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Girls Outdoors: key moments for (dis)engagement with nature

Reciprocal Care for Nature and Wellbeing (JHI-C6-1)

Work Package 2

Leonie Schulz, Esther Banks, Anna Williams, and Katherine N Irvine

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Contact: For further information, please contact Leonie Schulz (leonie.schulz@hutton.ac.uk) or Katherine Irvine (kate.irvine@hutton.ac.uk), Social, Economic and Geographical Sciences Department, The James Hutton Institute, Aberdeen, AB15 8QH, Scotland, UK.

Key Messages

- **Pre-teen girls' nature engagement is evolving.**
Outdoor behaviours are not in decline but shifting in response to girls' growing needs for autonomy, social connection, and self-expression. These shifts reflect developmental transitions rather than disengagement.
- **Connection to nature is dynamic and negotiated.**
Enjoyment of nature coexisted with discomfort, boredom, or frustration, especially around issues like weather, messiness, or perceived safety. These findings highlight that nature engagement is rarely all-or-nothing; instead, it evolves with context, mood, and identity. Supporting girls' connection to nature means recognising and validating this complexity.
- **Technology is both a tool and a tension.**
Phones enabled independence, navigation, and documentation, but also competed with outdoor time through screen-based leisure. Future engagement strategies must integrate technology creatively rather than treat it as a barrier.
- **Peer dynamics shape outdoor access and meaning.**
Friends were central to whether, how, and where girls spent time outside. Social inclusion or exclusion (online and offline) strongly influenced engagement with the outdoors.
- **Developmental needs should guide outdoor provision.**
Pre-teen girls seek challenge, novelty, and relevance. Outdoor environments and programmes should align with their psychological needs, not replicate early childhood play formats.
- **Outdoor learning is memorable but inconsistently delivered.**
Nature-specific experiences in school left lasting impressions but often tapered off in upper primary. This signals a missed opportunity to sustain engagement through adolescence.
- **Barriers are relational and systemic.**
Girls' access was constrained by adult control, poor infrastructure, transport issues, and exclusion from male-dominated spaces. Addressing these relational and systemic barriers is essential to achieve equity.
- **Enablers are powerful but underutilised.**
Support from family and friends, outdoor learning programmes (e.g. Scouts, Guides, Bikeability, residential), and access to appealing spaces (well-equipped parks, clean outdoor spaces) consistently motivated engagement. Positive use of technology (for safety, independence, meetups, and photography) also supported outdoor activity, as did food-related experiences (picnics, barbecues, campfires), the desire to stay fit and healthy, and the sense of achievement, novelty, freedom, or peace that nature provides. Building on these enablers offers a constructive pathway to sustain and expand girls' connection with the outdoors.

- **This age group represents a window of opportunity.**
Early adolescence is a pivotal time when identities, routines, and values are still forming. Responsive interventions—socially meaningful, youth-led, and well-designed—can ensure nature remains part of their evolving world.

Executive Summary

Background and Rationale

Spending time outdoors in natural environments during childhood is linked to positive outcomes in health, wellbeing, social development, and environmental stewardship (Wells & Lekies, 2006; Chawla, 2020; MacLean et al., 2023). Yet, existing research consistently demonstrates a gender gap in engagement with outdoor spaces, alongside a broader “teenage dip” in nature participation (Dobson et al., 2019; Richardson et al., 2019). Girls are known to access outdoor recreation less frequently, and their perspectives remain underrepresented in nature-engagement research.

The Girls Outdoors (GO) Study addresses this gap through a longitudinal study, incorporating a life-course perspective, that follows a cohort of girls from age 10-12 (Primary 7) into early adolescence (Secondary 1–2). Wave 1 (2023–24) explored how pre-teen girls engage with outdoor spaces, documenting the enablers and barriers that shape their relationship with nature during this transitional stage.

Aims and Objectives:

Wave 1 of the study set out to:

1. **Explore** pre-teen girls’ engagement and disengagement with the outdoors.
2. **Identify** factors shaping these behaviours, including social, environmental, and developmental influences.
3. **Generate insights** to inform policy, practice, and investment in equitable outdoor provision for young females.

Methods:

- **Mixed-methods design:** survey (structured interview) and semi-structured interviews, including a ‘*River of Life*’ timeline. Applying a life course perspective allowed us to explore how outdoor behaviours emerged and evolved, and how present engagement with outdoor environments is influenced by earlier experiences and broader socio-historical factors (Elder et al., 2003; George, 2003).
 - **Survey scales:** Nature Connection Index (Richardson et al., 2019), Illustrated Inclusion of Nature in Self (Kleespies et al., 2021), and nature engagement capabilities scale
- **Sample:** 24 girls in Primary 7 (ages 10–12) in a large urban area in Scotland
- **Analysis:** Thematic analysis of qualitative data with descriptive statistics from survey responses.

Key Findings:

1. Outdoor engagement patterns

- **Types of outdoor spaces:** Participants primarily accessed nearby, familiar outdoor spaces (gardens, local parks, grassy areas). Weather, clothing, and available age-appropriate play

equipment were decisive factors shaping both the amount of time spent outdoors and the types of spaces chosen.

- **Overall affinity with nature:** Most participants expressed positive feelings, with high agreement on survey statements such as *‘I find being in nature really amazing’* and *‘Being in nature makes me very happy’*. Participants often described happiness, calm, wonder, and beauty in relation to flowers, trees, wildlife, or skies. These sensory encounters frequently anchored their appreciation of nature.
- **Social and identity dimensions:** While many girls identified strongly with nature, the statement *‘I feel part of nature’* revealed the greatest divergence, with some expressing deep connection and others uncertainty or ambivalence. For many, nature was as much a social space as a personal one, valued for time with family, friends, or pets. Self-perceptions of being ‘an outdoorsy person’ were often conditional, shaped by seasonality, social influences, and changing routines.
- **Familiarity with different types of outdoor spaces:** Nearly all participants knew how to get to their local outdoor spaces, reported positive past experiences. While many girls felt comfortable in familiar outdoor spaces, confidence declined when facing new or unpredictable environments. Some participants described mixed feelings, acknowledging enjoyment of nature alongside aversions (e.g. mud, bugs, wet or cold weather) or competing pulls from technology and indoor routines. Self-perception as a “nature person” was conditional and context-dependent, reflecting identity development in transition.
- **Practical competence and adaptability:** Most participants could describe strategies for dealing with outdoor challenges (e.g., blocked paths, flooding). However, approaches ranged from pragmatic problem-solving to reliance on adult support, with confidence shaped by past experience, preparedness, and social reassurance.
- **Interest in and knowledge about the natural world:** Many participants showed genuine curiosity and enthusiasm for animals, ecosystems, and environmental change, often reinforced by family, school, or media influences. For some, this interest was deep and scientific; for others, it was more sensory or playful. Ecological knowledge (e.g. species identification), however, was limited, particularly around plants.
- **Care for nature:** Almost everyone expressed care for wildlife and nature. Respectful behaviours (e.g. avoiding littering, protecting plants, being mindful of animals) were often expressed through small, conscientious acts. Similarly, while most had experience with litter-picking, few knew how to independently engage in caring for outdoor spaces otherwise, revealing a gap between positive attitudes and practical awareness.
- **Overall:** The interviews indicated that the girls had a good base of familiarity with, care for, and enjoyment in outdoor spaces but with variable confidence, knowledge, and self-identification. Strengthening outdoor self-identity, ecological literacy, and independent opportunities for exploration and stewardship could help sustain engagement as they transition into adolescence.

2. Changes to engagement with the outdoors

- **Mixed trajectories of change:** Around half of the participants reported spending less time outdoors than in childhood, often due to technology, tiredness, or shifting interests. Others reported more time outdoors, usually linked to greater independence, confidence, or supportive friendships. A smaller group reported no change or were uncertain.
- **Shifting patterns of activity:** Engagement moved away from family-led trips and imaginative play towards more peer-centred, local outdoor space use. Girls described reducing long

walks, play equipment use, and “messy” play, while increasing independent trips to parks, socialising outdoors with friends, and using phones as part of their outdoor experience.

- **Influence of technology:** Phones and gaming consoles often displaced outdoor time, with many girls and parents linking increased screen use to reduced outdoor activity. However, phones also acted as enablers of independence, offering safety, connectivity, and new ways to engage outdoors (e.g. photography, messaging, video-making).
- **Personal and developmental transitions:** Emerging autonomy, changing preferences, and growing self-awareness shaped girls’ choices. Activities once enjoyed (imaginative games, climbing, bug-hunting) were increasingly seen as “too young” or embarrassing, while new interests (indoor hobbies, sports, or digital activities) competed for attention.
- **Independent outdoor use:** The ability to go outside without adults was a turning point, linked to confidence, trusting parents, friends and having a phone. Local parks and outdoor spaces became central, although limited independence sometimes meant fewer opportunities to reach more varied or adventurous spaces.
- **Friendship dynamics:** Peer relationships were highly influential. Friends who preferred indoor activities could limit outdoor engagement, while outdoor-oriented friends could encourage it. Shifting friendship groups, cliques, and exclusions (e.g. boys dominating football pitches) created barriers, while supportive friends enabled sustained outdoor time.
- **Overall:** Engagement was not simply declining but being reshaped by a complex interplay of developmental, social, and technological factors. Outdoor use increasingly reflected peer-oriented, independent, and localised patterns, with phones acting as both barrier and facilitator. Friendship networks and access to safe, varied local outdoor spaces emerged as critical determinants of whether outdoor time was sustained or reduced.

3. Barriers to and enablers for nature engagement

- **External barriers:**
 - **Environmental change and weather conditions:** Deforestation, storm damage, along with cold and/or wet weather reduced opportunities for play and exploration.
 - **Access and transport:** Lack of transport and poor cycling infrastructure limited girls’ ability to reach desirable or different types of outdoor spaces.
 - **Social exclusion and gender dynamics:** Boys’ dominance of football pitches and peer exclusion discouraged participation.
 - **Facilities:** Parks inappropriately designed for this age group (e.g. only grass, equipment for younger children) discouraged outdoor time in these spaces.
 - **Adult restrictions:** Safety concerns and parental restrictions limited independent access.
 - **Technology as competition:** Phones and consoles often kept girls indoors, particularly in darker and colder months.
- **External enablers:**
 - **Family and peer encouragement:** Parents provided planning, transport, and supervision; peers offered companionship and motivation. Both were critical to outdoor participation.
 - **Pets:** Dog walking created regular outdoor opportunities and (often) enjoyment.
 - **Technology as facilitator:** Phones supported independence, safety, and coordination with friends, and sometimes encouraged creative engagement with nature (e.g. photography).

- **Structured outdoor programmes:** Clubs, Scouts, holiday camps, and school activities opened access to otherwise unavailable spaces and experiences.
- **Infrastructure and appealing spaces:** Parks with variety, natural features (trees, rivers, beaches), and amenities (cafés, toilets) encouraged regular and enjoyable use.
- **Internal barriers:**
 - **Aversion to natural elements:** Many girls became more sensitive to mud, bugs, or messiness with age, reflecting changing self-presentation concerns.
 - **Fears and safety anxieties:** Concerns about slipping on ice, being alone outdoors, or encountering strangers reduced confidence.
 - **Dislike of outdoor clothing:** Wellies, waterproofs, and thick socks were viewed as uncomfortable and unfashionable by some participants, discouraging their outdoor play in poor weather.
 - **Low motivation and health issues:** Tiredness, allergies, asthma, or competing activities made outdoor time less appealing.
- **Internal enablers:**
 - **Health and physical activity:** Girls valued outdoor play for fitness, wellbeing, and fresh air.
 - **Curiosity and enjoyment of nature:** Exploration of animals, plants, and ecosystems (locally and globally) fostered curiosity, pride, and imaginative aspirations (e.g. dreams of being zoologists).
 - **Personal preferences:** Girls valued novelty, food-related activities (e.g. outdoor cooking), peacefulness, spaciousness, variety, and above all the presence of friends or family.
- **Overall:** The participants' engagement with outdoor spaces was shaped by a dynamic interplay of external structures (transport, facilities, adult rules, social inclusion), internal dispositions (confidence, curiosity, fears), and enabling factors (phones, pets, outdoor programmes). Adult and peer involvement was often decisive in whether girls went outside, underscoring the socially embedded nature of their outdoor lives. Effective interventions must tackle structural barriers (safety, transport, facilities) while strengthening enablers (social support, digital tools, appealing, age-appropriate infrastructure). Recognising girls' own motivations (health, friendship, curiosity, novelty) is critical for creating inclusive and developmentally relevant outdoor opportunities.

4. Potentially impactful outdoor experiences

- **Outdoor learning at school**
 - **Provision:** All girls had some form of outdoor learning across nursery and primary, but provision was highly variable. Many girls recalled outdoor learning as a fond but past memory, expressing a wish for more opportunities in later years of primary school.
 - **Types of outdoor learning:** In many schools, outdoor learning was limited to physical education (PE) or subject-based tasks outdoors (e.g. maths with chalk, spelling, or art), often dependent on weather or teacher interest. More meaningful nature-based learning (gardening, local river studies, species identification, litter picks) was rarer, usually dependent on access to nearby outdoor space or visiting practitioners.
 - **Bikeability stood out as especially impactful:** This programme not only developed cycling skills but boosted confidence and independence, with several girls cycling or considering cycling to school as a result.

- **Off-site outdoor learning**
 - **Residentials:** Nearly all participants had experienced, or were about to experience, a P7 residential trip, usually their first extended time away from parents. These trips provided exposure to novel natural environments (e.g. Scottish Highlands), as well as first-time experiences of activities like canoeing, abseiling, or archery. Residentials were remembered as socially significant (time with friends, dorms, shared adventures) and emotionally memorable (campfires, food, freedom from adults).
 - **Camps/ activity centres:** Similar benefits were described from Scouts/Guides camps and other organised activity programmes, though parents noted variation (e.g. Guides often more ‘crafty’, Scouts more outdoor-oriented).
- **Family outdoor experiences**
 - **Family time:** Girls described highly positive family experiences outdoors, ranging from visits to local parks and rivers to more ambitious hiking or cycling trips across Scotland. These outings often created enduring memories and helped establish family routines of outdoor life.
 - **Shifting patterns:** Some patterns were beginning to shift, with several girls preferring to spend free time with peers rather than family as their social priorities changed.
- **Overall:** Outdoor learning, residentials, camps, and family trips all represented potentially transformative outdoor experiences. These moments were often remembered vividly and positively, shaping confidence, autonomy, and emotional connection to nature. Crucially, they were not equally distributed: girls in schools with limited green spaces around school grounds or fewer outdoor programmes reported fewer opportunities, while those with structured access (Bikeability, residentials, external outdoor instructors) described stronger impacts. As the study continues, it will be important to examine how such “critical experiences” influence ongoing outdoor use and nature engagement as girls move into adolescence.

Implications

- **For Policy:**
 - Although national policies (Curriculum for Excellence, Learning for Sustainability, Play Vision) emphasise the importance of outdoor learning, delivery remains inconsistent; stronger alignment is needed to ensure outdoor learning is embedded across all years of primary school and beyond.
 - Mandate and resource gender-sensitive planning in national and local policy frameworks to close the outdoor engagement gap, ensuring that design standards and funding streams explicitly support safe, inclusive, and socially relevant spaces for girls.
- **For Practice:**
 - Support schools to sustain outdoor learning into later primary and secondary years.
 - Recognise mobile phones as tools for safe independence rather than only as barriers.
 - Co-design interventions with girls to ensure resonance with their lived realities.
- **For Research:**
 - Longitudinal data from Waves 2 and 3 will map how these early patterns develop.
 - Future research could explore interventions that leverage social and digital dynamics to reframe outdoor engagement as both peer-oriented and identity-relevant.

Conclusion

Wave 1 of the Go study indicates that pre-teen girls are not disengaging from nature outright; they are renegotiating their outdoor habits within the contexts of development, friendships, and structural inequalities. These insights highlight the urgency of designing policies, programmes, and spaces that sustain and adapt nature engagement at the point where childhood play is giving way to adolescent identities. Without such support, the gender gap outdoors is likely to widen; with it, girls' existing capabilities and motivations could be harnessed to foster lasting engagement with the outdoors.

Abbreviations and Definitions

GO	Girls Outdoors
OL	Outdoor learning
Outdoor space	Any area located outside, which does not necessarily include natural features (e.g. school playgrounds, town squares, sports courts).
Green space	A type of outdoor space that includes at least some natural elements such as grass, trees, or plants (e.g., parks, gardens, wooded areas).
Blue space	A type of outdoor space centred on water environments (e.g. rivers, lochs, reservoirs, beaches, coastal areas).
Outdoors	An umbrella term encompassing both outdoor spaces and green/blue spaces.

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1. Introduction

An overarching and longstanding interest of the Scottish Government is in increasing use of outdoor spaces. Encouraging, managing, and investing in this behaviour has cross-sectoral policy significance relating to planning, environment, public health, tourism, and education. As such, recreational use is a vital consideration in land management decisions, with important environmental and societal implications tied to how people engage with nature. For example, while increased engagement with the outdoors during the COVID-19 pandemic was widely welcomed (Armstrong et al., 2021), there was an unfortunate rise in undesirable behaviour (e.g. leaving litter, lighting fires in sensitive areas; see [Irresponsible Camping in National Park](#)).

The aim for the Reciprocal Care for Nature and Wellbeing project is to investigate possibilities and constraints for building capacities for reciprocal nature engagement through aspects of environmental settings (type, quality), users (barriers, behaviours) and mechanisms for benefit (green prescribing, outdoor learning). Our use of the language ‘reciprocal nature engagement’ reflects a move toward a less utilitarian framing of the people-nature connection than might be suggested in phrases such as ‘use of the outdoors’ (see Irvine, Brown & Thompson, 2024 for overview). The overall project addresses the increasingly recognised need to foster conditions that support a reciprocal relationship between people and the environment - one that nurtures human communities while encouraging active care for the natural world.

1.1 Rationale for the Girls Outdoors Study

Spending time outdoors in natural environments during childhood positively affects adult wellbeing, nature connection, frequency of engagement with the outdoors, and environmental stewardship behaviours (e.g. MacLean et al., 2023; Wells & Lekies, 2006; Ward-Thompson et al., 2008). Recent reviews highlight the positive and wide-ranging impact of time spent outdoors, including during outdoor learning/education, on children and young people (age 3-18 years old), including academic, health and wellbeing, interpersonal and social, confidence, skill, building, and behavioural (Chawla, 2020; Christie et al., 2016; MacLean et al., 2023).

The frequency of nature contact may, however, shape the extent to which natural environments deliver benefits to marginalised population subgroups (Colley, Irvine & Currie, 2022). Compared to adults, young people are less likely to spend time outdoors (Oppliger et al., 2019) with a widely acknowledged ‘teenage dip’ in young people’s engagement in outdoor activities, especially in the early teenage years (Richardson et al., 2019). Additionally, there is a recognised ‘gender gap’ in engagement with the outdoors (Dobson et al., 2019; Colley et al., 2022). Parks and recreational areas are used differently – and generally less often – by girls than boys (Evenson et al., 2016) and over time, females’ experience of, and engagement with, the outdoors changes.

Young girls are thus an important population group that are known to participate in outdoor recreation less frequently. The Girls Outdoors (GO) Study seeks to shed insight specifically on the experience of pre-teen/teenage girls in different types of outdoor settings. It utilises a life course perspective which considers the temporal context of behaviour, viewing behaviour from a developmental standpoint, where focus is placed on an individual’s unfolding sequence of roles and experiences throughout life and the transition points that mark changes in these across the study (Elder et al., 2003). Using a life course lens helps to illuminate the points at which, and why, this group (dis)engages with the outdoors, their behaviours in, and their relationship with the outdoors.

This study thus offers in-depth insights and gives a voice to a group who are seldom the focus of nature-engagement research. These insights could inform the design, management, improvement of, and investment in places and spaces that support nature engagement by – and its benefits for – this underrepresented group. More widely, insights from the study could support development of initiatives to promote outdoor recreation amongst young females, including consideration for design of and training for outdoor learning/ outdoor education programmes, policy, and investment as a mechanism to facilitate nature engagement.

1.2 Aims and objectives of the Girls Outdoors Study

The GO study is following a cohort of girls aged 10/11 (Primary 7) in Wave 1, through their transition to secondary school in Wave 2 at age 11-12(13) (Secondary 1), and into their teenage years at age 12-13(14) (Secondary 2) in Wave 3. The study aims to explore the personal experiences of pre-teen to teenage girls' (non)engagement with the outdoors. Its specific objectives are to:

1. Explore, understand, and document young females' (non)engagement with the outdoors leading up to and during their pre-teen to teenage years.
2. Identify factors, such as the quality of outdoor spaces, that influence their (dis)engagement.
3. Provide insights to inform policy and practice on the provision and accessibility of safe outdoor spaces for this demographic.

This in-depth field investigation will pay particular attention to: (i) personal experience of outdoor space and recreational patterns; (ii) the temporal relationship with and benefits derived from nature; (iii) perceived quality of outdoor spaces; (iv) nature engagement capabilities and care for nature; and (v) identifying the moments of change in life that affect increased/decreased engagement with nature.

To achieve our objectives, we have structured the four-year longitudinal study (2023–2027) into three Waves of data collection. The study employs a developmental design, where methods for Wave 2 are refined based on findings from Wave 1, and methods for Wave 3 are further refined using insights from both Waves 1 and 2. This adaptive approach builds in flexibility, allowing methods and research questions to be adjusted as needed to stay effective and relevant. Each wave is designed to explore specific aspects of outdoor engagement that align with participants' experiences over time. The next section will outline the aspects that Wave 1 has focussed on.

1.3 Wave 1 of the Girls Outdoors Study

Wave 1 of the GO Study explored how pre-teen girls (ages 10–12) in Primary 7 (P7) engage with outdoor spaces and nature. The aim of this first Wave was to establish a baseline understanding of their outdoor experiences, nature connectedness, and the social, environmental, and personal factors influencing their engagement. This work provides insights into an underrepresented group during a pivotal developmental stage and supports efforts to promote more meaningful, equitable, and sustained outdoor engagement.

The study used a mixed-methods approach, combining a survey with interviews involving both the girls and their parents. Tools included the 'River of Life' timeline to map key life events and outdoor experiences, as well as scales assessing nature connectedness and capabilities (see Section 2). This approach allowed the research team to explore not only current patterns of

nature engagement but also how preferences, perceptions, and interactions with nature have evolved since early childhood.

The findings contribute to understanding the barriers to and enablers for outdoor engagement, ranging from technology and facilities in outdoor spaces to internal factors like fears and safety concerns, motivation and (dis)like of outdoor elements and clothing. They also provide insights into how to improve outdoor spaces and support school-based outdoor learning. This research report is intended to identify emerging themes and priorities from Wave 1. It will help inform the design of future data collection (Waves 2 and 3) and support discussions on translating findings into practice, policy, and place-based improvements.

Following the methodology below, the report is structured into four main sections, followed by a discussion, conclusions, and implications:

1. **Outdoor engagement patterns** – An overview of how frequently and in what ways the girls engage with nature, including the types of outdoor spaces and the factors influencing that engagement.
2. **Life events and outdoor engagement** – Insights from semi-structured interviews (the ‘River of Life’ timeline), exploring how key life moments, transitions, and broader contexts are shaping the girls’ engagement with the outdoors.
3. **Barriers to and enablers for nature engagement** – A focus on both external (e.g. access, technology) and internal (e.g. confidence, motivation) factors, as well as the girls’ views on improving outdoor spaces.
4. **Potentially impactful outdoor experiences** – Insights gained from semi-structured interviews into potentially impactful outdoor experiences, such as school-based outdoor learning, residential trips, and family time spent in nature.

The findings lay the groundwork for future research and action aimed at enhancing nature engagement for pre-teen girls.

2. Research design

Wave 1 of the GO study aimed to establish a baseline by investigating patterns of engagement and disengagement with the outdoors from early childhood to the present (when interviews took place for Wave 1 between November 2023 and March 2024). This first Wave of data collection focused on understanding initial experiences, key life events, and enablers/barriers influencing outdoor engagement. ***For confidentiality reasons, all names of participants, their family members, friends, other individuals, and place names have been replaced with pseudonyms.***

2.1 Sampling

The study recruited 24 pre-teen girls (aged 10–12, Primary 7) from a large urban case study area. Recruitment efforts were guided by the aim of capturing a diverse sample, with particular attention paid to variation in ethnic background, socioeconomic status, and the level of access to outdoor spaces in participants' neighbourhoods.

To achieve this, schools were selected as the primary recruitment channel. This decision was made to avoid the demographic bias that can arise from recruiting through community

organisations or extracurricular clubs, which often consist of more specific or homogenous populations. The initial recruitment strategy targeted schools with known variation in pupil demographics, informed by factors such as free school meal entitlement (used as a proxy for socioeconomic status), local environmental features, and available ethnicity data. A shortlist of schools was drawn up based on these diversity indicators. However, as uptake for involvement in the study was low, outreach was expanded to include additional schools as well as local Girl Guides groups. Of the 24 individuals who took part in the study, one was recruited via Girl Guides with the remaining enrolled through twelve schools.

Recruitment through schools presented a number of challenges. First, contacting schools required navigating multiple layers of gatekeeping: the Scottish Government, the local authority, head teachers, class teachers, and finally parents/carers. At each stage, recruitment depended on the willingness of various people to engage with us and our research. Schools are consistently under pressure, and many have limited capacity to accommodate extracurricular activities. To make our visits more attractive to schools, we developed a reciprocal model of engagement in line with the ethical principles of the project: rather than just asking schools to “make space” for us, we offered something in return. Specifically, we designed an interactive session aligned with the *My World of Work* curriculum framework, which introduced pupils to different types of science at the James Hutton Institute, including social science, and showcased career pathways for women and girls in STEM. These sessions served multiple purposes: they provided a tangible benefit to schools, gave pupils the experience of learning about science, and helped generate enthusiasm for participating in a social science project.

Second, the process was resource-intensive. It involved repeated emails, phone calls, and meetings to secure head teachers’ agreement, followed by multiple school visits to deliver sessions and build trust. In practice, the recruitment process was iterative and adaptive. Some schools also promoted the project in newsletters or bulletins, while others required more hands-on engagement. Parallel outreach through Girl Guides was trialled as a complementary strategy, with one participant recruited this way.

