well-being and self-esteem

Well-being and self-esteem were measured using four well-established and commonly used scales. In order to capture both positive and negative dimensions of well-being, measures of subjective well-being and mental health symptoms were included.

Subjective well-being was measured using two scales. The Students' Life Satisfaction Scale (SLSS) (Huebner, 1991) is a 7-item self-report scale which asks respondents to evaluate their global life satisfaction in recent weeks. Items on the scale are context free and ask about life in general (e.g. ‘my life is going well’). Cronbach’s alpha for this scale was 0.87 for the autumn/winter and 0.89 for the spring/summer. The 40-item Multidimensional Students' Life Satisfaction Scale (MSLSS) (Huebner & Gilman, 2002; Huebner & Furlong, 2016) asks participants to evaluate their

satisfaction with five different domains of their lives - self, peers, family, school and living environment. Both scales use a 6-point Likert scale and questions are presented as statements which respondents select how true it is for them. Reponses are given a score of 1-6 where 1 = almost never true and 6 = almost always true. A higher mean score equals a higher satisfaction with life or a specific domain of life. Cronbach's alpha was 0.93 for both the autumn/winter and spring/summer.

The 10-item Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1965) was used to measure self-esteem (e.g., "On the whole, I am satisfied with myself"). It uses a 4-point Likert scale. It is the most common measure of self-esteem due to its simplicity and brevity. Cronbach's alpha was 0.90 for the autumn/winter and 0.92 for the spring/summer.

The 21-item Depression, Anxiety and Stress Scale (DASS-21) is a widely used scale for measuring mental health symptoms (Lovibond & Lovibond, 1995; Alfonsson et al., 2017). Depression was measured using seven items (e.g. I felt that I had lost interest in just about everything"), anxiety was measured using seven items (e.g., "I felt scared without any good reason") and stress was measured using seven items (e.g., "I found it difficult to relax"). Each item is scored 0-3, with a higher mean signalling a poorer overall emotional state. Cronbach's alpha for DASS-21 was 0.91 for the autumn/winter and 0.93 for the spring/summer.

3.4.2 Questionnaire development

This process involved five main stages: i) exploration, ii) pretesting, iii) pilot testing, and iv) testing reliability and validity, and v) finalising the questionnaire. While standardised measures were used for dependent variables, for the independent variables on adolescent outdoor life, a custom set of questions was developed, including the Quality of Adolescent Outdoor Life Scale (QAOLS).

The process began by exploring literature relating to adolescents' perceptions and use of outdoor environments to form a collection of existing scales of relevance, as well as possible constructs and items to measure these. When saturation was reached, with little new information on the topic appearing, I scrutinised the collected information, eliminating irrelevant or repetitive content and early versions of scales and the questionnaire began to take shape. Central to this process was an on-going dialogue with supervisors

and other colleagues in the fields of environmental psychology and landscape architecture, who provided regular feedback and suggestions.

The next phase involved crafting a questionnaire for pretesting while continuing to engage with the literature and reviewing old notes. During this process, I was aware that the questionnaire should be age-appropriate and not overly long or complex in order to ensure its usefulness with the intended age group (Lippman et al., 2014). For transparency, it should be noted that I am fluent in both written and spoken Swedish. However, I also recognise that the choice of appropriate words and style of question for the questionnaire was a challenge. Particular attention was paid to the overall structure of the questionnaire, as well as question structure and wording, drawing on established scales and questionnaires designed for adolescents. It was also important to ensure consistency regarding response type, and a 6-point Likert scale was chosen for the new scales in order to create a sense of unity with other well-established scales included in the questionnaire (e.g. SLSS and MSLSS). Likert scales without a neutral midpoint have been found to be appropriate and reliable in research with adolescents, as they reduce the risk of respondents giving quick, "good enough" answers, rather than the most accurate response (Omrani et al., 2019).

The questionnaire was divided into labelled sections to facilitate comprehension. For external and ecological validity (Steg et al., 2018), instructions provided a context to questions, such as "where you live and usually spend time", to focus respondents' attention on their everyday outdoor environments. A reference period (e.g. "during recent weeks") was provided to facilitate respondents' ability to place questions in their everyday lives.

There is little knowledge on the optimal approach for collecting data with surveys for this age group (Lippman et al., 2014), so steps had to be taken to safeguard reliability and validity of the questionnaire (Bell, 2007) and ensure effective communication (Campanelli, 2008). Initial testing involved the sharing of various versions of the questionnaire with colleagues and experts within the field. Informal methods, including reading the questionnaire aloud and personally completing it, were also employed (Campanelli, 2008).

A prototype questionnaire was subjected to pretesting involving a small focus group consisting of two 13 year old girls and two 15 year old boys. As recommended, future participants were not included in the pretest or pilot test process (Fink, 2015). To facilitate the pretesting, a cognitive response

model was used (Tourangeau, 1984), which involved assessing participants' comprehension, retrieval of relevant information, judgement and response reporting. In addition, other common methods such as cognitive interview and think-aloud techniques were employed (Lippman et al., 2014).

A pilot test of the questionnaire was subsequently conducted with three classes (n = 66) in a suburban school, separate from the main study, to refine the data collection process and analysis strategy. The pilot offered the opportunity for a scaled-down trial of the planned study to reveal potential flaws and practical issues before the full-scale implementation of the questionnaire (Teijlingen & Hundley, 2002). By scrutinising various aspects, such as recruitment procedures, questionnaire adequacy, data analysis and the relevance of research questions, the pilot test acted as a proactive measure to pre-emptively address any challenges or shortcomings.

Finally, the reliability and validity of the QAOLS were rigorously tested using the data from the pilot test. Construct validity was tested using exploratory factor analysis to determine the underlying structures or constructs in the developing scale (Tabachnick & Fidell, 2013). Internal consistency reliability was assessed using Cronbach's Alpha, with a threshold of > 0.7 set to ensure robustness (Bryman, 2016). The main aim was to identify any QAOLS items that did not contribute to its statistical reliability or align with other items measuring the same underlying construct (Tabachnick & Fidell, 2013). These non-conforming items were carefully assessed for potential removal or modification, in an effort to refine the QAOLS and ensure that it accurately measured its intended construct.

3.4.3 Data collection

In total, 320 individuals aged 12-15 years old completed the questionnaire during school time between October 2020 and January 2021 (autumn/winter 2020) and 208 individuals between May and June 2021 (spring/summer 2021). Of these, 189 completed it on both occasions, with 19 students only completing it on the second occasion for the first time.

Schools played a pivotal role in coordinating data collection, which took place during regular school hours. Prior to data collection, all participants, together with their guardian(s), were required to review and sign an informed consent form (see Appendix A2). These letters were distributed by class teachers within the schools, who also assisted in reminding students to complete them and collected them once finished. Questionnaires were

administered under the supervision of teachers, except for two schools where I oversaw the process. To mitigate potential issues and ensure the reliability of the data, detailed instructions were provided for each school and responsible teachers that described how data collection should proceed. This included things such as reading a pre-written introduction to the study and maintaining silence between respondents. The questionnaires were paper-based and featured a unique ID number linked to a separate class list containing each participant's name. This ensured the confidentiality of data collection and facilitated the integration of quantitative and qualitative inquiries within the study. According to teachers' reports, the questionnaire took approximately 15-30 minutes to complete.

During the autumn/winter the average daily temperature was between 7-10 ^{o}C in October and 0 ^{o}C in January. Monthly average sunshine hours were roughly 45 hours and sunset occurred between 3:30 and 4:30pm. During the spring/summer period, the average daily temperature was 11-16 ^{o}C, with an average of 260 sunshine hours per month, and sunset between 9:00 and 10:00pm.

During both the autumn/winter and spring/summer, roughly 57% of participants were girls. The age range of participants was 12-15 years old (mean = 13.3; SD = 0.6 autumn/winter and mean = 13.8; SD = 0.7 spring/summer). A greater proportion of participants were also from Grade 7 than Grade 8 (64% and 74% during the autumn/winter and spring/summer respectively). The urban sample was also the smallest during both periods of data collection, representing 27% and 15% of the total sample during the autumn/winter (n = 87) and spring/summer (n = 32). See Table 3 for demographic information.

Table 3: Demographic information of participants who completed the questionnaire during the autumn/winter and spring/summer

	Autumn/winter n = 320	**Spring/summer** n = 208
Age, mean (SD)	13.3 (0.6)	13.8 (0.7)
Boy, n (%)	137 (42.8)	88 (42.3)
Girl, n (%)	182 (56.9)	119 (57.2)
Sex = other, n (%)	1 (0.3)	1 (0.5)
Grade 7, n (%)	206 (64.4)	155 (74.5)
Grade 8, n (%)	114 (35.6)	53 (25.5)
Urban, n (%)	87 (27.2)	32 (15.4)
Suburban, n (%)	116 (36.3)	71 (34.1)
Rural, n (%)	117 (36.6)	105 (50.5)

3.4.4 Data analysis

The questionnaire data was analysed using IBM SPSS Statistics 26 and R version 4.1.2. Both the autumn/winter and spring/summer datasets exhibited less than 3% missing data, which was imputed using the expectation maximization algorithm (Tabachnick & Fidell, 2013). A few univariate outliers were identified and given new scores, while nine cases identified as multivariate outliers were removed. To incorporate an individual who selected "other" for sex into the analysis, they were categorized as girl since their responses more closely resembled those typically observed in girls rather than boys. However, for analyses specifically examining statistical differences between sexes, such as differences in QAOLS scores, this individual was excluded.

For comparisons regarding time spent outdoors, independent samples were subjected to a chi-square test and paired samples a sign test, with a significance level of 5%. A mixed model, incorporating person (= ID) as a random variable alongside the fixed factors sex (girl or boy), season (autumn/winter or spring/summer) and living environment (rural, suburban or urban), was used with interactions to analyse differences in QAOLS (including subscales) and perceived benefit of the outdoor environment scores according to sex, season and living environment. Tukey’s post hoc

test was applied to explore significant differences among the least squares means, with significance level set at $p \leq 0.05$.

Separate hierarchical multiple linear regression analyses were performed for each dependent variable to evaluate the contribution of each independent variable. Independent variables were entered in four steps for each model. Model 1 controlled for sex and living environment. Age, grade and school effects were controlled for but due to non-significant results were removed from models. Model 2 controlled for time spent outdoors. Variables related to changes in time spent outdoors during the pandemic were not included as they were only found to be a significant predictor during spring/summer for DASS-21. Model 3 added perceived environmental quality (QAOLS) and Model 4 added attitudinal variables (perceived benefit of the outdoor environment). Preliminary analyses confirmed no violations of assumptions. Results were interpreted with a significance level of 5%.

3.4.5 Method reflections

Research involving adolescents necessitates navigating the involvement of adult gatekeepers, such as parents and schools (Morrow, 2008). To maximise adolescent participation I focused on engaging with schools. Positive responses from headmasters granted access to class teachers of relevant age groups, facilitating contact with students. However, the process varied due to unique circumstances in each school. While one suburban school readily agreed to participate based on prior positive experiences with research, others in the suburban setting declined. Two rural schools agreed relatively quickly, expressing enthusiasm at being involved in research. However, the urban setting proved to be more difficult, with headmasters referring to time constraints due to the busy schedules of students, and sometimes "survey burnout" (i.e. engaged in too many studies). Direct communication with headmasters proved more effective in addressing concerns and helped address recruitment issues. In total, close to twenty different urban schools were contacted, before four eventually agreed to participate.

Participation varied significantly across schools, resulting in a smaller overall sample size than anticipated and uneven distribution between schools and living environments. While the overall sample size was smaller than I had hoped, it can still be deemed adequate for the statistical analyses and interpretations conducted. Notably, the urban sample was disproportionately affected, with one school in one of the city's most affluent areas dominating

and skewing the sample's representativeness. Moreover, urban participants' perspectives were underrepresented in the total sample compared to the other two groups, making it important to recognise sample bias when generalising.

Also of note was the significant dropout rate between the autumn/winter and spring/summer questionnaires. More frequent communication with participants following the completion of the initial questionnaire could have potentially mitigated the dropout rate by maintaining their engagement. Furthermore, the study is susceptible to self-selection bias, which can impact the study's internal validity (Winkel et al., 2009). In the case of this study, do adolescents with better well-being have better outdoor lives or does outdoor life actually promote well-being?

Central to the questionnaire was the development of the Quality of Adolescent Outdoor Life Scale to measure perceived environmental quality. While this aspect can be considered a strength of the study, it is important to note that the QAOLS is a composite measure encompassing various aspects of environmental quality. Therefore, generalising findings should be approached with some caution. The decision to use a composite measure limited the study's ability to examine the relationship between specific aspects of environmental quality, such as independent mobility and perceived affordances, and well-being. Separating the scale's subscales might have offered more specific insights into this relationship.

Reliance on self-report measures introduces issues such as recall bias, which should be taken into account when interpreting findings (Winkel et al., 2009). For example, self-reported time spent outdoors relied on participants' estimations and memory, making it less accurate compared to methods like GPS trackers. Both the pros and cons of in situ experiences and self-reporting experiences after the event should also be considered. While in situ data can capture momentary feelings of well-being, questionnaire responses may reflect both in situ experiences and the benefits derived afterward, such as time spent reflecting on the experience (White et al., 2019). The study is also subject to single source bias because the same person reported on both outdoor life and well-being. Finally, because participants completed the questionnaire twice, there is also the possibility that their responses the second time might have been influenced by their previous participation in the study.

3.5 Semi-structured and photo interviews

Qualitative methods can play a key part in identifying the processes connecting the environment with experiences and behaviours within their ecological context (Winkel et al., 2009). In this study, interviews were used to identify and understand the pathways between outdoor life and adolescent well-being. To achieve this, two interviews were conducted with the same individuals: first, a semi-structured interview, and second, a photo interview.

Research has demonstrated that interviews serve as a valuable and appropriate method for addressing sensitive subjects like adolescent mental health (Palinkas, 2014; Arola et al. 2023). Semi-structured interviews, in particular, can facilitate an open-ended discussion on the participant's own terms, unveiling unexpected details that the researcher might otherwise have missed (Heath et al., 2009a). The more open and flexible nature of semi-structured interviews is particularly valuable when engaging with adolescents, as it allows them to discuss the topics most familiar to them (Eder & Fingerson, 2003). The first semi-structured interview facilitated broader discussions regarding adolescents' overall perceptions and use of outdoor environments in their everyday lives, as well as their motivations for going outdoors. Additionally, it provided an opportunity to establish rapport and familiarity with the subject matter, potentially benefitting subsequent photo interviews. This aspect is particularly important for mitigating power disparities between adults and adolescents (Carpiano, 2009).

Photo interviews are a suitable method for explaining the relationship between health and place (Wang & Burris, 1997; Carpiano, 2009; Rose et al., 2016; Eriksson & Dahlblom, 2020; Stephens et al., 2023) and documenting adolescents' emotional geographies (Power et al., 2014; Arvidsen & Beames, 2018). Photo interviews invite participants to take photos of a specific phenomenon, before engaging in discussions about the photos with the researcher (Wang & Burris, 1997). These photographs serve as intimate "field notes" reflecting participants' experiences (Pyyry, 2013), situating them within the broader 'contexts of time, space and movement' (Blackbeard, 2014). Given adolescents' familiarity with documenting and sharing everyday experiences through mobile photography (e.g. social media), photo interviews emerge as a particularly fitting method for this age group. While the semi-structured interview provided a general overview of participants' outdoor lives, photo interviews helped contextualise

discussions by capturing participants' everyday activity spaces (Browning & Soller, 2014).

3.5.1 Participants

The questionnaire results from the autumn/winter informed the strategic and purposeful sampling of participants for the qualitative inquiry (see Table 4). The purposive sampling of participants from the quantitative inquiry established a link between the qualitative and quantitative inquiries (Creswell & Clark, 2017), fostering an interconnectedness crucial to this mixed methods approach. Given the study's focus on the role of outdoor life and environments for adolescent well-being, participants with above average scores on the Quality of Adolescent Outdoor Life Scale (QAOLS) were prioritised. To encompass a diverse range of pathways connecting outdoor life with adolescent well-being, the sample included participants with both higher and lower scores on measures of life satisfaction, self-esteem, and mental health symptoms. However, no adolescents with extreme values were selected. For example, from the sample of rural girls who scored above average on the QAOLS, one girl was selected with above average scores on all measures of well-being and self-esteem and another with above average scores on DASS-21 (i.e. higher frequency of mental health symptoms).

Table 4: An overview of the sample for the semi-structured and photo interviews

	Semi-structured interviews		**Photo interviews**	
	Higher well-being	Lower well-being	Higher well-being	Lower well-being
Urban	2 boys	1 boy	2 boys	
	2 girls		2 girls	
Suburban	1 boy	2 girls	1 boy	1 girl
	1 girl	1 boy	1 girl	
Rural	1 boy	1 boy	1 boy	1 boy
	1 girl	1 girl	1 girl	

3.5.2 Interview guides and development

Separate interview guides were used for the semi-structured interview and the photo interview (see Appendix A3 and A4). An interview guide is a list of questions that steer the conversation towards a specific research topic (Kallio et al., 2016). The quality of the interview guide can be essential for the quality of data collection and analysis (Rabionet, 2011).

A framework comprising three steps supported the development of a semi-structured interview guide (Kallio et al., 2016). The first step involved drawing on and using previous knowledge that had informed the background of this study and the quantitative inquiry. Through this process, key areas of focus, such as person-environment fit, favourite places and independent mobility, were highlighted and contributed to the formation of the guides (Turner, 2010; Kallio et al., 2016).

A second step involved formulating preliminary interview guides. This was achieved by using the knowledge acquired in the first step to begin compiling collections of questions in a progressive, coherent and logical order, ensuring a fluent conversation (Kallio et al., 2016). As questions began to take shape, an important aspect of this process was placing myself in the role of the interviewee. This involved thinking about how I would interpret and respond to in order to place focus on how questions were worded. To support this process, literature on interviewing adolescents and semi-structured interview design was consulted (Eder & Fingerson, 2002; Brinkmann & Kvale, 2018), as well as literature relating to the use of photos in the study of adolescents' relationship with place (Pyyry, 2013; Rose et al., 2016).

Appropriate follow-up questions were also considered in relation to the main themes of the interview guide. A socioecological perspective (Bronfenbrenner & Morris, 2007) guided the process to ensure various contextual aspects relating to the situatedness of participants' outdoor lives were included. These were relating to the what, who, where, when and how of outdoor life. Such questions can help encourage descriptive answers (Chenail, 2011). For example, after asking the question "what do you usually do outdoors?" follow-up questions included where they do it, when and with whom, as well as "what does it look like there?", "what's good about that place/doing it?", "how do you feel when you are there?" and so forth. In relation to the photo interviews, follow-up questions were critical in understanding the stories surrounding photos and the role of specific places

and activities in participants' everyday lives. For each photo, participants were first asked what it means to them, before asking follow-up questions focused on specific themes included activity (e.g. "what are you doing in the photo?"), movement practices (e.g. "how do you usually get there?), place qualities ("what is it about this place you like?"), social aspects (e.g. "who are you usually there with?"), well-being in relation to place (e.g. "how do you feel when you are there?"), temporal aspects (e.g. "when are you usually there?"), and ecological context (e.g. "what were you doing before going there?").

Of critical importance was my approach to well-being. In both interviews, instead of concentrating solely on the predefined dimensions of well-being covered in the questionnaire, such as life satisfaction or mental health, an inductive and more open approach was chosen. In doing so, I hoped to uncover a broader and more comprehensive range of outdoor pathways to well-being than a deductive approach would yield. During the first interview, this meant the inclusion of questions asking about participants' motivations for going outdoors (e.g. "what is it that makes you go outdoors?") and asking them to give examples of things they do outdoors that make them feel good or calm. They were also asked how they feel on days when they do not go out at all.

A third step involved pilot testing, which aimed to confirm the relevance of the guide's content, identify any issues, and test the procedure in full (Kallio et al., 2016). Input from supervisors and experts in the field regarding the content in relation to the research questions was central to the development of both interview guides. While I am fluent in Swedish, this process was still essential in ensuring the language used was not too formal and appropriate for the age group. The interview guide for the semi-structured interview was pilot tested in a one hour group interview on Zoom with the two girls who had previously helped to test the questionnaire. This entailed a full test-run of the interview guide, which enabled me to check the comprehension and relevance of questions and assess how well the questions revealed participants' perceptions and experiences (Chenail, 2011; Kallio et al., 2016). The pilot test also provided the opportunity for me to get a feel for the interview situation, with a key aspect being communicating with this age group. At the end of the interview, I asked the participants about the quality of the questions from their perspective and got some recommendations on wording. For example, they suggested avoid the use of the word "well-

being", suggesting instead to ask about how they feel. A full pilot test of the photo interview guide was not conducted, but preliminary questions for it were also tested during this pilot test.

While both interviews had the same overarching aim to understand the role of outdoor life for adolescent well-being, they approached it from different perspectives. The semi-structured interviews aimed to develop an understanding of the role of outdoor life in adolescents' lives in general. The photo interviews situated outdoor life within the context of specific places and activities from recent weeks, which made it easier to talk about the specific role of these places and activities and their motivations for going outdoors. Despite the different approaches, both interview guides were developed to centre on participants' actual outdoor lives, focusing on everyday behaviours, routines, activities and places.

3.5.3 Data collection

Two online interviews were completed with each participant between April and June of 2021. Each participant, as well as their guardian(s), read and signed an informed consent letter. Both interviews took place online using the online video software each participant was most familiar with (e.g. Microsoft Teams or Zoom). Each interview lasted around one hour. Interviews began with me introducing the study and myself, as well as the rough structure of the interview. An interview guide provided a rough structure for each interview and ensured key questions were asked. Participants were offered the opportunity to bring a friend to the initial interview as social support. Research has indicated that conducting interviews in a group setting can help minimize power differences between the interviewer and interviewee, as well as bring to light additional insights that may be overlooked in one-on-one interviews (Christensen & Prout, 2002). Two participants chose to do so. Participants were at home for both interviews, with the exception of two individuals, one of which was at school and the other outdoors by a quarry.

