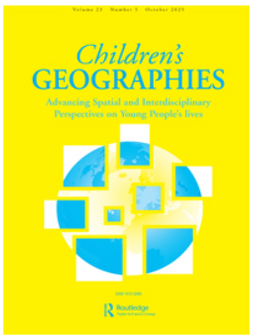

Children's Geographies

ISSN: 1473-3285 (Print) 1473-3277 (Online) Journal homepage: www.tandfonline.com/journals/cchg20

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To cite this article: Katherine King, Andrew Church & Paul Gilchrist (10 Oct 2025): Youth and the materialities of the outdoors: exploring nature connectivity through free play in hidden green spaces, Children's Geographies, DOI: 10.1080/14733285.2025.2568763

To link to this article: https://doi.org/10.1080/14733285.2025.2568763

CHILDREN'S GEOGRAPHIES
https://doi.org/10.1080/14733285.2025.2568763

Routledge
Taylor & Francis Group

Youth and the materialities of the outdoors: exploring nature connectivity through free play in hidden green spaces

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ABSTRACT

Nature connection is considered beneficial for young people's health and wellbeing and for developing pro-environmental behaviour, yet they display some of the lowest rates of access to nature spaces and levels of nature connectedness. Nature connection is often presented as synonymous with learning and formalised environmental education programmes represent the usual model for nature engagement interventions in youth. Evidence indicates, however, that activities which are youth led, and independently accessed may have the most impact in terms of improving nature connectivity. This paper presents the findings of a qualitative research project with young people aged between 12 and 16 years, who choose to access hidden green spaces regularly and independently, yet often without permission, on off-road mountain bikes. Their use of is predicated on accessibility, affordance for embodied engagement, and the creative practice of self-built jumps and trails and see's young people make claims to spaces on the suburban fringe and form embodied knowledge of, and engagement with material natures. Findings provide insights into the relational materialities of young people's self-directed connections with nature through independent access, the choices and negotiations with others that occur when accessing these spaces, and the emergence of action competence in respondents' environmental attitudes and behaviours.

ARTICLE HISTORY
Received 8 May 2024
Accepted 24 September 2025

KEYWORDS
Nature connectivity; green space; youth; free play; action competence; materialities

Introduction

There is growing attention in the global north on the public health implications of the disconnect between children and the natural world as numerous studies report the decline in interactions with nature in childhood (Ward 1978; Louv 2005; Kahn and Weiss 2017). Focus has been placed on the implications that arise from a lack of nature interaction for children's health and wellbeing (Moore 1986; Chawla 2020). Concern is also linked to the potential lack of pro-environmental behaviour and support for nature conservation amongst young people as direct experiences with nature reduce (Soga et al. 2016).

A considerable body of recent research and policy activity has focussed on nature connectivity as an element of population wellbeing. Nature connectedness refers broadly to the measurement of the cognitive, behavioural and affective relationship between people and nature (Shultz 2002). Braun and Dierkes (2017, 938) define it as 'inclusion of nature in self, emotional affinity towards nature, nature relatedness or connectivity with nature'. Nature connection is considered beneficial to the

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mental health and wellbeing of children and young people (Tillmann et al. 2018). It has received increased attention post pandemic when nature connectedness was identified as enabling young people to find fulfilment, respite and an interest in the state of nature near to where they lived (Martz, Powell, and Wee 2022).

Given the potential benefits for young people's wellbeing and pro-environmental behaviours, there is considerable interest across academic and political domains in improving opportunities for children and young people to connect with nature, particularly those spaces which offer independent 'free play', and nature play opportunities with limited adult supervision or involvement (Skar, Gundersen, and O'Brien 2016; King et al. 2024). As we outline in the next section, however, considerable knowledge gaps remain regarding the understanding of how young people engage with nature through unsupervised and informal 'free play' activities. In particular, the role of such independent 'free play' in enhancing pro-environmental attitudes and behaviours has received limited attention despite the wider research highlighting the potential of connections with nature to result in such behaviours.