After the interactive sessions, the GO project was introduced to pupils, who were given a handout, including a letter of invitation and a form to register their interest. The third challenge now relied heavily on the pupils who were interested themselves: they had to remember to show the materials to their parents and discuss the project with them, after which the parents would either return the form to school asking us to contact them, or directly phone, text, or email us to set up a discussion to find out more about the project. Each of these steps represented a potential drop-off point. Across contexts, building relationships and trust was critical, particularly with parents, who needed clear explanations of the research process, reassurance about ethics and confidentiality, and open channels of communication.

While recruitment required navigating multiple challenges, these efforts paid dividends. The approach not only resulted in a diverse sample of participants but also fostered goodwill and stronger relationships with schools. This relational groundwork created a foundation for sustained collaboration, supporting both future data collection and wider engagement with schools and communities.

2.2 Research questions

Wave 1 was guided by six research questions (Table 1) designed to explore the type, extent, and influences on pre-teen girls’ engagement with outdoor spaces. These questions focused on: (1)

recent patterns of outdoor engagement, (2) participants' perceptions of and connection to nature; (3) their perceived capabilities and experiences in engaging with the outdoors; (4) key life events and transitions shaping this engagement; (5) experiences of different types of outdoor spaces and activities; and (6) the evolving enablers and barriers that influence outdoor engagement. Together, these questions provided a framework for understanding how personal, social, and environmental factors influence the girls' engagement with different types of outdoor spaces.

Table 1: Research Questions Wave 1: Girls Outdoors Longitudinal Study (2023-2024)

	Research Questions Wave 1: Girls Outdoors Longitudinal Study
1	What are recent patterns of engagement with different types of outdoor spaces amongst the participants?
2	How do the participants perceive nature and reflect on their connection to it and their interest in caring for it?
3	How do the participants perceive their capabilities and experiences related to engaging with outdoor spaces?
4	What key life events and transitions relate to participants' engagement with outdoor spaces?
5	What are the participants' experiences of different outdoor spaces and activities?
6	What enablers and barriers impact participants' engagement with outdoor spaces, and how have these evolved across the study?

2.3 Structured interview (survey)

The structured interview (survey) was designed to provide an overview of key topics related to outdoor engagement amongst participants. Developed with input from the project's Steering Group, the survey incorporated quantitative measures to assess nature connectedness and patterns of engagement with different types of outdoor spaces, as categorised by Natural England in The Children's People and Nature Survey for England (Natural England, 2023). These measures were adapted from established tools, including Natural England's People and Nature Survey (PANS) dataset (2020), NatureScot resources, and the Nature Connection Index (Richardson et al., 2019). In addition, a set of statements developed to assess nature engagement capabilities (Irvine et al., in preparation) was included and linguistically simplified to ensure age-appropriate comprehension.

Administered at the start of each session, the structured interview was delivered verbally rather than as a self-completion questionnaire to enhance participant engagement and ensure consistent data quality. This method yielded both quantitative and qualitative data: the use of standardised questions allowed for comparability across participants, while the integration of open-ended follow-up prompts provided essential depth and nuance.

The combination of structured questions and qualitative elaboration was vital to the integrity of the research. It enabled a richer and more accurate understanding of how pre-teen girls make sense of their relationship with nature; not just in terms of frequency of engagement or attitude toward outdoor spaces, but in how they interpret, articulate, and navigate their outdoor experiences. This approach ensured that participants' voices were not only recorded but meaningfully understood in context. This initial structured component also served as a

foundation for the subsequent in-depth semi-structured interview using the 'River of Life' method.

2.4 Semi-structured interview ('River of Life' method)

We conducted semi-structured interviews to explore the girls' outdoor experiences from early childhood to the present. A key feature of this approach was the use of the adapted 'River of Life' method (Colley et al., 2022), a visual timeline that mapped participants' key life events, regular outdoor activities, and one-off experiences. During the interviews, researchers constructed the 'River of Life' timelines on behalf of participants. This ensured they could remain engaged in the discussion and the co-creation process without distraction. The timeline not only facilitated meaningful dialogue but will also serve as a memory prompt and personal reflection for participants at the study's conclusion.

Between November 2023 and March 2024, we refined the interview guide. Initially broad in scope, the guide was adjusted to focus on the most meaningful outdoor activities and preferences, shifting from documenting numerous experiences to gaining deeper insights into a smaller number of key moments. This modification allowed for a richer exploration of participants' likes, dislikes, and valued outdoor spaces.

2.5 Data analysis

The data analysis process for Wave 1 involved integrating the structured interviews, semi-structured interviews ('River of Life' method), and visual timelines. Interview audio-recordings were transcribed and imported into NVivo, a tool to support qualitative analysis. The visual timelines were also imported into NVivo (NVivo 12) to be used in conjunction with the transcriptions, providing a reference point for the participants' narratives and adding a visual dimension to the analysis.

Reflexive Thematic Analysis (RTA) was employed to analyse the qualitative data collected during Wave 1, with key themes identified in alignment with the study's research questions. The analysis focused on exploring pre-teen girls' preferences, perceptions, and experiences of outdoor spaces, with particular attention given to the factors influencing their engagement or disengagement. Themes were developed to examine existing outdoor provision, identify perceived gaps, and highlight the changes deemed necessary to improve access, safety, and appeal for this demographic. Both enablers for and barriers to outdoor engagement were identified, providing insights into how outdoor environments could be more effectively tailored to support meaningful, equitable, and sustained engagement with nature amongst P7 girls.

2.6 Validity and reliability

A structured and consistent approach was employed across recruitment, data collection, and analysis to support the validity and reliability of Wave 1 findings. Throughout the process, reflexivity was embedded to ensure that researcher assumptions, values, and potential biases were actively reflected upon and accounted for during both data collection, analysis, and interpretation.

To ensure consistency and reliability, all participants received the same study information and took part in comparable two-hour sessions at the James Hutton Institute, using identical interview materials. Detailed fieldnotes and debriefs were maintained for each interview to document any procedural adjustments, and audit trails were used during coding to ensure

transparency in the development of themes. Thematic saturation was monitored to ensure all relevant patterns in the data were captured.

2.7 Limitations and strengths

Despite concerted efforts to ensure diversity, the final sample and resulting findings may have been limited by certain factors. Recruitment was intentionally designed to capture a broad range of socio-economic, ethnic, and local variations in the availability of outdoor spaces. However, limited responses from priority schools required the expansion of outreach. While this approach enabled the study to achieve a final sample of 24 participants, the representation of participants from underrepresented backgrounds was lower than initially intended.

Practical and contextual constraints also shaped the recruitment process. Family-level factors, such as availability, comprehension of the project's aims, and attitudes towards outdoor activities, may have influenced decisions to participate. These conditions likely contributed to a degree of self-selection, with families already positively inclined towards outdoor engagement potentially being overrepresented in the sample, a recognised challenge in research of this nature (Houghton et al., 2020).

Additional limitations relate to the influence of adult gatekeepers. Teachers and parents may have shaped girls' preconceptions prior to participation, potentially affecting how they framed their experiences during interviews. Similarly, the presence of parents or siblings during some interviews (due to childcare or logistical needs) may have impacted the openness of participants' responses. While the interview protocols provided a clear framework, the approach was refined as the study progressed. Variations in researcher numbers (typically two, occasionally three) and in interaction styles may also have shaped the interview dynamics.

Moreover, participation in the study itself may have altered girls' perceptions of outdoor engagement. For some, the reflective process may encourage greater interest or motivation, especially if reinforced by adults. For others, it may reinforce disinterest or discomfort, highlighting the complex and potentially reactive nature of research involving behavioural and attitudinal themes.

Despite these limitations, the study successfully captured a wide range of outdoor experiences and perspectives, including those of participants with limited prior engagement with nature or outdoor activities. This diversity of experience enriched the dataset and allowed for a more nuanced exploration of the varying ways in which pre-teen girls relate to and interact with outdoor spaces. The presence of parents during the interviews added further value, both through their occasional interjections, which helped clarify or expand on the girls' accounts, and through the supportive dynamic their presence created. It is likely that without them, building rapport with the girls would have been more challenging, and the depth and openness of the conversations might have been compromised with some of the girls.

Importantly, the study foregrounds the voices of an often-underrepresented demographic in environmental and planning research. By centring the experiences of pre-teen girls within an urban setting, the research contributes valuable knowledge to inform more inclusive, equitable, and gender-sensitive approaches to the design and management of outdoor spaces. These findings provide a meaningful foundation for shaping policy, practice, and future research aimed at increasing the quality of outdoor spaces and engagement with nature amongst girls and young women. While the results may not be broadly generalisable, they represent an important step

towards understanding the complex and context-specific factors that shape girls' outdoor experiences.

3. Outdoor engagement patterns

This section presents key findings from the first part of the Wave 1 relating to how P7 girls engage with outdoor spaces and how they perceive and connect with nature. Drawing on the structured interviews, this section explores recent patterns of outdoor engagement, the girls' connection to nature, and their self-perceived capabilities related to outdoor engagement. ***For confidentiality reasons, all names of participants, their family members, friends, other individuals, and place names have been replaced with pseudonyms.***

The structured interview began by asking participants to identify the different types of outdoor spaces they had engaged with over the three months prior to the interview and to indicate how frequently they had engaged with each space. Focusing on recent experiences was supposed to help to support recall and concrete responses. Participants were also asked about their means of travel to outdoor spaces.

In the second part of the interview, the girls were invited to rate a series of validated statements related to their feelings about nature, drawing on the Nature Connection Index (NCI). The final section focused on perceived nature engagement capabilities, where participants rated their agreement with a series of scale items designed to assess access, confidence, and knowledge in relation to outdoor environments.

While the quantitative responses offered a surface-level overview of trends, such as how strongly participants agreed with particular statements, they did not, in isolation, convey how these statements were understood, interpreted, or applied in practice. Therefore, after selecting each outdoor space and rating each individual statement, participants were asked follow-up questions to explore their interpretations, motivations, and related experiences. These qualitative prompts were crucial in uncovering how each girl understood and contextualised her response, providing richer insight into attitudes, behaviours, and perceived barriers or enablers. This approach enabled a deeper understanding of how the girls made sense of their outdoor engagement, how they interpreted concepts such as connection and capability, and the underlying meanings that informed their responses.

Participants often interpreted the same statement in markedly different ways, and their numerical ratings did not always align with their actual levels of knowledge, confidence, or connection to nature. For example, in response to the item assessing ecological knowledge ("I can identify many different types of plants and animals"), several participants who demonstrated relatively advanced species knowledge selected mid-range values, whereas others who could name only a few common animals rated themselves at the top of the scale. The interviews revealed that such ratings were often shaped by individual interpretations of what counted as "many" or "different", or whether naming species correctly mattered. Without the opportunity to discuss their reasoning, these patterns might have remained hidden. The open-ended dialogue helped surface the complexities, enabling researchers to move beyond numeric responses and access the underlying assumptions, doubts, or self-assessment standards that shaped them. In this way, the structured interviews supported both clarity in data collection and depth in interpretation.

This pattern was evident across several items, particularly those related to nature connectedness and engagement capabilities. For instance, the statement ‘I feel part of nature’ elicited a wide range of interpretations, with some participants expressing emotional or philosophical reflections, while others were uncertain how to relate to the concept at all. Similarly, items related to confidence or comfort outdoors revealed that ratings were influenced not just by personal disposition, but also by past experiences, parental attitudes, seasonal context, and peer dynamics.

The section is structured into three parts. Section 3.1 outlines recent patterns of engagement across different types of outdoor spaces, including parks, gardens, woods, and more remote or infrequently visited environments. Section 3.2 explores participants’ sense of connectedness to nature, drawing on a validated scale and qualitative responses to understand how nature is valued, experienced, and integrated into their identities. Section 3.3 examines the girls’ nature engagement capabilities, including their confidence, knowledge, access, and perceived ability to navigate and care for outdoor environments. Together, these findings provide a rich, multidimensional account of how the pre-teen girls in an urban context relate to nature and use outdoor spaces in their daily lives.

3.1 Patterns of engagement with different types of outdoor spaces

This section explores how the P7 girls reported engaging with a range of outdoor spaces over the previous three months, as discussed during interviews conducted between November 2023 and March 2024. This period largely captured experiences from autumn and winter, characterised by colder weather, shorter daylight hours, and seasonal restrictions, which were frequently mentioned as factors shaping outdoor behaviour. This section focuses on frequency of use, social context, likes and dislikes, proximity to their homes, and familiarity, drawing on interview data across all 24 participants.

Figure 1 presents how often the P7 girls reported using various types of outdoor spaces, grouped by frequency of engagement (from every day in dark green to less often in light blue).

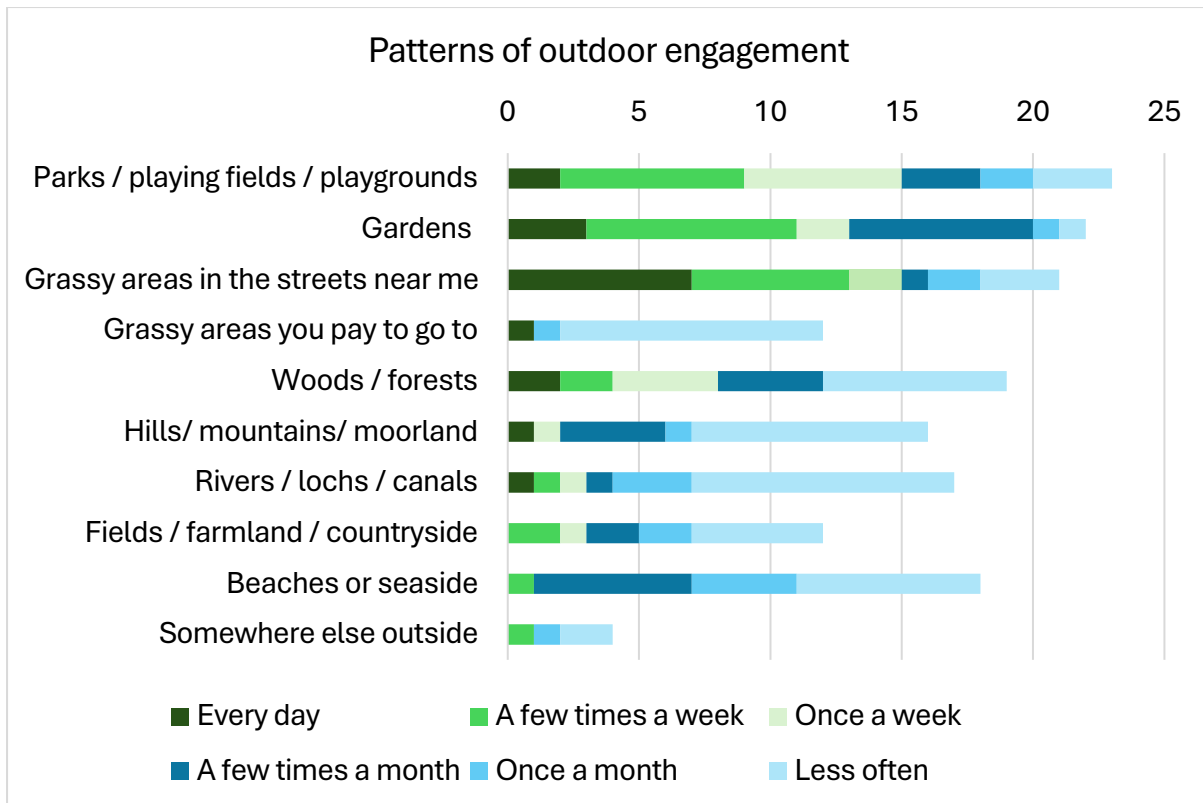


Figure 1: Patterns of outdoor engagement three month prior to interviews, which took place between November 2023 and March 2024 (GO Study, 2023-2024)

Overall, our participants most frequently used parks, gardens, and grassy areas near home, reflecting preferences for familiar, local, accessible outdoor spaces that can be used for different activities. Less frequent use of woods, beaches, rivers, and countryside was largely attributed to seasonal factors, transport challenges, or adult decision-making. Most girls expressed enjoyment of different outdoor spaces; however, their outdoor activity patterns were shaped by proximity, weather, features (e.g. trampolines, climbing trees), and social context. Table 2 summarises their patterns of outdoor engagement and highlight the most and least regularly visited outdoor spaces (blue), along with preferred qualities (green), social context (red) and the most commonly used transport options to get to outdoor spaces (yellow).

Table 2: Summary of patterns of engagement with and preference for outdoor spaces

Summary of patterns of engagement with and preference for outdoor spaces	
Most frequently used	Parks, gardens, and grassy areas near home – daily or several times a week
Less used but liked	Woods, beaches, rivers – monthly or seasonal engagement
Rarely used	Hills, farmland, paid spaces – typically transport-limited or seasonal
Preferred qualities	Proximity, safety, open space, play equipment, quietness
Social context	Mix of friends, siblings, parents, and pets.
Transport	Mostly by foot or bike; car required for more distant or natural settings.

While the quantitative responses provided a general overview of patterns as shown above, it was the qualitative elaborations that revealed the richness of context, motivation, and meaning behind these behaviours. Participants were asked to reflect on their recent engagement with the above range of outdoor spaces. For each type of outdoor space, interviewers used the initial scale responses as a springboard for deeper conversation, inviting participants to describe who they went with, what they did, how they felt, and what they liked or disliked. This method yielded valuable insights into not just what spaces were used, but how and why they were used.

In particular, the interviews captured important contextual factors such as proximity to home, influence of the different seasons as well as social relationships, whether with friends, family, pets, or organised groups. The participants also shared specific preferences and aversions, reflecting how their personal and social lives shape their outdoor experiences. The following sections synthesise the qualitative data on how pre-teen girls engage with different outdoor spaces.

3.1.1 Parks, Playgrounds, and Playing Fields

Parks, playgrounds, and playing fields were amongst the outdoor spaces the girls had engaged with the most, forming a regular part of many girls' weekly routines. The majority of girls engaged with these outdoor spaces on at least a weekly basis, with many reporting more frequent visits, particularly after school hours, during weekends, and across holiday periods. Frequency of visits was shaped by factors such as weather, physical accessibility, adult company, and available time.

"I go to the one near my school or the one near where my friends live... maybe like once a week." (Bambie, 2024)

Larger urban parks were frequently mentioned but visited less regularly as these often require a car journey. These parks were visited typically in connection with family outings or participation in organised groups, such as Scouts. As a result, patterns of park use were strongly shaped by proximity. Many girls travelled to parks on foot or by bike, visiting those near home or school. These local spaces, often described as *"just across the road"* or *"two milliseconds away"*, encouraged frequent use due to convenience and a sense of familiarity. Their quieter atmosphere was also valued by some girls, who preferred them to the busier, larger urban parks.

"I like... little parks better because they're not crowded very much. [...] It's a good open bit that people can go to because it's for all ages." (Julia, 2024)

Social relationships were central to the way parks were used, whether through informal time spent with friends or family.

"I normally just go there with my friends or sometimes with my brother." (Katy, 2024)

"I go out with my friends a lot of the time." (Sunset, 2023)

Some girls mentioned going to parks independently, suggesting a subtle shift in autonomy and how these spaces support growing independence. Julia's parent explained:

"Julia's started going by herself... Arthur Park is as far as she goes just now." (Julia's parent, 2024). Julia added that this shift coincided with getting her first phone: *"I got my phone in Primary 6... so like in Primary 6, 5 kind of."* (Julia, 2024)

Playground features, such as ziplines, swings, roundabouts, and open areas for football or cycling, were commonly mentioned.

“It has a zipline... and it has a thing where you sit in it, and it goes [imitates noise] like a roundabout.” (Chick, 2024)

Where play equipment was seen as ‘boring’ or designed only for very young children, girls were less engaged.

“It’s just swings, a slide, like a balance beam and this weird thing... I think it’s for little people.” (Charlie, 2024)

While strong dislikes were rare, a few girls noted the limitations of particular parks or the deterrent effect of winter weather, especially where fields became muddy or otherwise unusable. In these cases, frequency of use declined markedly in colder months. Additionally, several participants highlighted that some parks were used more for walking dogs or passing through than for spending time in.

Julia described regular and structured engagement with a cricket ground, offering a sport-specific example of how playing fields were used in more formalised ways. Having played since the age of five, Julia’s use of the cricket ground was clearly embedded in her sporting routine, closely tied to club membership and team activities. While use with the club was limited over the colder months, she noted occasional visits of the playing field on her own. This example illustrates how some playing fields served as more formalised sporting environments, supporting structured and sustained engagement beyond casual or seasonal use.

Overall, parks, playgrounds, and playing fields played a steady role in many girls’ outdoor experience. They were easy-to-reach places for hanging out with friends, being active, and spending regular time outside. The girls’ engagement was shaped by season, proximity, and availability of friends and family to join them.

3.1.2 Gardens

Private gardens - whether at the girls’ own homes or those of friends or relatives - emerged as one of the most consistently engaged-with outdoor spaces, offering a familiar setting that many visited daily or several times per week.

“A garden would be like every day, because remember we’d always go in there and chill.” (Amy, 2023)

Unlike other outdoor environments that required travel or planning, gardens were immediate and effortless to use, allowing for spontaneous outdoor engagement that was often woven into everyday routines.

“We just go outside when dad’s still doing work calls... he sends us outside to be quiet.” (Katy, 2024)

Most garden use occurred at home and was usually solo or shared with siblings or pets.

“Yeah, just with the dog really...” (Amy, 2023)

“I was playing with chalk with my little sister and jumping on our trampoline.” (Misty, 2024)

Gardens were valued not so much for their novelty as for their accessibility and versatility, offering space for a variety of activities. Their function often shifted with the moment, serving as a backdrop for active play, quiet retreat, or family time. Activities varied widely, from imaginative games and play equipment to relaxing or helping with family projects.

“Mainly just swinging on the swing and bouncing on the trampoline.” (Raya, 2024)

While very few girls expressed negative views, some acknowledged that gardens could become boring if nothing specific was happening, particularly during colder months and their use was shaped more by weather than by interest.

“Once a month now... we kind of run into the garden and then back in again because it’s so cold!” (Lola, 2024)

“At least like once a week or like twice a week. But also, winter. Mum always forces us to go outside in the summer.” (Misty, 2024)

The preference for garden use during warm, dry weather was common, and gardens with grass, space to move, or play equipment, especially trampolines, were seen as more engaging.

“I normally don’t really go in my garden that much, but I go in my friend’s garden... she has a trampoline.” (Bambie, 2024)

In sum, gardens offered an easily accessible space for regular outdoor time, with engagement shaped by weather, available play equipment - especially trampolines - and social context, such as time spent with siblings, pets, visiting friends, or family projects.

3.1.3 Grassy areas in the streets near me

Although the use of grassy areas in the streets near the girls’ homes varied widely, these outdoor spaces featured in many girls’ accounts of outdoor experiences. Many participants did not always think of them as meaningful outdoor environments and some questioned whether they ‘counted’ as outdoor spaces. Seasonal changes strongly influenced how often they were used, with cold or wet weather limiting interest.

Use was usually unstructured and incidental. Many girls described these spaces as places they passed through on the way to other destinations, rather than places they sought out intentionally. The ease of access, just outside the house or en-route to somewhere else, meant they required little planning.

“I go there like every single day... When I’m walking back home, I will go on the grass and I’ll just walk on it because it’s just a bit funner than the pavement.” (Julia, 2024)

Some girls used grassy areas for walking to school, cycling, playing with friends, or walking dogs. Activities included rolling down hills, quick chats with friends, or walks to get some fresh air.

“It’s fun with my bike sometimes because I get to just go... as fast as I can there and then I just get to curve away.” (Amy, 2023)

“Up the road there’s like a bit grassy hill where I take my dog for a walk and I sometimes go with my friends.” (Bambie, 2024)

Some girls noted feeling safer or more independent in areas visible from home, and parents expressed comfort when they could keep an eye on their children from the window.

“I just leave my house, and I just go outside for a bit... They can see me if I want to go out by myself.” (Julia, 2024)

For others, particularly where grassy areas were poorly maintained or lacked appeal, these spaces were visited only occasionally or not at all. Cleanliness and safety emerged as key considerations, with poor maintenance, especially the presence of dog mess, frequently mentioned as a reason for avoiding them.

“It’s got dog poo everywhere because of our next-door neighbour kind of people... It’s disgusting.” (Chick, 2024)

Overall, grassy areas near home were flexible and accessible places that supported everyday outdoor activity, especially with friends or pets. While not always seen as destinations in their own right, they played a subtle role in girls’ everyday routines, shaped by social context, season, and condition.

3.1.4 Grassy areas you pay to go to

Engagement with grassy areas that require payment, such as castle grounds, zoos, or farm parks, was generally low amongst the girls. Most had not visited these spaces in the last three months, and when they had, it was usually as a one-off outing, often during holidays or weekends with family or grandparents. Some girls recalled past visits, but such outings were *“maybe once a year”* or *“not in the last three months.”*

“We don’t usually pay to go visit... We went to the zoo but that was in Spain.” (Lola, 2024)

When discussed, these visits were nearly always adult-led and required travel by car, occasionally by bus, or even as part of international holidays.

“We went on the bus to get to Willowburn... but not to the zoo or a city farm. We would do that by car.” (Amy, 2023)

Several girls associated these places with excitement or special experiences, particularly where animals or castle grounds were involved.

“We used to love going to Rowan Farm Park, didn’t we?” (Avery, 2024)

Proximity and broader issues of convenience were key barriers to more regular use. While most of these spaces were not located nearby, convenience also referred to factors such as the need for advance planning, availability of transport, adult involvement, and coordinating visits around school or family schedules. The distance, combined with costs and seasonal limitations, reduced the likelihood of spontaneous or frequent visits.

“Because of course we can’t get there because it’s like five million hours away.” (Misty, 2024)

Not all viewed these spaces as worthwhile. One girl openly questioned the point of paying for such experiences.

“Who would pay just to go to a castle? It seems a bit pointless.” (Raya, 2024)

In sum, grassy areas that require payment were not a central part of the girls’ outdoor routines. They were typically occasional, adult-directed excursions, often remembered fondly, but rarely chosen or initiated by the girls themselves. Engagement was shaped by distance, cost, season,

and social setting, with such visits more often tied to holidays or family plans than everyday outdoor play.