The semi-structured interview concluded with the introduction of the photo interview, wherein participants were briefed on the aim of capturing their everyday outdoor lives. Participants also received written instructions (see Appendix A5), clarifying that they should not seek out places they do not usually visit. A two-week interval separated the semi-structured and

photo interviews. All interviews were recorded (audio only), and notes were taken on a printed copy of the interview guide.

3.5.4 Data analysis

Data was analysed using reflexive thematic analysis, as described by Braun and Clarke (2021). Analysis was supported by software for qualitative data analysis (NVivo 14). Through data familiarisation, which entailed listening to and transcribing each interview (396 pages in total), I developed an initial understanding of the material. The second phase contained a procedure of inductive coding during two different rounds. Coding in reflexive thematic analysis involves the systematic application of code labels to text containing meaning that is of potential relevance to research questions. In the second round, the material was coded in a different order to avoid falling into familiar rhythms. Both semantic and latent coding was used throughout the process (Byrne, 2022). The first round of coding generated several hundred codes which were later reduced to roughly two hundred codes following the second round of coding. Several rounds of theme development followed which involved the active development of themes that best fit the data and reflected the shared patterns of meaning across the data. A theme in reflexive thematic analysis is 'a pattern of shared meaning organised around a central concept' (Braun & Clarke, 2023, p.77) Themes were then reviewed in relation to the original data to ensure reliability, before deciding on six themes: *really being with others completely; being in motion; being in sensory experiences; developing independence; developing mastery and capacities;* and *managing emotions and thoughts*.

3.5.5 Method reflections

Interview guides

The interview guides provided valuable support during interviews, but might have benefitted from additional testing. In particular, refining questions that specifically asked about the role of outdoor places and activities for participants' well-being may have further ensured the study's internal validity. It is important to consider that the initial interview was likely the first attempt for many participants to articulate thought and feelings specifically related to the outdoor life and environments in their everyday life. During the second interview, individuals brought this experience with

them, having had the opportunity to sharpen and enhance their abilities in expressing these thoughts. I observed that during the second round of interviews, some participants found it easier to convey their experiences, possibly aided by the visual aids of recent activity photos. It was evident from the outset that some participants struggled with articulating their thoughts. Perhaps providing them with preparatory questions beforehand could have facilitated the process.

Online interviews

This was my first experience conducting online interviews, and I found several advantages to this method. The flexibility it offered allowed interviews to easily fit into participants' everyday lives between school and extracurricular activities. Additionally, due to the pandemic, most participants were already familiar with online meetings, making the process smoother. It also enabled participants to choose the interview setting, making it more comfortable for them. During the photo interviews, through placing focus on the photos shared on the screen, both participants and myself were able to turn off cameras, creating a more relaxed environment without having to worry about being on camera.

There were also some drawbacks to conducting interviews online. There were a number of technical issues, largely relating to poor Wi-Fi connection that meant interviews sometimes had slow starts or were interrupted part way through. The online setting required a higher level of concentration than in-person interviews, making it tiring, which might have contributed to a lack of focus at times both on my behalf and participants. Introducing short breaks during the interviews could have been beneficial in maintaining engagement. Additionally, the lack of physical presence made it challenging to interpret body language and facial expressions, which sometimes resulted in us interrupting each other.

Individual vs group interviews

Adolescents' relationships with their peers play a crucial role in their everyday lives, which is why focus groups or paired interviews are commonly used when conducting interviews with this age group (Eder & Fingerson, 2003; Heath et al., 2009b). However, based on my experience from this study, I believe the effectiveness of having a friend present during interviews depends on the individual. While some may feel more comfortable discussing personal matters with a friend by their side, others

might hesitate to share their emotions with peers. Moreover, some studies suggest that group situations may lead to participants giving answers that align with their partner's responses in order to fit in (Arvidsen & Beames, 2018; Stephens et al., 2023). I aimed to provide a sense of autonomy for participants by giving them the choice to have a friend present or not. Despite this, a combination of focus group and individual interviews may have better captured the role of outdoor life for socialising and the individual. Finally, I noticed that some participants, particularly boys, were hesitant to open up during the interviews. Whether this depended on shyness, an unwillingness to share or something else was unclear. Having a friend present might have made for a more natural setting for them to share their thoughts.

Power relations and rapport

Interviewing this age group for the first time, I was mindful of potential power imbalances inherent in such research (Morrow, 2008). Online communication is a central part of adolescents' daily lives and can help to reduce power imbalances between researcher and participants (Shapka et al., 2016). Moreover, online interviews allowed them to choose their own interview setting, something which is in line with their developing need for autonomy. Some were in their rooms, one at school and two in the kitchen close to parents, who occasionally checked in to make sure their children were okay. Some participants also multitasked, engaging in activities like playing video games and drawing, which appeared to help them concentrate and ease the formality of the situation. While this setup generally empowered participants, multitasking may have diverted some attention, underscoring this aspect of online interviews.

To establish rapport, I tailored my energy and behaviour to match each participant's demeanour. With lively participants, who laughed and smiled, I mirrored their enthusiasm, while adopting a calmer approach with more subdued participants. While this strategy appeared to make them feel comfortable, in some instances adopting the opposite approach might have been beneficial. For example, by bringing more energy to an interview situation in which a participant appears tired or quiet. Reflection during the process, particularly helped by the second interview, allowed me to refine my approach as I had a better idea about what had worked for each individual. By actively listening, showing interest and drawing parallels to my own experiences I aimed to show I could relate to them. In a similar way, I also shared general details from other interviews. For example, "other

people have said that too." However, this strategy risks fostering feelings of inferiority or insecurity, and in places perhaps a clearer adult-adolescent dynamic might have worked better.

Engaging some participants, particularly boys, proved challenging. It felt like I spoke more than they did as I struggled to activate them. This was also most likely a result of me being stressed at their lack of engagement. Short answers can, however, indicate a reluctance to discuss sensitive issues (Heath et al., 2009b). Perhaps other methods may have been more suitable for them. Text interviews (WhatsApp) have, for example, been used to good effect as they allow participants to respond in their own time and provide more flexibility and time to think (Gibson, 2022). It would also allow for, so called ecological momentary assessment, where participants can send messages and photos in-situ.

Interview quality

Following each interview, I made a habit to jot down my initial impressions on how the interview had gone, including both successes and failures. Despite efforts to learn from previous experiences, sometimes I found my personality and natural way of talking took over. At the same time, because of this, I found participants generally felt at ease. During interview transcription, I recognised moments where my eagerness to ask the next question occasionally led to abrupt responses on my behalf, showing a lack of focus. More practice, perhaps through further pilot testing, with full interviews and analysis would have enabled me to pick up on my interviewing weaknesses (and strengths). Moreover, maintaining a balance between my desire to get answers to my questions and a desire to develop an understanding of each interviewee proved challenging (Eder & Fingerson, 2002).

Listening back through the interviews, it became evident that the success of the interview is a product of the collaboration between the researcher and participant. It necessitates adept questioning (and listening) on the researcher's behalf and the ability and willingness of the participant to articulate their experiences. While some individuals were very expressive and articulate, others struggled. Putting into words and explaining something one does regularly as part of everyday life is no easy task. While some individuals needed no encouraging, others needed more support and at times I think I could have spent longer trying to help participants express themselves. I think the most important thing is patience and to not be afraid

of silence or even taking a break. I think the unfamiliar situation of the online interview had the opposite effect at times, urging the interview forwards instead of taking a minute to reflect.

The inclusion of two different interviews with the same individuals allowed for a more thorough investigation of their outdoor lives in relation to their well-being. However, previous research has found online interviews may lead to shorter answers, lacking contextual detail (Davies et al., 2020). Other methods such as observations or walking interviews may have been more effective in revealing other less tangible outdoor pathways, as well as the specific physical qualities of places.

The craft of data analysis

After transcribing all interviews, files were imported into NVivo for data analysis and ongoing familiarisation. Reading through each manuscript, I developed an initial idea of the shared meaning and patterns across interviews, which gave me the opportunity to prepare for coding through thinking about how code labels could take shape.

Deciding what to code has been a complex process. A code label can apply to a single word or a whole passage of dialogue. It was difficult to find the right level of detail – how fine-grained or broad should codes be? For example, "Relaxed" vs "Relaxed when walking in forest" vs "Feel relaxed when walking in forest after tough day in school." Should the specific outdoor setting be included in the code label or not? In my case, because the pathways connecting outdoor life with well-being were in focus, I chose not to code specific outdoor settings. Outdoor pathways manifested in a variety of settings, meaning coding according to place would have split the data up. Different code labels were added to the same text segment to capture different meaning, adding more complexity.

After meetings with supervisors and further reading about conducting reflexive thematic analysis in relation to my research questions, I realised my first round of coding was on a too fine-grained level. A second round of coding therefore commenced with my previous experience in mind. This time, coding was conducted in a different order to avoid falling into the same pattern or rhythm as the first time. The second round helped ensure the reliability of the coding process through checking if there was anything I had missed during the first round. The focus was on the underlying mechanisms linking outdoor life with well-being, as expressed through participants' motivations for going outdoors, as well as their experiences and emotions

relating to being outdoors. A significant challenge was that pathways could take on different forms, including activities, emotions, experiences and environmental qualities (.e.g. beautiful or calm). I strived to maintain an open approach regarding the research object to capture as many different outdoor pathways as possible.

The initial theme development phase involved the development of preliminary themes by analysing codes to identify shared meanings. After allocating each code to a theme, I had 13 candidate themes. Recognising the abundance of themes, subsequent steps focused on understanding what these themes reflected. This process ensured accuracy and coherence of themes. It was also possible to assess the shared meaning among codes contained under each theme. Codes were occasionally reassigned to other themes, and overly simplistic themes were merged with those sharing similar underlying mechanisms. Through e-mail discussions, supervisor meetings and continued engagement with the literature I gradually reduced the number of themes until they functioned as a unit reflecting the dataset well.

3.6 Ethical considerations

Ethical approval was granted by the Swedish Ethical Review Authority (Dnr: 2019-06487).

Adolescents have the right to be researched properly (Beazley et al., 2009). In practice, this entails asking questions such as: Is the research worth doing? Are the research questions relevant to the aim of the study? Which methods are best suited to answering the research questions? (Alderson & Morrow, 2020). Throughout this study, I have endeavoured to treat participants with respect, recognising their active role in shaping not only their own lives, but also those around them and the communities they live in (James & Prout, 1990). From an ontological perspective, acknowledging the essential role of adolescents' perspectives in addressing my research questions was crucial. Since adolescents see the world differently from me, it was necessary to do research "with" them, rather than "on" them (Kellett, 2010). Thus, a central consideration involved selecting and designing methods, materials and procedures to effectively enable adolescents to express their unique perspectives and experiences of everyday life.

At the same time, it was important to recognise and understand my role as an adult in actively supporting them in sharing their experiences and

perspectives. This meant considering their needs at every stage of the research process. Integral to this was identifying how my own knowledge, experiences and skills as a researcher contributed to understanding their perspectives in the context of the research topic.

As I navigated this process, I became increasingly aware of the interplay of power dynamics (Heath et al., 2009b; McGarry, 2016). Reflecting on my potential influence on participants was a continual process, requiring me to acknowledge the possible impact of my background, education, experiences, age, gender and ethnicity, among other factors. Given that this was my first time doing research with this age group, an important part of this process was the pretesting and pilot testing of the questionnaire and interview guides. These steps provided me with valuable insights into how to communicate, both verbally and non-verbally, and ensure that the methods fostered a sense of security, comfort and confidence among participants.

Ensuring that participants were properly informed about the research process was essential. It meant taking time to ensure they understood the study's aim, their role in it, the methods employed, who is conducting the research, and how their data will be used and safeguarded (Beazley et al., 2009). This meant conveying to participants that their participation was entirely voluntary and that their data would be kept private and confidential (Alderson & Morrow, 2020). Central to this endeavour was the informed consent letter (see Appendix A2), which served as my initial point of contact with participants. Crafting this letter involved ensuring all relevant and important details were presented clearly and concisely. Because the research design included two phases, the letter also included information about the possibility of a follow-up interview. With regards to obtaining consent for the interviews (see Appendix A6), it was important to ensure participants had the option to choose if their photos could be used in any material connected to this thesis. Examples of confidentiality in practice included using code lists that linked questionnaires to lists with names of participants, stored in separate places, and not using photos with where faces could be identified.

However, the requirement of consent first involved contacting gatekeepers, a term encompassing parents, headmasters and teachers. While gatekeepers often play a protective role, they also play a pivotal role in granting adolescents the opportunity to participate in research – something I grappled with first-hand. Their authority to refuse participation posed challenges for my ability to access adolescents, raising significant ethical

considerations (Heath et al., 2007; Clark, 2011), especially in light of The Convention on the Rights of the Child (CRC), which states that children have the right to express their views in all matters affecting them (Unicef, 1989). In Sweden, the recent integration of the CRC into Swedish law underscores the importance of amplifying adolescents' voices.

4. Summary of papers

This chapter summarises the appended papers, including each paper's aim, methods and the main findings.

4.1 Paper I – Elevating the Role of the Outdoor Environment for Adolescent Wellbeing in Everyday Life

This perspective paper explores the role of the outdoor environment for adolescent development and well-being, synthesising insights from previous research and offering guidance for future inquiries. It begins by acknowledging the increasing concerns regarding adolescent mental health and emphasises the potential benefits of the outdoor environment for fostering well-being. The paper argues that this potential has not received the same level of attention compared to the potential of outdoor environments to promote health and well-being in younger children. Consequently, it highlights the need to understand the specific role of outdoor environments in adolescents' everyday lives, including identifying the specific outdoor pathways through which outdoor environments influence their well-being.

Starting with an ecological framework, the paper draws on research from developmental psychology to illustrate how adolescents' developing independence and autonomy are central to their ability to find places that meet their specific needs and preferences. The paper goes on to suggest that studying adolescents' mobility patterns can offer insights into the role of the outdoor environment in their well-being. Additionally, it highlights the importance of understanding adolescents' needs and preferences in relation

to their specific developmental tasks, such as the need to manage their own time and develop social relationships.

The paper highlights that while multiple pathways link outdoor environments with well-being, three primary outdoor pathways have received most attention concerning adolescents: 1) restoration in nature, 2) physical activity, and 3) social interaction. It emphasises the need to better understand how different types of nature and activities in natural settings can support well-being across different living environments. Physical activity is emphasised as a key motivator for going outdoors, and some key characteristics of outdoor settings promoting physical activity are presented. Additionally, the paper underscores the significance of outdoor environments as spaces for socialising with friends, which is crucial for fostering adolescents' sense of belonging and overall well-being.

The paper draws attention to how adult perceptions of adolescents, in public spaces and planning practices, can limit their ability to take advantage of the potential of outdoor environments for their well-being. It also argues that a predominant focus on the health-promoting benefits of nature and social affordances might have led to overlooking other potential outdoor pathways. In conclusion, the paper proposes four key areas for future research and planning and design practices to focus on, aimed at elevating the role of the outdoor environment in promoting adolescent well-being: i) identifying the full spectrum of outdoor environments pertinent to everyday life; ii) describing the qualities of the activities and environments that support well-being; iii) integrating research from developmental psychology to help identify the different pathways; and iv) conducting longitudinal studies to capture developmental and seasonal variations in outdoor life.

4.2 Paper II – The quality of Swedish adolescents' outdoor life and its relationship with self-esteem and well-being

Paper II explores adolescents' perceptions and use of outdoor environments and examines the relationship between outdoor life and adolescent well-being based on data gathered through the questionnaire. Adolescents aged 12-15 years old from urban, rural and suburban settings completed a questionnaire once in autumn/winter 2020 (n = 320) and once in spring/summer 2021 (n = 208). The questionnaire included measures

developed to assess adolescents' perceptions and use of everyday outdoor environments, including perceived environmental quality (QAOLS) and the perceived benefit of the outdoor environment. The dependent variables included standardised measures of subjective well-being, self-esteem and mental health symptoms. Additionally, data on time spent outdoors, including questions related to potential changes due to the COVID-19 pandemic, were collected.

After controlling for age, sex, living environment, and time spent outdoors, the study's findings revealed that positive perceptions and use of the outdoor environment were positively associated with subjective well-being and self-esteem, and negatively associated with mental health symptoms. One unexpected finding was that while perceived environmental quality predicted higher subjective well-being, self-esteem and fewer mental health symptoms during the autumn/winter, the perceived benefit of the outdoor environment was the main predictor of outcomes during the spring/summer. Seasonal comparisons also revealed more time spent outdoors during the spring/summer compared to the autumn/winter

The study revealed differences in perceptions and use of the outdoor environment between boys and girls. While significant differences between sexes in time spent outdoors were evident only on weekdays during spring/summer, girls consistently reported lower perceived environmental quality scores across seasons. Additionally, they scored lower on perceived safety across seasons and on perceived affordances during the spring/summer. There were no significant differences in perceived environmental quality across rural, urban and suburban settings, but some variations in subscale scores were identified. Rural participants scored significantly higher on perceived affordances than suburban participants across seasons, while suburban participants scored higher on independent mobility than their rural and urban counterparts.

Overall, the findings suggest that outdoor life can play a role in enhancing the well-being and self-esteem of adolescents living in urban, rural and suburban settings. The study also underscores the need for more knowledge on how perceived environmental quality and the perceived benefits of outdoor environments impact adolescents' outdoor lives throughout the year and its seasons. Seasonal differences suggest that prioritising the improvement of environmental quality during colder, darker months in planning and design practices may benefit overall well-being. The findings

also suggest a poorer fit between girls and their everyday outdoor environments, highlighting the need to create outdoor spaces where they can move around freely and find different things to do. Although no significant differences were found across living environments in perceived environmental quality, a comparison of subscale scores suggests the need for closer examination of the complexities of everyday outdoor life across different living environments.

4.3 Paper III – Spaces for being, developing and managing: Outdoor pathways to adolescent well-being

Building on the perspective set forth in Paper I and the findings of Paper II, Paper III aims to enhance the understanding of the role of outdoor life for adolescent well-being. A sample of fourteen participants, including seven girls and seven boys, from three different living environments were purposely selected based on their responses to the questionnaire they completed in the autumn/winter of 2020. Semi-structured and photo interviews were employed to examine participants' everyday outdoor lives and the underlying motivations driving their activities, aiming to identify and explain the pathways connecting outdoor life and adolescent well-being. Through reflexive thematic analysis, six themes were developed representing the main pathways between outdoor life and well-being. The six pathways represent how outdoor life can function as an important resource for experiencing well-being in three distinct ways: being, developing and managing. See Table 5 for a summary of the pathways.

The first three outdoor pathways related to the experience of well-being through expanded opportunities for being when *"really being with others completely"*, *"being in motion"* and *"being in sensory experiences."* The fourth and fifth pathways highlight the role of the outdoors as an arena for developing capacities that give a sense of well-being, including *"developing independence"* and *"developing mastery and capacities."* The final pathway relates to coping with challenges and maintaining a sense of well-being through *"managing emotions and thoughts."*

The findings highlight the importance of space, accessibility and variation in facilitating the outdoor pathways outlined in the paper. Participants revealed that outdoor life offered space for larger group gatherings and doing

different things together, such as going for a walk, sitting and talking, and engaging in play or ball games. For example, schoolyards emerged as important settings that catered to many of their collective needs. Walking and biking were central to participants' everyday practices, and places for being active and playing sports were favoured. Additionally, outdoor spaces, particularly green and blue settings, were valued for their capacity to evoke feelings of alertness, relaxation and overall well-being through a range of different sights, sounds, smells and sensations.

The study suggests outdoor life offers a range of overlapping and interconnected outdoor pathways for adolescents to experience well-being across different environments. Given the attraction of indoor settings and new technologies, these findings gain particular significance, emphasising the indispensable role of outdoor life in adolescents' everyday lives. The study argues that because of their age and social status, adolescents rely more heavily on outdoor spaces compared to adults. Consequently, the paper advocates for adults responsible for shaping the contexts of adolescents' everyday lives to recognise and harness the potential of an outdoor life fostering well-being.

Table 5: Summary of pathways between outdoor life and adolescent well-being

Pathways	**Description**	**Example**
Really *being* with others completely	Going outdoors to socialise more fully, to talk and do things together and develop relationships and a sense of belonging	"I think it means quite a lot because that's where we stay to really socialise completely. Because when you're at school, for example socialising during breaks, there's still something else you have to think about. So it's a place where you don't have to think about anything else, you just spend time with each other"
Being in motion	The outdoor environment provided participants with opportunities to exercise and be active, and they spoke of both intrinsic and extrinsic motivations for doing so	"It's fun to move around outside and your body has to work a bit and you get a bit tired and I guess it's that you feel better when you move around like that and feel better when you get home"
Being in sensory experiences	Specific sensory experiences connected with being outdoors with inherent value for well-being	"I feel thankful that it is so nice, because you can see the green grass, because you can be happy when you see natural colours and you feel happy"
Developing independence	Going outdoors allowed participants to get away from parents and test and develop their autonomy and independence in the outdoor environment	"I've become more sure of myself out there, and I know what to do in situations and stuff like that, so I have become better and better"
Developing mastery and capacities	Going outdoors to test yourself, get better at things and feel a sense of achievement	"Well, you feel better, mentally speaking, and I feel a little happier. Maybe you managed to do something fun at football and then maybe it kind of brightens up your day"
Managing emotions and thoughts	Going outdoors to experience positive emotions, thoughts and feelings and to get away from or reflect on negative emotions, thoughts and feelings	"You are there and you don't have to think about anything else, about school or a lot of other things you need to do"

5. Discussion

5.1 Discussion of findings

In this section I discuss the main findings of the thesis. Central to this is the integration and discussion of both quantitative and qualitative findings, a key part of research employing a mixed methods approach (Creswell & Clark, 2017).