This paper presents the findings of qualitative research with young people aged 12 - 16 years, who choose to access outdoor spaces independently. Findings draw particular attention to the use of what participants termed 'hidden' spaces, green spaces visited rarely by other users, but which are accessed regularly, independently and often without permission, by young people on off-road mountain bikes. The aim is to provide new empirical insights into the relational materialities of young people's connections with nature through accessing outdoor spaces independently, the choices and negotiations with others that occur when accessing these spaces, and the resulting connections to the respondents' environmental attitudes and behaviours.

Nature connectivity and young people

The wellbeing benefits of nature connection for the general population, and young people specifically have been recognised through the Conservative Government's 25 Year Environment Plan for the UK (DEFRA 2018) which cites nature connectivity as one its six action areas, with a specific focus on engaging young people with the environment into the future. For young people, surveys have observed a decline in levels of outside unsupervised, independent play (Natural England 2020) and identified that children are spending less time unsupervised outside (Glover 2019). There are calls for urgent and ambitious programmes to inspire interest across younger generations in connecting with nature, particularly in spaces which are more easily accessible, such as those near to urban centres (Glover 2019). This is partly a response to a longstanding concern that children and young people's lives are increasingly urbanised (Ward 1978; Louv 2005), and opportunities for connection with nature are being lost, with negative consequences for their health, wellbeing, and motivation to act in protection of nature and the environment (Chawla 2020).

In addition to the personal wellbeing benefits, a range of studies have argued that connecting to nature is a fundamental component of developing environmental citizenship, or pro-environmental behaviour in youth. It is argued that self-exposure to nature is the strongest predictor of adult environmental citizenship as connecting with nature and acting to protect nature are considered mutually reinforcing (Cheng and Monroe 2012; Chawla 2020). According to Natural England (2020), individuals with high nature connectedness are 1.8 times more likely to report conservation behaviours than those with low nature connectedness. It is also claimed children's connectedness to nature influences their intention to participate in nature-based activities in the future (Cheng and Monroe 2012).

Studies have sought to measure the decline in the nature connectedness of young people identifying a drop between 10–21 years of age, with young people between 13 and 18 years of age demonstrating the lowest levels of nature connectedness than any other population age group (Richardson et al. 2019). The decline in nature connectedness in early teenage years is mirrored by a systematic decrease in pro-environmental behaviour (Krettenauer 2017). The perceived importance young people place on being connected to nature also decreases in teenage years (Piccininni et al. 2018).

Research seeking to understand the causes of this decline has often focussed on the barriers young people face in accessing nature. For example Bruni et al. (2017) identify insufficient time, lack of supervision, transportation, expenditure, unsafe neighbourhoods, and limited nearby opportunities as barriers. Studies also cite an apparent lack of interest in engaging with nature in youth. Natural England's (2021) report on the impact of COVID 19 found younger adults between the ages of 16–24 were more likely than any other age group to say they were not interested in spending time outdoors. Due to this perceived lack of interest, some authors argue that youth is a lost generation who do not experience the same fascination or emotional concern, and consequently nature connectedness, as younger children (Braun and Dierkes 2017).

Understanding changing youth connectedness to nature

Whilst the wellbeing benefits and potential for pro-environmental behaviours of youth nature connectedness are recognised, there is considerable debate over how young people's connections to nature should be analysed and understood. There is a significant critique of what are termed deficit perspectives that are focussed on certain ways of measuring connectedness and understanding the decline in terms of barriers to access. Birch, Rishbeth, and Payne (2020) argue deficit perspectives position young people's engagements with nature as part of 'good natural childhoods', with success measured by levels of scientific knowledge or time spent away from corruptions of sedentary indoor leisure practices, positioning young people as the problematic element requiring improvement. Furthermore, the structural whiteness of planning and place-making of urban greenspaces has been highlighted by Snaith and Odedun (2023) who argue a deficit perspective fails to recognise identifiable differences in cultural framings of nature that influence the perceived benefits (as well as risks associated with being outdoors).