3.1.5 Woods and Forests

Woods and forests featured in the outdoor experiences of many girls, although frequency of use varied widely. Some encountered wooded spaces daily or weekly, often as part of school routes or neighbourhood routines.

“We have to go through the forest to get home from school.” (Ivy, 2024)

Others visited less often, perhaps once a month or during holidays, typically for walks with family, Scout activities, or trips with friends. Seasonal patterns were clear, with winter conditions and cold weather deterring visits.

“We used to always like once a week walk into a forest but now... it’s always in the summer.” (Misty, 2024)

Familiarity with local wooded areas was generally high, especially those near homes, schools, or parks. Girls described casual use for play, such as climbing trees or walking dogs. Some spoke fondly of features that made certain woods enjoyable.

“There’s some trees with weird shaping... you climb up those bits.” (Julia, 2024)

Others referenced more structured or social outings, like a Scouts-walk near a beach or a litter pick. However, woods also elicited hesitation. A few girls described feeling unsafe or unsettled, especially in unfamiliar or isolated spaces.

“No, I’d be scared.” (Charlie, 2024)

Several participants noted that places they had once visited often were no longer accessible due to environmental damage.

“We did go to the woods, but they were all shut with Storm Arwen.” (Amy, 2023)

“They’ve cut down lots of trees there.” (Brittany, 2024).

Others described shifts in family routines or moving house which led to a reduced engagement with woodlands.

“When we lived in our old house, we were there like all the time... there’s just not that option now.” (Jemima, 2024)

Proximity strongly shaped engagement. Girls were far more likely to use woods within walking or biking distance than destinations that required a car. For some families, access was also limited by logistics or parental preference.

“Detina’s dad is not somebody that’s into just going to the woods for a walk.” (Detina’s parent, 2024).

On the whole, woods and forests held a meaningful, if uneven, place in the girls’ outdoor experiences, often associated with childhood play, tree climbing and family walks. Yet their use was shaped heavily by practicalities like weather, storm damage, and shifting routines. While some girls found ways to engage regularly with nearby wooded areas, others experienced these

spaces more sporadically, making woods less consistently part of everyday life than parks or more accessible outdoor spaces.

3.1.6 Hills and Mountains

Few girls had visited hills or mountains in the previous three months, with many noting that such activities were more common in summer, and mostly small local hills. Where visits happened, they were often remembered fondly or associated with holidays. Despite these positive associations, hills were not a core part of most girls' regular outdoor experience. While some girls were unsure if they had truly climbed a hill, or if driving near one counted, others had a plan to go more often.

"We go quite a lot of the time, but we haven't been in the past few months." (Violet, 2024)
– *"Well, we did like one hill walk... the one where we fell out!"* (added Violet's parent, 2024, with a grin).

Some expressed clear interest but acknowledged that busy schedules or distance made it hard to go regularly. Bambie remembered only one winter trip: *"We've been up Ben Noth"*. Like Bambie, many other participants also reported going less often, especially during colder months. Weather was a strong influence, along with gear, highlighting practical barriers to more regular visits.

"Probably less often. Because it's cold. Like in the summer, we will go to like all of these. But right now, it is terrible." (Julia, 2024)

Trips typically took place on weekends or holidays and were almost always family-led. While some recalled one-off trips, for others, hills formed part of regular outings.

"Usually on Sunday we go somewhere... if it's not a long time away, we'll go to Tower Hill." (Josie, 2024)

While hills and mountains were appreciated as places of fond memory, they tended to feature as occasional, seasonal destinations rather than regular outings. While not central to the girls' routine outdoor engagement, they often left a strong impression, offering memorable moments, and in some cases, a sense of adventure.

3.1.7 Moorland

Engagement with moorland amongst the P7 girls varied, with proximity and social context playing a central role. For those living near accessible moorland, these outdoor spaces were part of regular life and supported casual, often unstructured activity, typically with family members or dogs.

"We live - our house just backs onto a [moorland]. We go there quite often. [...] I walk the dog up there every day." (Ivy's parent, 2024)

Ivy confirmed that she joined at least once a week.

"We're very lucky to live beside it", noted Charlie's parent. Charlie described her visits as mostly for dog walking and sometimes for photography, although she added with a laugh, *"My camera isn't good."*

Visits were most common on weekends or after school, and mainly on foot or occasionally by bike. The moorland most often mentioned blurred the line between wild and suburban space, functioning almost like an extended garden for those nearby. In contrast, other girls expressed

less familiarity or frequency. For some, moorland was vaguely understood. *“Kind of, like... yeah”*, said Avery when asked if she knew what moorland meant. Where visits did happen, they were rarely destination-based, and instead tied to another purpose, such as dog walking or meeting friends. Enjoyment was mostly low-key and practical, like walking or simply being outside; the aesthetic and experiential qualities of moorland seemed less important than its availability and function.

“It’s just grass but it’s got like three trees in the middle...” (Charlie, 2024)

In summary, moorland was a quiet part of some girls’ outdoor lives, valued less for excitement or novelty and more for its practical role as a space that could be used for walking, socialising, or simply spending time outside. Although rarely described as exciting or special, for a few it provided a valuable setting for spending time outdoors.

3.1.8 Countryside, Fields, and Farmland

Engagement with countryside spaces was infrequent and often incidental, typically linked to visits to family living rurally or outings with friends. While some girls described meaningful or regular visits, often tied to specific activities like horse-riding, dog walking, or family ties, many reported infrequent or no recent engagement at all.

“I go to the farm because of our grandad and grandmother... so like a few times a month.” (Sunset, 2024)

Similarly, the only time Amy would go into fields and farmland is at her grandmother’s place, while Raya’s countryside visits were tied to a friend’s house next to a farm, from where they would often return muddy.

Some of the girls showed hesitation or asked questions like *“Would that go with the moors as well?”* (Ivy, 2024) or *“Does that count?”* (Amy, 2023). This variability in familiarity with these types of spaces suggests that for many, the concept of ‘countryside’ was not sharply defined. However, for a small group, the countryside played an active role in weekly life. Daisy, for example, travelled to the countryside every Friday for horse-riding, while Brittany described multiple countryside walks each week.

“We always go to the countryside with the dog for walks... he likes having a run out there in big fields.” (Brittany, 2024)

Memorable experiences often involved animals. *“I miss Polly!”*, said Tigger, recalling an alpaca on a past farm trip. Lola shared a humorous memory: *“I got carrots!”*, she laughed, after describing a visit to her relative’s workplace on an estate.

In Misty’s case, a Christmas countryside event involved ‘cheeky elves’ and outdoor games with friends, showing how seasonal events could spark rural engagement. However, for many girls, the countryside remained peripheral. Avery and Bambie both simply said *“No”* when asked about recent visits, and Julia, although reminded of a relative *“kind of country-ish”*, admitted *“We don’t spend much time there...anymore”*. Distance was often a barrier, and transport was usually by car. For some, the countryside felt more like a backdrop to other activities than a destination.

In brief, farms, fields, and countryside were most often visited in relation to something or someone, such as family, animals, holidays, and not for the space itself. While a few girls clearly valued and regularly visited these types of outdoor spaces, for many others, they remained distant or unclear in meaning.

3.1.9 Rivers, Lochs, and Canals

Rivers, lochs, and canals emerged as occasional and mostly seasonal elements in the outdoor experiences of the girls. While a few reported engaging with rivers weekly, particularly when small burns or rivers were part of nearby walks, most participants visited them less frequently. School residentials, summer holidays, and family trips played a central role in enabling engagement with lochs and rivers.

“We did go to rivers a lot... that was my favourite part!” (Amy, 2023)

Visits to these spaces were typically made with family and shaped by adult decisions about where to go and what was safe. The girls did not commonly visit rivers or lochs independently, and their use was often regulated by parental concerns over safety.

“We try to be as safety conscious as possible... we don’t normalise river stuff.” (Brittany’s parent, 2024)

Fast currents, slippery or muddy banks, and unpredictable dogs were all cited as reasons for caution. These safety considerations often limited interactions to viewing the water, walking alongside it, or structured activities in managed settings. Despite this caution, many girls associated rivers and lochs with positive memories. Activities such as paddle boarding, sailing, or walking along riverbanks were mentioned fondly.

“Most of my class’s birthday parties are like paddle boarding... I go a lot in summer.” (Julia, 2024)

“We did sailing and paddleboarding at [a Highland Loch]... that was fun.” (Detina, 2024)

Some also described wildlife encounters and picturesque settings, especially when these places were visited during warmer weather. However, few participants saw them as part of everyday life, largely due to their (perceived) distance from home.

“That would definitely be like by car because how would we get there? It would take like a day.” (Misty, 2024)

Overall, rivers, lochs, and canals were appreciated for their novelty, beauty, and potential for adventure, but remained peripheral in most girls’ weekly routines. Their use was shaped heavily by season, adult supervision, and proximity, with more regular engagement seen only where waterways were embedded in local outdoor spaces.

3.1.10 Beaches and Seaside

Beaches and the seaside featured prominently in the outdoor experiences of many girls, although their engagement was highly seasonal and weather-dependent. Most girls visited beaches occasionally, typically once or a few times a month during the warmer months. Winter months often saw a marked drop in beach visits, with several families explicitly stating they had not been in the last three months.

“In the summertime, yeah, but ain’t going out now.” (Chick, 2023)

When visits did occur, they usually happened on weekends or school holidays, and mostly with family members; some girls mentioned going with friends or dogs. The trips were often part of broader outings or included specific activities like wild swimming, paddleboarding, or beach clean-ups. Ivy described her trips as tied to walking her dog.

Beaches held strong positive associations. The P7 girls described enjoying natural features such as waves, shells, sea glass, and hermit crabs.

“There’s sea glass that’s like smoothed down by the sea. I like that.” (Lola, 2024)

Even girls who had not visited beaches or the seaside recently showed strong familiarity with beach settings. Some shared vivid past experiences, such as Gran Canaria or specific local beaches. These stories often held emotional significance, with references to family traditions and humorous moments. Misty recalled watching huge waves.

“I seen like one hundred people get splashed... a massive one went all over a group of people.” (Misty, 2024)

Recreational activities like swimming, rock-throwing, or simply relaxing were often mentioned, while food played perhaps the largest role.

“We used to go there every weekend... there’s always chips and ice cream at the end of it.” (Brittany, 2024)

Environmental awareness also surfaced. Luna participated in a beach clean and Detina spoke fondly of spotting hermit crabs with her grandfather, while Misty and her parent discussed observing erosion and the power of waves.

In summary, the beach was a familiar and valued space for fun and family time. However, its use was shaped by seasonality, family routines, and physical conditions. Beaches were not everyday destinations, yet they often offered memorable experiences.

3.1.11 Somewhere else outside

A small number of girls described regular or meaningful engagement with outdoor spaces that did not fit neatly into the above categories. These included a quarry and local golf courses.

A local quarry was described by one family as a local hidden gem, regularly used for dog walking and nature walks. Although they had not visited the quarry recently, Brittany’s parent noted it had once been a frequent destination, especially for dog walking along the circular path. Wildlife sightings were part of the space’s appeal, as Brittany remembered seeing a deer, although she admitted one encounter was a bit frightening: *“It had big horns... I think it was like a big male”* (Brittany, 2024).

Golf courses also featured in two girls’ accounts. For Jemima, golf was a familiar routine shared with her grandfather and she was a member of two clubs.

“In the winter probably around once a month maybe. The summer a lot more; it could be a couple of times a week.” (Jemima’s parent, 2024)

In contrast, Katy’s engagement with her local golf course was informal and weather-dependent.

“There’s a golf course at the back of our house, so we walk through there quite a lot.” (Katy’s parent, 2024)

The golf course was appreciated for its openness and proximity; however, it was mostly used in winter for sledging and Katy described a snowy period when the golf course became a temporary play space.

“For that one week, we went like three times.” (Katy, 2024)

Whether through structured sports, seasonal play, or family dog walks, golf courses and quarries supported diverse patterns of engagement shaped by familiarity, flexibility, and social context.

3.1.12 Summary: Patterns of outdoor engagement

These findings reveal that P7 girls' engagement with outdoor spaces was shaped by proximity, seasonality, social relationships, and available features. Parks, gardens, and nearby grassy areas were the most frequently engaged-with spaces, valued for their familiarity, convenience, and flexibility in supporting a range of activities with family and/or friends. Some of the less frequently visited spaces like beaches, woods, and countryside were nonetheless remembered fondly and associated with novelty, adventure, or seasonal routines.

Social context played a vital role, whether through family outings, casual time with friends, or shared play with siblings and dogs. The presence of play equipment, safe walking routes and wildlife added further appeal. Structured settings like golf courses or cricket grounds also provided meaningful engagement for some, highlighting how sport-specific routines can shape sustained relationships with particular places.

3.2 Participants' connection with nature

To gain insight into the relationship between pre-teen girls and nature, the participants were asked to reflect on various aspects of nature connection using two validated instruments. The Nature Connection Index (NCI; Richardson et al., 2019) largely explore emotional and experiential dimensions while the Illustrated Inclusion of Nature in Self scale (INNS; Kleespies et al., 2021) solely focused on the cognitive aspect. For the NCI, participants rated the extent to which they agreed or disagreed with six statements using a 7-point Likert scale (1 = completely disagree; 7 = completely agree):

- I always find beauty in nature
- I always treat nature with respect
- Being in nature makes me very happy
- Spending time in nature is very important to me
- I find being in nature really amazing
- I feel part of nature

The INNS incorporates pairs of circles – one labelled 'me' the other labelled 'nature' - varying in overlap to visually represent an individual's sense of self in relation to the natural world. Participants were asked to select one of the seven options ranging from completely separate from nature (A) to full unity (G) that most represents their relationship with nature.

After each selection on the respective scales, interviewers followed up with open-ended questions to better understand participants' interpretations and the meanings behind their responses. This method allowed for both a snapshot of overall trends and a deeper, more personal exploration of how pre-teen girls relate to the natural environment.

Figure 2 provides a visual summary of how participants responded to the six NCI statements. Overall, the responses suggest high agreement, suggesting appreciation of nature. The highest level of agreement (completely agree [7]) was found for the statements 'I find being in nature really amazing' and 'Being in nature makes me very happy', with 12 (50%) and 8 (30%) participants, respectively. Similarly, 'I always treat nature with respect' and 'I always find beauty in nature' both received 15 responses (63%) in the top two agreement categories (6 and 7

combined), highlighting the presence of both respect and aesthetic appreciation for nature within the sample.

There was slightly more variation in response to ‘Spending time in nature is very important to me’ and “I feel part of nature”, with several participants selecting the midpoint (4) or below. Notably, ‘I feel part of nature’, which begins to integrate the cognitive aspect of nature connection, was the most polarising, with some participants expressing strong agreement and others selecting ‘Disagree’ or ‘Strongly disagree’. This variation suggests that participants interpret personal direct experiences of and identity in relation to nature in different ways.

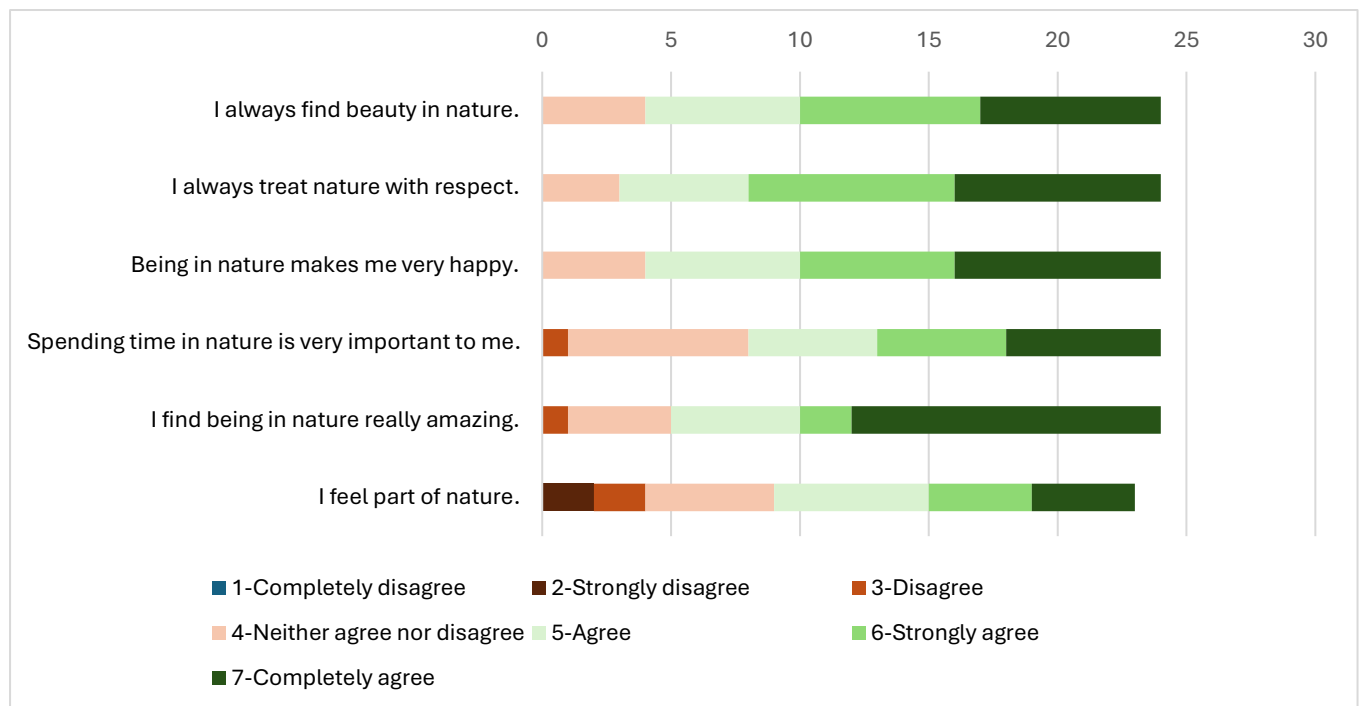


Figure 2: Levels of agreement with six Nature Connectedness statements amongst 24 pre-teen girls (GO study, Wave 1, 2023/2024).

The following sections draw on the qualitative data to explore the main themes that emerged, including emotional connection, respect, identity, social dimensions, and the realities of everyday engagement with nature.

3.2.1 Appreciation of nature

The structured interviews revealed a nuanced relationship shaped by sensory experiences, moral values, social relationships, and practical realities of everyday life. While individual responses varied, there was a consistent thread of connection, admiration, and care that ran through participants’ reflections. Many participants described being in nature as a source of happiness, calm, and wonder.

“When I’m out in nature and it’s just like... really peaceful and the sun is like shining through the trees, I just feel very calm.” (Julia, 2024)

The girls frequently expressed a strong appreciation for the aesthetic qualities of nature, with many stating that they ‘always find beauty in nature’. This sentiment was often grounded in specific sensory experiences, such as the sight of flowers, birds, the sky, or trees.

"The flowers and some of the birds cheeping away and singing their songs and normally the sun on the trees as well and some of the plants which is nice." (Brittany, 2024)

"Like, you know, when the grass is just green and there's lots of flowers." (Ivy, 2024)

Others found beauty in more detailed observations or recalled memorable experiences like photographing specific elements in nature.

"The leaves, when you like look at the leaves, or the sand, and you just see like all those teeny-tiny little dots in it..." (Julia, 2024)

For some, this appreciation was linked to moments of stillness or solitude.

"It's calm, relaxing... Maybe whenever you want to be... lonely you can go outside." (Poppy, 2023)

A few participants emphasised the dynamic and emotional aspect of nature's beauty, noting that elements like wildlife, the changing sky, sunsets and the moon.

"The moon... it was huge this morning, wasn't it?" (Avery, 2024)

However, this was not universal. Some statements demonstrated that regular exposure to nature plays a role in shaping these perceptions.

"I just didn't know because since I'm not outside that much then...yeah." (Charlie, 2024)

Detina added a humorous caveat, saying she would "probably" find beauty in nature "unless it's mud."

3.2.2 Respect and responsibility to care for nature

With regard to respect for nature, participants often described conscientious behaviour, such as avoiding littering, protecting plants, or being careful not to harm animals, illustrating both attentiveness and care.

"I try not to step on some of the flowers and... make sure I don't hurt the trees' branches." (Brittany, 2024)

This sense of responsibility extended to treating animals kindly and being mindful of their habitats. Participants described small but symbolic actions that demonstrated care, such as avoiding trampling plants or staying on paths:

"Not throwing rubbish and like if you're on a walk staying on the paths instead of going far away and trampling on all the plants." (Luna, 2024)

A few participants also offered honest reflections on small actions they saw as questionable, such as picking leaves or breaking branches, yet they typically framed these as minor lapses rather than disrespect, demonstrating a light-hearted but honest awareness of human-nature interaction.

"Sometimes I'll just randomly pull a leaf off a branch or something." (Lola, 2023)

In one case, a participant discussed her general respect for nature, only to be reminded by her parent of a time she picked a daffodil, prompting laughter and a deeper exploration of what respectful behaviour actually means. Several participants revealed a playful, curious, or imaginative relationship with nature. Misty, for example, described her concern about stepping

on insects. Her description combined moral sensitivity with childlike imagination. Such moments suggest that connection to nature can be playful, emotionally charged, and shaped by creativity as much as by logic.

“I step on the grass, oh no, I might be stepping on somebody’s house.” (Misty, 2024)

Others, like Brittany, recounted specific shared experiences, such as retrieving a dog’s toy from a tree without causing damage, to give examples for moments that illustrated care and memory-making in natural settings.

3.2.3 Uncertainty, ambivalence and emerging connection with nature

In response to the statement ‘I feel part of nature’, even those who felt less integrated in nature often recognised a latent connection shaped by personal experience. For some, the concept of ‘feeling part of nature’ is still developing or hard to define.

“If I like being in nature... I’m not very sure.” (Charlie, 2024)

Nature was also experienced through a social lens. It was described both as solitary refuge but also as a context for meaningful interaction with others. For example, Lola mentioned how natural spaces support both individual wellbeing and collective enjoyment.

“I like it ‘cause that means I’m out with my family and friends.” (Lola, 2023)

At the same time, a tension between practical and ideal engagement with nature surfaced repeatedly. While many girls expressed love for being outside, they also acknowledged barriers like time, technology, and routine. Various comments reflect the pull of nature as a valued experience, even when competing priorities limit access. When asked what might increase her sense of connection, Ivy noted:

“I always have fun when I’m outside... [but] if I didn’t have a phone...” (Ivy, 2024)

Brittany expressed a similar conflict:

“It’s just sometimes I’m mostly indoors most of the time, but I do like going outdoors a lot as well because it’s nice.” (Brittany, 2024)

Responses for the INNS clustered most densely between options E, F, and G, indicating a strong to very strong sense of interconnectedness with nature in this sample (light green to dark green in Figure 3). Specifically, E and F were the most frequently selected positions, each reflecting a high degree of perceived overlap between the self and nature. Three participants selected G, the highest level of unity, and only a small number selected C, suggesting a more moderate or developing sense of connection between self and nature.

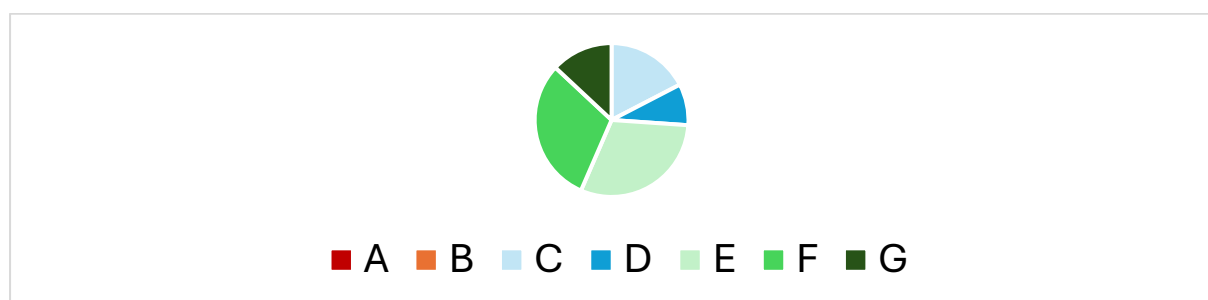


Figure 3: Self-Reported Connection to Nature Using the Illustrated Inclusion of Nature in Self Scale (IINS) amongst 24 pre-teen girls (GO study, Wave 1, 2023/2024).

The theme of identity and belonging in nature varied in strength but was commonly expressed. Some girls spoke of nature as a space they felt emotionally or existentially part of. Julia selected the image most representing oneness with nature (G), highlighting a felt sense of connectedness grounded in her experience of calm and peace in natural settings.

“When I’m out in nature and it’s just like... really peaceful and the sun is like shining through the trees, like I just feel very calm.” (Julia, 2024)

Raya, who chose ‘F’, articulated a more conceptual understanding, reflecting a sense of ecological continuity.

“Animals are part of nature and humans are animals.” (Raya, 2024)

Daisy selected ‘E’ and her comment captures the common attitude of measured but genuine connection; one shaped by affection and value, even if nature is not always at the centre of daily life.

“I like nature and I like being connected with it. But not like constantly.” (Daisy, 2024)

However, not all participants felt closely connected with nature. A few chose images representing moderate or uncertain connection, sometimes indicating confusion or ambivalence.

3.2.4 Summary: Participants’ connection to nature

Findings from the structured interviews suggest that most of the P7 girls in the study felt positively about nature, with high agreement on statements related to beauty, happiness, and respect for the natural world. Responses to items like ‘I feel part of nature’ were more varied, reflecting diverse interpretations of what connection means.

The qualitative data revealed that appreciation was often grounded in sensory experiences and emotional responses, such as calmness, curiosity, and wonder. Many girls demonstrated care for nature through small, respectful actions and a moral awareness. Responses to the IINS were varied: while most girls reported a moderate to strong sense of connection, some selected more neutral positions.

Overall, participants’ connection to nature was shaped by emotional and social factors, as well as by practical realities such as routine, technology, and seasonal access. These findings highlight both a shared affinity for nature and the complexity of how young people define and express their relationship with it.