5.1.1 Synthesis is key to understanding adolescent outdoor life and well-being

In order to understand the role of outdoor life and the outdoor environment for adolescent well-being, this thesis integrates knowledge from diverse disciplines and research domains. At its core lies a socioecological perspective (Bronfenbrenner, 1994; Stokols et al., 1996), serving as the framework for understanding the interactions between the key components of this thesis: adolescents, outdoor life and well-being. To elucidate the relationship between these components, I engaged with literature across disciplines and research domains, aiming to grasp how various theories, concepts and approaches could contribute to the overarching inquiry.

Building on my prior understanding of children's and adolescents' outdoor lives, a thorough exploration into interdisciplinary research on the specific role of environment during adolescence was critical for understanding the complex dynamics of person-environment interactions. While the focus has been on outdoor life, adopting a socioecological perspective demanded an examination of contextual factors shaping adolescents' outdoor lives, including changes to their ways of living and the physical environments shaped by planning and design practices. Insights

from developmental psychology, including investigations into early life conditions, health development and child public health, enriched my understanding of the determinants and intricacies of adolescent development. Furthermore, acknowledging the multidimensional nature of well-being necessitated engagement with research across various domains of psychology, such as positive psychology, and public health. Synthesising knowledge from these diverse research domains played a central role in shaping the design, implementation and interpretation of the findings in this study.

5.1.2 Positive associations between outdoor life and adolescent well-being

Participants who perceived their everyday outdoor environments more positively reported higher levels of subjective well-being and self-esteem, along with fewer incidences of mental health symptoms such as depression, anxiety and stress. The findings suggest the presence of pathways linking outdoor life and well-being, aligning with previous studies indicating a positive relationship between outdoor environments and adolescent well-being (Feda et al., 2014; Ward et al., 2016; Li et al., 2018; Zhang et al., 2020; Jackson et al., 2021).

More specific comparisons with previous studies poses a challenge due to variations in methodological approaches, outdoor settings, activities, qualities, exposures, and living environments considered (Nordbø et al., 2018; Zhang et al., 2020; Fleckney & Bentley, 2021). Research on the role of green and natural environments for adolescents has dominated (Tillmann et al., 2018; Roberts et al., 2019; Mueller & Flouri, 2021). The present study contributes with a broader perspective by treating outdoor life as the independent variable and positing that various kinds of outdoor environments can, and do, contribute to well-being in different ways. Moreover, the study investigates the role of outdoor life in relation to a broader range of well-being outcomes beyond mental health issues, such as depression and stress, which often dominate quantitative studies (Fleckney & Bentley, 2021). This includes assessing global and multidimensional measures of life satisfaction and self-esteem alongside mental health symptoms.

Interestingly, the study revealed seasonal variations in the relationships between measures of outdoor life and dependent variables related to well-

being. While perceived environmental quality emerged as the main predictor for all dependent variables during the autumn/winter, participants' perceptions of the benefits of the outdoor environment for their life in general, social life and health took precedence during the spring/summer. These results underscore the dynamic interplay between these factors across seasons, suggesting that environmental quality may play a more prominent role during colder, harsher months. Related to this, the qualitative inquiry revealed participants' appreciation for sensory experiences like sunshine and greenery, suggesting that the more immediately experienced benefits of being outdoors might be more palpable during warmer, lighter periods of the year. This is exemplified by the urgency to go outdoors to soak up some sun during darker months, with sunshine linked with increased use of public spaces during winter months (Costamagna et al., 2019; Larsson & Chapman, 2020). This novel finding highlights the intricate interplay between environmental quality, perceptions towards the benefits of outdoor environments and seasonal variations, urging further investigation.

5.1.3 Adolescents' perceptions and use of outdoor environments across sexes, season and living environment

People's perceptions and use of an environment are good indicators of how well it fits an individual or a group, offering insights into its potential to foster their well-being (Horelli, 2007). In this study, a strategic sample of girls and boys from different living environments was selected and studied across seasons to enhance the transferability of findings to the everyday outdoor lives of adolescents in the population at large, particularly within a Nordic context.

Questionnaire findings indicated significant differences in the outdoor lives of boys and girls, suggesting a poorer fit between girls and their everyday outdoor environments. Across seasons, girls scored significantly lower than boys on perceived environmental quality (QAOLS), both in autumn/winter and spring/summer. They also reported lower levels of perceived safety across seasons. In spring/summer, girls reported less independent mobility and perceived fewer affordances for outdoor activities. Overall, these findings suggest that girls, to a greater extent than boys, are under-catered for in outdoor environments, resulting in their everyday outdoor lives contributing less to their well-being. Previous studies have indicated gender differences, with girls generally preferring more private,

social settings, while boys prefer more public settings and engage more in sports (Lieberg, 1994; Duzenli & Bayramoglu, 2010). Further efforts and attention are required to understand the specific behavioural patterns and needs of girls and boys (Brown et al., 2008; Christensen & Mikkelsen, 2013), and to link them to the role of planning and design practices (Seims et al., 2022).

The context in which adolescents live their daily lives plays a crucial role for their development and well-being (Bronfenbrenner, 1979), with the environments they have access to serving as important resources for fulfilling their needs and preferences. By including rural, urban and suburban settings, this study set out to identify more universal characteristics, or at least general ones for how adolescents' perceive and make use of their everyday outdoor environments. However, the study design also opened up for comparisons across the three types of settings. This comparison revealed no significant differences in overall perceived environmental quality (as studied through QAOLS) across the investigated living environments, but an examination of subscale scores did reveal differences. The rural setting scored significantly higher on perceived affordances (e.g. "there are lots of different things I can do") compared to the suburban setting across seasons. This stands in contrast to prevailing discourses on the "dullness" of rural life for adolescents (Leyshon, 2008; Gotfredsen et al., 2022). Meanwhile, the suburban setting scored higher on perceived safety across seasons compared to the urban and rural settings. Considering the prevalence of urban-rural dichotomies in person-environment studies and planning literature (Karmanov & Hamel, 2008; van Vliet et al., 2019), these findings suggest that additional types of differentiation may be necessary to understand the nuances of adolescents' lived experiences in their everyday outdoor environment across different settings. Qualitative findings from the questionnaire in this study can contribute to future research on similarities and differences across different living environments.

Given the prominent role seasons play in the Nordic countries, seasonal variation has received little attention in relation to adolescent outdoor life. The study revealed that adolescents spent significantly more time outdoors during spring/summer compared to autumn/winter, which is in line with the well-documented decline in outdoor activity and physical activity during colder months (Pagels et al., 2020; Zheng et al., 2021). Nonetheless, there was a significant positive association between perceived environmental

quality and well-being, even during autumn/winter. Considering the long winters in the region, seasonal variations in relation to outdoor life and its role for well-being deserve more attention. It is noteworthy that the south of Sweden, where this study took place, generally receives little snow, with average temperatures generally remaining above freezing, as was the case during data collection. Winter, particularly with snow and ice, can afford many specific activities (Wiens et al., 2021), such as sledging and ice skating. Related to this, a study demonstrated how children in Northern Europe had higher physical activity levels and were more adept at maintaining activity levels despite the weather they experienced than other children in Western Europe and the US (Harrison et al., 2017). However, as climate change has led to a reduction in snow levels, the challenge increases for adolescents to engage in outdoor activities during the colder, darker winter months. Together with the findings in this study, this prompts the need to develop strategies to promote outdoor life and activities under new conditions, in tune with the overall strain of climate change and other societal challenges that also make an impact at local level.

5.1.4 Multiple overlapping outdoor pathways to well-being

Expanding on the findings from the quantitative inquiry, which suggested the presence of pathways between outdoor life and well-being, the qualitative inquiry examined the role of everyday outdoor life for the well-being of a smaller sample of adolescents. Findings revealed how the outdoors can serve as a valuable resource for experiencing well-being through six primary pathways relating to being, developing and managing: *really being with others completely; being in motion; being in sensory experiences; developing independence; developing mastery and capacities;* and *managing emotions and thoughts*. Consistent with prior research (Hartig et al., 2014; Markevych et al., 2017; Mouratidis, 2021; Fleckney, 2023), it became apparent that multiple pathways often operate simultaneously. For example, participants frequently mentioned going outdoors to be with friends ("*really being with others completely"*), but revealed that while with friends, they were often active ("*being in motion"*), walking or playing ball games, and would have fun together, talk about problems and daily life events ("*managing emotions and thoughts"*), while exercising their autonomy in making choices about how and where they spend their time together ("*developing independence"*).

The findings should pave the way for further interdisciplinary efforts studying adolescents' outdoor lives, concurrently considering different outdoor pathways related to specific needs for being (e.g. with friends), achieving developmental tasks (e.g. independence) and coping with challenges and maintaining a sense of well-being during this transitional period (e.g. managing emotions). The task of creating places that promote multiple pathways to well-being is a complex challenge (Kyttä & Broberg, 2014). The findings suggest that outdoor spaces that facilitate adolescents' movements and provide opportunities for them to do and experience different things can promote a range of outdoor pathways to well-being. This is in line with previous studies that highlight the crucial role of richness and actualisation of affordances, alongside independent mobility, as central criteria for creating child and youth-friendly environments (Lopes et al., 2018; Jansson et al., 2022).

Given the regular oversight of adolescents and their needs in planning and design practices (Goldman, 2020; Loebach, Little, et al., 2020; Owens, 2020), along with their potential exclusion from public spaces through urban design measures and policy (Woolley et al., 2011; Van Aalst & Brands, 2021; Barron, 2022), these findings highlight both the potential consequences and the opportunities inherent in investing in outdoor environments that cater for adolescents' needs and preferences. This potential for fostering adolescent well-being arises from the presence of multiple interacting outdoor pathways, offering opportunities to take advantage of synergies. It is also important to acknowledge that the pathways presented between outdoor life and adolescent well-being are not exhaustive, and there are likely many others. However, the intricate interplay of these pathways makes their study complex (Dzhambov et al., 2018; Fleckney & Bentley, 2021).

5.1.5 Everyday outdoor life (still) matters for adolescents

Overall, the findings of this study highlight how everyday outdoor life still matters for adolescent well-being. Given the strong pull of comfortable indoor environments and the many changes to adolescents' way of living, these findings acquire added significance by suggesting that outdoor life and environments possess qualities that are not easily replaced. Participants' motivations for going outdoors echo those documented in previous generations of adolescents, including socialising with friends, having fun,

relaxing, spending time in nature, exercising and getting away from parents (Lynch & Banerjee, 1977; Owens, 1988; Lieberg, 1995; Clark & Uzzell, 2006; Mäkinen & Tyrväinen, 2008; Owens, 2009; Duzenli & Bayramoglu, 2010). The consistency of these findings across time and generations is significant, suggesting that outdoor life plays an irreplaceable role in the development and well-being of adolescents.

There has been a tendency to focus on the otherness of adolescents and their behaviour in public spaces (Owens, 2002; Brunelle et al., 2018), but the findings here suggest adolescents' motivations for going outdoors are not too dissimilar to those of adults. This includes parallels in the major pathways linking outdoor environments with health and well-being, including social cohesion, physical activity and restoration (Abraham et al., 2010; Hartig et al., 2014; Kyttä & Broberg, 2014; Markevych et al., 2017; Ajayi & Amole, 2022). Further similarities emerge when placing the findings in a broader psychological context, with both adults and adolescents' needs converging around basic psychological needs for autonomy (*"developing independence"*), relatedness *("really being with others completely"*), and competence (*"developing mastery and capacities"*) (Deci & Ryan, 2000). This also encompasses key dimensions of well-being, including environmental mastery, positive emotions, positive relationships, personal growth and accomplishment (Ryff, 2014; Seligman, 2018). By recognising these commonalities, this thesis underscores the essential role of outdoor environments in fulfilling universal psychological needs and well-being across different stages of life.

On the other hand, because adolescence is a formative period in shaping behaviours for lifelong development and well-being (Patton et al. 2016), overlooking the specific significance of outdoor life during adolescence could have far-reaching consequences. Understanding adolescent behaviour and their need for outdoor spaces is crucial, as they play a vital role in everyday life. For many adolescents, the outdoor environment serves as one of the few spaces in which they can fulfil their needs, especially considering the limited alternatives available beyond the confines of home and school (Lieberg, 1995; Childress, 2004; Brunelle et al., 2018). Overall, this perspective highlights the value in moving beyond narratives of age-related conflicts in use of public spaces. Instead, it calls for a more uniting approach that recognises the diverse needs of different age groups and fosters outdoor

environments in which different age groups can coexist and meet their (Holt & Holloway, 2006; Evans, 2008).

5.1.6 The role of the pandemic for adolescents' outdoor life

Data collection took places during the COVID-19 pandemic, making it relevant to discuss its implications and possible influences on the results.

In general, the Swedish strategy contrasted to that of many other countries. Rather than restrictions and lockdowns, citizens were recommended to keep physical distance, avoid large gatherings, avoid non-essential travel and stay home if ill (Nyberg et al., 2023). Primary schools remained open, while secondary schools went over to remote teaching for a few months (Lindblad et al., 2021), as did the adolescents in this study. Studies on the effect of the pandemic on Swedish adolescents suggest some increases in mental health problems (Nyberg et al., 2023; Johansson et al., 2024). Other research points out the "outdoorification" of sports and leisure activities (Hedenborg et al., 2024), with possible impacts on outdoor recreation also beyond the pandemic (Hansen et al., 2023).

Both the autumn/winter 2020 and spring/summer 2021 questionnaires included specific questions that asked participants to reflect on how much time they had spent outdoors in relation to how much time they usually spend outdoors during that time of the year. Results were mixed and revealed that the majority reported spending roughly the same amount of time outdoors compared to how it usually is during the two periods, with some reporting having spent both less and more time outdoors.

During interviews, participants mentioned a number of examples of how the pandemic had impacted on their everyday lives, particularly during the couple of months they had online teaching, which meant limited contact with friends. Some spoke of cancelled football matches, while others didn't think it had affected their outdoor lives much at all. Overall, the influence of the pandemic appeared to vary from individual to individual, making it difficult to draw any overall conclusions.

5.2 Reflections on the research approach

The interdisciplinary approach and mixed methods design of this thesis allowed for a more complete understanding of the role of outdoor life for adolescent well-being. However, one limitation of this study was the

collection of qualitative data between the autumn/winter and spring/summer questionnaires. This is in contrast to a typical sequential explanatory mixed methods design, where qualitative data collection follows quantitative data analysis in order to explain the findings (Creswell & Clark, 2017). The original study idea followed this design, but due to time constraints relating to the COVID-19 pandemic, a decision was made to collect qualitative data between the two questionnaires instead. Because the full analysis of all quantitative data was not complete, interviews therefore focused on the role of outdoor life for well-being, which built on preliminary results that revealed a positive association between perceived environmental quality (QAOLS) and dependent variables.

If the qualitative inquiry had built on the full quantitative analysis, there would have been opportunities to examine adolescents' perceptions of the benefit of the outdoor environment to understand its role during summer and winter months. Additionally, it might have allowed for exploration of other interesting findings, such as significant (or non-significant) differences across sexes, living environments and seasons.

It might also have been feasible to adopt a different mixed methods study design that was not reliant on analysis of quantitative data. One example is a convergent design, through which qualitative and quantitative data were collected at the same time and later compared and merged in the presentation of results (Creswell & Clark, 2017). This design would have allowed for the collection of data during both seasons. Alternatively, conducting interviews after each questionnaire would have been an interesting approach allowing explanation of results for each questionnaire separately, as well as seasonal effects. Interviews following the final questionnaire would also have allowed for explanation of surprising results that revealed themselves after the final analysis of both questionnaires. For example, that there was only a significant difference in time spent outdoors between girls and boys on weekdays during the spring/summer.

Another line of argument would have been to first collect interview data and not questionnaire data. Findings from the interview phase could then have informed the development of the questionnaire. In doing so, the questionnaire may have relied less on previous research and might have more accurately reflected adolescents' outdoor lives. Further, the relationship between specific outdoor pathways and well-being could have been assessed in a larger sample.

However, it is important to acknowledge the logistical challenges and limitations of conducting mixed methods studies for a "lone" researcher (Creswell & Garrett, 2008). Moreover, recognising the limitations of individual researchers with regards their proficiency in areas of qualitative and quantitative research underscores the value of conducting mixed methods research in teams (Lavelle et al., 2013). As a newcomer to mixed methods research, and particularly quantitative inquiry, this was one limitation I encountered. Due to my inexperience with quantitative inquiry, this part of the study received more attention than the qualitative inquiry.

The inclusion of urban, rural and suburban settings aimed to enhance the generalisability and transferability of the study's findings to various populations and contexts. However, certain limitations emerged, particularly concerning sampling issues, notably in the urban setting, and there were significant dropout rates between the autumn/winter and spring/summer questionnaire. Additionally, one potential limitation lies in the decision to not include individuals with below average scores on the QAOLS, possibly overlooking valuable insights into the role of outdoor life for the well-being of individuals with more negative perceptions of their everyday outdoor environments.

The use of standardised measures for life satisfaction, self-esteem and mental health symptoms provided an opportunity to delve into these specific aspects in the interviews. Conversely, a more general approach was adopted in interviews that focused on participants' own habits and motivations for going outdoors in order to capture the well-being experiences that mattered most to them. In doing so, the study became more representative of participants' everyday lives. However, these choices somewhat weakened the link between the quantitative and qualitative inquires of the study. Consequently, it could be argued that this study combines elements of both a sequential explanatory design and convergent design (Creswell & Clark, 2017).

The findings of the thesis highlight the advantages of combining and integrating complementary quantitative and qualitative inquires within a single study. Through drawing on the strengths of both approaches, the study not only provides a comprehensive understanding of the relationship between adolescent outdoor life and well-being, but also provides depth to insights through including participants' everyday experiences, ultimately enhancing the validity of the study's findings.

5.3 Suggestions for further research

Based on this mixed methods study I acknowledge five key areas of particular interest for future research.

1. Interactions between different outdoor pathways

The presence of multiple, overlapping pathways between outdoor life and adolescent well-being presents opportunities for structural equation modelling to develop the understanding of interactions in between them, in relation to adolescent well-being.

2. The role of seasonal variations for adolescents' outdoor lives

The findings suggest the need to better understand the role of seasonal variation in adolescents' outdoor lives, emphasising the particular role of perception in relation to the quality and benefits of outdoor environments for adolescents' lives. While going outdoors during warmer, and particularly in Scandinavia, lighter months is generally evaluated positively, research is required to improve the quality of outdoor environments that persist the colder, darker months, when the overall perception and attitudes to being outdoors tend to be more negative.

3. Examine similarities and differences across living environments

The findings of this study revealed no significant differences in perceived environmental quality between urban, rural and suburban settings. They also suggest the outdoor pathways presented in this study are operating across different settings. However, examination of subscales of the Quality of Adolescent Outdoor Life Scale (QAOLS) revealed some significant differences which point to the need for closer investigation of specific environmental qualities across a range of living environments. By identifying the presence or absence of important qualities across different living environments, such research can contribute to addressing well-being inequalities between adolescents in different communities.

4. How do everyday outdoor settings support pathways?

While this thesis primarily highlights the value of outdoor life in general for supporting adolescent well-being, the data also helps to illustrate the role of specific settings affording multiple and overlapping outdoor pathways. In the findings, a range of outdoor settings appear, including gardens, schoolyards, parks, forests, beaches, neighbourhoods and cities. These, together with other frequently mentioned and favourite places deserve due attention. In particular, their specific characteristics and the types of pathways they afford to well-being. Schoolyards, for example, afforded opportunities to be with friends, have fun and be active after school hours away from the adult gaze. Based on these findings, and other studies on schoolyards for this age group (Chawla et al., 2014; Jansson, Abdulah, & Eriksson, 2018), exploring ways to introduced their appealing features into other types of outdoor settings emerges as an important field of inquiry. The sensuous dimensions of vegetation and biodiversity in schoolyards and other favourite places is another issue that warrants further research. Unused qualitative data from the questionnaire on favourite places and activities can contribute to this work.

5. The Quality of Adolescent Outdoor Life Scale (QAOLS)

The development of the Quality of Adolescent Outdoor Life Scale (QAOLS) offers opportunities to test the generalisability of the results regarding perceived environmental quality and its relationship with well-being into other types of settings and regions. The scale, including specific scales relating to the subscales included in the QAOLS, can be further developed and validated.

5.4 Practical implications

The findings of this study underline the value in adopting a socioecological perspective on adolescent outdoor life and wellbeing which can help to coordinate people and groups at different levels (Stokols, 1992). A network of people including parents, schools and their students, planners, landscape architects and designers, social workers, policymakers and other decision makers, are all stakeholders for knowledge on how to support and promote an outdoor life fostering adolescent well-being. Here follows some potential

implications of the results for policy and practice in planning and design and society at large:

1. The Quality of Adolescent Outdoor Life Scale

The Quality of Adolescent Outdoor Life Scale (QAOLS), originally developed could also be useful in planning and design practices. It enables comparison across and within different living environments on the status of adolescent outdoor lives and environments, insights useful when developing and managing outdoor environments that are appealing to adolescents, but can also play a role for their overall well-being.

2. Implications for society

Amid concerns about adolescent mental health (Patton et al., 2016; Swedish Public Health Agency, 2023a), this study emphasises the potential of outdoor life and environments in fostering adolescent mental well-being. Environments conducive to healthy behaviours can be more effective and wide reaching than targeting individual behaviours alone (Stokols et al., 1996; Mittelmark et al., 2022). Therefore, it is essential for society to counteract the trend of indoor sedentary lifestyles by prioritising outdoor life and supporting the collective needs of adolescents to go outdoors. While recognising the importance of adolescents' developing independence, it is equally vital to acknowledge their ongoing reliance on adult care and support. Given that adolescents spend most of their time at home or in school, guardians, teachers and other adults play a significant role in shaping their behaviours, and can play a pivotal role in promoting an active outdoor life rooted in everyday routines.