Furthermore, there has been criticism of the scales and measurements employed and the use of abstract concepts to assess nature connectedness that are often unsuitable for research with young people (Krettenauer 2017). Nature connectedness in youth is frequently examined through quantitative surveys which utilise self-reported exposure to nature and subjective feelings of connectiveness to nature as benchmarks. For example, Eames, Barker, and Scarff (2018) refer to activities such as planting trees, taking part in protests, or writing to the newspaper as indicators of young people's engagement with environmental action. Schneider and Schaal (2018) measure agreement to evaluative statements such as 'I help snails cross the street', or 'the sound of frogs croaking is comforting'. These examples of nature engagement, it is argued, may have little resonance in the context of the contemporary urbanisation of young people's lives and result in a lack of clarity in what is understood as constituting connection to nature (or not) (King and Church 2013). Furthermore, these measures highlight the pervasiveness of the nature-culture dichotomy in understandings of nature connectivity in youth, maintaining an anthropocentric view of youth-environment relationships (Spannring and Hawke 2021).

Partly in response to perceived critiques of deficit studies and measurements, recent work has employed a relational understanding of the interactions between young people and the materialities of green spaces that includes examining engagements and interactions with the more-than-human agents of outdoor green spaces (Goodenough, Waite, and Wright 2024; King et al. 2024), including how technologies can become interwoven into outdoor play to create post digital third spaces (Potter, Cannon, and Cowan 2024). Materialities perspectives explore the interplay between material objects including the shape and biophysical characteristics, facilities and features, and the practices and performances in which people engage (Petersen 2013). Properties and meanings are not intrinsic to material natures but emerge from their interaction with culturally and socially rooted ideas and the more-than-human (Bakker and Bridge 2006).

Other relational approaches to understanding youth connectedness to nature have drawn on related concepts of affordances and action competence. Gibson's (1977) theory of affordances has been applied to young peoples' place relationships and places a relational emphasis on the

agency and interaction experienced (Änggård 2015). It is argued that young people prioritise the affordances of environments through a situational evaluation of what the environment affords for pleasure or displeasure (Knoll and Roe 2017; von Benzon 2018). Knowledge and skill development, may happen, but this is incidental to the personal meanings attached to these environments.

Studies drawing on ideas of action competence have sought to understand the relations between material objects and the social world by considering how actions and competencies develop as part of engagements with nature. Action competence is formed as a result of authentic experiences through which individuals ask critical questions to help them consider how actions can bring about change (Eames, Barker, and Scarff 2018). For young people, some environmental actions are deemed more appropriate than others, as Ideland (2016, 105) contends, 'the action competent child works with authentic problems, solved in authentic ways, resulting in authentic experiences'.

The relational aspects of work exploring youth nature connectedness through affordances and action competence resonates with calls for a post-nature approach to understanding young people and the more-than-human, which focuses on the 'doings of and in these spaces' (von Benzon 2018). Following Wylie (2007, 10), the 'interconnectivity of self, body and knowledge' are central to the ways in which individuals relate to the landscape and nature. A post-nature approach takes account of the self-driven and playful ways in which young people seek to connect with green spaces and more-than-human worlds. Snaith and Odedun (2023) call for more recognition of alternative configurations of nature in schemes which seek to support their access, rather than assuming a narrative of deficit and disconnection.

The need for relational perspectives that focus on action, doing, and the playful is confirmed by evidence indicating that activities which are youth led, and enable young people to have choice and agency generate positive experiences and have the most impact in terms of improving nature connectivity (Braun and Dierkes 2017). According to Kahn and Weiss (2017), merely providing the opportunity does not result in increased use, it is the choice to act in ways that reinforce positive feelings and attitudes towards experiencing nature that can yield the best outcomes. Youth nature experiences need to be embedded in the context of peer interaction and be 'socially rewarding' (Krettenauer 2017, 590).