3.3 Nature engagement capabilities

This section presents findings from the third section of the survey (structured interview), which explored nature engagement capabilities amongst the P7 girls. The questions explored a range of factors including familiarity with outdoor spaces, comfort and confidence in natural environments, nature-related knowledge, and emotional connection to the natural world. The participants rated their agreement with eleven statements on a scale from 0 (‘Completely disagree’) to 10 (‘Completely agree’). Figure 4 shows the distribution of responses from P7 girls across the eleven statements related to nature engagement capabilities, illustrating varying levels of agreement, with the strongest consensus appearing around familiarity with outdoor spaces, care for nature, and past positive experiences. Sections 3.1.1–3.1.3 summarise the quantitative findings, while Sections 3.1.4–3.1.14 contextualise these results with evidence from the structured interviews divided by each of the eleven statements.

3.1.1 Confidence in and knowledge and familiarity of outdoor spaces

Across the sample, participants demonstrated very high levels of basic familiarity with their local outdoor spaces. All participants (100%) agreed that they knew how to get to their local outdoor spaces, with twelve (50%) rating this at the maximum level (10). Similarly, most reported being used to spending time outdoors, with nine (38%) at level 9 and seven (29%) at level 10.

Confidence in practical outdoor skills and ecological knowledge, however, was more uneven. While many girls reported being confident in dealing with situations outdoors (eight (33%) at level 8, seven (20%) at level 9), a smaller number gave mid-range responses, pointing to pockets of uncertainty. The statement ‘I can identify many different types of plants and animals’ showed the greatest variation, with only two (8%) at level 10 and four (16%) clustered at neutral (level 5). This indicates that while participants feel able to be in outdoor settings, their ecological knowledge and confidence in handling challenges could be developed further.

3.1.2 Outdoor-self-identity, comfort and interest

Participants expressed a strong interest in the natural world, with ten (42%) selecting the highest level (10) and only two (8%) giving neutral ratings. Past positive experiences were also near-universal: ten (42%) at level 10 and six (25%) at level 9 reported having ‘had good experiences in outdoor spaces in the past’.

However, outdoor-self-identity and comfort with unfamiliar elements were more mixed. While many strongly agreed that they see themselves as the kind of person who spends time outdoors (eight (33%) at level 9, five (21%) at level 10), seven (29%) gave mid-range responses (levels 4–6). Likewise, the statement ‘I am not put off by natural elements like dirt, bugs, cobwebs’ showed a broad spread, with four (17%) at neutral and three (13%) below level 5, alongside six (25%) at level 7 and five (21%) at level 9. Comfort exploring new outdoor spaces also varied: although seven (29%) rated this at level 10, twelve (50%) clustered at levels 6–8 and two (8%) rated it at level 5. These findings suggest that while interest and enjoyment are strong, not all participants identify with being ‘outdoorsy’ and some remain cautious in unfamiliar settings.

3.1.3 Care and respect for wildlife and nature

Caring for wildlife and nature was the most strongly endorsed theme across all statements. Thirteen participants (54%) rated ‘Looking after wildlife and nature is something I care about’ at the highest level (10), and a further five (21%) rated it at level 8 or 9. This was the single most strongly agreed item in the survey, indicating an emotional connection to wildlife and nature.

Knowledge of how to actively get involved in looking after outdoor spaces, however, was less consistent. While five (21%) participants rated this at level 10 and a further five at level 8, four (17%) gave neutral responses and two (8%) selected low scores (levels 1–3). This contrast highlights a clear gap between values and practical awareness. Participants care deeply about wildlife and nature, but many are less confident about the pathways through which they can take action.

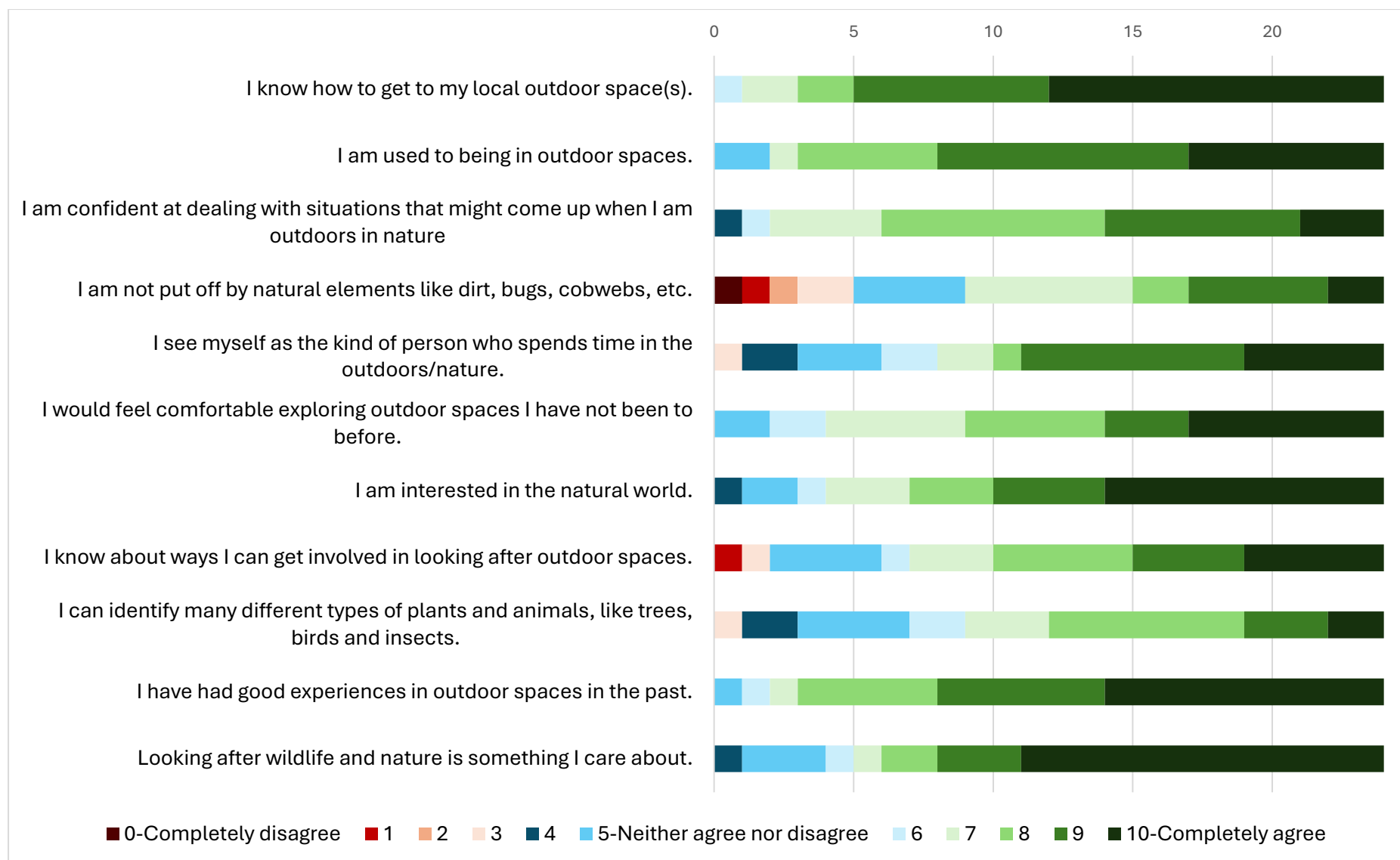


Figure 4: Nature engagement capabilities scale – results from across all 24 participants (GO Study, 2023-2024)

A structured interview format was critical in capturing the nuanced perceptions and experiences of participants, particularly because many of the statements explored subjective or self-assessed capabilities. This approach made it possible to explore how participants interpreted each statement and what their responses actually meant in practice, as reported in Sections 3.1.4 – 3.1.14.

3.1.4 I know how to get to know my local outdoor spaces

The interviews indicated that most participants possessed a strong familiarity with their local outdoor spaces. The girls mentioned places such as parks, grassy areas, forests, and playing fields, and many were able to describe specific routes or landmarks they used to reach them. This level of detail suggested a regular exposure to outdoor areas within their neighbourhoods.

“Yeah, I know my way, I’d have to go through Lowburn, take the way, keep on going straight down... Yeah, I can go to the beach by myself.” (Amy, 2023)

“I’ve been outdoors a lot, and I know how to get there because I’ve been with a lot of my friends, and I just know all the ways around.” (Brittany, 2024)

Confidence and comfort in navigating these spaces were evident in nearly all responses. Participants commonly expressed that they could get to familiar outdoor spaces on their own or with friends, which indicated a sense of autonomy.

“Yeah, I can like go down to the park and like near the Thistlemount House place, I can also go there because I know how to get there.” (Detina, 2023)

In a few cases, participants acknowledged the possibility of getting lost or expressed some uncertainty when navigating unfamiliar areas, however, these were exceptions rather than the norm.

“Probably like an eight because maybe sometimes I don’t know where I’m going – I’m a bit lost sometimes.” (Julia, 2024)

“If it’s in my area then yeah, but if it’s somewhere I haven’t been before, then no!” (Tigger, 2023)

Parental input occasionally clarified boundaries or reinforced safety expectations, highlighting the balance between participants’ independence and adult supervision. Overall, the interviews suggested that most pre-teen girls felt capable and confident in accessing local outdoor spaces, which provided them with opportunities for self-directed outdoor experiences and contributing to their broader engagement with nature.

3.1.5 I am used to being in outdoor spaces

The interviews indicated that most participants were used to being in outdoor spaces, suggesting a general familiarity and ease with outdoor environments. Pre-teen girls described time outdoors as a routine part of daily life, particularly through school breaks, informal play, and time spent with family or friends.

“I’m normally at school when it’s like break and lunchtime, I’m used to being outside because like I know all the places outside and there’s lots of fun with all my friends.” (Brittany, 2024)

In addition to familiarity, the interviews conveyed a moderate sense of confidence in using outdoor spaces. While most participants expressed ease, a few acknowledged some uncertainty when dealing with unfamiliar or unpredictable outdoor scenarios.

“That would be a nine because who knows something could just come and jump scare you or there’s something new there.” (Misty, 2024)

Comfort was often expressed directly or implied through tone and responses. Participants described outdoor spaces as normal parts of their routine. However, there was some variation in how participants interpreted the idea of being “used to” outdoor spaces. Some sought clarification, indicating different understandings of the concept. Finally, some noted limitations in access due to age or safety concerns, even when they felt comfortable in known spaces.

“Some places that are a bit like out of my reach that I can’t really go to, but I want to...” (Brittany, 2024)

Overall, the interviews demonstrated that most pre-teen girls felt a general sense of ease and normality in being outdoors. While not all expressed strong enthusiasm or emotional attachment, the data indicated that being outside was a familiar and accepted part of their lived experience.

3.1.6 I am confident at dealing with situations that might come up when I am outdoors in nature

The interviews showed that the majority of participants demonstrated a practical, and often confident, approach to managing unexpected situations in outdoor spaces, such as blocked paths, flooding, or other obstacles. The girls often described how they would respond by taking an alternative route, navigating around an obstacle, or, in some cases, turning back.

“Yeah! ‘Cause why not climb! It’s fun.” (Chick, 2023)

“I have, like, sometimes taken a stick and seen how deep [the puddle] was.” (Katy, 2024)

Familiarity with surroundings often supported this confidence. Participants who regularly explored their neighbourhoods were more likely to describe calm responses when encountering outdoor disruptions.

“If it was blocked with a tree, I would probably try and climb over.” (Amy, 2023)

“If I had wellies on, I’d just go through [the puddle].” (Bambie, 2024)

Confidence levels, however, varied. While many participants described actions like “yeeting” a bike over a tree or climbing over a log, others expressed hesitation or would seek adult support.

“I would probably be a bit panicked, and I’d probably reach for my phone and call someone, like my mum or my dad.” (Julia, 2024)

“Call my mum [laughter] or I’d go the other way.” (Ivy, 2024)

Their responses varied depending on confidence, past experience, physical conditions in outdoor spaces, and what they were wearing. Participants frequently considered the size of the obstacle, their footwear, or the weather before acting. Many linked their confidence to preparedness, especially having waterproof boots or spare clothes.

“If it’s just like a puddle then I would be fine with that but if it’s like a lot of flooding then I would probably just go the other way.” (Detina, 2023)

“I would see if I can go around it and if I can’t I’d just ride on my bike through it.” (Luna, 2024)

From cautious avoidance and seeking help, to bold and humorous solutions, the girls showed a range of competencies in responding to the unpredictability of outdoor settings.

3.1.7 I am not put off by natural elements

Participants expressed a broad and varied range of reactions to natural elements such as dirt, bugs, and cobwebs. While some displayed enthusiastic or pragmatic acceptance, others described strong aversions, often shaped by social influence, learned fears, or situational context.

Many participants indicated they were unbothered by mud or dirt, especially when appropriately dressed.

“I probably wouldn’t want to get muddy in nice clothes, but if I’m wearing like wellies or a hiking jacket, I probably wouldn’t mind.” (Julia, 2024)

“I don’t really mind mud if I get my fingers dirty, I just wash them... I don’t mind getting my clothes dirty.” (Bambie, 2024)

Bugs and cobwebs, however, elicited more divided responses. While some participants found them fascinating or even lovable, others reported discomfort or disgust, most often in relation to spiders.

“Cobwebs freak me out. I don’t mind spiders, but I don’t like cobwebs at all... they’re sticky and there might be dead bugs.” (Daisy, 2024)

Nonetheless, there were several expressions of fondness and curiosity towards insects.

“I love bugs, bugs are so cool! Especially butterflies... one landed on me and opened its wings—it was one of the prettiest orange butterflies I’ve ever seen!” (Tigger, 2023)

Some participants described bug-collecting as part of their routine outdoor play.

“There’s a place we call the mucky garden... there’s like millipedes and worms there.” (Detina, 2023)

Tigger recounted that she got upset when a classmate killed a spider she intended to carry outside. Empathy for non-human creatures emerged strongly in other cases, too.

“They’re nature! They don’t deserve to die!” (Chick, 2023)

Attitudes often evolved over time. Several girls described becoming more squeamish with age, while others developed confidence through experience or education.

“I used to keep snails in a tub... but then it was too gross.” (Bambie, 2024)

“When I was younger, deathly afraid of snakes and spiders... now I’m like [enthusiastically] ‘Spiders!’ Not as in scary, but like yay!” (Tigger, 2023)

Family influence also played a significant role. Some participants mirrored their parents’ fears.

“Mum doesn’t like spiders either... probably that’s why.” (Bambie, 2024)

Conversely, in families where bugs were treated with curiosity or calm, participants were more likely to tolerate or protect them.

Peer influence also shaped behaviour. Bambie described a contrast between two groups of friends.

“Two of my friends never want to go outside. But then my other friend will ask me to go collect bugs and dig.” (Bambie, 2024)

Overall, the interviews revealed that while some girls were highly confident and comfortable with natural elements, others maintained clear boundaries or fears, often mediated by experience and social context. However, sometimes even amongst the more hesitant participants, there was a general understanding that dirt and bugs are part of outdoor life, and with the right mindset or gear, these elements could be tolerated.

3.1.8 I see myself as the kind of person who spends time in nature

There was a wide range of self-perceptions amongst the sample, which were shaped by past experiences, seasonal routines, social influences, and changing habits. Some participants confidently affirmed an outdoors-oriented self-image, while others described themselves as “*kind of an outdoor person*”, acknowledging some degree of regular outdoor engagement but also moments of preference for indoor activities.

“I do sometimes go out for fresh air as well and sometimes play with stuff in the garden... I sometimes get my bike as well [...] So yeah, I would say I’m kind of an outdoor person.”
(Brittany, 2024)

Many participants or their parents framed their outdoor behaviour in relation to past habits, which changed over time.

“You were out all the time... every day you were in a park or that. But the older you’ve got, the more you don’t want to be out—you’d rather be with your pals stuck in your room, or on your phone, or drawing.” (Jemima’s parent, 2024)

Peer dynamics and social routines also played a significant role. Social influence often shaped whether time in nature happened at all, suggesting that self-perceptions of being outdoorsy were context-dependent and entangled with the habits of friends and family.

“Sometimes my friends, we’ll just go to one of our houses and just stay in... on phones.”
(Ivy, 2024)

For some, indirect engagement with nature formed a part of their identity. Raya initially hesitated when asked if she spent time in nature, however, her parent offered an alternative lens:

“You kind of do it in a book... it’s always about animals.” (Raya’s parent, 2024)

Seasonality also emerged as an important influence. Even those who regularly spent time outdoors often framed their engagement around warmer months or more favourable weather conditions.

“If that was a seasonal question, then like not so much in the winter, but in the summer sure...” (Amy, 2023)

In sum, many girls held a conditional or shifting sense of being a “nature person.” Their identity in this regard was often shaped by personal history, peer behaviour, age, season, and broader lifestyle patterns. The perception of being someone who spends time in nature appeared fluid, reflecting not just behaviour, but also how that behaviour was influenced and narrated over time.

3.1.9 I would feel comfortable exploring outdoor spaces I have not been to before

Participants’ responses to this statement revealed a mix of enthusiasm, caution, and conditional comfort. For many, the willingness to explore unfamiliar outdoor spaces was heavily dependent on (adult) company and the type of outdoor space. While some participants described themselves as adventurous and eager to explore, the presence of a trusted adult or friend

emerged as the strongest influence on their comfort levels, with safety concerns and unfamiliarity most often mentioned as barriers to going alone.

“If it was with mum then yeah... As long as I’m with someone I know.” (Chick, 2023)

“Probably not by myself, because, like, I might get lost or not know where to go or anything. [...] My mum, probably. Mum or Dad.” (Katy, 2024)

Safety anxieties were common, particularly around the possibility of getting lost, encountering something unexpected or accidents.

“In case we can’t find the way out or something comes.” (Bambie, 2024)

“If I didn’t know where the place was, I wouldn’t want to be there just in case like something happened, I fell over or something.” (Detina, 2024)

The type of outdoor space also made a difference. Many drew a clear line between exploring a new urban park versus a woodland or rural outdoor space. Parks were generally seen as safe and manageable, especially if close to home, whereas woods evoked stronger reluctance.

“A brand-new park that you had never been to in Aberdeen?” (Interviewer 1) – *“Yeah I’d feel fine going there.”* (Bambie, 2024)

“If it was near home, I would probably be more comfortable exploring it myself.” (Josie, 2024)

Some participants, however, expressed a stronger sense of confidence and independence, framing exploration as a positive, adventurous challenge.

“[...] I’m a Sagittarius; I’m adventurous and I take risks.” (Amy, 2023)

“Yeah. I’d go around the woods and start to climb trees and then I would make a shelter.” (Luna, 2024)

Parents often reflected on their role in gradually supporting independence, describing a balance between protecting their children and providing opportunities to develop confidence.

“We are providing the experiences for her... so she’s got the tools when she is a little bit older.” (Brittany’s parent, 2024)

In summary, children’s comfort with exploring unfamiliar outdoor spaces was conditional and context dependent. While a small number embraced adventure, the majority required the reassurance of trusted family or friends and outdoor spaces they perceived as safe. They would typically feel comfortable exploring parks near home they had not been to, while woods and more rural spaces raised anxieties. Overall, participants showed a willingness to explore but within clear boundaries of trust, safety, and support.

3.1.10 I am interested in the natural world

Most participants expressed a genuine and often vivid interest in the natural world, although the nature and depth of that interest varied widely - from sensory and emotional connections with animals to scientific curiosity about geology, ecosystems, and environmental change.

For some, their interest was rooted in a strong personal affinity for nature. Avery mentioned, *“The sky... animals, nature... yeah,”* and added that she loved horse riding and spending time at stables. Others gave simple yet heartfelt affirmations and showed an appreciation for wildlife.

"I find it interesting how like when you go out you sometimes see like squirrels and deer."
(Sunset, 2023)

Emotional memories often supported this interest.

"Papa used to plant things with us." (Jemima, 2024)

Jemima also shared the joy of receiving a symbolic gift, as she and her family were sponsoring an African elephant.

"I got an elephant for my birthday... Not like an actual elephant in my garden, unfortunately. [...] They can eat watermelons in one!" (Jemima, 2024)

Others were drawn by curiosity and wonder, particularly around natural processes and scientific themes. Katy said she was fascinated by *"how things grow, like, and like evolution and stuff."* Josie noted she was interested in *"how the mountains are formed and what lives there."* Chick had a deep fascination with volcanoes and natural disasters, recalling a school project with excitement: *"As soon as my teacher said it, I was like yes!"*

Media and school-based learning reinforced these interests. Chick and Tigger referred to watching Blue Planet and Newsround, and discussed climate change, biodiversity loss, and habitat shifts. Tigger reflected on a striking moment and expressed both concern and empathy.

"Flowers are growing in Antarctica now! [...] David Attenborough, do something!" (Tigger, 2023)

Some participants showed evolving relationships with the natural world. Bambie remembered exploring bugs with her dad and reflected on how comfort levels could reshape interests over time.

"We used to lift up the rocks and look at the bugs... I used to ask dad if we could go after school. [...] Now if I did it, I would be like urgh, disgusting." (Bambie, 2024)

Different experiences with nature shaped interest in the natural world. While Raya's engagement developed through reading, Ivy enjoyed exploring the dirt with friends, digging up soil to compare textures. Jackie described picking up shells, conkers, and observing deer and squirrels in the forest. Daisy, who loved marine life, said she would consider studying marine science one day.

"Oh I love marine life... I would maybe like to do Marine Science when I'm older." (Daisy, 2024)

Tigger's detailed fascination with bugs and snakes stood out, especially in her critique of how people treat insects.

"I've seen people that pin them... and I found that scary, too. I just like watching [bugs]."
(Tigger, 2023)

In summary, participants demonstrated a broad and dynamic engagement with the natural world. This interest was shaped by formative memories, school and media influences, sensory enjoyment, and emotional experiences and concerns, particularly towards animals and environmental change.

3.1.11 I know about ways I could get involved in looking after outdoor spaces

Participants demonstrated a wide range of familiarity and experience when it came to environmental stewardship, from organised school initiatives to informal family-led activities. Most had engaged in some form of caring for outdoor spaces, yet, their confidence and autonomy in accessing or initiating these opportunities independently varied considerably.

Many participants' first exposure to environmental action came through school. Litter picking was the most commonly cited activity, often framed as a routine part of school life.

"Our school has started doing litter picking... every class does some around the neighbourhood. [...] Maybe our classes could take a turn around and we can go outside and we can go around the neighbourhood picking up litter." (Julia, 2024)

Beyond school, participants' involvement tended to depend on adult facilitation. Independent engagement was rare but not unheard of.

"One time I litter picked around my neighbourhood... I just wanted to do it. [...] I think I might have seen it on like a video or something, someone litter picking." (Bambie, 2024)

Yet, many girls expressed uncertainty about how to get involved without school or family guidance. A common refrain was: *"I would ask my mum"*. This reliance on adults reflected both a lack of confidence and limited access to visible or youth-friendly opportunities.

Technology was often seen as a gateway to involvement, although rarely used independently.

"Maybe like a website or something... probably on Facebook or something. Like a platform." (Avery, 2024)

Parents often confirmed this, noting their role in researching and vetting opportunities.

"She will generally look it up and then bring it to me and say, 'What do you think about this?'" (Daisy's parent, 2024)

Several participants expressed strong moral motivations for environmental care.

"Maybe I'd remind people in the community to pick up after their dog... pick up litter... make sure no one is being mean to forests... and like polluting. [...] We need to make sure that where we live is nice and clean because if it's not nice and clean then you wouldn't really like the place anymore." (Brittany, 2024)

Similarly, Julia explained her reasoning for promoting litter picking.

"So it won't harm any of the natural animals." (Julia, 2024)

Despite this clear sense of care, some described barriers to greater involvement; mainly time, competing commitments, or a lack of (obvious) opportunities.

"We've always looked to do something like that but... it clashes with gymnastics or whatever, dancing and stuff." (Bambie's parent, 2024)

"There's no opportunities to make something near you, like a park or anything." (Katy, 2024)

Ultimately, while participants' practical knowledge about how to get involved varied, most expressed a willingness - and in many cases, a desire - to contribute. With greater visibility,

accessibility, and support, the girls would likely engage more often, confidently and independently in looking after outdoor spaces.

3.1.12 I can identify many different types of plants and animals

The participants demonstrated a wide spectrum of familiarity, interest, and confidence in identifying plants and animal. While most could name a few birds, insects, or trees, the depth of knowledge varied significantly, from basic recognition to vivid memories and detailed ecological interest. Several participants could name some birds, insects, or trees, although often just a few species. Birds such as robins, sparrows, blue tits, gulls, and woodpeckers were commonly named.

“I can tell the difference between a crow, a magpie, a seagull and certain garden birds... a blue tit and a robin.” (Luna, 2024)

Common types of insects were familiar to many girls.

“I know ladybirds and beetles, ants, bees, wasps.” (Luna, 204)

Trees, in particular, were the least confidently identified category, even by more nature-engaged participants, as the girls were trying to recall tree names: *“I only know oak, spruce I think”* (Misty, 2024); *“Probably just oak”* (Daisy, 2024).

Some participants connected their identification skills with places or personal experiences. Avery recalled, *“There’s one in Rowanbrae Park... we used to go through it on our horses”* describing a special tree known as the “*Magic Tree*”, although she couldn’t name its species.

Confidence in identification varied greatly. Some felt reasonably capable, while others rated themselves very low.

“Probably like eight, nine... I don’t know any trees.” (Misty, 2024).

“I can identify like insects and plants but not really trees and birds.” (Ivy, 2024)

Brittany’s confidence was shaped by her emotional response to animals.

“I don’t really like birds, I kind of have a fear of birds... Like they’re kind of scary, from all the fluttering. [...] I normally put [ladybugs] on my fingers... they’re calm with me.” (Brittany, 2024)

Even when their knowledge was limited, participants expressed interest and enjoyment and many girls engaged playfully.

“Probably butterfly because they’re just, like, elegant, or bee. Bees help us live.” (Katy, 2024)

“A robin. They are very cute.” (Jemima, 2024)

“Oh yeah I do like butterflies.” (Josie, 2024)

Many credited family members or activities for their learning, such as their experience from a residential stay.

“My mum really likes birds, so I know a lot of birds.” (Katy, 2024)

“I learnt one... if it’s a love heart, it’s an edible plant.” (Amy, 2023)

A common challenge was the overwhelming variety of species.