3. Implications for planning and design

Space is an important quality for adolescents, facilitating movement and enabling social interactions in larger groups. Neighbourhoods and city centres are important as they provide space for adolescent roaming (*"developing independence"*), either alone or with friends. Preschool and schoolyards become meaningful due to their familiarity and the opportunities they offer for the collective fulfilment of various needs, including being and

doing things together (*"really being with others completely"*), being active (*"being in motion"*) and talking about life (*"managing emotions and thoughts"*). Walkable, runnable and bikeable environments, as well as places for exercise and sports (*"developing mastery and capacities"*) appear to be particularly important for adolescent well-being.

Outdoor environments that offer a network of different settings, activities and experiences in close proximity to each other facilitate their movement and should be attractive to adolescents. On the other hand, because complex sensory experiences were valued (*"being in sensory experiences"*), it is important to ensure that other qualities are not introduced or prioritised at the expense of qualities affording such experiences, such as green and natural settings, which afford multiple pathways to well-being. Maintaining and increasing biodiversity is an important avenue to add sensory experiences that are important for well-being (Van den Bosch & Sang, 2017; Beery & Jørgensen, 2018; Hanson & Olsson, 2023).

Planning and design practices can both support and threaten the presence of qualities within outdoor environments from which adolescents can benefit (Cele, 2015; Nordstrom & Wales, 2019). For example, densification is threatening the availability of open spaces and the presence of green and quiet spaces. Moreover, schoolyards are shrinking in size (Moström & Svanström, 2018; Kylin & Fridell, 2021), demanding more attention to their significance for adolescents (Jansson, Abdulah, & Eriksson, 2018). This renders the relationship between outdoor life and adolescent well-being precarious, meaning it cannot be taken for granted and necessitating strategic interventions in planning and design practices.

The study revealed a particular need to increase the fit between girls and their everyday outdoor environments. A focus on reducing gender inequalities through the use of gender-sensitive policies and design is important for social sustainability (Horelli, 2017), and has received growing attention in Sweden (Wrangsten et al., 2022; Sandström et al., 2024).

Finally, seasonal variations with regards to the relationship between perceived environmental quality and well-being underscore the need for heightened focus on outdoor environments during colder, harsher periods of the year. This becomes especially important in southern Sweden, where many regions are experiencing decreasing snow levels, thus limiting the opportunities for adolescents to engage in outdoor life during colder months.

6. Conclusions

This thesis set out to examine the role of outdoor life for adolescent well-being. Through the synthesis of knowledge across different disciplines and research domains, and the use of a mixed methods design, the findings suggest outdoor life still plays an important role for adolescent well-being. Taking into consideration the changing context of adolescence, these findings take on special significance in underlining the specific role of outdoor life in the everyday lives of adolescents.

The quantitative inquiry revealed positive associations between how adolescents' perceive and use outdoor environments and a range of outcomes relating to well-being. The findings offer insights into the role of perceived environmental quality and the perceived benefits of the outdoor environment for adolescent well-being across seasons. Furthermore, comparisons of perceived environmental quality between sexes suggest the fit between girls and their outdoor environments is poorer, while no significant differences were found between urban, rural and suburban settings.

The qualitative inquiry revealed multiple and overlapping pathways through which outdoor life fosters well-being across different living environments. Outdoor pathways included opportunities for *really being with others completely; being in motion; being in sensory experiences; developing independence; developing mastery and capacities;* and *managing emotions and thoughts*. The findings highlight the importance of accessible, spacious and varied outdoor environments in nurturing the different outdoor pathways.

In conclusion, by illustrating the various ways in which outdoor life still matters for adolescents, this thesis provides valuable insights that point to the need to elevate the prominence of outdoor life and environments in adolescents' everyday lives as a vital resource for well-being.

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Popular science summary

Going outdoors is an essential part of everyday life, with the outdoor environment offering space for movements, encounters and experiences. Well-being encompasses both feeling good and functioning well, such as maintaining positive relationships with others. The extent to which outdoor environments meet these types of needs can be important for overall health and well-being in a population.

Everyday life has changed across generations, with adolescents spending a lot of time indoors in the comfort of their homes. Additionally, the prevalence of digital devices has introduced new forms of communication, enabling adolescents to interact with friends and others from their homes. The majority of adolescents now also live in urban areas, raising concerns about their access to green and natural environments. Growing parental fears are also limiting their independent mobility. Planning practices like densification put the spaces they can use at risk, and it is rare to provide specific outdoor spaces for adolescents. In addition, adolescents' behaviours and activities in public spaces tend to be viewed with suspicion, which can result in them feeling unwelcome.

Why does this matter? Adolescence is a time of biological, physical and psychological change, making it a critical and sensitive period in life for human development. While this sensitivity can pose risks, such as mental health issues, it also provides a "window of opportunity" for exposure to positive experiences and the promotion of healthy behaviours. The outdoor environment can provide a range of opportunities for activities and experiences promoting well-being, such as meeting up and socialising with friends, exercise and getting away from daily hassles. These different opportunities make up potential outdoor pathways to well-being. Given the

potential of outdoor life to foster well-being, it becomes important to reassess adolescents' relationship with outdoor life and the outdoor environment.

This study investigates the role of outdoor life, and its environments, for adolescent well-being. Adolescents aged 12-15 years old from urban, rural and suburban living environments in southern Sweden participated in the study. Participants completed a questionnaire, once during the autumn/winter (n = 320) and again during the spring/summer (n = 208), that explored the relationship between their perceptions and use of outdoor environments and their well-being and self-esteem. The findings revealed that adolescents who had more positive perceptions of their everyday outdoor environments and being outdoors reported significantly higher levels of life satisfaction and self-esteem, as well as fewer mental health symptoms. Participants' perceptions of the overall quality of the outdoor environment was more important for well-being and self-esteem during colder, darker months than during warmer, lighter seasons. The results were similar across the different living environments, but girls generally perceived their everyday outdoor environments less positively than boys.

In order to better understand the role of outdoor life and environments for their well-being (i.e. the different outdoor pathways), a small subsample of individuals participated in two interviews, including taking photos of their everyday outdoor life. The key outdoor pathways connecting outdoor life and well-being identified included heightened opportunities for experiencing well-being through *really being with others completely*, *being in motion* and *being in sensory experiences*. It also played an important role in supporting the development of specific capacities supporting well-being, including *developing independence* and *developing mastery and capacities*. A final pathway, *managing emotions and thoughts*, highlights how adolescents go outdoors to feel good and better cope with everyday stresses. Overall, the findings illustrate how outdoor life can promote adolescent well-being in a variety of different and overlapping ways.

The study highlights the potential of targeting the everyday outdoor environments of adolescents for promoting their well-being. Central to this is the engagement of various stakeholders engaged in the welfare of adolescents, including parents, schools, and professionals in planning and policy, who can ensure the availability of outdoor spaces that accommodate adolescents' daily activities and needs across different types of living environments.

Populärvetenskaplig sammanfattning

Att vistas utomhus är en viktig del av vardagen, där utomhusmiljön ger människor utrymme för rörelse, socialt liv och intressanta upplevelser av olika slag. Välbefinnande omfattar både att må bra och att fungera väl, t.ex. möjligheten att utveckla positiva relationer. Kunskap om i vilken utsträckning utomhusmiljön bidrar till att tillgodose dessa behov har betydelse för befolkningens hälsa.

Vardagslivet har förändrats över generationerna och idag tillbringar ungdomar ofta mycket tid inomhus. Digitala former för kommunikation gör att ungdomar interagerar med sina vänner hemifrån. Att majoriteten av ungdomarna nu bor också i städer kan också begränsa deras tillgång till natur och andra gröna miljöer. Föräldrars rädslor begränsar också deras rörelsefrihet. En stadsplanering med ökad förtätning äventyrar samtidigt utrymmena mellan husen och ofta saknas satsningar på platser för ungdomar. Vidare tenderar ungdomars aktiviteter i offentliga rum att betraktas med viss misstänksamhet, vilket leder till att de kan känna sig ovälkomna där.

Varför är detta viktigt? Tonåren är en tid med stora biologiska, fysiska och psykologiska förändringar, vilket gör det till en kritisk period i människans utveckling. Samtidigt som denna känslighet kan innebära risker, t.ex. för psykiska problem, öppnar det möjligheter för särskilt positiva upplevelser som kan stimulera till hälsosamma beteenden och livsstilsförändringar. Utomhusmiljön kan erbjuda en rad viktiga möjligheter som att träffa vänner, motionera och pausa från en stressfylld vardag, alla möjligheter med potentiella ”utomhus-kopplingar” till välbefinnande. Med tanke på utomhuslivets potentiella roll för hälsa och välbefinnande är det viktigt att förstå hur ungdomars förhållande till utomhusliv och utomhusmiljöer ser ut idag.

Denna studie undersökte vilken roll utomhusliv och dess miljöer har för ungdomars välbefinnande. Ungdomar i åldern 12-15 år från stadsmiljö, landsbygd och förortsmiljö i södra Sverige deltog i studien. Deltagarna fyllde i ett frågeformulär, en gång under hösten/vintern (n = 320) och en gång under våren/sommaren (n = 208), där de tillfrågades om hur de upplever och använder sin utomhusmiljö och om deras välbefinnande och självkänsla. Resultaten visade att ungdomar som hade en mer positiv upplevelse av att vara utomhus och av sina utomhusmiljöer i vardagen också rapporterade högre nivåer av livstillfredsställelse och självkänsla, samt färre symtom på psykisk ohälsa. Utomhusmiljöns kvalitet var viktigare för välbefinnande och självkänsla under kallare och mörkare månader än under varmare, ljusare delar av året. Resultaten var likartade i de olika livsmiljöerna, men flickor upplevde generellt sin utomhusmiljö mer negativt än pojkar.

För att bättre förstå utomhuslivet och utomhusmiljöns betydelse för välbefinnande deltog ett mindre urval av ungdomar i två intervjuer som också innebar att de fotograferade sin utomhusmiljö. De utomhuskopplingar till välbefinnande som identifierades var möjligheten *att verkligen vara helt och hållet tillsammans med andra*, *att vara i rörelse* och *att vara i sensoriska upplevelser*. Utomhusmiljöer spelade också en viktig roll för att stödja utvecklingen av specifika förmågor som främjar välbefinnande, inklusive *utveckling av självständighet, färdigheter och förmågor*. Till sist, den sjätte kopplingen till välbefinnande, som handlar om förmågan *att hantera känslor och tankar*, belyser hur ungdomar använder utomhusmiljön för att må väl och bättre hantera vardagsstress av olika slag. Sammantaget pekar studien ut flera överlappande ”utomhuskopplingar” till välbefinnande som är närvarande i ungdomars utomhusliv.

Studien belyser potentialen i att arbeta med ungdomars utomhusmiljöer för att främja deras välbefinnande. Det blir avgörande att det finns föräldrar, skolor och yrkesverksamma i planering och beslutsfattande som ser till att ungdomars utomhusliv främjas och att det finns tillgång till utomhusmiljöer som passar deras vardagliga aktiviteter och behov i alla olika typer av boendeområden.

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Mark Wales
Anderstorp/Alnarp, April 2024

Appendix

A1 The questionnaire

Vilken roll har utomhusmiljön för dig?

Här är ett frågeformulär om vad platser och aktiviteter i utomhusmiljön betyder för dig och hur du ser på dig själv och ditt liv i stort. Läs instruktionen till varje fråga som beskriver hur du skall tänka när du svarar. Svara genom att kryssa i rutor och skriva på raderna. Kontrollera att du har svarat på alla frågor innan du lämnar in det.

Det finns en forskare i rummet som du kan ställa frågor till och lämna in frågeformuläret till när du är klar. Det är inga andra än de forskarna i studien som kommer att se hur just du har svarat på frågorna.

Ta den tid du behöver och svara så noggrant du kan.

Tack för att du deltar!

Mark Wales
Doktorand
xxx-xxxxxxx
mark.wales@slu.se

1. Jag är:

☐ Flicka

☐ Pojke

☐ Annat _____

_____ år (antal) Jag föddes _____ (årtal)

2. Hur mycket tid var du utomhus under våren?

Tänk på hur det var under våren innan sommarlovet.

Hur mycket tid var du utomhus varje dag på vardagarna?

Mindre än 30 minuter	30-60 minuter	Mer än en timme
☐	☐	☐

Hur mycket tid var du utomhus varje dag på helgerna?

Mindre än 30 minuter	30-60 minuter	Mer än en timme
☐	☐	☐

Jämfört med hur det brukar vara på våren, tycker du att du var utomhus:

Mer än vanligt	Ungefär lika mycket	Mindre än vanligt
☐	☐	☐

3. Hur mycket tid har du varit utomhus de senaste veckorna?

Tänk på hur det har varit de senaste veckorna.

Hur mycket tid har du varit utomhus varje dag på vardagarna?

Mindre än 30 minuter	30-60 minuter	Mer än en timme
☐	☐	☐

Hur mycket tid har du varit utomhus varje dag på helgerna?

Mindre än 30 minuter	30-60 minuter	Mer än en timme
☐	☐	☐

Jämfört med hur det brukar vara på hösten, tycker du att du har varit utomhus:

Mer än vanligt	Ungefär lika mycket	Mindre än vanligt
☐	☐	☐

4. Hur har du tagit dig till skolan?

Tänk på hur det har varit de senaste veckorna. Du kan kryssa i mer än en ruta vid varje fråga.

Vem har du haft sällskap med till skolan?

Vänner	Föräldrar	Syskon	Ingen	Andra
☐	☐	☐	☐	_____

Hur har du tagit dig till skolan?

Gått	Cykel	Bil	Buss/tåg	Moped	Elscooter	Skateboard	Annat
☐	☐	☐	☐	☐	☐	☐	_____

5. Hur är det utomhus där du bor?

Tänk på utomhusmiljön där du brukar vistas och vad du har gjort där de senaste veckorna. Tänk både på skoldagar, helger och lov.

Sätt ett X för att markera hur väl du tycker påståendet stämmer för dig.

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Jag tycker om utomhusmiljön	☐	☐	☐	☐	☐	☐
Jag tycker om att vara i naturen	☐	☐	☐	☐	☐	☐
Jag känner mig glad när jag är utomhus	☐	☐	☐	☐	☐	☐
Ibland när jag känner mig ledsen är det skönt att vara utomhus	☐	☐	☐	☐	☐	☐

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Jag tillbringar mycket tid utomhus	☐	☐	☐	☐	☐	☐
Jag tillbringar mycket tid utomhus med min familj	☐	☐	☐	☐	☐	☐
Jag tillbringar ofta tid utomhus i naturen	☐	☐	☐	☐	☐	☐
Det finns gott om grönområden som jag kan använda	☐	☐	☐	☐	☐	☐
Där finns många olika saker jag kan göra	☐	☐	☐	☐	☐	☐
Det finns platser där jag kan göra det jag vill utomhus	☐	☐	☐	☐	☐	☐
Där finns platser som inspirerar mig	☐	☐	☐	☐	☐	☐
Där finns vackra platser	☐	☐	☐	☐	☐	☐
Där finns platser där jag kan utmana mig själv	☐	☐	☐	☐	☐	☐

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Jag känner mig trygg utomhus under dagtid	☐	☐	☐	☐	☐	☐
Jag känner mig trygg utomhus på kvällen	☐	☐	☐	☐	☐	☐
Jag känner mig trygg på skolgården	☐	☐	☐	☐	☐	☐
Det finns platser där jag kan vara utomhus när det är dåligt väder	☐	☐	☐	☐	☐	☐
Jag tillbringar mycket tid utomhus på vardagar	☐	☐	☐	☐	☐	☐
Jag tillbringar mycket tid utomhus på helgerna	☐	☐	☐	☐	☐	☐
Jag tillbringar mycket tid utomhus med mina vänner	☐	☐	☐	☐	☐	☐
Jag tycker om att vara utomhus	☐	☐	☐	☐	☐	☐

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Jag kan lätt ta mig runt på egen hand utomhus	☐	☐	☐	☐	☐	☐
Det finns platser där jag kan röra på mig	☐	☐	☐	☐	☐	☐
Där finns platser där jag kan vara själv	☐	☐	☐	☐	☐	☐
Det finns platser där jag kan umgås med mina vänner	☐	☐	☐	☐	☐	☐

Vilka platser/områden tänkte du på när du svarade på frågorna om hur det är att vara utomhus?

_____ _____

_____ _____

6. Hur använder du din mobiltelefon utomhus?

Tänk på hur det har varit de senaste veckorna både på skoldagar, helger och lov.

Sätt ett X på varje rad för att visa hur ofta du har gjort något.

Hur ofta har du gjort följande med din mobiltelefon utomhus?

	Aldrig	Sällan	Ganska sällan	Ganska ofta	Ofta	Alltid
Använt internet	☐	☐	☐	☐	☐	☐
Använt sociala medier (t.ex Instagram, Tik Tok, Snapchat)	☐	☐	☐	☐	☐	☐
Tagit bilder	☐	☐	☐	☐	☐	☐
Mms:at (skickat bilder eller filmer)	☐	☐	☐	☐	☐	☐
Laddat upp bilder/film på nätet	☐	☐	☐	☐	☐	☐
Sett på film/videoklipp	☐	☐	☐	☐	☐	☐

	Aldrig	Sällan	Ganska sällan	Ganska ofta	Ofta	Alltid
Spelat in egna filmer och klipp	☐	☐	☐	☐	☐	☐
Lyssnat på musik eller podcast	☐	☐	☐	☐	☐	☐
Haft videosamtal (t.ex. Skype, Facetime)	☐	☐	☐	☐	☐	☐
Pratat i telefon	☐	☐	☐	☐	☐	☐
Skickat textmeddelanden (t.ex. sms, Snapchat, iMessage, Whatsapp)	☐	☐	☐	☐	☐	☐
Spelat spel	☐	☐	☐	☐	☐	☐
Använt karta/GPS	☐	☐	☐	☐	☐	☐

7. Hur bidrar utomhusmiljön till ditt liv?

Tänk på hur det har varit de senaste veckorna på skoldagar, helger och lov.

Sätt ett X för varje fråga för att visa hur väl du tycker påståendet stämmer för dig.

Utomhusmiljön där jag bor…

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
…är bra för mig	☐	☐	☐	☐	☐	☐
…är bra för min hälsa	☐	☐	☐	☐	☐	☐
…är bra för mitt umgänge med vänner	☐	☐	☐	☐	☐	☐

8. Vad tycker du om ditt liv?

Vilka tankar har du haft om livet de senaste veckorna? Tänk på vad du har gjort om dagar och kvällar och på hur det har varit under större delen av denna period.

Sätt ett X för att markera hur väl du tycker varje påstående stämmer för dig.

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Mitt liv går bra	☐	☐	☐	☐	☐	☐
Mitt liv är precis som det ska vara	☐	☐	☐	☐	☐	☐
Jag skulle vilja ändra många saker i mitt liv	☐	☐	☐	☐	☐	☐
Jag önskar att jag hade ett annat sorts liv	☐	☐	☐	☐	☐	☐
Jag har ett bra liv	☐	☐	☐	☐	☐	☐
Jag har det jag vill ha i livet	☐	☐	☐	☐	☐	☐
Mitt liv är bättre än de flesta ungdomars	☐	☐	☐	☐	☐	☐

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Mina vänner är snälla mot mig	☐	☐	☐	☐	☐	☐
Jag är rolig att vara med	☐	☐	☐	☐	☐	☐
Jag mår dåligt i skolan	☐	☐	☐	☐	☐	☐
Jag trivs *inte* med mina vänner	☐	☐	☐	☐	☐	☐
Det finns många saker jag gör bra	☐	☐	☐	☐	☐	☐
Jag lär mig mycket i skolan	☐	☐	☐	☐	☐	☐
Jag tycker om att tillbringa tid med mina föräldrar	☐	☐	☐	☐	☐	☐
Min familj är bättre än andra familjer	☐	☐	☐	☐	☐	☐

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Det finns många saker med skolan som jag *inte* tycker om	☐	☐	☐	☐	☐	☐
Jag tycker att jag ser bra ut	☐	☐	☐	☐	☐	☐
Jag har jättebra vänner	☐	☐	☐	☐	☐	☐
Mina vänner hjälper mig om jag behöver det	☐	☐	☐	☐	☐	☐
Jag önskar att jag inte behövde gå i skolan	☐	☐	☐	☐	☐	☐
Jag tycker om mig själv	☐	☐	☐	☐	☐	☐
Det finns många roliga saker att göra där jag bor	☐	☐	☐	☐	☐	☐
Mina vänner behandlar mig väl	☐	☐	☐	☐	☐	☐

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
De flesta människor tycker om mig	☐	☐	☐	☐	☐	☐
Vi kommer bra överens i min familj	☐	☐	☐	☐	☐	☐
Jag ser fram emot att gå till skolan	☐	☐	☐	☐	☐	☐
Mina föräldrar behandlar mig rättvist	☐	☐	☐	☐	☐	☐
Jag tycker om att vara hemma med min familj	☐	☐	☐	☐	☐	☐
Jag tycker om att vara i skolan	☐	☐	☐	☐	☐	☐
Mina vänner är taskiga mot mig	☐	☐	☐	☐	☐	☐
Jag önskar att jag hade andra vänner	☐	☐	☐	☐	☐	☐

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Skolan intresserar mig	☐	☐	☐	☐	☐	☐
Jag tycker om skolaktiviteter	☐	☐	☐	☐	☐	☐
Jag önskar att jag bodde i ett annat hus/lägenhet	☐	☐	☐	☐	☐	☐
Man pratar vänligt till varandra i min familj	☐	☐	☐	☐	☐	☐
Jag har väldigt roligt med mina vänner	☐	☐	☐	☐	☐	☐
Jag och mina föräldrar gör roliga saker tillsammans	☐	☐	☐	☐	☐	☐
Jag tycker om området där jag bor	☐	☐	☐	☐	☐	☐
Jag önskar att jag bodde någon annanstans	☐	☐	☐	☐	☐	☐

	Stämmer inte alls	Stämmer dåligt	Stämmer ganska dåligt	Stämmer ganska bra	Stämmer bra	Stämmer helt
Jag är en trevlig person	☐	☐	☐	☐	☐	☐
Det finns många otrevliga personer där jag bor	☐	☐	☐	☐	☐	☐
Jag tycker om att prova nya saker	☐	☐	☐	☐	☐	☐
Mitt hem är fint	☐	☐	☐	☐	☐	☐
Jag tycker om mina grannar	☐	☐	☐	☐	☐	☐
Jag har tillräckligt med vänner	☐	☐	☐	☐	☐	☐
Jag önskar det bodde andra sorters människor där jag bor	☐	☐	☐	☐	☐	☐
Jag trivs där jag bor	☐	☐	☐	☐	☐	☐

9. Vad tycker du om dig själv?

Här är en lista av påståenden angående din generella känsla för dig själv. Var vänlig indikera hur bra varje påstående stämmer in på dig genom att kryssa i ditt svar på skalan.