“There are so many things to learn... it’s a never-ending learning process.” (Tigger, 2023)

While nearly all participants could name at least a few familiar plants or animals, depth of knowledge, confidence, and comfort varied. Birds and insects, especially robins, ladybirds, and butterflies, were more readily identified than trees. Emotional responses shaped engagement, with humour, fear, or fascination often accompanying these interactions. Family influence and outdoor experiences, particularly through clubs or schools, played key roles in shaping what children knew and how they felt. Despite knowledge gaps, most participants showed curiosity and care, revealing potential for developing richer ecological literacy through supported engagement with nature.

3.1.13 I have had good experiences in outdoor spaces

Most participants expressed a broad range of positive experiences in outdoor environments, from joyful play and sensory exploration to memorable family outings and outdoor learning. In many cases, positive outdoor experiences were linked to learning or exploring, such as scouting, school trips, or nature play. While most girls spoke warmly of their time in nature, a few noted negative or mixed memories. These experiences, both good and challenging, shaped their relationships with outdoor spaces.

Many participants associated outdoor spaces with familiar, everyday environments, such as gardens, parks, school playgrounds, and woods. These places often provided the setting for encounters with insects, birds, and plants. Others recalled family fun, nature play, or outdoor learning. Positive experiences often involved curiosity, humour, or compassion towards nature. For example, Brittany fondly recalled a muddy adventure:

“I remember once when I almost fell into a puddle and my brother caught me... then he slipped and we both fell. It was very funny.” (Brittany, 2024)

While overwhelmingly positive, some girls shared less enjoyable outdoor moments, such as injuries, discomfort, feelings of disorientation or social tensions.

“Yes and also no, because once I fell and I got super muddy and... other bad stuff.” (Misty, 2024)

“I’ll go nine because sometimes there’s like fights... like arguments [with friends].” (Ivy, 2024)

3.1.14 Looking after wildlife and nature is something that I care about

Participants broadly expressed care and concern for wildlife and the natural environment, though the depth and nature of that concern varied across the girls. For many, this care was grounded in personal encounters with animals, a sense of moral responsibility not to cause harm, and in some cases, an awareness of global environmental issues. Family conversations and media were important factors in shaping values and reinforcing empathy towards wildlife and natural elements.

Many participants described experiences with individual animals that fostered a strong sense of care and responsibility. Amy, for example, recalled feeding a hedgehog she had named:

“I called him Spiky! I miss him still!” (Amy, 2023)

Pets also provided daily opportunities for responsibility and emotional connection. Violet and Jackie described caring for their cat Clyde. Others expressed compassion even towards creatures they feared, which points towards an ethic of protection that extended beyond personal comfort.

"I don't want a spider to die even though I'm scared of it, I just like it to be outside." (Detina, 2024)

This theme of empathy for vulnerable animals was particularly visible when participants spoke about pets, local wildlife, or chance encounters outdoors. For example, Detina described carefully returning bugs outdoors rather than letting others hurt them, showing how even small acts of care were important. These reflections suggest that participants were developing an early ethical framework that positioned wildlife as worthy of respect and protection.

"They're nature! They don't deserve to die!" (Chick, 2023)

For some participants, care for wildlife was linked to wider concerns about environmental change. Exposure through school, discussions with friends and relatives, and media fostered awareness of global ecological challenges alongside personal care for animals. In particular, nature documentaries and programmes encouraged empathy and sparked reflection, with participants mentioning *The Blue Planet*, YouTube, and Newsround. Tigger reflected on climate change in polar regions, noting with concern:

"Flowers are growing in Antarctica now! [...] Penguin life really went from like 'this' to like 'boom'. Really quick." (Tigger, 2023)

Brittany connected nature degradation to human wellbeing:

"If we don't take care of it then it will make life a bit harder for the earth and it might make it a bit difficult for us human beings because it will be hard to breathe for oxygen and stuff like that." (Brittany, 2024)

While many girls spoke passionately about caring for wildlife, others expressed weaker or more neutral views. Max, for example, rated it '4/10', while Ivy suggested it was *"just one of the things"* she cared about. These responses indicate that, while care for wildlife and nature was common, its intensity varied.

Overall, participants demonstrated a widespread care for wildlife and nature, expressed through:

- Strong emotional bonds with individual animals (e.g. pets and wildlife encounters)
- Ethical positioning against harm, even towards feared creatures like spiders
- Awareness of environmental issues such as deforestation and climate change
- Influence of friends, relatives and media in shaping attitudes and values

Although levels of concern varied, the majority expressed an interest in protecting wildlife and recognised their responsibility towards nature protection. These findings point to the early formation of empathy, ethical reasoning, and environmental awareness as part of children's developing relationship with nature.

3.1.15 Summary: Nature engagement capabilities

Participants generally reported good access to local outdoor spaces and positive past experiences in nature, with many expressing care for the environment. However, confidence and outdoor self-identity varied. While nature was enjoyed, not all girls saw themselves as "outdoorsy" or felt confident in unfamiliar settings.

Knowledge gaps were evident in species identification and awareness of how to get involved in looking after outdoor spaces. While many had taken part in activities like litter picking, few felt confident acting independently.

Reactions to natural elements and outdoor challenges (e.g. mud, insects, obstacles) were mixed and shaped by social, familial, and environmental factors. Despite this variation, most girls showed interest, curiosity, and emotional connection to the natural world, indicating a good foundation with clear areas for support and development.

4 Changes to engagement with the outdoors

Wave 1 of data collection has already given rise to some interesting insights about key life events and transitions which have impacted or are impacting the girls' use of the outdoors. While we are particularly interested in the events and transitions that unfold over the course of the longitudinal study, which will be observed by comparing data year-on-year, it is important to note that significant changes were already underway at the point of the first data collection period, as described in the following sections.

To gain insights into key life events and transitions relating to (dis)engagement with outdoor spaces, data about *changes* to outdoor use patterns were gathered by asking participants directly about differences in outdoor use compared to childhood. In addition to this direct questioning, any indirect discussion around changes that had taken place was also considered for this section. Many of the changes discussed had taken place in the previous two years.

4.1 Changes in outdoor use

We were particularly interested in exploring and understanding potential changes to the *amount of time* our participants were spending outdoors. What emerged during the course of the interviews was a complex of interacting factors determining this. Table 3 summarises responses to the question about changes in the amount of time spent outdoors.

Table 3: Changes to amount of time spent outdoors by the participants

Changes to amount of time spent outdoors	Participants	Reasons given
Less time	Amy, Avery, Brittany, Violet, Charlie, Ivy, Jemima, Josie, Misty, Raya, Tigger, Jackie	Technology (e.g., phones, consoles) for social interaction, social media, and gaming, COVID, preference for indoor activities, being tired, different living circumstances (e.g., moving house, parents' jobs)
More time	Charlie, Daisy, Katy, Lola, Sunset	Living circumstances (e.g., parents' jobs), friends, independence, realising that the outdoors is good for you, enjoying the outdoors more due to feeling more capable
Same	Chick, Max	A sense of using the outdoors as much but differently to previously
Unsure or unclear	Bambie, Coco, Detina, Julia, Luna, Poppy	N/A

To understand changes to the amount of time outdoors, it was also important to consider changes to *what* they were doing outdoors (i.e. activities), *where* they were going outdoors (e.g. parks, gardens, forests, etc.), and *who* they were going outdoors with (e.g. parents, friends, siblings). For example, one parent perceived that their daughter was spending less time outdoors but then reconsidered after their daughter highlighted that they were now spending *more* time outdoors with friends in the local area, as opposed to time spent outdoors on walks with that parent. Additionally, *when* the girls are spending time outdoors (e.g., after school, on weekends) will likely be an important factor to consider as the study progresses, particularly for developing relevant and targeted recommendations. The interaction of these factors along with others begins to explain why these changes are occurring, which is explored in the next section., while **Error! Not a valid bookmark self-reference.** provides examples of the types of changes observed in how the girls are using outdoor spaces.

Table 4: Other changes to outdoor use noted by participants

Changes to...	Examples
WHAT <i>changes to outdoor activity habits</i>	<ul style="list-style-type: none"> • Less appetite to go on long-distance walks with family • No, less, or different use of play equipment in local parks • Fewer or no imagination games • Less playing in the garden • Stopping/starting to cycle to school • Less appetite for or fear of looking at bugs and getting mucky where previously this had not been a problem • Stopping playing football • Stopping other team sports or sports clubs • Fewer risky activities, e.g., climbing, jumping from height • Starting to use phone outdoors (e.g., to take pictures of nature and the outdoors, of self/friends/family, to communicate, to play games)
WHERE <i>changes to the kinds of places where time is spent outdoors</i>	<ul style="list-style-type: none"> • Fewer planned trips with parents/siblings to places like petting farms, zoos, city parks, and nature spaces • Starting to play more in local parks and outdoor spaces without adults, i.e., alone or with friends • Less playing in the garden • Stopping going to local woodlands
WHO WITH <i>changes to company outdoors (which also encompasses the ‘how’ of access in many cases)</i>	<ul style="list-style-type: none"> • Starting to spend more time spent with friends outdoors, instead of with parents or siblings • Starting to spend time alone outdoors • Starting to find some friends don’t want to go outdoors anymore

4.2 Drivers of change

As P7 girls transition into early adolescence, their outdoor engagement is shaped by a combination of interacting factors - personal, social, environmental, and technological. This section explores how changes in behaviour and attitudes towards the outdoors are often not driven by a single cause but rather emerge through a complex interplay of influences that vary from child to child.

Themes such as increasing access to phones and technology, shifts in friendship dynamics, growing autonomy, and evolving personal preferences all play a role in shaping how, when, and why girls spend time outdoors. These factors are not mutually exclusive; instead, they intersect in ways that reflect the nuanced experiences of pre-teen girls.

By examining these overlapping influences, Section 4.2 highlights how outdoor behaviours evolve in relation to broader developmental and social transitions and underscores the importance of recognising these changes as fluid, context-dependent, and deeply individual.

Notably, many of the changes in outdoor engagement described were driven by the changing living circumstances of the girls (e.g., from moving house, having/losing pets, parents' job schedules, access to transport, through to injuries and health issues). Additional changes were influenced by other external circumstances, such as landscape changes, outdoor space quality, play equipment suitability, or lack of cycling infrastructure. To avoid repetition, these external factors are not discussed in this section but are discussed in Section 5 on Enablers and Barriers.

4.2.1 Phones and technology

The impact of increased use of phones and gaming consoles on our participants' outdoor engagement was particularly notable, both in terms of what they were doing outdoors and time spent outdoors. Many of the girls had recently received their first phones and were enjoying using them to communicate with their friends, access social media, and play games alone or with friends online. Apps mentioned included TikTok, YouTube, Snapchat, Facetime, and WhatsApp. In addition to phones, they were using other technologies like gaming consoles, tablets, and laptops. TV was also a factor for some girls. As illustrated by transcript excerpts below, some parents directly related increased screentime to a reduction in time spent outdoors.

"A year ago or two years ago, you would have been well up for going for a walk, but now you have to be forced. You would rather just sit and play on whatever device that you've got in front of you!" (Amy's parent, 2023)

"The amount of times I've said to you to go out and play and you're like 'Nah' and you're upstairs on your phone lying on your bed while Facetiming your pals when you could be out with them." (Jemima's parent, 2024) – "It's because half the time they're all like doing stuff and the days I'm free are the days they're not. We have terrible timing, it could be better, not be better but like...yeah." (Jemima, 2024).

It is important to note that many of the girls described choosing to spend time indoors using technology, but that this did not mean that they were not interacting with their friends. The use of technology was often an inherently social experience and seemed to indicate a shift in their use of social spaces – from outdoor spaces to virtual spaces.

However, not all the girls felt that phones or technology use was affecting their outdoor use, even if their use of technology had increased generally. Some had limited access to technology, had strict time limits implemented by their parents, or were self-limiting themselves.

As well as direct phone use by the participants, their friends' phone use was also mentioned as a factor that was beginning to impact on how they spent time outdoors, with some friends preferring to stay in with their phones – the element of friendships is discussed more fully in Section 4.2.2.3.

Conversely, phone use *outdoors* was also discussed. Some uses of phones outdoors mentioned were: to play games, record dancing videos, take selfies, and take pictures of landscapes and nature. For example, Bambie noted that:

“But we used to play like Harry Potter with sticks and yeah...it was always my friend Jenny who did it because she likes Harry Potter and she’s like...so when it was her turn to choose we’d always do that. But we don’t really play that anymore. We normally just play games on the phone or something.” (Bambie, 2024)

Notably, phones could also have a highly positive role in facilitating outdoor access, in terms of enabling a transition towards independent outdoor use with friends. Phones offered a means of communication between parents and their children while they were outdoors, offering a degree of peace of mind. In response to a question about important events in her life, Julia responded:

“I think when I got my phone... It’s ‘cause... wait, when I got my phone is when I started going out more, and that’s when like I felt more comfortable going out... Not just because... I’m not bragging.” (Julia, 2024)

Phones also served as time tracking devices, allowing the girls to know when to come home. One girl actually described the discomfort of not having her phone during her school residential trip, meaning that she was not able to tell the time or take pictures of her trip.

4.2.2 Personal and social transitions

Many of the changes to how the girls were using the outdoors, and to some extent, affecting the total amount of time spent outdoors were the many ongoing personal and social transitions taking place within and around them.

4.2.2.1 Autonomy, agency, and other changes to self

What emerged from conversations with the girls and their parents was a sense of the girls starting to better understand themselves and their preferences, and the interaction of this with negotiations around their autonomy, in terms of not always having to do what they were told and the ability to act upon their preferences. The idea of this negotiation was raised in a few different contexts, demonstrating different boundaries and approaches to parenting, for example, Jemima’s parent noted:

“I think until you’ve had a voice and said no you don’t want to do something you would rather sit on your phone with your pals, you were out all the time, you were never in. Every day you were in a park or that and then the older you’ve got the more you don’t want to be out, you’d rather be with your pals stuck in your room, or on your phone, or drawing.” (Jemima’s parent, 2024)

Julia indicated that parental influence was stronger when she was younger, saying *“I was outside a lot when I was younger. My mum and dad wanted to keep me outside...”* Josie’s parent spoke of the need to limit the perception of choice in certain contexts:

“Once they have an illusion that they have a choice, then all this moaning starts for example like when we were somewhere else and then they know that there is no choice

to go somewhere, yeah, no problem ... So on that day the annoying part is skipped when they know that there is no choice.” (Josie’s parent, 2024)

This sense of ongoing negotiation of autonomy and agency was taking place alongside changes in the girls’ preferences, potentially allowing them to act more upon these than previously. Examples of these changing preferences included:

- **A shift towards indoor activity preferences** for some girls, e.g., indoor hobbies (including technology use, but also, activities such as crafting, reading, etcetera), and spending time with friends indoors (whether using technology or engaging in other kinds of activities).
- **Prioritisation of certain extra-curricular activities**, whether dropping certain clubs to allow for more focus on others, or reducing time in the outdoors to make more time for extra-curriculars.
- **Stopping attending clubs and extra-curriculars that they were previously encouraged to attend**, often related to lack of enjoyment or a sense of boredom.
- **Beginning to find activities or places boring** that previously they enjoyed, often related to the idea of ‘same-ness’ and a desire for novelty, for example, a number of girls expressed that they would like to visit new places.
- **Wanting to spend more time with their friends.**

Some of these changes are illustrated in the below transcript excerpts:

“Like some people like walking for ages but like I don’t really like going on big walks. I used to.” (Bambie, 2024) – “That’s fair enough if you don’t like it.” (Bambie’s parent, 2024) - “But I don’t really...I would rather not do it. Yeah, I would just rather not do it because I don’t really like walking long.” (Bambie, 2024) - “Okay, so short walks maybe?” (Interviewer 1, 2024) – “Yeah short walks are good, like maybe the Braeton...” (Bambie, 2024) – “Yeah you like that one better.” (Bambie’s parent, 2024).

“Okay. Big changes. So, have you noticed a change in how much time is spent outdoors? (Interviewer 1, 2024) - “Yeah definitely. When she was little little, that’s what we did, went out, went to the parks, we did all that, went for walks. Obviously getting a bit older, she wants to spend time with her friends.” (Ivy’s parent, 2024)

These changes and negotiations were sometimes also taking place in the context of other mental, emotional, and physical changes, including:

- A sense of **increased personal knowledge and capacity**, leading to a desire to spend more time outside. For example, Misty explained *“I think when I was younger I used to just go outside automatically but now I go outside on occasions, like...like go to the beach, but I do a lot more stuff now because I’m more capable of doing it”* and *“Yes but I think being now it’s better because...because I can do more stuff outside and more activities.”* Lola noted that *“I like activities more and I know about staying healthy and stuff.”*
- **A sense of ‘growing up’ and certain activities and games no longer being appropriate**, for example, imagination games or playing on equipment in the garden, activities which were often linked to a sense of social embarrassment. In response to a question about potential changes in the sort of things she did with her friends, Ivy explained *“Bit different, because it was games that we would play when we were younger that we don’t play anymore, like we’ve grown up.”*

- Some girls described feeling quite **low energy**, sometimes preferring to stay in bed or stay in and be cosy than go outdoors, as compared to previously when they would have spent more time outdoors.
- Some girls communicated a growing sense of **risk aversity**, for example, no longer wanting to take part in activities like climbing or jumping from heights.
- Many participants described **a changed or changing relationship with certain outdoor elements, such as invertebrates and/or mud** and thus a change in the kinds of activities they might like to take part in outdoors. This was quite a notable shift for some, in that previously they had been unworried by or even curious about these things. Some did note that this relationship could be quite dynamic, having gone through phases of liking or disliking, for example, spiders, and that this could be socially mediated. For some, learning more about, for example, spiders, could help them to approach things with less fear or disgust. The below excerpt from the conversation with Bambie and her parent illustrates some of these points:

“She’s literally just changed with the bugs and the dirt and stuff I would say, it’s like literally been in the last six months, she’s always been outdoorsy. They had mud kitchens at nursery and school and things like that, and she was always happy to be in it. She’s nae bothered if she gets mud on her clothes really, are you, but you’re never really in a situation you would be like rolling in mud and things like that.” (Bambie’s parent, 2024) – “I’m not someone who digs in mud.” (Bambie, 2024) – “No, the feet are muddy every day she comes home from school.” (Bambie’s parent, 2024) – “But it’s because there are puddles all the way to school.” (Bambie, 2024) – “There’s a lot of muddy fields and the hill home is muddy, but the bug thing I think that’s very recent because it was...she would always save a beastie or she would catch a bee and take it outside or a ladybird, it would be don’t touch it, move it. The spiders have always kind of been...that’s probably me because I’m really scared of spiders.” (Bambie’s parent, 2024) – “I don’t like spiders, I don’t mind small ones but like if it’s like a big tarantula thing, it’s disgusting. Its hairy legs and... urgh.” (Bambie, 2024).

4.2.2.2 Independent outdoor use

A key factor influencing how time was spent outdoors by the girls, and, in some cases, the total amount of time spent outdoors, was the girls’ ability to spend time outdoors without adult supervision. As explained by Katy:

“...I think I’m getting outside more now because I’m allowed to like go outside by myself with like my friends, and when I was younger I wasn’t really allowed to like go out with my friends without my parents, so I’m probably getting outside more now since I’m allowed to like maybe walk somewhere by myself, yeah.” (Katy, 2024)

The transition towards more independent outdoor use appeared to be being influenced by a combination of different factors, including practicality (for example, it being easier at a family level for the girls to walk to school by themselves), the ability of the girls to socially organise themselves (moving away from adult-organised ‘play dates’), and changing preferences on the part of the girls (as described in Section 4.2.2.1)

Levels of nascent independence and the girls’ willingness to take advantage of this seemed to be mediated by confidence levels (for both parents and girls), in interaction with other environmental and social factors, such as availability of desirable outdoor spaces, friends to spend time with, perceived neighbourhood safety, and, very importantly, having a mobile phone for tracking and/or communication.

“So I suppose it was only probably when she was about maybe 10...well no maybe a bit younger than that, a couple of years ago, that we would be letting her go down to the park really without one of us being present so I suppose up until that time she would have been down there with us. But once that came that we could just let her go down on her own it opened up a whole new kind of choice of activities and stuff with her chums. It’s quite a safe place to be because there’s no through traffic because its only people that come into the street and stuff.” (Detina’s parent, 2023)

Some girls were in the very early stages of using the outdoors in this way, while others had more experience, and there was often clear desire for more – for example, to be allowed to take the bus into town with their friends.

In this context, the proportion of time spent outdoors with parents, versus alone or with friends was in flux. Who they were spending time with outdoors necessarily affected where, when, and how they were spending time outdoors, for example, many of the girls seemed to be losing interest in weekend trips to city parks or nature walks with their families but showed a lot of interest in spending time with their friends in local outdoor spaces throughout the week and at weekends. Conversely, in response to a question about how her outdoor use had changed, Bambie made an interesting observation about the limitations of her current independence:

“I think it was a bit different when I was younger because you didn’t have a phone or anything and...” (Bambie, 2024) – “Your friends didn’t have phones?” (Interviewer 2, 2024) – “Yeah, you couldn’t go outside by yourself so it was more like spending time with your family and stuff. So we would do like more like bigger walks or we would go somewhere new, but now it’s kind of the same. And I don’t mind that because I like playing with my friends and stuff... But I feel like before it was like...it was a bit funner because, you know, there are more places to go when you have an adult with you because they can drive. So it’s better. Because we can’t drive and we can’t take the bus but...” (Bambie, 2024)

4.2.2.3 Friendships and peer social dynamics

The social lives and contexts of our participants were in a state of flux as they transitioned into their teenage years. As already discussed, the influence of friendships and peers on the girls’ outdoor use was quite marked, whether in regard to the amount of time spent outdoors or how time was being spent outdoors.

In terms of current friendships that the girls were maintaining, it became clear that the preferences of friends could influence our participants’ outdoor use patterns. Bambie noted that her friends had stopped coming out when she asked them, while also observing that she did still have one friend that liked going outdoors to collect bugs and dig. Bambie also described the need to stop doing certain activities that other friends did not enjoy to ensure the inclusion of everyone in the friend group *“We always used to do it but now we don’t really do it because I feel like my other friend, she doesn’t like to do that kind of stuff so it’s instead of leaving her out, we try to include everyone.”* Charlie described how she stopped going to a particular spot and playing imaginary games because *“Andrea and Chelsea got to the age that they couldn’t be bothered anymore.”* Additionally, friends could just simply be busy with other tasks, such as clubs or chores, meaning that they could not come out as often, meaning that the girls might choose to stay at home as well.

Conversely, friendships could of course have a positive influence on outdoor use, with ‘outdoorsy’ friends being equally influential as friends who preferred to stay indoors. Two participants described how they had stopped engaging in nature play because their close friend had moved away. Daisy and her parent noted that while some of her friendship group would now

rather play Roblox, Daisy was choosing to spend time with her more active friends. Detina described the impact of her friendship with Jenny: *“I remember I used to get a lift to school nearly every single day until like P4-P5 that’s when me and Jenny became friends and I started going outside as well. So yeah...”*

Many of the girls described major flux in their friendship groups with degrees of cliquy-ness emerging alongside regular fall outs, creating a complicated social landscape for negotiating outdoor time and activities. For some girls, such as Brittany, this had resulted in a feeling of social exclusion and often having nobody to go out with. Coco’s parent described how her after school activities had changed completely after deciding to change friend groups:

“You’ve kind of changed friends, though, have you? There used to be a couple of kids at our park that you played with before and now you don’t really muck about with them. So she does different things now after school. But she was always at the park every night after school but you’re just doing different things now, are you? Like hanging about with Lisa and that more.” (Coco’s parent, 2023)

Another theme that emerged was a sense of changing norms around social dynamics in outdoor spaces. For example, Chick described how previously she would have played on her own and how this was sometimes preferable as it meant fewer arguments and fewer compromises, but that she was not really able to do this anymore. Sunset described feeling uncomfortable playing by herself: *“I would feel if it’s by myself like if I go out in my garden there’s...I guess there’s jumping on the trampoline but that by myself it just doesn’t feel right if you’re just out there by yourself. Yeah.”* Chick and Amy also described historic scenarios of more impromptu play in communal outdoor spaces, often involving large numbers of children from the local area. This could often mean playing with people they did not know and even playing with different people each day.

A final theme that emerged was a sense of division emerging between boys and girls. This was illustrated most acutely in the case of football, where a number of girls felt as though they could no longer participate in football due to active exclusion by boys, and also the rough way in which it was played. This sometimes extended to an exclusion from the spaces in which football was being played.

4.3 Summary: Changes to engagement with the outdoors

This section has described the changes that were taking place in terms of the girls’ engagement with the outdoors, as well as the drivers of these changes. While around half of our participants did feel as though they were spending less time outdoors than their younger selves, a good proportion felt as though they were spending more or the same amount of time, while some were uncertain. The main changes in terms of how the girls were engaging with the outdoors related to a nascent move away from spending time with family in outdoor spaces, often further away from home, to wanting to spend more time with friends in local outdoor spaces.

It was striking how much phones and other technology were impacting on many of the girls’ desire to spend time outdoors, with many girls and their parents linking increased technology use to reduced time outdoors. However, it was clear that it was also facilitating outdoor use through enabling the girls to be outdoors without adults, and creating new ways to interact in the outdoors, for example, through taking photos, recording videos, or playing on phones outdoors.

Other factors described were personal and social elements impacting on the girls’ engagement with the outdoors, but it is important to note that much of their technology use was inherently social and interwoven with these. The girls were starting to develop as individuals with a sense of autonomy and agency, which interacted with their often newfound ability to explore the outdoors

‘adult-free’. This combination of factors often led to a self-reported increase in time spent outdoors, as well as a change in use patterns, with more time spent with friends in local outdoor space. Phone use could either facilitate or counteract this. Limitations to exercising this autonomy emerged from multiple sources, but of note was the sense that local outdoor spaces could get boring and that the girls did not have quite enough independence or the resources to remedy this. The impact of friendships was also marked, with the sense that influential friends could determine where and how time was spent (either indoors or outdoors), or simply that a lack of friends could discourage the girls from spending time outdoors.

5 Barriers to and enablers for nature engagement

Understanding what supports or limits pre-teen girls' engagement with outdoor spaces is central to promoting sustained and meaningful engagement with nature. The study explored the lived experiences of P7 girls, capturing the factors that either encouraged or restricted their time spent outdoors. Both the structured and semi-structured interviews revealed a wide range of external and internal influences, from practical barriers to social dynamics, personal fears, and shifting perceptions of nature.

This section presents a detailed account of the key barriers and enablers that shaped the girls' outdoor engagement. It draws on direct quotations and themed analysis to highlight the complexity of their experiences. In many cases, what helped or hindered outdoor time was not simply one factor, but the interaction between environmental conditions, social relationships, availability of local outdoor spaces, independence, and personal motivations. The section is organised into four parts:

1. **External barriers** – covering practical and social factors outside the girls' control that limited outdoor engagement, such as adult restrictions, weather, physical accessibility, and transport.
2. **External enablers** – highlighting external supports, including encouragement from adults, pet ownership, favourable facilities, and supportive use of technology.
3. **Internal barriers** – addressing the personal or emotional factors that discouraged outdoor activity, including fears, discomfort, lack of motivation, and concerns around clothing or safety.
4. **Internal enablers** – identifying motivations and sources of enjoyment that encouraged engagement, such as a desire for health motivations, food, the appeal of types of conditions in outdoor spaces, and curiosity about nature.

5.1 External barriers

The interviews revealed a wide range of external factors that limited their engagement with outdoor spaces. These included restrictions imposed by adults, changes to local landscapes, competing activities, challenges related to the physical accessibility of outdoor spaces, the availability of outdoor facilities, social factors, the influence of technology, transport, and weather. Social barriers, such as exclusion or discomfort around others, were also frequently mentioned, alongside weather-related constraints (Table 5).

Table 5: External barriers to outdoor engagement

Barrier	Themes	Supportive quotes
Adult imposed restrictions	Safety concerns, not allowing independence, adult availability, influence of siblings	<i>"I mean, I do really want to go into town but like my parents won't let me yet because I don't think I can be trusted yet". (Brittany, 2024)</i>
Changing landscape	Deforestation, ecological changes	<i>"There's not really a lot of trees... we don't really go [there] anymore." (Chick, 2023)</i>
Competing activities	Indoor extracurricular activities, friends' activities too busy to go out	<i>"It's because half the time they're all like doing stuff and the days I'm free are the days they're not." (Jemima, 2024)</i>
Physical accessibility	Steps, poor paths for cycling	<i>"I did take my bike today because it was Bikeability today but I normally walk like with my feet and then like I take like stairs to get there as well." (Brittany, 2024)</i>
Outdoor facilities	Descriptions of elements within outdoor spaces	<i>"I don't like places like parks where there isn't much, just grass". (Luna, 2024)</i>
Social factors	Exclusion, having no one to go out with, bullying, discomfort from strangers	<i>"Sometimes boys said 'only P7s' and I'm a P7! And they're saying I'm not allowed to play..." (Amy, 2023)</i>
Technology	Excitement from technology over being outdoors, technology in winter months	<i>"Because I have more stuff to play with inside, like more art stuff and more computers" (Misty, 2024)</i>
Transport	Going further afield on bus	<i>"The bus does stop us going to a lot of places because the country ones only go so far so...we can't go too far really you know?". (Coco's parent, 2024)</i>
Weather	Weather restrictions, winter weather barrier	<i>"Because when the ice comes I don't want to go outside because I'm worried I'm going to slip and break my whole entire body." (Detina, 2023)</i>

The following account of external barriers presents a selection of the most noteworthy insights drawn from interviews with the P7 girls. These barriers highlight the complexity of challenges faced by pre-teen girls in getting to and enjoying the outdoor spaces. While not exhaustive, this account captures important themes and examples that offer a deeper understanding of the environmental and social contexts that act as barriers to spending (more) time outdoors.

5.1.1 Environmental changes and suitability of outdoor spaces and facilities

Ecological decline and changes in local landscapes, such as deforestation, storm damage, and reduced availability of suitable outdoor spaces, emerged as significant factors shaping how girls perceived and engaged with the outdoors. The girls' reflections highlighted how environmental changes, such as the removal of trees, had changed familiar outdoor spaces and disrupted established routines of play or other forms of outdoor engagement, such as tree climbing. Many noted that places they once visited regularly had changed significantly, making them less appealing or more difficult to get to.

“We sometimes go there... most of the forests aren’t really available to the public because of all the trees knocked down.” (Brittany, 2024)

The condition, cleanliness, and variety of outdoor facilities and play equipment were all raised as factors influencing outdoor engagement. Some girls reported that the physical infrastructure of outdoor spaces no longer met their needs. As the girls grew older, spaces that were once suitable for play began to feel limiting or inappropriate, particularly when equipment was designed for younger children. Parks and gardens that offered a variety of engaging, age-appropriate features were used more frequently, while less stimulating places were often dismissed.

“I don’t like places like parks where there isn’t much—just grass.” (Luna, 2024)

The girls’ reflections highlight the critical role that the design and availability of outdoor spaces play in shaping their engagement. Unsuitable play equipment and infrastructure along with undesirable changes to familiar environments have contributed to a decline in opportunities for unstructured, explorative play and other outdoor activities. As these spaces become more difficult to get to or less appealing, girls may feel less inclined to spend time outdoors, potentially weakening their long-term connection to nature.

5.1.2 Means of getting to outdoor spaces

For girls without access to a car, public transport presented a significant constraint, particularly for reaching rural or more remote outdoor locations. While places within the city were easier to get to by public transport, visiting outdoor spaces outside of the city was described as difficult.

“The bus does stop us going to a lot of places because the country ones only go so far so...we can’t go too far really you know?”. (Coco’s parent, 2023)

Barriers to cycling also emerged, particularly where routes to school included steps or uneven paths, making it impractical or challenging for the girls to travel by bike. Such challenges not only limited the practical use of these spaces but also influenced the girls’ confidence and willingness to cycle.

“I did take my bike today because it was Bikeability today, but I normally walk like with my feet and then like I take like stairs to get there as well.” (Brittany, 2024)

“The path was like that small, so I was literally like ‘no I’m walking. I am not falling into the river, trying to swim after my bike.’ [...] How am I meant to carry a bike? I can barely lift it down the stairs.” (Chick, 2023)

This highlights how engagement with outdoor spaces is not only shaped by desire or interests, but by practical constraints, particularly by infrastructure and mobility.

5.1.3 Social exclusion and gendered dynamics

Exclusion emerged as a key barrier to outdoor engagement for several girls, particularly within the context of gendered play. Football was frequently mentioned as a game the girls wanted to join but felt unwelcome in. Many expressed frustrations after not being included.

“Sometimes boys said ‘only P7s’ and I’m a P7! And they’re saying I’m not allowed to play...” (Amy, 2023)

Jackie described withdrawing from football altogether because of the boys’ aggression.

“The boys take over and then get too aggressive.” (Jackie, 2024)

These interactions demonstrate how public play spaces can become gendered territories. Even when girls technically had access, feeling excluded or unsafe discouraged them from participating. Social exclusion also extended to peer interactions, with some girls describing being left out of friend groups during outdoor play.

“If I ask them if I can just watch them, they sometimes say ‘maybe not’. Then I just watch them from a distance...” (Brittany, 2024)

Such social barriers highlight the need for inclusive environments that actively consider peer dynamics and support equal participation.

5.1.4 Summary: External barriers

The interviews revealed that pre-teen girls face a range of barriers to outdoor engagement, including environmental changes, poor infrastructure, and limited transport; all of which restrict access and reduce motivation to spend time outdoors. Many outdoor spaces were no longer seen as age-appropriate, leading some girls to stop visiting them altogether. Social exclusion, particularly within male-dominated play, further discouraged engagement with the outdoors. Collectively, these factors limit opportunities for active and enjoyable outdoor experiences. Despite these barriers, the interviews also highlighted several external factors that supported and encouraged the girls’ engagement with outdoor spaces, which are described in the next section.

5.2 External enablers

The interviews revealed several factors that encouraged the girls’ engagement with the outdoors. These included encouragement from family and peers, spending time outside with pets, the use of technology to support independence, favourable weather conditions, participation in structured outdoor programmes, and an appealing outdoor spaces and infrastructure (Table 6).

Table 6: External enablers to outdoor engagement

Enabler	Themes	Supportive quotes
Family and peer encouragement	Proposing outings, encouraging independence, family trips and routines, friends and family as motivators	<i>“My parents were like ‘I think she needs to get a phone so she can contact us because then if something happened then she can contact us.’” (Julia, 2024)</i>
Pets	Dog walking	<i>“Do you think you would go out less if you didn’t have [the dog]?” (Interviewer 2, 2024) – “Yeah.” (Charlie, 2024)</i>
Technology	Phones to encourage independence, taking photos of nature	<i>“Maybe like at sunsets or like I did...I actually did go to the[park] and I took a picture of a flower.” (Julia, 2024)</i>
Favourable weather	Sun and warmth, snow	<i>“It’s nice and sunny, and when you go in the river it might be cold at first but then you get that nice little sun in the way, and you’re cool at the same time.” (Amy, 2023)</i>
Structured outdoor programmes	Outdoor learning, residential experiences, clubs and group activities like Scouts, holiday clubs, summer schools, camping, nature activities and play embedded in different social clubs and groups	<i>“I used to go out with my RADS group. We did it in the woods and everything... it was really fun.” (Chick, 2023)</i>
Infrastructure and appealing outdoor spaces	Varied play equipment, presence of amenities, engaging environments with novelty or natural features	<i>“I like how it has a lot of trees, me and my friends can climb... little swings and stuff, little hidey holes.” (Lola, 2023)</i>

5.2.1 Family and peer encouragement

Family and peer encouragement emerged as a key driver of the girls’ engagement with the outdoors, with both adult prompting and peer support contributing to when and how outdoor activities took place. Parents were often the primary instigators of outdoor activity, whether by organising family outings, encouraging the girls to participate in clubs or simply insisting they spend time outside. In some cases, parents were explicit that without adult involvement, the girls would not go outdoors of their own accord.

“You still go outside a lot because you’re forced! That’s what I’m meaning...you’re not up for us going out more.” (Amy’s parent, 2023)

This reliance on adult initiative was also evident when the girls reflected on their own preferences.

“If I didn’t say ‘Come on, let’s go to the beach, let’s do this, let’s get outside’, what would you want to do?” (Amy’s parent, 2023) - “Really...I would probably just want to stay in the house and do my usual stuff and play my games.” (Amy, 2023)

Even when the girls did enjoy being outdoors, their access to nature was frequently facilitated by adults through planning, transport, or supervision. In some cases, adults encouraged

participation in groups such as Scouts to ensure their children had regular engagement with the outdoors.

Peers and siblings also played a motivating role in encouraging outdoor play. Many girls indicated that they were more likely to go outside when they had someone to go with, and that their interest in certain activities declined when friends or older siblings stopped participating.

“So when did you stop going?” (Interviewer 2, 2024) - “As soon as Andrea and Chelsea got to the age that they couldn’t be bothered anymore.” (Charlie, 2024)

In some cases, the social element was the main appeal of certain spaces, as the girls described how time outdoors was closely tied to peer socialising.

“Sometimes I go out with my friends to like the Greenfield Centre and some other places to just to hang out... It’s just somewhere to hang out that isn’t at home, where parents can’t see.” (Brittany, 2024)

Overall, social encouragement, whether from adults or peers, was essential in enabling the girls to spend time outdoors. Adult involvement provided structure and opportunity, while peer companionship offered motivation, enjoyment, and a sense of safety.

5.2.2 Pets

Pets, particularly dogs, played a meaningful role in encouraging the P7 girls to spend time outdoors. Whether through daily routines like dog walking, spontaneous play in the garden, or more adventurous outings to parks and beaches, domestic animals frequently acted as a motivator and source of joy. Many girls described going outdoors specifically because they had a pet to walk or play with. For example, Charlie was clear that her dog Buddy was the reason she regularly spent time outside. Even when not particularly enthusiastic about walking the dog, a sense of responsibility or routine often kept girls going.

“I would still take him out because I have no option.” (Charlie, 2024)

For others, dog walking was made more enjoyable when shared with friends or family. Chick explained that she and a friend would often walk someone else’s dog for fun.

“If Lana’s friend’s dog’s owner is away somewhere we walk their dog or we just walk the dog for them because it’s fun.” (Chick, 2023)

Likewise, Tigger described how walking her friend’s dog gave her a reason to get her friend out of the house and socialise.

“I prefer going out with my friends to going out alone...so then we just walk his dog together.” (Tigger, 2023)

Beyond routine walking, pets also inspired more playful or exploratory interactions with nature. Amy recalled a memorable moment when she helped her dog explore the water at a river:

“I held her, right, and I tried to get her as deep as I can and then didn’t she kind of start paddling...” (Amy, 2023)

Similarly, Brittany shared numerous examples of how their Labrador had become central to family outdoor life. His need for exercise encouraged regular walks and trips to parks and beaches.

“He likes to swim in the water, it doesn’t matter where it is, just going in the water.”
(Brittany, 2024)

This theme of dogs enriching outdoor experiences came through repeatedly. For Max, visits to the beach became more enjoyable when the family dog was included, transforming an ice-cream trip into something more adventurous. Meanwhile, Sunset highlighted how even short, familiar dog walks could become a meaningful part of her daily routine.

“In the morning, sometimes the dog needs a walk, so I take the dog out around the house....” (Sunset, 2023)

In sum, pets provided structure, companionship, and playful unpredictability, helping to make outdoor spaces more enjoyable.

5.2.3 Technology

The interview data revealed that technology can act as a complex and occasionally enabling force in P7 girls’ engagement with outdoor spaces. A key driver for change (Section 4.2.1), mobile phones, in particular, provided a sense of safety, social connectivity, and creative opportunity that made going outside feel more accessible or appealing. For several girls, having a phone was directly linked to increased independence. For instance, Julia explained that receiving her phone marked a key turning point in her confidence to spend time outdoors on her own.

“When I got my phone is when I started going out more, and that’s when like I felt more comfortable going out.” (Julia, 2024)

This connection between mobile technology and safety was echoed by Brittany, who described using her phone as a protective measure when walking alone.

“I will always have my phone on the call app just in case anyone tries to come at me and then I’ll do 999.” (Brittany, 2024)

Access to a phone not only gave the girls a tool to manage risk but also allowed them to arrange spontaneous meetups with friends.

“I have this big group chat with all my friends, does anyone want to go here with me and half of them say yes so we’re just there all the time.” (Tigger, 2023)

However, lack of access to a phone could serve as a barrier to social participation. Violet noted how her limited independence was shaped by not owning a phone, especially when friends were already using them to coordinate plans:

“Yeah but we don’t have phooooones. Grace has a phone and Olivia has a phone.” (Violet, 2024) - *“You could arrange it at school and then just...”* (Violet’s parent, 2024)

Technology also contributed to outdoor experiences in more creative and expressive ways. Julia described taking her phone outdoors to capture and share moments in nature.

“I actually did go to Duthie Park and I took a picture of a flower... I was feeling very photographic!” (Julia, 2024)

These kinds of interactions show how phones can enhance girls’ engagement with nature by providing new ways of noticing, documenting, and valuing their surroundings.

Interestingly, some games, especially those in virtual reality, blurred the boundaries between physical and digital activity. Max described how playing Gorilla Tag on a VR headset felt physically active, even if it was technically indoors.

“I’m always outside in Gorilla Tag.” (Max, 2024)

While this distinction was contested by her parent - *“That’s virtual reality, you’re still in the lounge!”* - it highlights how girls may experience virtual worlds in embodied ways that, at times, mirrored outdoor play.

In summary, technology, and particularly mobile phones, can act as an enabler to outdoor engagement. Technology can offer a sense of safety, social connection, and creative tools that in some cases supported the P7 girls to access and enjoy the outdoors. These forms of engagement with technology underscore the need for a more nuanced understanding of digital life in shaping girls’ outdoor behaviours.

5.2.4 Structured outdoor programmes

Structured outdoor programmes, such as after-school clubs, activity camps, or extracurricular initiatives, offered many of the girls the opportunity to explore outdoor spaces in a supported and often social context. These programmes often served as a stepping stone, helping the girls to become familiar with different types of outdoor spaces they might not otherwise access independently.

Some girls spoke positively about clubs or community groups that provided regular, organised activities outside, describing them as enjoyable and reassuring spaces where expectations were clear and adult supervision was present. These structured settings often facilitated peer connection and engagement in physical activity, making outdoor time feel purposeful and safe.

“I used to go out with my RADS group. We did it in the woods and everything... it was really fun.” (Chick, 2023)

“In the summer we go to a holiday club, and they take us to different places like the forest and the beach.” (Sunset, 2023)

Different types of outdoor-related programmes contributed to positive outdoor experiences. The influence of outdoor learning programmes is explored in more depth in Section 6.1, where their role in shaping the girls’ outdoor experiences and behaviours is discussed more fully.

5.2.5 Infrastructure and appealing outdoor spaces

The quality and accessibility of local outdoor infrastructure often influenced whether the girls chose to spend time outside. For many girls, the presence of interesting or well-equipped parks was a central draw. The girls were drawn to features like ziplines, (net) swings, and soft play areas.

“One of them is kind of small and boring and then the other one is a bit more exciting because it has a zipline... and a thing where you sit in it and it goes like a roundabout. [...] There’s like a net and then there’s a slide... and a tiny rock wall.” (Chick, 2023)

Proximity to outdoor spaces encouraged regular engagement and was often described positively. Several girls described having favourite spots that became part of regular routines, such as neighbourhood parks, paths near their homes, or areas close to their parents’ workplaces. These spaces enabled spontaneous play and socialising and fostered a sense of independence, even when visits were still supervised or prompted by adults.

“I just leave my house and go outside for a bit... listen to some music and just walk. And it’s safer than going further away because my parents can see me.” (Julia, 2024)

The girls valued natural elements like rivers, wooded areas with trees to climb, wildlife, and beaches. These features created a sense of adventure and freedom, making outings feel special

and memorable. They supported activities such as climbing, sledging, and exploration, and were often described as either exciting or peaceful..

“I like how it has a lot of trees; me and my friends can climb... little swings and stuff, little hidey holes.” (Lola, 2023)

“And sometimes we might see deer there as well... it had big horns, I think it was like a big male.” (Brittany, 2024)

Large, open spaces were repeatedly highlighted as appealing and seen as especially inviting due to their variety and size.

“It has different things to play with and it’s very large... you can choose between the activities and stuff.” (Poppy, 2023)

Many girls enjoyed blue spaces, especially rivers, lochs, and the seaside. These places enabled swimming, dog walking, and “wild” experiences that differed from regular parks. Water spaces were most appealing in good weather and when paired with activities like picnics, games, or dog walking.

“We like going to Shelton to that beach... there’s lots of stuff around, there’s lots of parks and other swimming stuff there as well.” (Brittany, 2024)

Mentions of ice cream shops, barbecues, café visits, and public toilets in larger parks reflect how supporting amenities can encourage time spent outdoors and make it feel more comfortable or enjoyable.

“If we stop at the café part that’s good... if we had food that’s better.” (Bambie, 2024)

Crucially, the girls themselves identified ways their local environments could be improved to further support outdoor activity. Suggestions such as cleaner gardens, more trees to climb, or better-maintained paths pointed to the importance of investing in infrastructure and natural elements that are not only safe but also inviting and imaginative.

“If it [the garden] was clean then [I’d] probably [spend] a little bit more [time outdoors].” (Chick, 2023)

5.2.6 Summary: External enablers

A range of external factors supported the P7 girls’ engagement with outdoor spaces. Parents played a key role in initiating and facilitating outdoor activity through planning, transport, and encouragement, while peers and siblings enhanced motivation and enjoyment through shared experiences. Pets, particularly dogs, provided routine opportunities for outdoor time and made nature-based activities more engaging. Technology, especially mobile phones, supported independence, communication, and a sense of safety, enabling more autonomous exploration. Structured programmes such as clubs, camps, or school-led activities offered accessible, supported contexts for outdoor engagement. Finally, access to high-quality local infrastructure, including parks, outdoor spaces, and natural features, encouraged regular use, particularly when such environments were safe, varied, and well-maintained.

5.3 Internal barriers

Through the conversations with the girls and their parents, a range of internal barriers to outdoor engagement emerged. These included a dislike of certain outdoor elements, low motivation, fears and safety concerns, issues with outdoor clothing, reluctance to travel, health conditions affecting engagement, and social pressure, among others. While Table 7 provides an overview of

all internal barriers that emerged during the interviews, the detailed account below focuses on the most notable factors, specifically those likely to evolve over time or influence the girls' outdoor engagement as they grow older.

Table 7: Internal barriers to outdoor engagement

Barrier	Themes	Supportive quotes
Dislike of outdoor elements	Dislike of dirt, bugs, sea creatures/seaweeds, birds, weather	<i>"I just find it gross looking at all the bugs and stuff, like the dirt, I don't know."</i> (Bambie 2024)
Low motivation	Competing demands, routines, emotional fatigue, or everyday busyness	<i>"It depends if it's like a rainy day, or I'm just too tired, or too lazy to go."</i> (Chick 2024)
Fears and safety concerns	Fear of birds, wooded areas, ice, other people	<i>"I don't really like birds, I kind of have a fear of birds."</i> (Brittany 2024)
Outdoor clothing	Dislike of boots and other outdoor clothing	<i>"That's why I hate wearing thick socks and boots..."</i> (Raya 2024)
Dislike of travel	Long journeys	<i>"Car rides! Hour long car rides to get to this one place! This one place!"</i> (Tigger 2024)
Health affecting engagement	Allergies, asthma affecting time outdoors	<i>"I prefer doing it outdoors, but it is harder for my asthma with the cold air and stuff. But I do enjoy more doing it outside."</i> (Tigger 2024)
Social pressure	Peer conformity, embarrassment	<i>"Me and my friend used to dress up our Barbie's and play. Whenever we saw someone coming, we would throw them in the bush."</i> (Bambie 2024)

5.3.1 Dislike of outdoor elements

Several of the girls described a growing discomfort with aspects of the natural environment, which at times limited their enthusiasm for outdoor engagement. Dislikes ranged from fears of animals in the sea to aversions to bugs, mud, dog fouling, and litter. Some reflected on how their tolerance for the outdoors had changed over time, marking a shift away from earlier enthusiasm, as described in Section 4.1. Concerns about dirt and mess were common particularly when clothing or footwear felt unsuitable, although these worries were often eased when appropriate clothing was available.

"If it's really muddy as well, like if I'm not wearing my boots, I don't want to get dirty. Well if I'm wearing my boots, I'd be stepping in all those puddles." (Detina, 2023)

While some girls still enjoyed tactile engagement with nature, such as jumping in puddles or playing in the mud, many expressed increasing discomfort or self-consciousness around these elements. These feelings appeared to grow stronger with age, suggesting a potential shift in how they related to nature and personal presentation.

5.3.2 Fears and safety concerns

Fears and safety concerns, both environmental and social, emerged as internal barriers to outdoor engagement for several participants. These fears were often specific and varied, including animals, weather conditions, and interactions with strangers. Slipping on ice, in particular, was raised repeatedly as a source of anxiety and a reason for avoiding certain activities. A number of girls expressed nature-related fears that directly influenced how and where they spent time outdoors.

“I don’t like walking in the woods at night or when it’s dark, I just feel like someone’s going to pop out.” (Charlie, 2024)

Fears related to other people were significant, especially when girls were outside alone or in unfamiliar spaces.

“It’s just being scared when I’m alone - like if I’m with a friend, I’m fine, but if I’m alone just...” (Charlie, 2024)

These fears often influenced decisions about when and where to go outside and with whom. Being with friends or trusted adults typically mitigated these concerns, whereas being alone could provoke anxiety or avoidance.

Overall, while many girls were confident in familiar outdoor spaces, underlying fears, particularly around personal safety, played a role in shaping their outdoor routines and comfort levels.

5.3.3 Dislike of outdoor clothing

A recurring internal barrier to outdoor engagement amongst the girls was a strong dislike of certain outdoor clothing, particularly items associated with wet or cold weather, such as wellies, thick socks that slip down when walking, and waterproofs. These clothing items were often described as uncomfortable or undesirable, and in some cases, discouraged girls from spending time outside altogether.

“That’s why I hate wearing thick socks and boots.” (Raya, 2024)

Similarly, when asked if she would wear wellies in the rain, another girl laughed and admitted:

“Probably not! I’d probably wear my trainers...” (Avery, 2024).

For some, the discomfort seemed to outweigh the practical benefits, even when it meant getting wet or cold. This aversion also extended to waterproofs.

“I don’t like wellies and I don’t like waterproofs.” (Raya, 2024)

These preferences were closely linked to a desire to stay clean, dry, and stylish; traits not typically associated with bulky outdoor gear. Many girls expressed a preference for dry places where they could wear their preferred footwear.

“It’s easier to run without water just going into your shoes.” (Raya, 2024)

Overall, the discomfort and inconvenience associated with outdoor clothing, combined with concerns about appearance and physical ease, formed a subtle but consistent barrier to outdoor engagement, particularly in poor weather conditions.

5.3.4 Summary: Internal barriers

Several internal barriers influenced the girls’ engagement with outdoor spaces. Discomfort with natural elements like mud, bugs, and animals became more pronounced with age, often linked

to a growing concern about cleanliness and appearance. Fears, such as slipping on ice or being alone, also shaped where and when they felt safe outside.

A dislike of outdoor clothing, especially wellies and waterproofs, further deterred participation in poor weather. These items were viewed as uncomfortable and unfashionable, making the outdoors less appealing. Overall, these internal factors limited outdoor engagement.

5.4 Internal enablers

While many factors that support outdoor engagement stem from external structures or social influences, internal enablers, such as motivations, personal preferences and interests also played a role in shaping the P7 girls' experiences with outdoor spaces. Three key internal drivers emerged across the data: health and physical motivation, curiosity and enjoyment of nature, and individual preferences (**Error! Reference source not found.**).

Table 8: Internal enablers for outdoor engagement

Enabler	Themes within	Descriptive quote
Health and physical motivation	Wanting to stay physically fit and healthy	<i>"And I like activities more and I know about staying healthy and stuff."</i> (Lola 2024)
Sources of enjoyment	Food, peacefulness, spaciousness, novelty, variety	<i>"I mostly go to the same places, but I like going to new places."</i> (Coco, 2024)
Curiosity about nature	Relaxation, sense of achievement, learning, exploration	<i>"I like how it has a lot of trees me and my friends can climb... And there's little swings and stuff, little hidey holes..."</i> (Lola, 2024)

5.4.1 Health and physical motivation

For several participants, a desire to remain physically active and maintain personal health was a key driver of outdoor engagement. Activities such as walking, cycling, and using outdoor fitness equipment were described not only as enjoyable but beneficial to their well-being.