	Stämmer inte alls	Stämmer dåligt	Stämmer bra	Stämmer helt
Jag känner att jag är en värdefull person, åtminstone lika värdefull som andra	☐	☐	☐	☐
Jag känner att jag har många positiva egenskaper	☐	☐	☐	☐
Vanligtvis brukar jag tänka att jag är en misslyckad person	☐	☐	☐	☐
Jag klarar av saker och ting lika väl som de flesta andra människor	☐	☐	☐	☐
Jag känner att jag *inte* har mycket att vara stolt över	☐	☐	☐	☐
Jag känner mig verkligen oduglig ibland	☐	☐	☐	☐
Jag har en positiv inställning till mig själv	☐	☐	☐	☐
På det hela taget är jag nöjd med mig själv	☐	☐	☐	☐
Jag önskar att jag hade mer respekt för mig själv	☐	☐	☐	☐
Då och då tycker jag att jag är värdelös	☐	☐	☐	☐

10. Hur har du känt dig?

Läs igenom alla påståendena och ringa in den siffra, 0, 1, 2 eller 3, som bäst motsvarar hur mycket påståendet beskriver dig *<u>den senaste veckan</u>*. Skalan är som följer:

0 Beskriver mig inte alls
1 Beskriver mig till viss del, eller en del av tiden
2 Beskriver mig en större del av tiden, en stor del av tiden
3 Beskriver mig väldigt mycket, eller största delen av tiden.

Jag blev upprörd över minsta lilla sak	0	1	2	3

Jag var uppmärksam på att jag var torr i munnen	0	1	2	3
Jag kunde inte uppleva några positiva känslor alls	0	1	2	3
Jag hade lite svårt att andas (t.ex. snabb andning, andfåddhet utan kroppsansträngning)	0	1	2	3
Jag kom inte igång med någonting	0	1	2	3
Jag hade lätt att överreagera	0	1	2	3
Jag kände mig darrig (t.ex. i händerna)	0	1	2	3
Jag hade svårt att slappna av	0	1	2	3
Jag upplevde situationer som gjorde mig så ängslig att jag var otroligt lättad när det var över	0	1	2	3
Jag kände att jag inte hade någonting att se fram emot	0	1	2	3
Jag blev snabbt upprörd	0	1	2	3
Jag betedde mig väldigt nervöst	0	1	2	3
Jag kände mig ledsen och deprimerad	0	1	2	3
Jag blev otålig då jag blev försenad på något sätt (t.ex. hiss, trafikljus, eller annat)	0	1	2	3
Jag kände att jag höll på att svimma	0	1	2	3
Jag kände att jag hade tappat intresset för nästan allt	0	1	2	3
Jag kände mig värdelös som person	0	1	2	3
Jag kände att jag lätt tog åt mig av saker	0	1	2	3
Jag svettades mycket (t.ex. handsvett) utan att det var varmt och utan fysisk aktivitet	0	1	2	3
Jag kände mig rädd utan någon särskild anledning	0	1	2	3
Jag kände att livet inte var värt att leva	0	1	2	3

11. Här följer frågor om platser och aktiviteter utomhus som är dina favoriter

Tänk på hur du brukar använda utemiljöer under skoldagar, helger och lov. Vad tycker du om att göra utomhus? Var tycker du om att vara utomhus?

Välj ut upp till 3 favoriter som du berättar mer om.

Favorit 1

Vilken favoritplats eller favoritaktivitet utomhus vill du berätta mer om?

_____

_____

_____

_____

Vad brukar du göra och vad är särskilt bra med platsen/aktiviteten?

_____

_____

_____

_____

Vem brukar du vara där med? Du kan kryssa i mer än en ruta.

Vänner	Föräldrar	Syskon	Ingen	Andra
☐	☐	☐	☐	_____

Under vilka årstider brukar du vara där? Sätt ett X för varje årstid du brukar vara där.

Våren	Sommaren	Hösten	Vintern
☐	☐	☐	☐

Favorit 2

Vilken favoritplats eller favoritaktivitet <u>utomhus</u> vill du berätta mer om?

_____

_____

_____

_____

Vad brukar du göra och vad är särskilt bra med platsen/aktiviteten?

_____

_____

_____

_____

Vem brukar du vara där med? Du kan kryssa i mer än en ruta.

Vänner	**Föräldrar**	**Syskon**	**Ingen**	**Andra**
☐	☐	☐	☐	_____

Under vilka årstider brukar du vara där? Sätt ett X för varje årstid du brukar vara där.

Våren	**Sommaren**	**Hösten**	**Vintern**
☐	☐	☐	☐

Favorit 3

Vilken favoritplats eller favoritaktivitet utomhus vill du berätta mer om?

_____

_____

_____

_____

Vad brukar du göra och vad är särskilt bra med platsen/aktiviteten?

_____

_____

_____

_____

Vem brukar du vara där med? Du kan kryssa i mer än en ruta.

Vänner	Föräldrar	Syskon	Ingen	Andra
☐	☐	☐	☐	_____

Under vilka årstider brukar du vara där? Sätt ett X för varje årstid du brukar vara där.

Våren	Sommaren	Hösten	Vintern
☐	☐	☐	☐

Vill du berätta något mer om det du brukar göra utomhus eller hur det är utomhus där du bor?

_____

_____

_____

_____

Tack för att du har svarat på frågorna!

A2 Informed consent letter for the questionnaire

Förfrågan om deltagande i forskning om ungdomars utomhusmiljöer och välbefinnande

Hej!

Vi vill fråga dig om du kan tänka dig att delta i studien ”Ungdomars utomhusliv och välbefinnande” som pågår vid Sveriges Lantbruksuniversitet i Alnarp. I det här brevet får du information om projektet och om vad det innebär att delta. Forskningsprojektet ska ta reda på hur aktiviteter och platser i utomhusmiljön kan bidra till välbefinnande. För att få svar på frågorna behöver vi ställa frågor till ungdomar. Målet är att få kunskap som gör det lättare att planera och utforma utomhusmiljöer som passar ungdomar.

Vad innebär det?
Studien genomförs i klassrummet under skoltid. Deltagarna svarar på ett frågeformulär som tar 20-30 minuter att fylla i. Enkäten innehåller frågor om hur mycket tid man är utomhus, hur man tar sig till skolan, hur man upplever och använder miljön där man bor och vad den bidrar med i livet och även frågor om vad du tycker om ditt liv och dig själv. Formuläret fylls i under hösten 2020 och två gånger under våren 2021. Det kommer att finnas en forskare i klassrummet när du fyller i enkäten som du kan ställa frågor till. Om du upplever att någon fråga är för känslig kan du välja att avstå från att svara. Ett mindre antal ungdomar kommer att bjudas in till en uppföljning med kompletterande intervjuer längre fram.

Vad händer med mina uppgifter?
Dina resultat kommer bara ses av de forskare som arbetar med projektet och ditt namn kommer ersättas med en kod för att skydda din identitet. Endast ansvarig forskare vet vilken kod som hör till vilken person. När resultaten presenteras så kommer man inte kunna se vilka resultat som är dina. Det insamlade materialet kommer att förvaras så att endast forskarna i projektet kan ta del av det. Ansvarig för dina personuppgifter är Sveriges lantbruksuniversitet. Enligt lagen har du rätt att få ta del av de uppgifter om dig som hanteras i studien och rätta om något är fel. Du kan också begära att

uppgifter om dig raderas samt att behandlingen av dina personuppgifter begränsas.

Hur får jag information om resultatet av studien?
Resultaten publiceras i vetenskaplig tidskrifter och fackpress för personer som jobbar med dessa frågor. Önskar du ta del av analysresultat kan du kontakta ansvarig för studien.

Deltagandet är frivilligt
Ditt deltagande är frivilligt och du när som helst kan avbryta ditt deltagande utan att uppge skäl. På blankett som medföljer kan du ge ditt samtycke till att delta i forskningsprojektet.

Vi hoppas du tycker projektet låter intressant och kan tänka dig att delta. Om du har några frågor redan nu kan du kontakta mig, Mark Wales, som är ansvarig för projektet eller min handledare Fredrika Mårtensson (xxx-xxxxxxx).

Mark Wales, Doktorand
xxx-xxxxxxx
mark.wales@slu.se
Samtycke till att delta i studien ”Ungdomars utomhusliv och välbefinnande”

Jag har fått muntlig och skriftlig informationen om studien och har haft möjlighet att ställa frågor. Jag får behålla den skriftliga informationen. Jag vet att deltagande är helt frivilligt och att jag när som helst och utan förklaring kan avsluta deltagandet.

☐ Jag samtycker till att delta i studien ”Ungdomars utomhusliv och välbefinnande” och jag samtycker till att uppgifter om mig behandlas på det sätt som beskrivs i informationsbrevet.

Namn: _____ Klass: _____

_____ _____
Plats och datum Underskrift

A3 Semi-structured interview guide

Hej X, hur är det med dig idag?

Tack för att du kunde prata med mig idag. Intervjun kommer att ta 40-60 minuter.
Jag tänkte börja med att berätta lite om mig själv. Jag är från Manchester i England och flyttade hit 2009. Jag är doktorand på SLU Alnarp där vi är många som forskar om utomhusmiljöer som till exempel skolgårdar, skogen, parker, gator, gårdar osv. Som du vet, så är jag intresserad av ditt utomhusliv och vad olika platser och aktiviteter betyder för ditt liv och hur du mår. Jag vill veta vad du brukar göra utomhus, var, när och med vem du är utomhus, och vad det betyder för dig att vara utomhus. Allt kring ditt utomhus liv helt enkelt.

Jag tänkte att vi kunde börja med att prata om hur en typisk skoldag brukar se ut för dig från morgon till kväll? Vad gör du? Var är du? Fråga om rastpolicy/skolgård.

Hur ser en typisk helg ut?

Hur mycket brukar du vara utomhus? Vardagar? Helger?
Hur har pandemin påverkat hur mycket du är utomhus? Har det påverkat det du gör utomhus nånting?

Hur viktigt är det för dig att vara utomhus? Vad får dig att gå utomhus?
Hur påverkar att vara utomhus hur du mår?
Berätta om något du gör utomhus som gör att du mår bra/lugn.
Händer det att det finns dagar då du inte är utomhus alls? Hur känns det?

Var bor du nånstans? Kan du berätta lite om hur det ser ut? Passar det dig att bo där?
Hur är det att vara utomhus där du bor? Passar det dig?
Vad är viktigt i en utomhusmiljö för dig?
Hur brukar du ta dig runt? Känns det tryggt?

Vad brukar du göra utomhus? Var? När? Med vem?
Hur ser det ut där?
Vad är det som är bra med den platsen/att göra det?
Hur får det dig att känna? Hur mår du efter du har varit där?
Har du något ställe utomhus där du och dina vänner brukar träffas eller hänga tillsammans? Vad är det som är bra med de platserna? Vad är det som gör att ni kan vara fler där? Hur bestämmer ni var/när ni ska ses?
Hur använder du din mobiltelefon när du är utomhus?

Brukar du vara i naturen? Vad gör du? Med vem? Var? När?
Hur mår du av att vara ute i naturen?
Vilka årstider gillar du?

Har du någon favoritplats eller aktivitet utomhus du kan berätta om?
Vad gör du? Var? Med vem? När?
Hur ser det ut där?
Vad är det som gör det till din favorit? Vad betyder platsen/aktiviteten för dig?

Tänk på en speciell gång när du var utomhus som du minns extra väl, som du kan berätta om.
Finns det något du inte gör så ofta, men tycker om som du skulle vilja berätta om?

Photo-elicitation questions
Kan du berätta vad du ser i bilden?
Var tog du den och vad ville du visa med den?
Vem brukar du vara där/göra det med? När?
Vad betyder det för dig?

Extra
Är det något jag glömt att fråga om som är viktigt för dig när det gäller att vara utomhus?

Avsluta med att berätta om fotouppgiften

Innan vi avslutar tänkte jag bara berätta lite kort om nästa intervju i maj. Fokusen på denna intervju har varit att prata om ditt utomhusliv generellt, men nästa intervju kommer att fokusera på det du gjort utomhus under ett par veckor i maj. För att göra detta vill jag att du ta foton med din mobiltelefon under 2 veckor innan vi ses nästa gång. Under nästa intervju kommer du visa de för mig och vi kommer att prata om varför du tog dem, vad du gör i bilderna och vad platserna och aktiviteterna betyder för dig. Jag kommer att skicka instruktioner till dig som förklarar hur du ska göra. Samtidigt kan vi boka in en tid för nästa intervju. Låter det ok?

Några sista frågor innan vi avslutar? Tusen tack igen för din medverkan! Det uppskattas!

A4 Photo interview guide

Ecological context
Vad har hänt sen sist vi sågs?

Photo interview impressions
Hur har uppgiften varit för dig?

Vi kanske kan börja med den bilden som betyder mest för dig. (Then ask them to choose another which is important and so on…)

Meaning
Vad ser du på bilden?
Vad har du velat fånga på den här bilden?
Vad betyder denna bild för dig?

Activity
Vad gör du på bilden?
Vad är det med aktiviteten som du tycker om?
Brukar du göra något annat där?

Movement practices/spatial autonomy
Var ligger platsen?
Hur brukar du ta dig dit?
Hur länge har du kunnat ta dig runt utan dina föräldrar?
Vad betyder det för dig att kunna ta dig runt själv?

Place qualities
Vad är det med denna plats som du tycker om?
Finns det något du skulle vilja ändra på med platsen?

Social/relational aspects
Vem brukar du vara där/göra det med?
Hur bidrar dina kompisar/att du är själv till upplevelsen?
Var det andra personer på platsen? Hur använder de platsen?

Well-being in relation to place/activity
Vad får dig att gå dit?
Hur mår du när gör detta/är där?
Hur mår du efter du varit där/gjort det?
Hur bidrar aktiviteten till ditt liv och hur du mår generellt?

Temporal aspects
När brukar du vara där/göra det? Hur ofta är du där?
När/hur upptäckte du platsen? När var du där för första gången?
Hur länge har du gjort aktiviteten?

Ecological context
Vad gjorde du innan du gick dit? Vad gjorde du efter?
Vad säger bilderna du tagit om dig som person och ditt liv just nu?

Extra
Finns det några foton du önskar att du kunde ha tagit?

A5 Photo interview instructions

Instruktion till fotouppgift inom projektet ”Ungdomars utomhusliv och välbefinnande”

Stort tack för ditt bidrag till studien om ditt utomhusliv så här långt! Nu går studien vidare med en uppföljande intervju där vi tar hjälp av bilder från ditt utomhusliv för att undersöka vad olika platser och aktiviteter utomhus betyder i ditt liv.

Vad händer nu?
Du tar foton av olika aktiviteter, platser och saker som ingår i ditt utomhusliv, både under vardagar och helger.

Tänk på att:
Du kan ta foton under en två-veckorsperiod.
Du får ta hur många foton du vill men ofta räcker det med 10-20 stycken.
Jag vill få en bild av hur det brukar vara! Du behöver inte leta upp nya platser att fota.
Undvika bilder med andra människor i närbild där man ser ansiktet.

Vad händer sen?
Fotona skickar du till mig. Skicka med e-post: mark.wales@slu.se eller med SMS xxx-xxxxxxx. Vi träffas sen online för en intervju där vi samtalar vidare kring ditt utomhusliv. Fotona använder vi som stöd i samtalet.

Jag kommer att höra av mig framöver per mail för att boka in en tid för intervju.

Kontakta mig om du har några frågor kring uppgiften eller studien i stort.

Vi hörs!
Mark Wales
Doktorand, SLU i Alnarp

A6 Informed consent letter for interviews

Förfrågan till elev om deltagande i del 2 av studien ”Ungdomars utomhusliv och välbefinnande”

Hej!
Du har tidigare lämnat ditt samtycke för att delta i studien ”Ungdomars utomhusliv och välbefinnande” och har redan fyllt i en enkät. Vår fråga till dig nu är om du kan tänka dig att delta i två uppföljande intervjuer som är en del av samma studie?

Du kommer att intervjuas en gång nu i mars och en gång i maj. Under intervjuerna kommer vi att prata om ditt utomhusliv och vad det betyder för dig. Du får gärna ta med en kompis till intervjun.

Inför den första intervjun vill vi också att du kollar om du har några bilder på din mobiltelefon av ditt utomhusliv från de senaste månaderna. Om du vill, får du gärna visa dem under den första intervjun. Inför den andra intervjun kommer vi att be dig att ta foton av ditt utomhusliv under 2 veckor. Under intervjuerna kommer vi att prata om fotona du tagit.

Allt insamlat material kommer att avidentifieras för att skydda din identitet. Bara forskarna i projektet kan ta del av materialet. Ansvarig för dina personuppgifter är SLU. Dataskyddsombud är xxxx xxxxx och kan nås på xxx-xxxxxx. Enligt EU:s dataskyddsförordning har du rätt att få ta del av de uppgifter om dig som hanteras i studien och rätta dem om något är fel. Du kan också begära att uppgifter om dig raderas samt att behandlingen av dina personuppgifter begränsas.

Resultaten från studien publiceras i tidskrifter för personer som jobbar med dessa frågor och i vetenskapliga sammanhang. Om du vill ta del av analysresultat kan du kontakta mig. Ditt deltagande är helt frivilligt och du kan när som helst avbryta deltagandet utan att berätta varför. På blanketten som medföljer kan du ge ditt samtycke till att delta och markera om du tillåter att vi får publicera de bilder du har delat. Du måste inte dela foton för att delta i intervjuerna.

Jag hoppas att du tycker att denna del av studien verkar intressant och att du kan tänka dig att vara med!

Kontakta mig om du vill veta mer eller har frågor kring studien.

Tack!

Mark Wales mark.wales@slu.se

Samtycke till att delta i del 2 av studien ”Ungdomars utomhusliv och välbefinnande”

Jag har tagit del av informationen om studien och förstår att deltagandet är helt frivilligt och att jag kan avbryta när som helst utan att ange någon orsak.

☐

Jag samtycker till att vara med i del 2 av studien ”Ungdomars utomhusliv och välbefinnande” och jag samtycker till att mina uppgifter behandlas på det sätt som beskrivs i brevet.

☐

Jag samtycker till att de bilder jag delat får publiceras i både tryckt och digital form i material kopplat till studien.

Namn: _____ Skola och klass:

_____ _____

Plats och datum Underskrift

Papers

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Elevating the Role of the Outdoor Environment for Adolescent Wellbeing in Everyday Life

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In light of concerns about adolescent mental health, there is a need to identify and examine potential pathways to wellbeing in their daily lives. Outdoor environments can offer multiple pathways to wellbeing through opportunities for restoration, physical activity and socialising. However, urbanisation and new lifestyles revolving around the home and the internet are changing young people's access, use and relationship to the outdoor environment. The authors point out how the research related to adolescents' outdoor environments is generally not treated with the same level of importance or as comprehensively as that for younger children. The aim of this paper is to pave the way for research and planning initiatives on everyday outdoor environments promoting the wellbeing of adolescents and the authors suggest ways in which perspectives from developmental psychology might inform the study of adolescents' outdoor environments. The paper concludes by calling for an elevated focus on the role of outdoor environments in adolescents' everyday lives as a source of wellbeing and more research that makes clear the specific attributes, activities and experiences related to places outdoors which make adolescents feel good.

Keywords: public open space (POS), urban planning and design, adolescent development, youth-friendly environments, environmental psychology, salutogenic affordances, independent mobility, ecological systems approach

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INTRODUCTION

Mental health problems among adolescents appear to be increasing on a global scale (Collishaw, 2015; Patton et al., 2016; Patalay and Gage, 2019). This worrying trend is attributed to circumstances in family, school and everyday life linked to globalisation, urbanisation, digitalisation and environmental degradation (Tomasik et al., 2012; Collishaw, 2015; Patton et al., 2016). More recently, new routines established during the COVID-19 pandemic, such as online teaching and other social distancing measures, have posed further challenges (Guessoum et al., 2020; Magson et al., 2021). In light of this it becomes urgent to identify possible pathways to mental health and wellbeing in the everyday lives of adolescents, also the foundation for wellbeing during adulthood (World Health Organization [WHO], 2004; Patton et al., 2016).

Environment-based approaches to improve health and wellbeing are acknowledged to offer more encompassing and long lasting effects than many individual-based measures (Ward Thompson, 2013). Outdoor environments in particular house many vital everyday activities that

offer pathways to adolescent wellbeing by serving social life, nature contact and other recreational activities (Knöll and Roe, 2017; Owens, 2020; Mygind et al., 2021). However, many young people spend much time indoors in sedentary activity with negative consequences for their wellbeing (Hoare et al., 2016; Oswald et al., 2020). While the provision of salutogenic (i.e., promoting health and wellbeing) and child-friendly outdoor (play) environments for younger children has caught considerable attention in research, policy and planning (Chawla, 2015; Wells et al., 2018; UNICEF, 2019; Clark et al., 2020), the topic has not been treated with the same level of importance, detail or care in relation to adolescents.