"It makes your legs less sore whilst also giving them a workout." (Detina, 2023)

Similarly, Julia emphasised the appeal of multi-functional spaces that combine play with exercise.

"[...] And I can exercise there and play at the same time." (Julia, 2024).

Beyond structured activity, some girls recognised the general health value of being outdoors, particularly as they grew older.

"I realise that spending time outside is more important... I like activities more and I know about staying healthy and stuff." (Lola, 2023)

Even in school settings, outdoor physical education (PE) was preferred for its energising effect, despite challenges like cold air or health conditions.

"It's just... it feels better than inside. Because inside it feels stuffy... Outside I'm like 'I'm free!'" (Tigger, 2023)

5.4.2 Sources of enjoyment

A range of preferences emerged as enablers that positively shaped the girls' interest to engage with outdoor spaces. These sources of enjoyment were often specific and multifaceted, reflecting both sensory and social dimensions of outdoor experiences. Many girls expressed enjoyment of participating in structured groups like Guides or Scouts.

"Okay, shall we talk about Scout camp in a bit of detail? So let's think how long Scout camp?" (Interviewer 1, 2023) - "2 days." (Poppy, 2023) - "2 days, what do you remember?" (Interviewer 2, 2023) - "They taught us how to set a camp." (Poppy, 2023) "[...] Was it camp or tent? [...] Okay, tent." (Poppy's parent, 2023) - "Yeah, tent." (Poppy, 2023) - "Anything else you remember from camp, what did you enjoy the most about it?" (Interviewer 2, 2023) - "The food!" (Poppy, 2023)

Food-related experiences, such as picnics or cooking at Guides, often motivated the girls to spend time outdoors and added enjoyment. For some, food and nature were inseparable – Bambie described walking up a hill as a special experience because of the picnic at the top, while Daisy admitted she was *"food motivated"* and vividly recalled cakes at a mountain teahouse. These moments highlight how food-related rewards enhance outdoor engagement.

"A hill [...], for the views or...why would you like a hill?" (Interviewer 2, 2024) - "Because I like climbing hills, with food." (Raya, 2024) - "That's going to stay in your memory, isn't it?" (Raya's parent, 2024) - "[...] Okay, but a good hill with some food at the top?" (Interviewer 1, 2024) - "Yeah. Pizza!" (Raya, 2024)

Peacefulness and quiet were also valued, with noisy or crowded areas often avoided. Lola said she preferred parks with *"less people there... further away from people I know"*, while Julia liked smaller outdoor spaces because *"they're not crowded."* Similarly, Raya contrasted her dislike of cities that *"just stink"* with her preference for *"lots of nature... hardly any buildings."*

"Normally, when I want to go home by myself, I get to walk there, and I just enjoy a peaceful time [...]." (Amy, 2023)

Spaciousness and variety were another common theme. Julia talked about different parks as *"good open bit[s] for all ages"*, while Sunset highlighted the appeal of mountains and farms where *"you can go and see the animals... and you can explore."* Max and Misty were drawn to beaches and water activities, valuing both the excitement of boogie boarding or sailing and the routine of *"ice-cream, sand, puddling"* afterwards.

Many girls also valued novelty, seeking out new experiences as well as different types of outdoor spaces and activities. Exploring new places emerged as a common theme.

"I like going to new places. [...] It's like you'd be thinking how is it going to be, is it going to be big, small or fancy." (Poppy, 2023)

"I like going for old places with like memories, but I like going new places to create memories!" (Tigger, 2023)

In addition, thrill and movement of new activities often underpinned enjoyment. Katy loved adventurous parasailing and aerial assault courses, while Tigger valued cycling *"being fast!... super speed!"* and swings that gave her a sense of risk.

5.4.3 Curiosity about nature

For some, curiosity about nature was rooted in everyday encounters, which encouraged a personal interest in the natural world that would sometimes even extend into self-directed learning.

“I would find a butterfly and then I would follow it... I started looking at the names of butterflies.” (Katy, 2024)

Others expressed a desire to explore global landscapes and ecosystems, driven by a fascination with animals and biodiversity. One participant shared a vivid interest in visiting places like Ecuador, the Galápagos Islands, Australia, and the Amazon rainforest.

“I want to see a poison dart frog and all the other animals there... and also jaguars.” (Raya, 2024)

This enthusiasm extended to aspirations of becoming a zoologist and “*bringing back the dodo*”, illustrating an imaginative and scientific engagement with the natural world.

5.4.4 Summary: Internal enablers

The girls’ engagement with the outdoors was frequently driven by internal factors such as a desire to stay physically healthy and active, along with different sources that added enjoyment to outdoor experiences and inspired curiosity about the natural world. Health-related motivations often connected with active play and movement, while enjoyment of nature spurred exploration and interest in the world around them; ranging from butterflies in local parks to dreams of visiting the Amazon rainforest. These internal enablers reveal the depth of personal meaning that outdoor experiences can hold and highlight the importance of recognising children’s own motivations in supporting engagement with the outdoors.

5.5 Summary: barriers and enablers

This section has explored external and internal barriers and enablers that shape P7 girls’ engagement with outdoor environments. External barriers included practical and environmental challenges such as limited transport options, poor infrastructure, and unsupportive weather conditions. Social and structural factors, such as adult-imposed restrictions, gendered exclusion in play, and changing local landscapes, further limited opportunities for spontaneous or independent engagement with the outdoors.

Conversely, external enablers highlighted the critical role that adults, peers, pets, and infrastructure can play in facilitating engagement. Family encouragement, structured programmes, mobile phones, and well-maintained parks all supported the girls’ engagement and confidence in navigating outdoor spaces.

Internal barriers were more personal, including fears related to safety or nature, low motivation, discomfort with outdoor clothing, and health issues such as allergies or asthma. These internal barriers often intersected with external conditions to shape decisions about going outside, while internal enablers reflected the girls’ own interests, values, and motivations, such as health and fitness goals, food, novelty, and a curiosity about nature. Several sources of enjoyment emerged as enablers that positively shaped the girls’ interest to engage with outdoor spaces. These were often specific and multifaceted, reflecting both sensory and social dimensions of outdoor experiences (Table 9).

Table 9: Preferences to outdoor engagement

Theme	Examples
Natural elements	Liking flowers and trees, mountains, rivers
Cleanliness	Preferences for spending time in clean, litter-free, dry outdoor spaces
Company	Many of the girls enjoyed spending time with friends and family outdoors and suggested that time outside was better when spent with other people
Ease	Parks or spaces closer to home were often favoured
Food	Many of the girls enjoyed outdoor time when food was involved, and especially talked fondly about cooking outdoors in Guides/Scouts
Novelty	Visiting new places, as bored of visiting the same places
Peacefulness	Quiet areas, less crowded places
Spaciousness	Preferring lots of space to run around
Variety	Variety of equipment in parks, variety of trees in outdoor spaces, garden equipment

Overall, these findings illustrate that outdoor engagement amongst pre-teen girls is shaped by a dynamic interplay of individual, social, and environmental factors. Recognising and addressing both barriers and enablers is essential for designing inclusive and responsive outdoor opportunities that meet the evolving needs and preferences of girls as they grow.

6 Potentially impactful outdoor experiences

One question that this study would like to address over subsequent years, is how key moments or experiences can influence how our participants engage with the outdoors and nature. We are particularly interested in the role of outdoor learning, as well as other key childhood outdoor experiences, and our observations on these areas are discussed in this section.

School-based outdoor learning, as an integral part of Curriculum for Excellence, was identified as a potentially impactful intervention that could influence our participants' attitudes towards and engagement with the outdoors and nature. As such, each of the girls was asked about their experiences of outdoor learning at primary school, in terms of whether they ever went out for outdoor learning, and how often. Other potentially impactful outdoor experiences that emerged from the interviews were school residentials and camps, as well as time spent with family in outdoor spaces.

6.1 Outdoor learning

Section 6.1 introduces the range of outdoor experiences described by the girls, spanning school-based activities, residentials and camps, and family outings. The section is structured in four parts: first, the different types, frequency, and experiences of outdoor learning within school (6.1.1); second, the role of residentials, camps, and activity centres in offering novel and memorable opportunities (6.1.2); third, time spent with families in natural spaces (6.1.3); and finally, a summary of potentially impactful outdoor experiences across these contexts (6.1.4).

6.1.1 Types of outdoor learning described

When questioned about outdoor learning, the participant and their parents described a wide array of school-based outdoor activities that could be considered outdoor learning – i.e., any class time spent outdoors. The exception was residential trips, which were discussed separately. Responses were organised into six broad categories and are presented Table 10. The activities described were not necessarily current; some girls reflected on past outdoor learning experiences.

Table 10: Types of outdoor learning mentioned by the participants

Type of outdoor learning	Examples
Learning outdoors	PE; Numeracy/maths, including car counts outdoors, times tables in the playground with chalk, running games with a numeracy element; Spelling with chalk; Shape art with chalk; Science experiments outdoors.
Learning outdoors with elements of nature engagement	Numeracy/maths, including times tables with sticks; Literacy using snow angels as inspiration; Art, including nature drawing, making people from leaves and sticks.
Learning outdoors explicitly about nature and the environment	Learning about trees and forests in local outdoor spaces; Gardening; Learning about local rivers; Learning to identify nature, like birds, trees, insects, and plants; Litter picks in the local area; Learning about coordinates and mapping.
Learning outdoors through play (free and adult-led)	Loose Parts play in the playground; Running games; Choices of sports activities during Token Time; Loose Parts, bushcraft play, nature play, and other free play in school gardens (often with features like climbing frames, mud kitchens, and trees to climb on); Scavenger hunts
Class trips to local nature spots and parks	Class trips to local beaches, estate gardens, and city parks, often at the end of term.
Bikeability	P6/7 cycling proficiency

The majority of girls described going outdoors with their classroom teacher or another teacher from their school, usually for subjects like maths or PE. There were instances of teachers using the Daily Mile as an opportunity to integrate nature-related learning. One girl described having a “*nature teacher*” and other visitors who came to her school to teach the children about local forest and river areas. She was the only child to describe having practitioners coming into the school to support nature-focussed outdoor learning. Some girls also described that while they did not get many opportunities for going outdoors during class time, the nursery children did, and that they were able to join them on occasion. Many of the girls referenced Bikeability as they had recently gone through or were currently receiving their training.

There was a great deal of variability in the kinds of spaces used for outdoor learning described by the girls. Some described their schools as having only a concrete playground, while others had multi-functional outdoor spaces, sometimes with garden areas, and some had access to various local outdoor spaces, such as forests or river areas.

6.1.2 Frequency of outdoor learning

The girls' responses indicated a lot of variability in terms of how much outdoor learning they had received. For many, PE was the main way they were given access to the outdoors during class time, and this could be very seasonal and weather dependent. Indeed, outdoor learning was often described as a memory – something they used to do in nursery or with a particular teacher when they were younger. It seemed that in many cases, any school garden areas were reserved for the nursery children and older children were not given access these spaces – something about which some of the girls expressed dissatisfaction.

“She’s quite a good teacher though for taking the kids out, so whether its Nursery, Primary 1, Primary 2 she’s outdoor learning with them a lot. She’ll take them into the woods and stuff.” (Jemima’s parent, 2024) - “She takes Jamie out a lot, it’s not fair, I want Mrs Green.” (Jemima, 2024)

Those who were getting out fairly regularly generally had access to school gardens or local outdoor spaces; these girls also seemed to be receiving more nature-related input. Notably, a few participants reflected that they had previously had more outdoor learning but that it had been stopped due to vandalism and problems with the security of outdoor resources.

6.1.3 Experiences of outdoor learning and Bikeability

While the girls' experiences of outdoor learning were not explored in depth, what generally emerged from our conversations with the girls was that outdoor learning, or any type of learning outdoors, was viewed positively, was memorable, and in some cases was preferable to being indoors. For example, Tigger explained: *“It just it feels better than inside. Because inside it feels stuffy and I’m like ‘I don’t like it’. Outside I’m like ‘I’m free!!’ almost!”*. Some girls described fond and detailed memories of their times playing in school gardens, for example, Detina explained *“But there’s a bit in the playground called the Mucky Garden where it’s just all mud and trees, and I used to go there and I loved it, but now I can’t...”*. Tigger also had good memories:

“That was like in Primary 3 and 4, so we just went to the woods, and we did this like drawing thing. I was, like, really into drawing in Primary 3. So like, we were drawing... like we had to pick a spot in the woods to draw and I drew a dandelion with grass and trees in the background with a bee. The bee was there and let me tell you he was an unpaid actor, he stayed there until I finished! ... And then when I stood up, he was like ‘Alright I’m gone’ and I was like ‘Thanks bro!’. And like, he got the sunshine on his wings and everything, and I was like ‘Damn, you’re good bro!’” (Tigger, 2023)

Other positive experiences had emerged from learning outdoors through Bikeability. Many of the girls were in the process of receiving or had recently received their Bikeability training. While not necessarily viewed as a universally enjoyable experience at the time (though some girls did really enjoy it) it did seem to have had an impact on some of the girls' attitudes to cycling. For example, Luna pointed out that *“Since I did Bikeability, I’m always on my bike”* and Avery explained:

“Yeah, I cycled to school by myself the other day, actually, because I had Bikeability, which is going out on your bike on the road. And then... Yeah, so I cycled, and I got there pretty quick! [laughing slightly] I was actually pretty impressed myself! ‘Cause I hadn’t cycled in a while!” (Avery, 2024) - “Well done!” (Interviewer 1, 2024) - “But you don’t want to do that regularly?” (Interviewer 2, 2024) - “Mhmm! I’m actually considering it because I actually like cycling now.” (Avery, 2024)

6.2 Residentials, camps, and activity centres

Almost all the participants had already been on or were about to embark upon their first residential trips with their P7 classes. These took place largely at activity centres in the Scottish Highlands and often involved being away from parents for an extended period for the first time, as well as spending extended time with peers for the first time. Some girls also visited activity centres with their parents. For many, residential trips involved exposure to and ability to explore novel natural environments in Scotland that they might otherwise never visit. For example, following her trip to a residential activity centre in the Highlands, Lola expressed an interest in visiting and exploring a nearby mountain range – something her class had not had an opportunity to do. These trips were also significant in terms of many of the girls trying out adventure activities, such as canoeing, archery, and abseiling, for the first time. Some expressed interest in being able to explore these areas more, and in doing these activities again. Many memories shared were vivid and positive, with highlights around particular activities, social elements, campfires, and food. Examples include:

“Yeah, I would, I would like to do canoeing again, I think. I think it’s also with kinda my friends that I like to do it. I feel like if I’m put in a group with people that I don’t know really like kinda know, I would not really get along better and wouldn’t want to do it, but if I was with my friends then I would.” (Avery, 2024)

“I remember Inverness, going to that activity centre, we did like lots of things, like I learnt my love of archery from there because I was quite good at archery.” (Brittany, 2024)

“And...we were doing treasure hunts so we had to...we got maps of the thing and we were just let off again exploring. We were just left off and we had to try and find something. It was a really good setting, I really loved it.” (Avery, 2024) - “What did you like most about it?” (Interviewer 2, 2024) - “Probably the freedom we got as well. But...mhm. I kinda wish you could have brought your phones ‘cause it was really nice...like I wanted to take pictures...” (Avery, 2024)

“What did you like about visiting the Highland loch?” (Interviewer 1, 2024) – “I was in a dorm...with some of my best friends so... We didn’t get the suite though, so...” (Lola, 2024)

“I also liked lighting a fire and having hot chocolate.” (Max, 2024)

For many, there were activities they had loved, as well as those that had not been so enjoyable. For the girls who had not yet attended, as well as general excitement about activities and social elements, some expressed a mix of nervousness and fear around sleeping arrangements and being able to get to sleep in a new place surrounded by unfamiliar people.

There were similar positive experiences of Scouts, Guides, and other club camps, shared by several participants. Notably, a number of parents highlighted that their experience of Guides had been that there was more of an indoor ‘crafty’ focus, whereas Scouts prioritised outdoor activities and was thus more favoured by some.

6.3 Family time in natural spaces

Many of the girls recounted incredibly positive accounts of time spent outdoors with their families, often with more substantial activities taking place at the weekend or during holidays. For those with limited access to transport, this sometimes meant spending a great deal of time in city parks and local rivers. For others, family trips might involve exploring, hiking or cycling in different parts of Scotland, with some families having regular places that they would visit.

As already discussed in Section 5, it was obvious in some cases that these patterns were beginning to change as the girls' social worlds started to transform and started to express preference for spending time with friends over family

6.4 Summary: Potentially impactful outdoor experiences

This section has described some potentially influential outdoor experiences that the girls have had to date. With regards to outdoor learning, what emerged from this questioning was a descriptive snapshot of the girls' outdoor learning experiences. Notably, it was clear that there existed a great deal of variability quantitatively and qualitatively in outdoor learning provision. All of the girls had received outdoor learning at some point in their nursery and primary experience, but for many this had become a fond memory or something that only happened on sunny days. For those that were receiving regular outdoor input, much of the time this amounted to outdoor PE, with only a handful receiving regular outdoor learning with nature engagement elements. This type of outdoor learning appeared to be facilitated by local environments (availability of green spaces within or around school grounds), and the involvement of outdoor practitioners. Many girls spoke with great enthusiasm about their outdoor learning experiences, including Bikeability, and there was a clear desire from many to be able to spend more time outdoors within their school settings.

Other prominent and largely positive outdoor experiences discussed by the girls were P7 residential trips, camps, and family outings into natural spaces. As this study progresses, it may be possible to make observations around how these experiences or lack thereof relate to ongoing outdoor and nature engagement into the girls' early teenage years. It will also be interesting to note if the girls continue to engage in such experiences, and what enables or stands in the way of this as they progress through adolescence.

7 Discussion

Wave 1 of the Girls Outdoors study offers a timely contribution to the growing body of research on nature engagement in middle childhood and early adolescence. While many of the patterns identified in the data are well-documented in the literature, this study adds nuance by foregrounding how these dynamics are interpreted and negotiated by pre-teen girls themselves. By capturing a transitional moment - just before or during the onset of adolescence - the findings illustrate not only how outdoor behaviours are changing, but why. Through rich, qualitative insights, this phase of the study highlights the role of identity formation, technology use, shifting social structures, and institutional experiences (like school-based outdoor learning) in shaping patterns of engagement and disengagement with outdoor spaces. The discussion below situates these findings in relation to existing literature, while also identifying emergent themes that warrant further exploration in the subsequent Waves of the study.

7.1 Outdoor engagement patterns

The findings from Wave 1 of the Girls Outdoors study align with existing literature on childhood engagement with natural environments while offering important new insights into how pre-teen girls interpret, access, and use outdoor spaces. The structured interviews revealed nuanced patterns shaped by proximity, seasonality, social context, and individual meaning-making.

Girls most frequently engaged with nearby parks, private gardens, and grassy areas, supporting existing findings that access to outdoor spaces is shaped by proximity, familiarity, and perceived safety (Lloyd et al., 2008; Owens, 2002). Use of more remote or novel natural environments (e.g. woods, hills, rivers) was typically infrequent, seasonal, and dependent on adult facilitation,

consistent with patterns observed in earlier research on access limitations amongst youth (Brussoni et al., 2017).

Social relationships played a major role in outdoor behaviours. Girls often accessed nature with siblings, friends, parents, or pets. This reflects broader findings on the importance of social context in shaping young people's engagement with the outdoors (Owens, 2002; Larson et al., 2019). The association of outdoor time with peer interaction, rather than solitary exploration, suggests that pre-teen girls already seek socialised, relational experiences in nature, even before teenage autonomy. While the Freshspace campaign (YoungScot, 2018), which is based on co-design sessions with 16 girls and young women aged 12–19, often framed peer dynamics as barriers — linked to fears of being judged, appearing 'uncool' or breaking gendered norms — Girls Outdoors participants often described peers as enablers of outdoor engagement, with constraints emerging mainly around the use of technological devices.

Weather, season, and gear were key factors in shaping use, particularly in colder months, corroborating with studies highlighting the importance of seasonality and equipment in enabling or constraining engagement (Larson et al., 2019). Play equipment and multifunctionality were also influential; girls preferred spaces with trampolines, swings, or opportunities for different games, indicating how material design continues to shape experiences well into late childhood (Owens & McKinnon, 2009; Brunelle et al., 2018). These preferences echo insights from the 2010 NatureScot literature review, which, although focused on a different population rather than girls specifically, emphasised the importance of 'appreciative' recreational activities and accessible facilities in fostering both enjoyment and environmental awareness (Land Use Consultants, 2010).

While much of the data supports existing literature, three findings offer new insights:

- **Redefining everyday nature:** Girls did not always consider grassy verges, urban moorland, or incidental green space as "nature". This highlights a need to broaden how nature is defined in urban childhood research, attending to outdoor spaces that play a role in daily life.
- **Fluid outdoor identities:** Girls' descriptions of themselves as "kind of" outdoorsy point to a fluid and evolving outdoor identity. This identity appeared tied to context (weather, season), age, and peer dynamics. These findings complicate binary categorisations of "nature connected" or "disconnected" and suggest identity should be seen as negotiated, conditional, and responsive to change. This fluidity contrasts with the more static typologies used in wider environmental behaviour literature, where participants are often categorised as 'ecocentric' or 'technocentric' (e.g. Land Use Consultants, 2010).
- **Uncertainty and playful engagement with nature:** The open-ended follow-up questions revealed ambivalence even in high scorers of nature connectedness. For instance, girls who expressed strong interest in nature also expressed disgust towards mud, which suggests that affective connection does not preclude discomfort or contradiction. This supports a more dynamic view of nature engagement, where curiosity and aversion can co-exist.

7.2 Transitions and (dis)engagement

Wave 1 indicates that behavioural shifts and key moments of (dis)engagement with the outdoors are already underway by age 10–12. While the full scope of these transitions will emerge across the longitudinal study, it is already clear that outdoor behaviours are not simply declining, but being reshaped by a complex interplay of developmental, social, environmental, and

technological factors. The early adolescence phase presents both risks of disengagement and important windows of opportunity to sustain or reframe nature engagement.

Our data revealed nuanced changes in how much time girls spent outdoors, the types of activities they engaged in, the places they frequented, and who they spent time with. These shifts were rarely described as abrupt; rather, they reflected an accumulation of small but meaningful changes over the past one to two years, often coinciding with the onset of adolescence, increased autonomy, and exposure to digital technologies. This incremental pattern echoes earlier findings that transitions in outdoor use are gradual, reflecting both developmental stage and wider social influences (Valentine & McKendrick, 1997; Brussoni et al., 2017).

While over half of the sample described spending less time outdoors, others reported either an increase or a shift in the form of their outdoor use. In several cases, girls were simply moving from adult-led, structured outings to more informal, peer-led time spent in accessible local outdoor spaces. As Lloyd et al. (2008) and James (2001) observed, this shift can reflect growing individuation and the desire for social spaces that feel free from adult control. National survey data often frame early adolescence as a period of straightforward decline in outdoor activity (e.g. Sport Scotland, 2021; Learning through Landscapes, Play Scotland & NatureScot, 2025). In contrast, findings from our Girls Outdoors study emphasise reconfiguration rather than loss. For many participants, outdoor time still remained important but was repurposed towards peer sociability, nearby outdoor spaces, and easier, low-effort activities. This reframing suggests that the early adolescent ‘dip’ may be overstated when only measured by frequency, without considering evolving forms of engagement. It is therefore important to recognise this shift not as disengagement from nature, but as a developmentally normative reorientation towards emerging priorities - such as peer relationships, autonomy, and personal space - consistent with findings by Owens and McKinnon (2009) and Thomaes et al. (2023). We will report on any further changes as the girls transition to secondary school and into S2 in Waves 2 and 3.

Tables 3 and 4 (see Section 4) summarise how these changes manifested across participants, highlighting the importance of understanding (dis)engagement not just as a matter of quantity of time outdoors, but in terms of changing social dynamics, evolving preferences, and contextual constraints.

7.3 Developmental drivers

Wave 1 participants were in the midst of a developmental phase characterised by cognitive, social, and emotional change. As several classic and contemporary texts on adolescent development highlight (e.g. Steinberg & Morris, 2001; Eccles et al., 1993), early adolescence is a period when young people begin actively constructing new identities and pushing for greater agency within their daily lives. This was reflected in the girls’ growing capacity to articulate their preferences, whether around walking, being outside alone, or giving up certain play-based activities. Preferences once shaped by parental routine (e.g. family walks) were increasingly replaced by peer socialising or indoor interests, such as crafting, reading, or screen-based play. Participants described boredom with previously enjoyed places or routines, supporting literature that stresses the importance of novelty and variety in sustaining adolescent engagement with outdoor environments (Brussoni et al., 2017; Owens & McKinnon, 2009). National research also shows that novelty is an important predictor of sustained engagement with school grounds and outdoor learning (Learning through Landscapes, Play Scotland, & NatureScot, 2025), with repetitive or poorly designed outdoor spaces often linked to reduced use over time.

Developmental psychology suggests that early adolescence is a key period for the uptake of new hobbies and routines (e.g. Sawyer et al., 2018; Steinberg & Morris, 2001). Our findings reinforce

this: many girls described shifting their focus towards particular extracurricular activities or sports, while others were looking for new interests to align with emerging identities. There is a clear opportunity here to work towards offering socially-rewarding nature-related hobby opportunities, programmes, or groups that resonate with girls' evolving sense of self and provide meaningful, peer-supported entry points into outdoor life. Given the insight that can be gleaned through in-depth dialogue about the 'lived experience' of those who engage with outdoor spaces, we suggest that rather than seek to define what these could be in a top-down fashion, it could be more fruitful to reflect on what the key ingredients might be, and then to approach in a place-based and child-led way, such as has been done by the Make Space for Girls campaign (Make Space for Girls (n.d.) around design of outdoor spaces.

Independent outdoor engagement emerged as a turning point for many girls. Access to local outdoor spaces without adult supervision was seen as a developmental milestone, offering freedom, self-direction, and social belonging. Phones enabled this shift, but so too did parental trust, peer presence, and nearby outdoor spaces that were easy to get to. These findings are echoed by Brunelle et al. (2018), who emphasise the importance of designing youth-responsive spaces that support both independence and safety.