We urge for an effort to pinpoint the distinctive role of outdoor environments in the context of adolescents' everyday lives, taking on the challenge to map potential pathways to adolescent wellbeing for which their relationship to place is vital. For the purposes of this article the term wellbeing encompasses various aspects of emotional, psychological and social wellbeing (Keyes, 2006) and our understanding of development begins with Bronfenbrenner's ecological systems theory as a foundation to build on and understand adolescent wellbeing in the context of place. As to what constitutes the "outdoor environment," this is an empirical question, as they are the outdoor spaces where adolescents spend time. This includes any gardens at home, parks, playgrounds and other outdoor facilities in the neighbourhood, their school grounds, but also the streets, squares and any surrounding landscape accessible to them, such as forests, lakes or beaches.

PLACE AND ADOLESCENT WELLBEING

Adolescence is a distinct period of life between childhood and adulthood that begins with puberty and spans roughly 10–19 years old (World Health Organization [WHO], 2015), although research suggests this period may in fact last until 24–25 years old (Sawyer et al., 2018). This maturational period is characterised by rapid and profound physical, cognitive, social and psychological changes that are pivotal for the life course (Dahl et al., 2018).

Individuals' repeated interactions with their immediate physical and social surroundings over time fuel their development and are profoundly formative (Bronnfenbrenner and Morris, 2006). For example, the gradual attainment of independence and autonomy during adolescence builds on prior childhood experiences (Dahl et al., 2018) that are the function of the individual's characteristics, their family, their living environment, and the society in which they live (Bronnfenbrenner and Morris, 2006). Parents often orchestrate children's access to salutogenic environments. With repeated visits to places such as playgrounds, children work on their independent mobility; that is their ability to move around freely outside without adult supervision (Wales et al., 2020). Through their growing independent mobility children are able to take advantage of the affordances, or the perceived function (Heft, 1988), of the outdoor environment. These two factors form the foundation of a child-friendly environments (Kyttä, 2004). By adolescence individuals have the knowledge, confidence and networks to extend their range of movement, pursue their own interests and create and maintain place attachments and social relationships crucial for their development and wellbeing (Horton et al., 2013; Arvidsen and Beames, 2018; Cox, 2020).

Adolescents' ability to realise their new found autonomy and find socially meaningful places are vital parts of a youth-friendly environment (Lopes et al., 2018). It should be noted, however, that this should not be taken for granted nor does it occur automatically. It is a result of a complex web of arrangements between adolescent, parent and their everyday environment. Its significance for young people's ability to promote their own wellbeing should not be understated and it is essential that spatial practitioners, such as planners and landscape architects, are well-informed (Arvidsen and Beames, 2018). Independent mobility differs between genders (Christensen and Mikkelsen, 2013; Schoeppe et al., 2016), abilities (Bedell et al., 2013) and living environments (Veitch et al., 2017). Studying adolescents' independent mobility and mobility patterns can help us detect the role of the physical and social environment as part of a larger network of people, places and objects supporting adolescent wellbeing.

It has been argued that congruity, or a positive relationship, between individual and living environment, is the very foundation of wellbeing (Horelli, 2006; Moser, 2009). When there is a "good fit" between the two, this is revealed through an individual's positive perceptions of the particular environment (Uzzell and Moser, 2006). Accordingly, it is likely that youth try to spend time in and bond to places which possess characteristics that mirror their developmental needs (Clark and Uzzell, 2006; Korpela, 2012). Adolescents' own evaluations and perceptions of their lives (Lippman et al., 2011; Navarro et al., 2015) and living environments (Travlou et al., 2008; van der Burgt, 2013; Lopes et al., 2018) are therefore vital for understanding how a particular place facilitates their ability to meet their needs.

Adolescents' needs and aspirations stem from developmental changes connected to the onset of puberty, as well as structural and functional changes to the brain, that emerge through their growing interest in thrill-seeking, peers and their wider social context (Dahl et al., 2018). Owens (2020) draws on developmental and environmental psychology in describing how place helps adolescents solve various developmental tasks pertinent to adolescence and describes how the public realm can help youth to nurture social relationships, manage free time and stimulate self-reflection. Korpela (1992), p. 251 describes how "contexts deliberately chosen or shaped by the individual deserve particular attention because they may form a major strategy in the service of development." Indeed, it is during adolescence we acquire the ability to "adaptively pursue new goals and priorities" (Dahl et al., 2018, p. 442), making adolescents more than just "passive targets of environmental influences" (Salmela-Aro, 2010, p. 14).

OUTDOOR PATHWAYS TO WELLBEING

The literature describes how outdoor environments can provide multiple pathways to wellbeing (Hartig et al., 2014; Kyttä and Broberg, 2014; Fleckney and Bentley, 2021), helping to reduce

harm, but also serving to build and restore various capacities (Markevych et al., 2017). We identify three pronounced pathways in relation to adolescents; the restorative nature, physical activity and social life.

Natural environments have documented benefits for adolescent emotional, psychological, and social wellbeing (Chawla, 2015; Tillmann et al., 2018; Vanaken and Danckaerts, 2018; Wells et al., 2018) and there are studies documenting associations with adolescents' access, exposure and engagement with nature (Mygind et al., 2019; Zhang et al., 2020). Other studies improve our understanding on how and why they actively seek out natural spaces and describe how they can provide a feeling of calm and of getting away as well as a safe environment in which to be and find oneself (Birch et al., 2020; Hakoköngäs and Puhakka, 2021). Different pathways to wellbeing can occur at different levels of interaction, ranging from indirect engagement when looking at some trees through a window, to more incidental engagement when passing a park on the way to school, to more purposive use when playing sports (Pretty, 2004). For example, a study from Finland revealed girls aged 13–16 visited nature to experience pleasant emotions, be active and feel better (Wiens et al., 2021). Other nature-based activities, such as wilderness therapy and outdoor education are also used to treat mental health problems, boost self-esteem and enhance learning (Barton et al., 2016; Mutz and Muller, 2016; Manner et al., 2020). In contrast to this, a recent study revealed how everyday, more urban nature was often more valued by youth than more rural, activity-based nature experiences (Birch et al., 2020). More detailed research is needed to reveal how different kinds of nature and activities promote different dimensions of wellbeing for different people.

Despite adolescence being a period of declining physical activity (Bélanger et al., 2019), exercise is one of the main reasons for youth to venture outside (Lopes et al., 2018; Hakoköngäs and Puhakka, 2021; Wiens et al., 2021) and physical activity generally increases outdoors (Dunton et al., 2007; Pagels et al., 2014; Bélanger et al., 2019). This makes it an important mediator between time spent outdoors and wellbeing. For youth the presence of paths, proximity to parks, playgrounds and sport facilities, traffic safety and an overall varied landscape, are some of the factors triggering physical activity (Gardsjord et al., 2014; Johansson et al., 2020). School ground greening has also been linked to wellbeing through improved opportunities for physical activity, but also mental restoration with implications for attention in class and school achievement (Chawla et al., 2014; Mårtensson et al., 2014; Kelz et al., 2015; Jansson et al., 2018).

When entering adolescence the social aspects of outdoor life gain extra importance and places are often valued by adolescents in terms of the presence and/or absence of others (Clark and Uzzell, 2006; Travlou et al., 2008; Owens, 2020). For example, outdoor settings are often chosen by adolescents to hang out with friends away from the parental gaze. The dominance of the social in outdoor life is exemplified by Portuguese adolescents who marked more social affordances than leisure, emotional or functional (play) affordances in a neighbourhood mapping exercise (Lopes et al., 2018). Through their social interactions in the neighbourhood adolescents develop a sense of belonging and become part of a community which is formative for their identity and contributes to their psychological wellbeing (Morrow, 2000; Matthews, 2003; Barron, 2021).

In summary, research has documented how the social nature of adolescence means the value of outdoor environments is often understood in relation to others, making them heavily social environments, but also settings for restoration and recreation (Korpela et al., 2002; Owens, 2009; Brunelle et al., 2018). One study describes how children under 11 years old use outdoor space as a setting for play and games, 13 year olds as a place for hanging out and be "where things happen," and older youth as a place to get away from the hassles of daily life (Matthews, 2003). Adolescents have also been shown to show lower emotional connection to nature than younger children, with a low point at 15–16 years old (Hughes et al., 2019). On the other hand, adolescents regularly list their favourite places as being in natural environments when asked (Owens and McKinnon, 2009; La Rochelle and Owens, 2014; Birch et al., 2020). There is a research gap with regards the similarities and differences in dimensions of outdoor life that are essential across the lifespan from childhood to adulthood.

DISCUSSION

In this paper we have highlighted the role of outdoor environments in adolescents' everyday lives and pointed out how by scrutinising the interplay between the two as development embedded in social and physical contexts we can improve our capacity to create youth-friendly environments which promote their wellbeing. However, adolescents' ability to take advantage of their growing role as active agents of their own wellbeing is circumscribed by the societal context in which they live (Bronnfenbrenner and Morris, 2006; Broberg et al., 2013).

The way in which society perceives adolescents has consequences for their wellbeing. Conceptions of adolescents in public spaces as being at risk and/or problematic are common (Travlou, 2003) and have repercussions for adolescents' ability to exercise their autonomy and find places that fit their needs. Adolescents can be viewed suspiciously, made to feel unwelcome and even excluded from spaces through spatial practices (i.e., planning, design and management) that restrict their activities (Owens, 2002; Woolley et al., 2011). Where adolescents are allowed to enter school grounds at night, they tend to become favourite hang-outs as they provide a sense of security and belonging, as well as privacy. They might play music while they talk and swing and smoke. The lack of supervision and their behaviour is often negatively interpreted (Owens, 2020), but research suggests such behaviour is a complex issue which for the adolescent fill an important function for self-regulation (Ward Thompson et al., 2005). Other people's perceptions can influence whether or not they feel welcome and hinder their ability to have meaningful experiences outdoors that are central to the quality of youth-friendly environments (Broberg et al., 2013; Lopes et al., 2018).

The way adolescents are perceived in spatial practices influences the outdoor environments adolescents have access to.

Perceptions of them as competent and autonomous appear to have placed much of the responsibility on adolescents' themselves to meet their place needs through their appropriation of space in other people's places (Childress, 2004). This is further reflected in the growing focus on youth participation in spatial practices (Bishop and Corkery, 2017; Derr et al., 2018; Loebach et al., 2020). The agency of youth in spatial practices is a truly vital aspect of their wellbeing, but should not get mixed up with the overarching responsibility of adults having to make decisions in their best interest (Vanderbeck, 2008). In contrast, the perception of (younger) children as less competent and more vulnerable, has instilled a sense of duty among adults to provide playgrounds, an infrastructure recognised as an essential part of public space in many parts of the world (Jansson, 2010; Woolley and Lowe, 2013).

Outdoor spaces specifically allocated for adolescents are rare (Owens, 2017; Sundevall and Jansson, 2020) and the unique experiences of adolescents have not received the attention they deserve, resulting in a neglect of adolescents' place needs. Valentine (2019) suggests this stems from a view of adolescents as problematic and confusion surrounding definitions of "adolescents," "youth," and "teenagers" which has meant the study of adolescents' relationship with place is regularly engulfed by the field of children's geographies. As a result, the study of youth geographies lacks its own identity as a field for practice and research. While the distinctive features of child development are regularly taken into account in playground design, little attention is paid to the unique characteristics of adolescence in spatial practices (Owens, 2020). Maybe the focus on play in children's outdoor behaviours is easier (and more desirable) to plan for than the more complex (and problematic) behaviours of adolescents outdoors? We argue a discourse preoccupied with the salutogenic effects of nature and the dominance of the social features of adolescents' outdoor lives has refrained us from better harnessing the potential of adolescents' everyday outdoor environments. It may also mean other aspects of value for their wellbeing might be overlooked, such as their urge for independent mobility (Arvidsen and Beames, 2018), their need for places to be alone (Clark and Uzzell, 2006) and their desire to play (Ward Thompson, 2007; Owens, 2018). If we ask them, just like children, adolescents also describe environmental qualities and places that they like, need and aspire to visit (Jansson et al., 2018; Owens, 2018; Van Hecke et al., 2018).

CONCLUSION

In this paper we have examined the role of outdoor environments for adolescent wellbeing and illustrated some of the pathways through which it can support and promote wellbeing; the most pronounced being restorative nature experiences, physical activity and social opportunities. We have shown how adolescents actively contribute to their own wellbeing through selecting environments that fit their needs and aspirations. We have also highlighted how important the increase in independent mobility actually is in the transition from childhood to adolescence in their continued development. Some of the societal influences limiting adolescents' ability to take full advantage of the salutogenic potential of outdoor environments have also been discussed. Misleading preconceptions about adolescents and their behaviour in outdoor environments prevail. These have to be contested! Moreover, we point out how there is an imbalance in the emphasis placed on the social nature of adolescents' lives and the role of nature in contrast to other key aspects and the specificities of the physical contexts of their everyday outdoor lives. With examples from research literature across urban and rural conditions we have illustrated how intertwined the activating, social and restorative roles of the outdoor environment can be in the daily life of adolescents. This makes it hard to identify the full range of pathways and benefits for adolescents themselves. We argue that by adopting a developmental approach to the study of adolescents' outdoor lives, as a complement to the existing body of research, we can make the benefits more transparent for society and spatial practictioners and create more youth-friendly environments.

Considering the current state of adolescent mental health, it is therefore time for research and spatial practices to further elevate the role of outdoor environments in the service of adolescent wellbeing. In order to do this and actualise the salutogenic potential of outdoor environments we suggest researchers and spatial practitioners address the following four challenges:

(1) Identify the full range of outdoor environments and experiences which comprise adolescents' everyday lives.
(2) Characterise the specificities of adolescents' outdoor lives and the attributes of outdoor environments which support their wellbeing. Particular attention needs to be paid to the (often neglected) specific physical characteristics which help to create youth-friendly environments.
(3) Link findings on adolescents' outdoor lives and place preferences to the growing body of research on adolescent development and wellbeing. Focus should be on revealing, understanding and making transparent the different pathways to wellbeing which exist.
(4) Follow adolescents' outdoor lives over time to reveal the nuances and value of their outdoor experiences throughout adolescence and how they develop over time, from early (10–14 years old) to late adolescence (15–19 years old), as well as across seasons.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

MW conceived the idea for the manuscript. All authors contributed to the writing and development of the manuscript's ideas and read, and approved the final manuscript.

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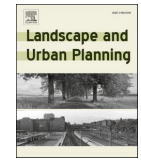

The quality of Swedish adolescents' outdoor life and its relationship with self-esteem and well-being

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HIGHLIGHTS

- The quality of adolescent outdoor life is positively associated with well-being.
- Examined differences between seasons, sexes and living environments.
- Girls were less satisfied with their outdoor environments than boys.
- Suburban areas were perceived as safer than rural and urban areas.
- The Covid-19 pandemic had limited effect on adolescents' time spent outdoors.

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ABSTRACT

This study investigates the relationship between outdoor life and the well-being and self-esteem of Swedish adolescents aged 12–15 years old (n = 320), residing in three different living environments in the south of Sweden. The study employed a questionnaire that was administered twice during a school year that included questions on time spent outdoors, environmental quality and the perceived benefit of the outdoor environment. Additionally, the study used standardized scales to measure life satisfaction, self-esteem and mental health. The results of the study revealed that adolescents who had more positive perceptions of their outdoor environment and being outdoors reported higher life satisfaction and self-esteem, as well as better mental health. Notably, girls' generally perceived their outdoor environments as lower quality compared to boys across different seasons. Furthermore, variations between living environments and seasons were also observed. Overall, the study underscores the importance of promoting outdoor life and highlights specific areas planners should address to create outdoor environments with possible benefits for the well-being of adolescents of different ages, sexes and living in different communities.

1. Background

When adolescents have the resources to meet their needs and aspirations, they thrive and can realise their capacity (Chawla, 2015; Patton et al., 2016). These resources may come from within the individual or their surroundings (Bronfenbrenner, 1994). Well-being can be seen as an ongoing process of interaction between the resources available to an individual and their needs, including their capacity to meet life's challenges and achieve their goals (Dodge, Daly, Huyton, & Sanders, 2012; Lercher, 2003). Environments which lack the resources individuals might need can thus be seen as failing to provide the conditions necessary for well-being, making the study of environmental quality essential (Devlin, 2018). Well-being is multidimensional, specific to an individual's experiences and culture (King, Renó, & Novo, 2014), and includes both positive (salutogenic) and negative (pathologic) aspects co-existing together (Dodge et al., 2012; Karademas, 2007). Well-being can be seen as the presence of positive attributes, such as life satisfaction and positive affect, and the absence of negative attributes, such as stress, risky behaviours and negative affect (Diener & Ryan, 2009). Individuals actively participate in the creation of their own well-being by using the

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resources available to them to meet their needs (Korpela, 1992; Lercher, 2003). Through a process of self-regulation, individuals use attributes in their environment to mitigate possible threats and restore and build capacities (Korpela, 1992; Markevych et al., 2017). People's own evaluations of their lives and environments are therefore central to the study of well-being (Diener & Ryan, 2009).

Mental health problems among adolescents are a primary public health concern in many high-income countries (Bor, Dean, Najman, & Hayatbakhsh, 2014; Collishaw & Sellers, 2020; Erskine et al., 2015), including Sweden, where self-reported complaints, such as stress and psychosomatic symptoms, have increased (Bremberg, 2015; Laundy Frisenstam, Van Den Bosch, Chen, Friberg, & Osika, 2017; Löfstedt, Arnarsson, Corell, Lyyra, Madsen, Torsheim, & Eriksson, 2020). This trend is especially prominent among Swedish secondary school students, and girls in particular (Hagquist, 2015; Löfstedt et al., 2020), with adolescents living in cities more likely to report psychosomatic symptoms (Laundy Frisenstam et al., 2017). Despite these trends, levels of life satisfaction have remained relatively stable in recent decades (Folkhälsomyndigheten, 2018). Studies have also suggested that the well-being of Swedish adolescents was largely unaffected by the Covid-19 pandemic, which has been attributed to the fact that secondary schools and related routines continued as normal for the most part during the pandemic (Chen, Osika, Henriksson, Dahlstrand, & Friberg, 2022; Hörbo, Johansson, Garnow, Garmy, & Einberg, 2021).

It has been suggested that humans possess an innate desire to enhance their fit with the environment (Uzzell & Moser, 2006). Adolescence is a critical period for expanding one's range of movement and discovering what everyday environments have to offer, and the increasing autonomy during this period is essential for this (Cox, 2020). By exploring their environment, young people develop environmental strategies to meet their needs and actively contribute to their own development (Korpela, 2002). Environments rich in affordances therefore stand a better chance of meeting individual needs (Kyttä, Broberg, & Kahila, 2012). Affordances refer to the functional significance of an environment as perceived by the individual (Heft, 2010). In line with this, the concept of developmental affordances has been utilised to connect environmental affordances with the specific developmental tasks of adolescents (Owens, 2017). In addition, independent mobility, or the ability to move about without adult supervision, is associated with increased opportunities for physical activity, nature contact and social interaction (Cox, 2020; Owens, 2020). Independent mobility and the actualisation of affordances are essential components of youth-friendly environments (Kyttä, 2004). It is also important to consider how young people interact with and attribute meaning to their environment (Kyttä & Broberg, 2014; Lopes, Cordovil, & Neto, 2018). Developing attachments to place can contribute to the satisfaction of key psychological needs such as belonging and self-esteem (Jack, 2008; Scannell & Gifford, 2017), as well as feelings of safety, security and comfort (Colburn, Pratt, Mueller, & Tompsett, 2020; Whitlock, 2007). As many mental health problems in adulthood have their roots in adolescence (Solmi et al., 2022), the attitudes, behaviours and values formed in relation to place during adolescence can play a key role for long-term health and well-being (Fleary, Joseph, & Pappagianopoulos, 2018; Sawyer et al., 2012).

The quality of outdoor environments has received increasing attention as a source of adolescent well-being (Fleckney & Bentley, 2021; Mavoa et al., 2019; Nordbø, Nordh, Raanaas, & Aamodt, 2020; Zhang, Mavoa, Zhao, Raphael, & Smith, 2020; Wales, Mårtensson, Hoff, & Jansson, 2022), providing opportunities for socialising, physical activity and retreat (Clark & Uzzell, 2006; Owens, 2020). Public spaces can also serve adolescents' overall development, social relations, identity formation and emotional connections to place (Fleckney & Bentley, 2021; Owens, 2020). However, urban planning practices, such as densification, and concerns about safety and lifestyle have been linked to negative consequences for Swedish adolescents' access to and use of their surroundings (Cele, 2015; Sandberg, 2012). It has also been suggested that Swedish adolescents' needs are often overlooked in planning processes (Cele & van der Burgt, 2013; Sundevall & Jansson, 2020). Adolescents' use of public spaces is also complex and often contested, and they may be perceived as both at risk and a source of risk for others (Brunelle, Brussoni, Herrington, Matsuba, & Pratt, 2018; Cox, 2020). For this reason, adolescents are regularly excluded from public spaces through the use of public policy and urban design practices a (Owens, 2002; Pyyry & Tani, 2016). Moreover, cyberspace has become an increasingly significant space for socialising, playing and identity formation (Mesch, 2010), with possible implications for adolescents' relationship with their local outdoor environments (Jensen, 2011). While there is a general concern adolescents are spending less time outdoors and more time indoors on digital devices (Larson et al., 2018; Oswald, Rumbold, Kedzior, & Moore, 2020), relatively little is known about the outdoor lives of Swedish adolescents. A 2015 study found that boys spent more time both outdoors and on screens compared to girls (Winkvist et al., 2015), while another study found that outdoor time during school decreased significantly with age across all seasons (Pagels, Raustorp, Guban, Fröberg, & Boldemann, 2016). Studies on the effects of the Covid-19 pandemic are mixed, with some studies suggesting increases in both screen and outdoor time among Swedish adolescents (Kerekes et al., 2021; Martinsson, Garmy, & Einberg, 2022), while other reports suggest no significant changes in health behaviours (Chen et al., 2022).

The study of the relationship between the outdoor environment and well-being is more precisely the study of the relationship between an individual and their specific environment (Moser, 2009), and this perception is influenced both by the unique qualities of the environment and the bond between the individual and place (Chatterjee, 2005; Horelli, 2006). Failure to recognise and accommodate adolescents' needs in the process of placemaking can lead to a mismatch between their needs and the affordances provided by the outdoor environment. Understanding how adolescents' experience and perceive their living environments can therefore provide valuable insight into the success of society (e.g., parents, urban planners, schools) to meet their environmental needs. Although individuals' perceptions of their surroundings are unique, places are not typically designed with specific individuals in mind (Horelli, 2007). Thus, exploring how places can meet the needs of adolescents as a group can improve the "collective environment fit" of this age group (Horelli, 2007). In this study, we aim to investigate how Swedish adolescents perceive their everyday outdoor environments. We define this concept as the "quality of adolescent outdoor life."

This study investigates the quality of adolescent outdoor life and its relationship with the well-being and self-esteem of adolescents aged 12–15 year olds in the south of Sweden. The aim is to improve our understanding of how Swedish adolescents perceive and use their everyday outdoor environments with benefits for their overall well-being. To achieve this, this paper aims to address three key questions:

- How much time do Swedish adolescents spend outdoors?
- How do perceptions and use of outdoor environments differ between sexes, seasons and living environments?
- What are the associations between perceptions and use of outdoor environments and adolescent well-being and self-esteem?

2. Study design and sampling

2.1. Methods

This paper presents results from a questionnaire that is part of a larger mixed methods study examining adolescent outdoor life and well-being. In the present study, Grade 7 and 8 students from schools in three different living environments (rural, urban and suburban) in the south of Sweden completed a paper questionnaire during school time, once during the autumn/winter of 2020 and again during the spring/summer of 2021. The questionnaire, which took 15–30 min to complete,

included self-report measures of their time spent outdoors, their perceptions and use of the outdoor environment, their well-being and self-esteem. Ethics approval was attained from the Swedish Ethical Review Authority (Dnr 2019-06487).

The questionnaire was completed by 320 students between October 2020 and January 2021 and again by 208 students between May and June 2021, of which 189 completed it on both occasions while 19 filled it in on the second occasion only. Approximately 57 % of the participants were girls in both periods. Participants were 12–15 years old (mean = 13.3; SD = 0.6 autumn/winter and mean = 13.8; SD = 0.7 spring/summer). The average daily temperature during the autumn/winter period ranged between 7 and 10 °C in October and 0 °C in January, with an average of 45 sunshine hours per month and sunset between 3:30–4:30 pm. The average daily temperature during the spring/summer ranged between 11 and 16 °C, with an average of 260 sunshine hours per month and sunset between 9:00–10:00 pm. See Table 1 for a summary of the demographic characteristics of the sample.

The three subsamples in this study were selected to represent different living conditions commonly found among families with adolescents in Sweden. The urban sample is from a coastal city of roughly 360,000 people, including students from three schools in neighbourhoods dominated by three to five-story apartment buildings with courtyards as well as students from a school in a neighbourhood dominated by a mix of detached and terraced houses with some apartments and its own main street with shops and restaurants. The suburban sample included students from a commuter village located 20 km outside of the coastal city, with a population of around 4,000 people, and dominated by detached houses with private gardens. A previous study in this village revealed high levels of independent mobility among 10–11 year olds (Wales, Mårtensson, & Jansson, 2021). Finally, the rural sample included students from schools in two inland communities from the same municipality, with populations of 10,000 and 4,500 people. The neighbourhoods are dominated by detached houses with gardens, with easy access to surrounding coniferous forests and lakes. The nearest larger city is located 90 min away by car.

2.2. Measures

Before commencing data collection, the questionnaire was pre-tested with a small focus group of four 13–15 year olds. Participants completed the questionnaire and provided feedback on any questions that were difficult or unclear. They were also asked to provide alternative wordings if necessary. Based on this feedback the questionnaire was revised. Next, the revised questionnaire was pilot tested with a class of 58 ninth grade students to assess its comprehensibility and appropriateness for the target age group. Feedback was used to further refine the questionnaire before it was administered.

2.2.1. Independent variables

Participants were first asked to state their age, birth year and sex (based on the question "I am: boy/girl/other"). The next section included questions about time spent outdoors. Participants were asked how much time they had spent outdoors (>one hour, 30–60 min, <30 min) on weekdays and weekends in the weeks preceding the completion of the questionnaire. In order to capture possible influences from the Covid-19 outbreak in February 2020, they were also asked if they thought they had spent more, the same or less time outdoors than normal during the spring and autumn of 2020 (asked in autumn/winter 2020) and the winter of 2020 and spring of 2021 (asked in spring/summer 2021).

The 20-item *Quality of Adolescent Outdoor Life Scale* (QAOLS) was created for the specific purpose of this study and contains five subscales. The face and concept validity of the items was scrutinized by experienced researchers in the field of outdoor environments for children. The scale includes items relating to adolescents' use and perception of their everyday outdoor environments. Independent mobility was assessed using four items (e.g. "I can easily move around on my own outdoors"), perceived affordances was assessed using five items (e.g. "There are lots of different things I can do"), perceived safety was assessed using three items (e.g. "I feel safe outdoors during the day"), emotional affinity toward being outdoors was assessed using four items (e.g. "I feel happy when I am outdoors") and perceived time spent outdoors was assessed using four items (e.g. "I spend a lot of time outdoors"). A 6-point scale was used and participants indicated their agreement with each statement with a higher value indicating a higher quality of outdoor life. Cronbach's alpha for the scale was 0.88 for both autumn/winter and spring/summer.

The *perceived benefit of the outdoor environment* contains three items on how the participants evaluate the role of the outdoor environment and its potential benefits for their lives at large: The outdoor environment where I live is "good for me", "good for my health" and "good for my social life." Agreement with each item was indicated on a 6-point scale. A higher value indicates they perceive the outdoor environment as more beneficial for them. Cronbach's alpha was 0.83 for both autumn/winter and spring/summer.

2.2.2. Dependent variables

Subjective well-being in recent weeks was measured using two scales. The 7-item *Students' Life Satisfaction Scale* (SLSS; Huebner, 1991) was used to measure participants' overall satisfaction with their lives in recent weeks (e.g. "I have a good life"). Cronbach's alpha for this scale was 0.87 in autumn/winter and 0.89 in spring/summer. The 40-item *Multidimensional Student Life Satisfaction Scale* (MSLSS; Huebner, 1994; Huebner & Gilman, 2002) was used to assess participants' satisfaction with five important life domains: self, school, friends, family and living environment. Both scales use 6-point scales, with higher mean scores indicating higher levels of life satisfaction. All negative items were reversed before mean scores were calculated. Cronbach's alpha was 0.93 for both autumn/winter and spring/summer.

Rosenberg's Self-Esteem Scale (Rosenberg, 1965) measured self-esteem. The scale includes ten items (e.g., "On the whole, I am satisfied with myself"). A 4-point scale was used, with a higher mean score indicating better self-esteem. All negative items were reversed before mean scores were calculated. Cronbach's alpha was 0.90 for autumn/winter and 0.92 for spring/summer.

The *Depression, Anxiety and Stress Scale-21* (DASS-21; Lovibond & Lovibond, 1995) was used to measure mental health (i.e. negative emotional states) during the previous week. Depression was measured using seven items measuring symptoms such as lack of interest (e.g., "I felt that I had lost interest in just about everything") and hopelessness (e.g., "I felt that I had nothing to look forward to"). Anxiety was measured using seven items measuring symptoms such as autonomic arousal (e.g., "I felt scared without any good reason") and skeletal muscle effects (e.g., "I experienced trembling e.g., in the hands"). Stress was measured using seven items measuring symptoms such as difficulty relaxing (e.g., "I found it difficult to relax") and being easily agitated (e.g., "I found myself getting upset rather easily"). Each item was scored 0–3, with a

Table 1
Summary of the demographic characteristics of the sample.

	autumn/winter n = 320	spring/summer n = 208
Demographics		
Age, mean (SD)	13.3 (0.613)	13.8 (0.663)
Boy, n (%)	137 (42.8)	88 (42.3)
Girl, n (%)	182 (56.9)	119 (57.2)
Sex = other, n (%)	1 (0.3)	1 (0.5)
Grade 7, n (%)	206 (64.4)	155 (74.5)
Grade 8, n (%)	114 (35.6)	53 (25.5)
Urban, n (%)	87 (27.2)	32 (15.4)
Suburban, n (%)	116 (36.2)	71 (34.1)
Rural, n (%)	117 (36.6)	105 (50.5)

higher mean score indicating poorer mental health. Cronbach's alpha for DASS-21 was 0.91 for autumn/winter and 0.93 for spring/summer.

2.3. Statistical analysis

The analyses were conducted using IBM SPSS Statistics 26 and R version 4.1.2. Both autumn/winter and spring/summer had less than 3 % missing data overall and missing values were therefore imputed using the expectation maximization algorithm (Tabachnick & Fidell, 2013). A handful of univariate outliers in both autumn/winter and spring/summer were identified after examining histograms and boxplots and cases deemed deviant were assigned a new score for the specific variable that was one unit larger or smaller (0.1) than the next most extreme score that was not deemed an outlier in order to make them less problematic (Tabachnick & Fidell, 2013). After examining Mahalanobis distances, nine cases ($p < 0.001$) were identified as being multivariate outliers and were subsequently removed from all analyses. In order to be able to include an individual who identified as "other" for sex in analysis, they were coded as a girl because their responses were better aligned with those observed in girls than boys. However, in analyses specifically focusing on statistical differences between sexes, such as differences in QAOLS scores between boys and girls, this individual was not included.

For comparisons between time spent outdoors, a chi-square test is used for independent samples and a sign test for paired samples, with 5 % as the level of significance. To see if there were any significant differences in QAOLS scores (including subscales) and perceived benefit scores according to sex, season and living environment, a mixed model with person (=ID) as random variable and the fixed factors sex (girl or boy), season (autumn/winter or spring/summer) and living environment (rural, suburban or urban) was used with interactions as fixed factors. Tukey's post hoc test with significance level $p \leq 0.05$ was used to explore significant differences between the least squares means. To analyse the model, the function lmer from package lme4 in R was used, and for the post hoc tests the function emmeans from package emmeans.

Finally, separate hierarchical multiple linear regression analyses were performed for each of the four dependent variables to investigate the specific contribution of independent variables. The same was performed for the five dimensions of MSLSS. Independent variables were entered in four steps for each model. Model 1 controlled for demographics factors (sex and living environment). Age, grade and school effects were controlled for but were removed from models due to non-significant results. Model 2 controlled for behavioural variables (time spent outdoors). Variables related to changes in time spent outdoors during the pandemic were not included as they were only found to be a significant predictor during spring/summer for DASS-21. Model 3 added environmental quality variables (QAOLS) and Model 4 added attitudinal variables (perceived benefit of the outdoor environment). Preliminary analyses were performed for all models to ensure no violation of assumptions. Results are interpreted using a significance level of $p \leq 0.05$.

3. Results

Descriptive statistics for both seasons are provided in Table 2. Correlations for all variables can be found in the Appendix (Table A1 and A2).

3.1. How much time do Swedish adolescents spend outdoors?

A full summary of time spent outdoors can be found in the Appendix (Tables A3–A5).

During the autumn/winter, 34.4 % of adolescents reported spending more than one hour outdoors on weekdays, while during the spring/summer this number doubled to 70.2 %. Furthermore, 20.3 % of participants reported spending less than 30 min outdoors on weekdays in the autumn/winter compared to 3.8 % during the spring/summer. On weekends, the proportion of adolescents spending more than one hour outdoors increased from 49.4 % during the autumn/winter to 75.5 % during the spring/summer. The overall comparison for time spent outdoors shows a significant difference between autumn/winter and spring/summer for weekdays and weekends (chi-square test, $p < 0.001$). There was also a significant difference in time spent outdoors between weekdays and weekends during the autumn/winter (sign test, $p < 0.001$), but not during the spring/summer (sign test, $p = 0.40$). See Fig. 1 for comparisons between seasons and time of week.

Table 2
Descriptive statistics of the sample for autumn/winter and spring/summer.

Variables	autumn/winter n = 320	spring/summer n = 208
Independent variables, mean (SD)		
Quality of Adolescent Outdoor Life Scale	4.59 (0.63)	4.67 (0.63)
Independent Mobility (QAOLS)	5.16 (0.67)	5.13 (0.74)
Perceived Affordances (QAOLS)	4.34 (0.91)	4.27 (0.97)
Perceived Safety (QAOLS)	4.76 (0.93)	4.66 (0.95)
Emotional affinity (QAOLS)	4.59 (0.95)	4.74 (0.83)
Time spent outdoors (QAOLS)	4.13 (0.98)	4.57 (0.95)
Perceived benefit of the outdoor environment	4.78 (0.85)	4.77 (0.91)
Dependent variables, mean (SD)		
SLSS	4.51 (0.92)	4.58 (0.98)
MSLSS	4.74 (0.56)	4.65 (0.61)
MSLSS self	4.64 (0.72)	4.66 (0.78)
MSLSS friend	5.32 (0.66)	5.26 (0.67)
MSLSS school	4.04 (0.93)	3.87 (1.00)
MSLSS family	5.05 (0.79)	4.87 (0.89)
MSLSS living environment	4.66 (0.79)	4.59 (0.79)
Self Esteem	3.06 (0.60)	3.05 (0.65)
DASS-21	0.69 (0.52)	0.72 (0.59)
Depression	0.57 (0.61)	0.59 (0.66)
Anxiety	0.63 (0.54)	0.68 (0.62)
Stress	0.87 (0.62)	0.90 (0.69)

The differences between girls and boys and between seasons are illustrated in Fig. 2. There is no significant difference in time spent outdoors, except for on weekdays during the spring/summer (chi-square test, $p = 0.036$).

The differences between living environments and seasons are illustrated in Fig. 3. For all environments, except the urban sample on weekends, participants reported spending significantly more time outdoors during the spring/summer compared to the autumn/winter. During the autumn/winter, the proportion of participants who spent more than one hour outdoors on weekends was significantly higher compared to weekdays in the suburban and urban environments. However, during the spring/summer the difference was only significant for the rural environment.

The pandemic began in Sweden during the spring of 2020. According to the results, 69.7 % of participants perceived they had spent roughly the same time outdoors during the spring following the outbreak of the pandemic compared to what they usually do at that time of year, with 13.4 % reporting less and 16.9 % more time outdoors. During the autumn of 2020, 54.1 % of participants perceived that they had spent roughly the same time outdoors as usual, while 20.6 % perceived that they had spent less time outdoors and 25.3 % more time outdoors. The figures remained roughly the same during the winter of 2020, but in the spring of 2021 34.6 % reported spending more time outdoors than is normal for that time of year, while just 7.2 % perceived they had spent less time outdoors.

3.2. How do perceptions and use of outdoor environments differ between sexes, living environment and seasons?

In the analysis of the independent variables of sex, living environment and season (autumn/winter or spring/summer) and their interactions, there were no significant interactions with living environment. However, there were sometimes interactions observed

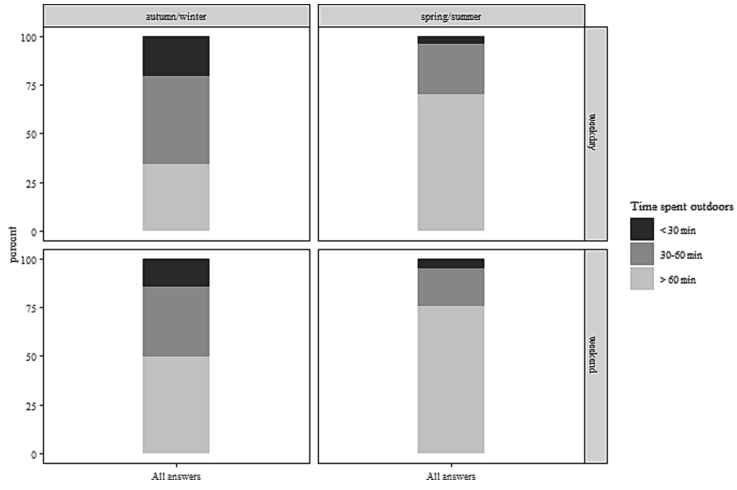

Fig. 1. Time spent outdoors for the different seasons and time of week.

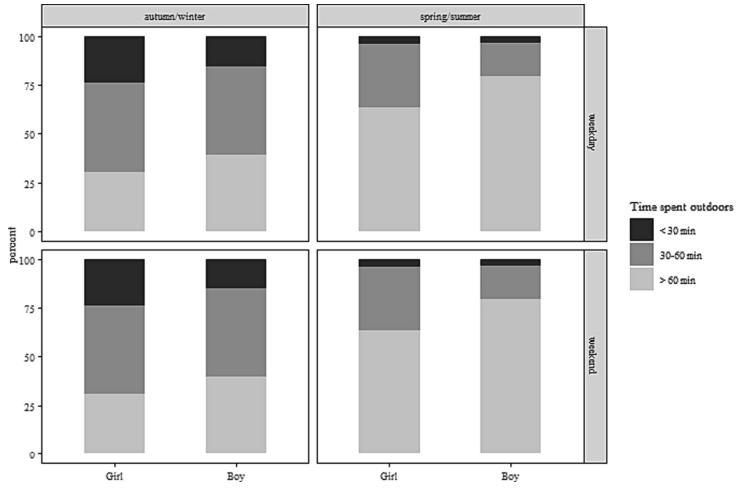

Fig. 2. Time spent outdoors for boys and girls for the different seasons and time of week.

between sex and season. As a result, the results are described using the least squares mean values (LS mean in tables) of living environment overall across both seasons and separately with combinations of sex and season.

The Quality of Adolescent Outdoor Life Scale (QAOLS) scores did not significantly differ between living environments. During both seasons, girls had significantly lower QAOLS scores compared to boys. Boys had significantly higher scores on QAOLS in spring/summer compared to autumn/winter, but this was not observed for the girls (Table 3). There were no significant differences found in the perceived benefits of the outdoor environment between sexes, living environments or seasons (Table 4).

The study also analysed the subscales of QAOLS. Perceived time spent outdoors did not differ significantly between living environments or sex, except for a significant difference during spring/summer. Independent mobility scores did not differ significantly between living environments, but girls scored significantly lower than boys during spring/summer. The rural sample had significantly higher mean scores for perceived affordances when compared to the suburban sample (Table 5), and boys had significantly higher mean scores than the girls during spring/summer. The suburban sample had significantly higher mean scores for perceived safety compared to the rural and urban samples (Table 6), while girls scored significantly lower on perceived safety during both seasons. There were no significant differences for the emotional affinity subscale.

3.3. How do perceptions and use of outdoor environments predict well-being and self-esteem?

Results for all hierarchical multiple regression analyses are shown in Table 7. Results for hierarchical multiple regression models for MSLSS subscales are shown in Table A6 in the Appendix. The standardized

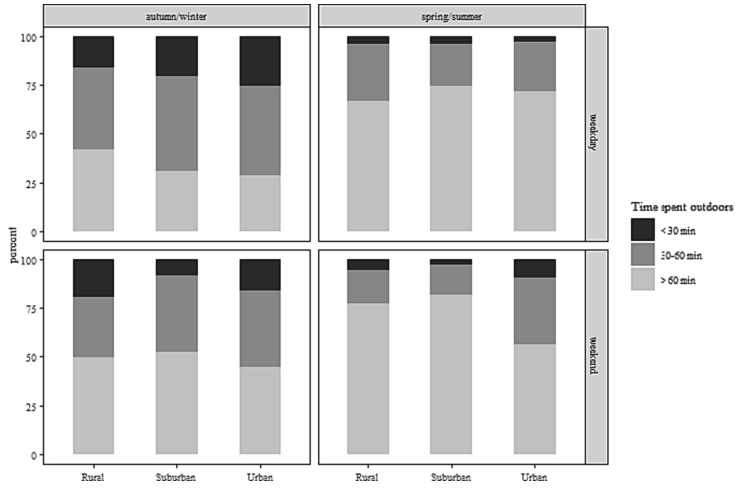

Fig. 3. Time spent outdoors for different living environments for the different seasons and time of week.

Table 3
Least squares means for QAOLS. For environment, levels with a common letter are not significantly different.

Environment	LS mean		autumn/winter	spring/summer	
Suburban	4.71 a	**Girl**	4.51	4.50	ns
Rural	4.62 a	**Boy**	4.66	4.82	sign
Urban	4.53 a		sign	sign	

Table 4
Least squares means for Perceived benefit of the outdoor environment life. For environment, levels with a common letter are not significantly different.

Environment	LS mean		autumn/winter	spring/summer	
Rural	4.80 a	**Girl**	4.77	4.69	ns
Suburban	4.79 a	**Boy**	4.77	4.82	ns
Urban	4.70 a		ns	ns	

Table 5
Least squares means for QAOLS subscale Perceived affordances. For environment, levels with a common letter are not significantly different.

Environment	LS mean		autumn/winter	spring/summer	
Rural	4.45 a	**Girl**	4.26	4.12	ns
Urban	4.38 ab	**Boy**	4.43	4.43	ns
Suburban	4.11b		ns	sign	

Table 6
Least squares means for QAOLS subscale Perceived safety. For environment, levels with a common letter are not significantly different.