7.4 Shifting preferences, fears, and embodied sensitivities

Internal barriers were notably linked to developmental transitions: changes in risk perception, growing discomfort with messiness, dirt, or bugs, increasing desire for cleanliness, and emerging body awareness. Of particular interest was the *development* of fear or disgust towards natural phenomenon, which had previously elicited curiosity or joy. While there appears to be a paucity of work exploring this shift, studies have highlighted the role that gender stereotypes (rather than sex) and vicarious learning can play in amplifying or suppressing fears and the expression of fears (e.g., Muris and Rijke, 2011; Askew et al., 2013; Gerdes et al., 2022). The rejection of outdoor clothing, the aversion to getting muddy, and concerns about appearance reflect the psychosocial changes identified in classic developmental models (Eccles et al., 1993). Such concerns echo the findings of the Freshspace campaign, where girls highlighted body image, hygiene, and fear of being judged as barriers to outdoor activity (YoungScot, 2018). The recurrence of these themes across studies over time suggests they are not confined to individual contexts but reflect wider, socialised pressures that shape adolescents' relationships with the outdoors.

Some girls described feeling more capable in outdoor environments than before, or more aware of what they enjoyed. Others acknowledged emerging fears, tiredness, or a growing aversion to natural elements (e.g. bugs, mud), which appeared to reflect evolving self-consciousness and social norms, especially around gender (Owens, 2002). This aligns with evidence from the 2010 NatureScot literature review, which similarly documented gendered anxieties and discomfort as barriers to sustained outdoor engagement (Land Use Consultants, 2010). While such barriers are frequently depicted in the literature as stable or enduring, findings from the Girls Outdoors study suggest they are fluid and context-dependent. This highlights the need to conceptualise outdoor engagement as dynamic and continually renegotiated in line with girls' evolving identities, capacities, and interests.

Discomfort with solitude and a heightened sense of personal safety also emerged. These were not always linked to concrete risks but reflected internalised anxieties, particularly in unfamiliar or unsupervised spaces. As girls begin to develop independence, they may also become more aware of potential threats, real or perceived. As discussed by Thomaes et al. (2023), designing for this life stage may mean working with, rather than against, this caution: ensuring outdoor environments feel socially connected, visible, and safe. The School Grounds Survey 2025 also reported that 'pupil safety' was amongst the most common problem cited by secondary schools,

highlighting the systemic nature of these concerns (Learning through Landscapes, Play Scotland, & NatureScot, 2025). However, our Girls Outdoors study found that safety was additionally articulated in terms of peer presence and social acceptability.

Internal enablers, such as health motivations and enjoyment of physical activity, also grew in importance. Some girls recognised the role of nature in supporting their health and wellbeing. Others described a growing awareness of health benefits, or a deepening interest in nature itself. This reflects the developmental literature on habit formation in adolescence (Sawyer et al., 2018), which suggests early teen years are a key window for embedding new behaviours. This life stage is therefore not simply a point of disengagement but a critical opportunity for re-engagement with nature on new terms, as already illustrated by the previous section.

7.5 Structural and social barriers and enablers

Our data support James (2001) and Lloyd et al. (2008), who argue that adolescents' social needs - rather than nature disengagement - are often the real drivers of outdoor change. The girls were not rejecting nature; they were re-prioritising where, how, and with whom they wanted to be outside. Crucially, they wanted to be with peers, not always with parents. This finding echoes the Freshspace campaign, which found that girls often associated the outdoors with peer visibility and judgement, and sought socially acceptable spaces which to engage with (YoungScot, 2018). Bombie's reflection, for example, that time outdoors with parents had allowed for more adventurous destinations, but time with friends was more limited and repetitive, highlights a key design challenge: making nature-accessible, teen-oriented, socially acceptable spaces. It also highlights the importance of enabling travel and exploration for (pre-)teenagers, for example, through free bus passes.

As adolescents begin to construct peer-centred social worlds, friendships act as both enablers and constraints of outdoor engagement. Several girls described being pulled indoors due to friends' preferences for screen-based activities, while others maintained or rediscovered outdoor enjoyment through active peer groups. Shifting friend groups, peer conflict, and emerging cliques added to the complexity. The discomfort of being alone outdoors or being excluded from peer-dominated spaces like football pitches (as also described in Owens, 2002) highlights the social barriers many girls face. These findings align with Dlamini et al. (2015) and Brussoni et al. (2017), who emphasise the importance of relational factors in youth participation, and corroborate the 2010 NatureScot literature review, which highlighted the relational nature of exclusion as a recurring barrier, particularly for girls in adolescence (Land Use Consultants, 2010). This underscores the need for inclusive outdoor designs that consider gendered dynamics, peer cultures, and the fragile nature of adolescent friendships.

The analysis of barriers and enablers to outdoor engagement amongst P7 girls affirms many of the developmental, social, and environmental patterns documented in the wider literature, while also surfacing new insights into the dynamic and transitional nature of this life stage. Drawing on theoretical perspectives from adolescent development (Steinberg & Morris, 2001; Eccles et al., 1993), emerging work on nature connectedness (Barrable et al., 2022), and digital life (Thomaes et al. 2023; Larson et al., 2019), this study offers a nuanced picture of the many interlocking factors shaping girls' engagement with outdoor spaces.

Many of the external barriers identified in the interviews, such as adult-imposed limitations, poor infrastructure, lack of transport, and social exclusion, are consistent with previous findings that highlight how young people's outdoor mobility is tightly regulated (Owens, 2002; Lloyd et al., 2008; Brunelle et al., 2021). Safety concerns and logistical restrictions often curtailed

independent outdoor activity, echoing previous work on the constrained autonomy of children, especially in urban environments.

Changing landscapes, including deforestation or the loss of familiar outdoor spaces, were cited as reasons for decreased engagement. While ecological changes are not often foregrounded in studies of children's access to nature, these accounts suggest the girls were attuned to environmental degradation and its impacts. This resonates with research that positions young people as sensitive to the quality and sustainability of nature environments (Thomaes et al., 2023). Additionally, changed landscapes brought with them safety concerns and uncertainty, with families stopping visiting sites due to a lack of up-to-date accessibility information.

Gendered dynamics in play spaces, particularly exclusion from male-dominated games like football, reaffirm known patterns of spatial marginalisation of girls in parks and playgrounds (Lloyd et al., 2008; Dlamini et al., 2015; Brunelle et al., 2021). Girls' accounts of being actively excluded, or withdrawing due to perceived aggression, reflect persistent gendered hierarchies in outdoor public space (Colley et al., 2022). This mirrors findings in the Freshspace campaign (YoungScot, 2018) and the 2010 NatureScot review (Land Use Consultants, 2010), which emphasised the long-standing nature of gendered barriers. However, participants in the Girls Outdoors study often articulated these exclusions not simply as passive withdrawal but as active negotiation of space: choosing where to go and with whom to maintain social comfort. These findings highlight the need for outdoor spaces that support equitable engagement across genders and foster socially inclusive norms.

Social exclusion also intersected with digital life. Girls without phones were sometimes unable to coordinate outdoor meetups; a phenomenon that underscores the increasing role of technology in enabling (or limiting) social access. This ties into research by Odgers and Jensen (2020) on how digital devices now shape adolescents' social geographies, not just in virtual space but in how they move through the physical world. The Freshspace campaign (YoungScot, 2018) similarly found that use of social media could both normalise and constrain outdoor engagement, reinforcing the dual role of technology as an enabler and a barrier.

7.6 Relational and spatial support for outdoor time

Our study found that enablers of outdoor engagement were often relational in nature. The encouragement of parents and other family members remained central to enabling outdoor experiences, particularly those involving planning, transport, or supervision. While this reinforces prior work on the importance of adult scaffolding in childhood leisure (Beery, T., & Jørgensen, 2018; Kellstadt et al., 2024; Land Use Consultants, 2010; Owens & McKinnon, 2009), it also exposes a potential vulnerability: many girls noted that without adult involvement, they would likely not initiate outdoor time on their own.

Peer companionship was also a powerful enabler. Girls consistently described outdoor time as more enjoyable - and often only desirable - when shared with friends. This supports the suggestion by Eccles et al. (1993) and other developmental theorists that the transition to early adolescence is marked by a reorientation towards peer relationships and the construction of autonomous social worlds. The Freshspace campaign also reinforces this finding, showing that young women prefer small, everyday outdoor activities when framed as shared peer experiences rather than solitary pursuits (YoungScot, 2018). Crucially, this does not imply disengagement from the outdoors per se, but rather a shift in how and why outdoor time is pursued; a reframing that calls for more peer-centred outdoor provision.

7.7 Technology as a central and ambivalent force

Consistent with findings by Kawas et al. (2021) and Hawley (2022), mobile phones simultaneously enabled independence (helping girls coordinate outings, navigate, and document experiences) and acted as a barrier that led to increased screen-based activities indoors. Some participants described a drop-in outdoor time coinciding with increased screen use, particularly for socialising, gaming, and passive content consumption, echoing concerns raised by Owens (2002) and Larson et al. (2018). Parents noted their frustration with their children opting to stay indoors to Facetime friends or scroll TikTok, rather than go outside. Yet, phones were also described as important enablers of outdoor independence, offering safety through connectivity and functioning as a key condition for parental permission to go out alone or with peers. This duality mirrors findings from the Freshspace campaign, where girls highlighted both the benefits of social media for coordinating activities and the risks of being judged or excluded in digital spaces (YoungScot, 2018).

Importantly, girls were not simply passive recipients of technology. Some reported using phones outdoors to take pictures, navigate, record videos, or explore nature-related apps. This supports the idea that digital and natural worlds are not mutually exclusive. As Hawley (2022) argues, it is increasingly important to map the continuum between “green time” and “screen time”, recognising the hybridised ways in which young people now engage with their environments. Unlike broader survey evidence, which often treats digital and outdoor activity as oppositional (e.g. Learning through Landscapes, Play Scotland & NatureScot, 2025, which flagged screen use as competing with use of school grounds), Girls Outdoors findings highlight how the two can be intertwined, with technology sometimes deepening rather than displacing engagement.

More recent literature suggests an urgent need to design outdoor experiences that resonate with what girls already enjoy about digital life, particularly its social, expressive, and playful dimensions. Although gamified nature apps exist, they tend to remain family-centric or adult-driven (Kawas et al., 2023), limiting their appeal. Evidence from the Freshspace campaign further highlights that interventions should avoid patronising tones or overly didactic framing, instead adopting co-designed, youth-relevant approaches (YoungScot, 2018). This is particularly salient given that girls’ social-media-oriented use of phones (e.g. Facetiming from bed or scrolling TikTok) often competes directly with outdoor time. As Larson et al. (2019) argue, the immersive qualities of digital platforms can act as powerful deterrents, yet this very appeal may represent a design opportunity. Building on outdoor design literature (Thomaes et al., 2023) and adolescent psychology (Dlamini et al., 2015), future interventions could focus on creating socially acceptable, peer-driven outdoor experiences that replicate the immediacy, feedback, and group interaction of digital platforms, while remaining physically embedded and aligned with young people’s actual interests and social realities.

7.8 The potential of outdoor learning

Outdoor learning – broadly defined in our results as any educational experience taking place outside the classroom – was explored in this study as a feature of the girls’ school experience. In Scotland, outdoor learning forms an integral part of Curriculum for Excellence (Scottish Government, 2010). By virtue of its theoretical universality, school-based outdoor learning has the potential for creating more equitable access to nature, especially for children from less advantaged backgrounds, who may be excluded or marginalised from natural spaces (Colley et al., 2022; Stevenson et al., 2020). It also therefore offers the prospect of building a national foundation of reciprocal care for nature through facilitating quality experiences in nature and allowing children to establish relationships with nature from an early age – as per Barrable and

Booth (2020) and Chawla (2020), such experiences could be key to establishing conservation attitudes and environmental behaviours later in the life course. Curriculum for Excellence recognises the potential of outdoor learning in this regard, while also considering a broader pedagogical framework encompassing “whole-person development”, including particular skills, as well as cultural and societal connection (Scottish Government, 2010).

While this Wave of the study did not explicitly try to examine any connection between the girls’ relationship to nature and their participation in outdoor learning, it did shed light on their experiences of outdoor learning. The girls’ accounts highlighted a distinction between learning outdoors (e.g. maths in the playground) and learning about nature outdoors, and only a subset of participants reported recent activities with direct ecological content or explicit engagement with living systems. Notably, no matter the content of the learning, almost all the girls reported enjoying learning that took place outdoors more than classroom-based learning. However, as per Nicol et al. (2007) “Simply ‘being outdoors’ is not sufficient for young people to express an ethic of care for nature or develop an understanding of natural processes” Notably, those who had participated in nature-specific learning (e.g. tree identification, river ecology, gardening) recalled these in particularly vivid, positive terms, consistent with Barrable and Booth (2020) and echoing Barrable et al.’s (2022) and Land Use Consultants (2010) findings that sensory and embodied encounters with nature during learning can foster deeper, more lasting connections. Tigger’s recollection of drawing a bee in the woods, complete with vivid sensory detail and humour, illustrates how these experiences are not just educational but can be emotional, playful, and personally meaningful.

Notably, given how positive their outdoor learning experiences had been, many of the girls in the study expressed disappointment that outdoor learning was no longer available to them, or frustration at the infrequency of its provision. As a result of this variability in provision (discussed in more detail in the following section) these girls may have missed opportunities to create lasting memories in nature – memories which could form the foundation of a lifelong relationship with nature. Our findings on provision align with national evidence: for example, Mannion et al. (2023), found that outdoor learning provision in Scottish primary schools had decreased since 2014, with particular variability in provision in schools within areas of deprivation and/or those with larger school rolls. Additionally, the 2025 Scottish School Grounds Survey found that while nearly all schools used their grounds for learning, outdoor provision was often uneven, short-term, or dependent on individual teachers’ enthusiasm (Learning through Landscapes, Play Scotland & NatureScot, 2025). Such findings raise issues of equity and suggest that many children across Scotland could be facing similar frustrations to the girls in our study, while missing out upon foundational experiences in nature.

In developmental terms, reduced access in late primary school represents a missed opportunity. As noted by Thomaes (2023) and the adolescent development literature (Eccles et al., 1993; Sawyer et al., 2018), early adolescence is a key transitional phase when habits, identities, and interests become more self-directed. Offering sustained outdoor learning opportunities during this period could help support continuity of engagement at precisely the point when interest in childhood forms of nature play may be declining.

What emerges as novel from these accounts is the way girls themselves are noticing, remembering, and commenting on the withdrawal of outdoor learning. This suggests that girls are acutely aware of these shifts and potentially affected by them in ways that are not routinely documented. This adds a fresh dimension to existing literature by foregrounding pre-teen girls’ own interpretations of systemic change, particularly in relation to equity of access within the school setting.

7.9 Outdoor learning provision

Despite national policy enthusiasm for outdoor learning, the girls' accounts revealed patchy implementation. Some schools appeared to prioritise outdoor learning for the early years (i.e., nursery to P1/P2), while older pupils, including P7s, were often restricted to occasional outdoor PE sessions. Some girls described a decline in outdoor learning over time - often attributed to vandalism, resource loss, or safety-related restriction. This aligns with broader critiques of how outdoor learning can be inconsistently delivered depending on teacher characteristics (e.g., interest, confidence), school leadership, funding, opportunities for professional development, and availability of outdoor spaces and infrastructure (Waite, 2011; Prince, 2019; Barrable & Booth, 2020; Oberle, 2021; Mannion et al., 2023). Indeed, some of these same critiques note that outdoor learning in primary education is often underpinned by individual teacher enthusiasm rather than structural or policy-based support (Waite, 2011; Prince, 2019). As such, provision is vulnerable to systemic pressures, including limited infrastructure, competing curricular demands, and insufficient long-term investment.

Observations made by the girls around the loss of access to school garden or nature areas as they progressed through primary school, and that these spaces were primarily used by younger children.. This reflects a recognised trend, whereby outdoor experiences are prioritised in the early years but become less frequent for older pupils (Waite, 2011). Indeed, recent work in Scotland highlights the even more limited delivery of outdoor learning in secondary settings (e.g., Mannion et al., 2023; Learning through Landscapes, Play Scotland & NatureScot, 2025). Prince (2019) found that while teachers consistently value outdoor learning, actual delivery often tapers off in the later stages due to governance and logistical barriers.

The issue of governance has been highlighted in a Scottish context. In their national survey of outdoor learning provision in Scotland, Mannion and colleagues observe that outdoor provision in early years settings has actually increased since a 2014 survey, compared to a decrease in primary school provision. The authors note that this increase in the early years has taken place within an enabling structural environment, including “cultural expectations (and) policy imperatives around outdoor learning and play” (Mannion et al., 2023) – see, for example, [Realising the Ambition](#) (Scottish Government, 2020). Elsewhere in the report, they note a less enabling environment for primary schools, with “a need to address how inspections are conducted on outdoor and Learning for Sustainability provision” (Mannion et al., 2023). While current primary and secondary school trajectories are discouraging, the success in the early years can perhaps be celebrated and used to highlight opportunities for creating a more enabling institutional context for delivering outdoor learning in primary and secondary schools. Indeed, the need to build this understanding and learn more about that which *enables* outdoor learning at different scales has been highlighted by numerous authors (e.g., Harvey, 2021; Mannion and Adey, 2011; Oberle, 2021; Thorburn and Allison, 2013).

This study has also raised questions about the design and zoning of school grounds. Rather than treating gardens or outdoor classrooms as ‘nursery domains’, our findings suggest a need, where possible, to reimagine these spaces as multifunctional learning environments suitable for a range of ages and subjects. Where this is structurally impossible, support may need to be given to enable schools and teachers to take advantage of local green spaces and off-site visits. This recommendation aligns with the call made by Barrable et al. (2022) and Kellstedt et al. (2024) for more sustained, developmentally-appropriate contact with nature that adapts across the school years. Other opportunities for widening outdoor horizons

A specific form of school-based outdoor experience - Bikeability training - stood out as an activity that both supported skill development and boosted autonomy. Girls who had recently completed JHI-C6-1 Work Package 2: Girls Outdoors Study – Wave 1 Brief

their training often spoke with increased confidence about cycling, with some even reconsidering cycling to school. These examples reflect the concept of developmentally appropriate autonomy-building, discussed by both Thomaes et al. (2023) and Sawyer et al. (2018), which emphasises that early adolescent experiences must be structured in a way that builds confidence and competence. Outdoor programmes that emphasise and enable doing, moving, and self-directed exploration - such as Bikeability may hold particular promise for embedding outdoor activity in girls' day-to-day lives by connecting nature to tangible life skills and everyday routines.

Residential experiences also emerged as significant opportunities for widening horizons. Although less frequently mentioned (as many of the girls were yet to participate in their end-of-year class residentials), those who had participated in residential trips (e.g. outdoor centres, overnight camps) described them as impactful due to their novelty, intensity, and immersive social dimension. Previous research supports this: Waite (2011) and Christie et al. (2016) highlight how residentials foster resilience, confidence, and social bonding, particularly among pupils who may otherwise have limited access to adventurous outdoor experiences. Indeed, the importance of 'outdoor education' (previously 'pursuits') in relation to environmental learning, as well as social and personal development was already beginning to be recognised in 1970's educational policy (Nicol, 2002). The Freshspace campaign also found that girls valued opportunities framed as collective, peer-based experiences, suggesting residentials align well with adolescent priorities for sociability and belonging. Unlike wider evaluations of residential programmes, which often highlight academic or leadership outcomes, Girls Outdoors participants framed them primarily as memorable social and sensory experiences, reinforcing the importance of fun, novelty, and togetherness in sustaining engagement.

These findings resonate with the School Grounds Survey 2025, which reported that many schools are increasingly reliant on off-site facilities for nature-based learning, often compensating for the limited utility of their own school grounds (Learning through Landscapes, Play Scotland & NatureScot, 2025). This reliance, however, also raises equity issues: residentials may not be universally available, accessible, or affordable, risking uneven benefits across different schools and socioeconomic groups.

8 Conclusions and implications

Findings from Wave 1 of the Girls Outdoors Study highlight key aspects of nature engagement amongst pre-teen girls, including barriers and enablers, offering new insights into the gender gap, where boys tend to spend more time outdoors. Addressing these factors could inform policies aimed at creating safer, more inclusive, and engaging outdoor spaces for pre-teen girls.

8.1 Conclusions

This report provides a detailed snapshot of how pre-teen girls aged 10–12 engage with different types of outdoor spaces. While many findings reinforce established research on the importance of proximity, safety, social relationships, and access to play equipment, the study also surfaces new dimensions, particularly around the fluidity of outdoor identity, the ambivalent role of digital technologies, and the girls' nuanced perspectives on outdoor learning. Rather than viewing reduced nature engagement in early adolescence as loss or failure, this study supports a more constructive framing: pre-teen girls are not stepping away from nature; they are navigating new social, emotional, and spatial pathways. Their motivations, boundaries, and identities are in flux. They seek novelty, peer connection, agency, and self-expression, often mediated through technology. As such, future policy and design interventions must move beyond simplistic calls to

“get kids off their screens” and instead explore how nature-based experiences can offer the same psychological rewards: belonging, competence, autonomy, stimulation.

Pre-teen girls want to socialise, express themselves, and try new things. The challenge is to ensure that nature can offer spaces for all of this, while respecting their need for independence, safety, and peer credibility. This stage of life is not just a time of disengagement, but of opportunity. With the right support structures, flexible design, and youth-informed programming, the natural environment can remain a relevant and enriching part of adolescent life. Our findings reveal that while traditional forms of nature play may decline, new forms of interest - often peer-led, digitally mediated, or independence-seeking - begin to take shape. Recognising both the barriers and enablers can inform more effective, age-appropriate strategies for fostering sustained outdoor connection. While existing literature has noted these dynamics, this study contributes new insights into how digital life, identity formation, and developmental transitions intersect to reconfigure girls’ relationships with nature.

Key conclusions:

- **Outdoor identities are evolving, not disappearing:** Girls in this age group do not simply become “less outdoorsy”; rather, their preferences, interests, and conditions for nature engagement shift. Outdoor time increasingly hinges on peer companionship, autonomy, and social acceptance, suggesting the need for spaces and programmes that support youth-driven experiences.
- **Everyday nature is both used and overlooked:** While local parks and grassy areas are regularly accessed, many girls did not recognise them as “real” nature. This disconnect highlights a need to redefine and revalue the ordinary natural spaces that shape children’s daily lives.
- **Technology is not just a barrier; it is a gateway:** Phones and digital tools were both inhibitors and enablers of outdoor activity. Girls used technology to navigate, document, and stay connected outdoors, but also reported screen-based leisure as a competing interest. This dual role of digital life demands more creative integration of social, playful, and tech-mediated experiences in outdoor programming.
- **Adolescence brings both risk and opportunity:** Shifting bodies, increasing self-consciousness, and changing friendship dynamics all influenced how girls perceived and used outdoor space. However, many also expressed a desire for independence, challenge, and meaningful activities, which underscores early adolescence as a critical window for embedding new outdoor routines.
- **Outdoor learning is valued but inconsistently provided:** Girls recalled early positive experiences of gardening, forest school, and nature-based learning, yet reported reduced access in upper primary years. The loss or underuse of school outdoor spaces, particularly by older pupils, signals a systemic gap that risks undermining long-term nature connection.
- **Social belonging is central:** Whether constrained by peers’ screen preferences, excluded from male-dominated play spaces, or encouraged by active friendship groups, social dynamics played a defining role in outdoor engagement. Many girls reported that the presence or absence of friends - and the dynamics they bring - ultimately shaped their willingness to be outside.

8.2 Implications

Based on the findings from Wave 1, the following recommendations aim to support more inclusive, developmentally appropriate, and future-facing approaches to outdoor engagement for pre-teen girls:

1) Reimagine nature engagement for pre-teen girls

Supporting pre-teens' outdoor engagement requires moving beyond child-centric play models. This life stage offers a critical opportunity to embed lifelong nature connection through identity-aligned, developmentally appropriate, and socially meaningful interventions. Rather than trying to preserve earlier childhood patterns, policies and programmes must evolve in tandem with pre-teen girls' changing needs and interests. Activities and spaces should foster autonomy, social belonging, challenge, and self-expression, while reflecting the importance of peer dynamics and identity formation.

2) Create nature-rich public spaces that are appropriate for this age group

Outdoor spaces should be welcoming to older children, offering privacy, seating, Wi-Fi access, and scope for self-directed play and socialising. Co-designed approaches involving pre-teens themselves can ensure these spaces feel relevant and inclusive. Public and educational sectors must also broaden their view of 'nature' to include informal urban spaces, such like verges and moorland, that serve as meaningful contact zones for this age group.

3) Support mobility and access

Improve access to natural spaces by reducing logistical barriers and expanding free or low-cost transport options—especially for families without cars—to ensure all girls can reach remote or less familiar outdoor environments.

4) Develop inclusive, co-designed outdoor programmes

Offer residential trips, adventure days, and peer-led initiatives that reflect the real interests, identities, and social lives of pre-teen girls. These experiences should provide opportunities for autonomy, challenge, and friendship and avoid one-size-fits-all, adult-imposed programmes.

5) Position outdoor learning as developmentally responsive pedagogy

Sustain nature-focussed outdoor learning and beyond the early years and ensure it continues meaningfully into upper primary and beyond. Align such outdoor learning with adolescent interests and concerns and provide sustained support and investment for professional learning, development of outdoor spaces, and off-site visits (including residential). The supportive institutional context that has allowed for ongoing success in early years outdoor provision could reveal opportunities at the primary and secondary levels.

6) Integrate technology thoughtfully

Outdoor programmes should reflect the social and digital dimensions of girls' lives. This includes developing peer-facilitated groups, gamified nature tools, or social-media-friendly activities that meet youth where they are—without undermining their autonomy or intelligence.

7) Tackle gendered spatial exclusion

Address the marginalisation of girls in parks and playgrounds by promoting gender-sensitive design and inclusive programming that actively challenges male-dominated norms. Reclaim

public outdoor spaces as equitable environments by recognising that exclusion is not only physical, but also social and symbolic shaped by visibility, belonging, and peer dynamics.

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