Environment	LS mean		autumn/winter	spring/summer	
Suburban	4.98 a	**Girl**	4.47	4.23	sign
Rural	4.62b	**Boy**	5.00	5.07	ns
Urban	4.48b		sign	sign	

coefficient and significance level of each variable are included in tables. All models are at the 95 % confidence level.

3.3.1. Overall life satisfaction

Being a girl was significantly associated with lower life satisfaction in all models. During the autumn/winter, time spent outdoors on weekdays (but not weekends) was positively associated with life satisfaction (Model 2). However, during the spring/summer, time spent outdoors was not significantly associated with life satisfaction. After adding environmental quality variables in Model 3, behavioural variables were no longer significant in both seasons. Environmental quality was found to be positively associated with life satisfaction during both the autumn/winter ($\beta = 0.378$) and spring/summer ($\beta = 0.258$). After adding attitudinal variables in the final model, environmental quality remained a significant predictor in the autumn/winter ($\beta = 0.291$), while the perceived benefit of the outdoor environment was not found to be significantly associated with life satisfaction. However, in the spring/summer, it was the perceived benefit of the outdoor environment ($\beta = 0.237$) that was significantly associated with life satisfaction, not environmental quality. Final models accounted for 19 % of the variance in the autumn/winter and 21 % of the variance in the spring/summer.

3.3.2. Multidimensional life satisfaction

In Model 1, individuals residing in the suburban settlement ($\beta = 0.141$) had significantly higher MSLSS scores during the autumn/winter compared to those living in the urban settlement. Sex was not found to be significantly associated with MSLSS in any of the models. After introducing behavioural variables in Model 2, living environment was no longer a significant predictor. Spending 30 min or more outdoors on weekdays was found to be significantly associated higher MSLSS scores during both seasons. Nevertheless, when environmental quality variables were added in Model 3, time spent outdoors lost its significance. Instead, environmental quality was found to have a positive association with MSLSS during both the autumn/winter ($\beta = 0.566$) and spring/summer ($\beta = 0.418$). In the final model, both environmental quality (autumn/winter: $\beta = 0.385$; spring/summer: $\beta = 0.229$) and the perceived benefit of the outdoor environment (autumn/winter: $\beta = 0.265$; spring/summer: $\beta = 0.317$) were significantly associated with MSLSS during both seasons. Final models accounted for 32 % of the variance in the autumn/winter and 26 % in the spring/summer.

The analysis of the five dimensions of the scale revealed that

Table 7
Results from regression models for all dependent variables.

	Variables	SLSS		MSLSS		Self-esteem		DASS-21	
		Autumn/ winter β	Spring/ summer β	Autumn/ winter β	Spring/ summer β	Autumn/ winter β	Spring/ summer β	Autumn/ winter β	Spring/ summer β
Model 1	Sex (ref: boys)	−0.243***	−0.331***	−0.074	−0.110	−0.315***	−0.340***	0.282***	0.367***
	Suburban (ref: urban)	−0.008	0.060	0.141*	0.095	0.004	0.047	−0.055	−0.082
	Rural (ref: urban)	−0.023	0.030	0.124	0.048	−0.057	−0.019	−0.020	−0.090
Model 2	Sex (ref: boys)	−0.220***	−0.297***	−0.051	−0.074	−0.289***	−0.321***	0.262***	0.349***
	Suburban (ref: urban)	−0.021	0.056	0.124	0.075	−0.002	0.027	−0.052	−0.100
	Rural (ref: urban)	−0.048	0.045	0.104	0.045	−0.093	−0.032	0.011	−0.119
	> 1 h outdoors (weekdays)	0.215*	0.320	0.217*	0.517**	0.310***	0.313	−0.255**	−0.279
	30–60 min outdoors (weekdays)	0.188*	0.142	0.209**	0.368*	0.241***	0.253	−0.203**	−0.143
	> 1 h outdoors (weekends)	0.053	0.111	0.093	0.177	−0.095	0.077	0.109	−0.020
	30–60 min outdoors (weekends)	−0.016	0.137	0.060	0.130	−0.107	0.0004	0.128	−0.114
Model 3	Sex (ref: boys)	−0.189***	−0.242***	−0.004	0.016	−0.269***	−0.287***	0.239***	0.317***
	Suburban (ref: urban)	−0.068	0.031	0.054	0.034	−0.032	0.011	−0.018	−0.085
	Rural (ref: urban)	−0.055	0.021	0.094	0.006	−0.098	−0.047	0.016	−0.105
	> 1 h outdoors (weekdays)	0.079	0.197	0.013	0.316	0.223**	0.236	−0.156	−0.207
	30–60 min outdoors (weekdays)	0.099	0.064	0.075	0.242	0.184*	0.205	−0.138	−0.098
	> 1 h outdoors (weekends)	−0.104	0.038	−0.142	0.059	−0.195*	0.032	0.223*	0.022
	30–60 min outdoors (weekends)	−0.104	0.115	−0.071	0.093	−0.163*	−0.014	0.191*	−0.101
	Quality of Adolescent Outdoor Life	0.378***	0.258***	0.566***	0.418***	0.241***	0.160*	−0.276***	−0.149*
Model 4	Sex (ref: boys)	−0.198***	−0.259***	−0.024	−0.008	−0.276***	−0.300***	0.245***	0.333***
	Suburban (ref: urban)	−0.068	0.045	0.055	0.053	−0.031	0.022	−0.018	−0.099
	Rural (ref: urban)	−0.057	0.017	0.088	0.002	−0.100	−0.050	0.018	−0.102
	> 1 h outdoors (weekdays)	0.093	0.086	0.043	0.168	0.233**	0.152	−0.165	−0.105
	30–60 min outdoors (weekdays)	0.103	−0.024	0.084	0.124	0.187*	0.138	−0.141	−0.016
	> 1 h outdoors (weekends)	−0.108	0.071	−0.149	0.102	−0.197*	0.056	0.226*	−0.008
	30–60 min outdoors (weekends)	−0.104	0.134	−0.071	0.119	−0.163*	0.001	0.191*	−0.119
	Quality of Adolescent Outdoor Life	0.291***	0.116	0.385***	0.229**	0.179*	0.053	−0.218**	−0.019
	Perceived benefit of the outdoor environment	0.127	0.237**	0.265***	0.317***	0.091	0.179*	−0.085	−0.218**

*p < 0.05, **p < 0.01, ***p < 001.

environmental quality was significantly associated with higher satisfaction with self, family, friends, school and living environment during both seasons in Model 3. After adding attitudinal variables, it remained a significant predictor for all dimensions across seasons except for family and school during the spring/summer. The perceived benefit of the outdoor environment was positively associated with satisfaction with friends and living environment during both seasons, and with family and school during the spring/summer only. In the final model, rural participants had significantly higher satisfaction with their living environment than urban participants during the autumn/winter. During the autumn/winter, individuals who spent more than 30 min outdoors on weekdays were significantly more satisfied with self than those who spent less than 30 min outdoors on weekdays. However, on weekends, more time outdoors was significantly associated with lower satisfaction with self.

3.3.3. Self-esteem

Being a girl was significantly associated with lower levels of self-esteem compared to boys in all models and during both seasons. Adding behavioural variables revealed a positive association between time spent outdoors on weekdays and self-esteem during the autumn/winter (Model 2). In Model 3, environmental quality was significantly associated with higher self-esteem during both the autumn/winter ($\beta = 0.241$) and spring/summer ($\beta = 0.160$). Spending more time outdoors on weekdays during the autumn/winter was significantly associated with self-esteem. However, more time spent outdoors on weekends was significantly associated with lower self-esteem during the autumn/winter. These associations remained consistent in the final model. Environmental quality remained significantly associated with self-esteem during the autumn/winter ($\beta = 0.179$), but not the spring/summer. Additionally, the perceived benefit of the outdoor environment was only significantly associated with self-esteem during the spring/summer ($\beta = 0.179$). Final models accounted for 17 % of the variance during the autumn/winter and 15 % during the spring/summer.

3.3.4. Mental health

During both seasons, girls had significantly lower levels of mental health than boys across all models. In Model 2, spending more than 30 min outdoors on weekdays was significantly associated with better mental health (i.e. lower DASS-21 scores) in the autumn/winter but not

the spring/summer. In Model 3, time spent outdoors on weekends, not weekdays, was significant during the autumn/winter. However, during the spring/summer, time spent outdoors was not significant in any of the models. Environmental quality was significantly associated with better mental health in Model 3 during both the autumn/winter ($\beta = -0.276$) and spring/summer ($\beta = -0.149$). In the final model, environmental quality remained significantly associated with DASS-21 in the autumn/winter ($\beta = -0.218$), but not the spring/summer. The perceived benefit of the outdoor environment was only significantly associated with lower DASS-21 scores during the spring/summer ($\beta = -0.218$). Additionally, more time spent outdoors on weekends was significantly associated with poorer mental health (i.e. higher DASS-21 scores). Final models accounted for 15 % of the variance during the autumn/winter and 17 % during the spring/summer.

4. Discussion and implications

This study examined the relationship between the quality of outdoor life and adolescent well-being. Our findings indicate the outdoor environment can have positive effects on the well-being and self-esteem of boys and girls living in different communities in Sweden. After controlling for age, sex, living environment and time spent outdoors, environmental quality (QAOLS) was associated with higher levels of overall and multidimensional life satisfaction and self-esteem, as well as lower levels of depression, anxiety and stress. This is in line with previous research suggesting outdoor environments can offer multiple pathways to well-being including mitigation of mental health issues, psychological restoration, and the building of positive attributes and capacities (Chawla, 2015; Hartig, Mitchell, De Vries, & Frumkin, 2014; Mygind et al., 2019; Zhang et al., 2020). It should be noted, however, that due to the cross-sectional nature of the study, causality cannot be inferred.

A somewhat unexpected finding was that the relationship between environmental quality and dependent variables changed after the perceived benefit of the outdoor environment was added to final models. While environmental quality was significantly associated with higher multidimensional life satisfaction (MSLSS) during both seasons, perceived benefit replaced it during the spring/summer for overall life satisfaction (SLSS), self-esteem and mental health. However, during the autumn/winter, environmental quality remained significantly associated with all dependent variables. One possible explanation is that participants may have become more aware of the subject matter after filling out the questionnaire for the second time. Additionally, during the colder and darker periods of the year, the benefits of being outdoors may be less apparent than during the warmer months. It is also possible that environmental quality is more critical for the perception and use of outdoor environments during the autumn/winter. Prior studies from Sweden have reported reduced physical activity and school ground use during the winter (Jansson, Abdulah, & Eriksson, 2018; Pagels et al., 2016), while it has been suggested that the value attributed to children's outdoor activities by families, neighbourhoods and societies might vary across the seasons (Ergler, Kearns, & Witten, 2016). However, seasonal variations have not been extensively studied in relation to the relationship between the outdoor environment and adolescent well-being. Our findings indicate planning initiatives targeting the quality of outdoor environments during the autumn/winter may be effective in promoting more positive attitudes toward being outdoors throughout the year. Future studies should therefore look to better understand the relationship between attitudes to being outdoors and environmental quality.

Measures of life satisfaction are commonly employed to assess and compare levels of subjective well-being among adolescents (Due et al., 2019; Proctor, Linley, & Maltby, 2008). However, the outdoor environment has received little attention as a source of life satisfaction for adolescents. Research on the effect of urban greenspace on life satisfaction is prevalent in relation to the general population (Ayala-Azcárraga, Diaz, & Zambrano, 2019; Jabbar, Yusoff, & Shafie, 2021) and life satisfaction is increasingly seen as reflective of liveability (Wu, Chen, Yun, Wang, & Gong, 2022). For adolescents, school and neighbourhood influences on adolescents' life satisfaction are usually the focus (Oberle, Schonert-Reichl, & Zumbo, 2011; Proctor et al., 2008). Neighbourhoods play a central role in fulfilling the needs of adolescents, fostering a sense of community and belonging, and generating feelings of satisfaction (Moser, 2009; Pooley, Pike, Drew, & Breen, 2002). Participation in leisure activities has also been linked to life satisfaction through the fulfilment of the psychological need for autonomy, competence and relatedness (Leversen, Danielsen, Birkeland, & Samdal, 2012). Our results are in line with these findings and suggest the outdoor environment might contribute to the fulfilment of their needs and thus their satisfaction with their life as a whole, as well as specific aspects of everyday life such as friends and school.

Research suggests that adolescents' favourite places can contribute to maintaining good levels of self-esteem and self-regulation (Korpela, 2002). While previous studies on the relationship between the outdoor environment and self-esteem are somewhat inconsistent (Mygind et al., 2021; Tillmann, Tobin, Avison, & Gilliland, 2018), our findings suggest that the outdoor environment might serve as an arena for activities influencing how adolescents' feelings about themselves. Interactions with friends and others in outdoor environments are essential to adolescents' social lives and can contribute to the development of their social competence, self-identity and self-esteem (Cox, 2020; Owens, 2017). Previous studies also suggest that engagement with and activity in nature or greenspaces can improve self-esteem (Mygind et al., 2019; Owens, 2009; Tillmann et al., 2018). Additionally, participation in outdoor activities, such as sports, can improve perceived competencies and promote positive feelings about oneself (Bowker, 2006; Wagnsson, Lindwall, & Gustafsson, 2014). It has been suggested that promoting girls' participation in outdoor activities is one way to reduce sex differences in self-esteem (Dishman et al., 2006; Richman & Shaffer, 2000).

There is a growing focus on targeting and preventing mental health problems in adolescents and our results suggest the outdoor environment has potential to contribute to this work. While our findings found a negative association between environmental quality and negative emotional states, it is important to point out that individuals with mental health issues may also value the outdoor environment for its health-promoting ability. Previous studies have shown that natural and green environments can help improve coping skills (Chawla, Keena, Pevec, & Stanley, 2014; Tillmann et al., 2018) and restore emotional balance in adolescents' (Akpinar, 2021; Korpela, Kyttä, & Hartig, 2002; Mennis, Mason, & Ambrus, 2018). Despite the well-established benefits of natural and green environments, the specific characteristics of these settings that are most beneficial for adolescent mental health are not well understood (Fleckney & Bentley, 2021). For example, while adults may prefer serene environments, adolescents may seek out less serene settings for safety reasons (Akpinar, 2021). Additionally, the relationship between poor living environments and mental health problems works in both directions (Dupéré, Leventhal, & Vitaro, 2012; Kim, 2010), with individuals with mental health problems more likely to perceive their surroundings as unfavourable (Fagg, Curtis, Clark, Congdon, & Stansfeld, 2008). This highlights the need for further research to identify the specific qualities of outdoor environments that promote self-regulation and restoration in adolescents, as well as the potential for improving living environments to prevent mental health problems.

Based on our findings, it is clear that there are seasonal differences in the amount of time adolescents spend outdoors, with more time spent outdoors during the spring/summer compared to the autumn/winter. Adolescents also spent more time outdoors on weekends compared to weekdays during the autumn/winter, but not during the spring/summer. Interestingly, the study found that more time spent outdoors on weekdays was positively associated with self-esteem and satisfaction with self during the autumn/winter, while more time spent outdoors on weekends was negatively associated with self-esteem (as well as

satisfaction with self) and mental health. While this might seem counterintuitive, the findings suggest adolescents might spend time outdoors for different reasons throughout the year. One possible explanation could be that going outdoors during the autumn/winter may be of particular importance for individuals with low self-esteem or mental health issues. For example, it could be that they spend more time outdoors in order to escape unsupportive environments at home. Another possible scenario could be that these individuals may be less involved in scheduled indoor activities (e.g. handball training) during the autumn/winter, making them more reliant on the outdoor environment. In addition, research also suggests even short periods of time outdoors can be beneficial. For example, breaks as short as 4 min during school time can be enough to restore attention levels (Ma, Le Mare, & Gurd, 2015). Thus, encouraging short periods of time outdoors can potentially have positive effects on adolescent well-being. However, it is difficult to draw conclusions on the relationship between time spent outdoors and well-being due to a lack of longitudinal data and other confounding factors. Qualitative research is also needed to shed more light on these differences.

Following the start of the Covid-19 pandemic, the outdoor environment received increased attention in relation to well-being (Jackson, Stevenson, Larson, Peterson, & Seekamp, 2021; Rosen et al., 2021; Venter, Barton, Gundersen, Figari, & Nowell, 2021). In Sweden, while some studies have reported an increase in outdoor participation (Hansen, Beery, Fredman, & Wolf-Watz, 2022; Hedenborg, Fredman, Hansen, & Wolf-Watz, 2022), others have pointed out the cancelation of children's out-of-school activities (Bohman, Ryan, Stjernborg, & Nilsson, 2021; Jenholt Nolbris et al., 2022). In line with this, our results are inconclusive, with little perceived change in time spent outdoors for most participants. This is consistent with a recent study that found no significant changes in adolescent health behaviours during the pandemic (Chen et al., 2022).

Contrary to previous studies (Larson et al., 2018; Winkvist et al., 2015), there were no significant differences in time spent outdoors between boys and girls, except for boys spending more time outdoors on weekdays during the spring/summer. One explanation could be that perceived safety issues are more of a concern for girls more during the lighter spring/summer months, while during winter months, the weather and darker evenings influence both boys' and girls' time spent outdoors. Recent studies from Sweden suggest both boys and girls generally feel safe when outdoors, but point out that whereas boys are more comfortable being alone, girls often seek out the company of others to feel safe (Johansson, Laflamme, & Eliasson, 2012; van der Burgt, 2013). In contrast to this, we found girls had significantly lower perceived safety scores during both seasons. Girls also had significantly lower environmental quality scores overall across seasons, which indicates the fit between girls and their outdoor environments is poorer than for boys. Moreover, girls scored lower on perceived affordances and independent mobility during the spring/summer. Our findings suggest that safety concerns may limit their opportunities to engage with and learn about their environment (Cox, 2020; Kyttä, 2004). Given that girls generally report lower levels of well-being and self-esteem than boys, these findings offer valuable insights into some of the barriers preventing girls from taking advantage of the benefits outdoor life may provide for their well-being.

While our results suggest there were no major differences between living environments in the overall quality of adolescents' outdoor life, analysis of QAOLS subscale scores revealed some differences. For example, rural adolescents had significantly higher perceived affordances scores across seasons compared to suburban adolescents, while suburban adolescents had significantly higher levels of perceived safety than their rural and urban counterparts. While much of the research on outdoor environments and well-being tends to focus on urban areas, our study underlines the importance of including a variety of communities that are representative of where adolescents live. Future research that explores how adolescents meet their needs in different living environments throughout the year can provide important knowledge on how to create more youth-friendly environments, with possible benefits for outdoor life and well-being.

4.1. Strengths and limitations

The study utilised self-report measures to assess participants' use of outdoor environments in their daily lives, as recommended in previous research studying the relationship between outdoor environments and well-being (Fleckney & Bentley, 2021; Zhang et al., 2020). However, it is important to acknowledge that self-report measures have limitations, as they do not capture actual exposure or use. To increase the reliability of findings, future studies should incorporate objective measures in addition to self-report measures. Additionally, there is currently a lack of standardisation in measures of environmental quality and definitions of different outdoor environments, making comparisons between studies difficult. The development of a standardised measure, such as the QAOLS used in this study, may increase the comparability of future research.

To our knowledge few studies have examined the relationship between the outdoor environment and adolescent well-being across seasons and different living environments. Data collection at two different time points during the pandemic also allowed us to comment on how the pandemic might have affected adolescents' outdoor lives as a whole. The Covid-19 pandemic did, however, present some issues for data collection. Because we could not visit all schools in person, instructions were provided for teachers supervising data collection. However, our absence means we are not able to comment on the data collection procedure. Furthermore, the absence of teachers during data collection led to participants filling in the questionnaire at different times, which may have affected the accuracy of comparisons between seasons.

It is also important to note that the study had limitations in recruiting participants from urban areas, with "survey burnout" and "lack of time" being cited by several schools we contacted. This suggests a heavy focus on urban adolescents' lives. While the four schools in the urban sample are all located in neighbourhoods with different socioeconomic conditions, poor response rate from three of the more inner-city schools meant the majority of participants attended a school in an area with above average socioeconomic conditions for this city. The outdoor environment is also not as representative of the rest of the city. Finally, this paper presents only the quantitative findings of the study and does not provide detailed information on environmental characteristics or outdoor activities that may contribute to well-being. Subsequent papers will present qualitative findings that will help shed further light on the findings presented in this paper.

5. Conclusion

The mental health and well-being of Swedish adolescents is a growing public health concern. Our study points to the potential of outdoor life to promote and maintain adolescent well-being and self-esteem. While it is widely acknowledged that girls often experience poorer mental health and self-esteem than boys, our findings suggest that their specific needs may not be met in their everyday outdoor environments. Moreover, our research emphasises the importance of recognising community-level differences in outdoor environments, including seasonal variations. These findings collectively underscore the ongoing need to better understand the characteristics and qualities of outdoor environments that are accessible to diverse groups of adolescents. This understanding has far-reaching implications for urban planning, public health and interventions targeting the promotion of well-being in different groups.

CRediT authorship contribution statement

Mark Wales: Formal analysis, Investigation, Methodology, Project

administration, Visualization, Writing – original draft, Writing – review & editing. **Eva Hoff:** Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing. **Fredrika Mårtensson:** Conceptualization, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. **Jan-Eric Englund:** Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

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

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.landurbplan.2024.105023.

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This thesis examines the role of outdoor life for the well-being of 12-15 year olds across urban, rural and suburban settings in southern Sweden. Despite the changing context of adolescence, the findings indicate that outdoor life still matters and can foster adolescent well-being through multiple and overlapping pathways. Societies are urged to adopt strategies in planning and policy that support adolescents' outdoor lives and the establishment of outdoor spaces tailored to their specific needs and preferences.

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