Research from a relational perspective has also revealed the significance of place in shaping young people's nature connectedness especially those informal spaces where the influence of adults or institutions is reduced. Gotfredsen et al. (2022, 1351) argue 'that more attention should be given to social places of leisure that young people create themselves, and the effort this requires', a viewed echoed in research on children-nature interactions that takes seriously the place-making practises of nature play (Aminpoor, Bishop, and Corkery 2020; Motta and Ferreira 2022). A number of studies have argued that unlike the majority of outdoor spaces, the materialities of 'hidden' and informal spaces, especially in less managed settings on the suburban fringe, offer opportunities for leisure practices which are rarely captured in research, or land use decision making at policy level (Bruni et al. 2017; Rupprecht, Byrne, and Lo 2016). This requires us to look at informal spaces as more than 'worlds apart' from adult surveillance and expectations within the interstitial spaces of the urban environment (Matthews, Limb, and Percy-Smith 1998) to consider, in a more robust fashion, the material properties and potential of 'edgelands' (Mabey 1973; Roberts and Farley 2011) for young people's development of autonomy and agency. Gearey (2022) adopts the term 'terrain vague' to highlight the ludic potential of such marginal spaces, covering a plethora of unimproved, agriculturally unproductive, less managed environments that make up an 'interstitial wasteland' (Jorgensen and Tylecote 2007) of ludic affordances in sites as varied as river corridors, marshland and abandoned gravel pits. Such spaces offer choice, flexibility, and possibilities for unstructured play for young people to pursue their own initiatives away from the rules and regulations of parents or educators, and the omnipresent surveillance of adult authority (Haartsen and Strijker 2010; Gundersen et al. 2016; Gotfredsen et al. 2022) in territories that affirm young people's uses and access to space on their own terms and in defiance of adult-imposed constructions of childhood innocence (Cloke and Jones 2005). As Gearey (2022, 10) observes of the emancipatory

potential of furtive geographies in disordered landscapes, 'less managed spaces have always been places of discretion, plotting and disruption'.

Much of the research on informal and hidden green spaces highlights their significance for young people to be playful. A clear knowledge gap remains, however, understanding what takes place in these spaces and the implications for the nature connectedness of the young people who use them. As Chawla (2020) argues, what young people are doing in nature is key to understanding their connectedness to it. To address this knowledge gap the body of research on youth nature connectedness suggests that a broad relational perspective is required to understand fully how young people develop connections to nature by experiencing the intersections in between bodies, self, agency, choice, knowledges and the more-than human in these informal and 'hidden' spaces. Furthermore, previous studies have identified that it is also important to identify how the nature connections involving young people in informal and 'hidden' spaces can shape environmental citizenship and pro-environmental behaviours and attitudes.

Research to date on youth engagements with informal and hidden spaces has often paid more attention to access and conflict issues and the spatialities of inclusion and exclusion (Danic 2012; King and Church 2013; Brown 2014). A further second and related knowledge gap exists, therefore in understanding how negotiations with others and learning to care for the more-than-human in informal spaces has the potential to build agency and capacities for environmental citizenship. This paper aims to address these two knowledge gaps which as previous research has highlighted require methods that go beyond deficit perspectives and are suitable for understanding the complex engagement with space and the more-than-human in the lives of young people. The next section presents qualitative research methodologies designed to explore young people's experiences of interpedently accessing nearby green spaces, including hidden spaces, as part of a wider project to include young people's voices in outdoor leisure space design at the point of proposal, of which they are rarely heard.

Methodology

Children and young people are more dependent on local places and the social opportunities of immediate surroundings than adults for their interactions with nature, and should be recognised as active participants in public spaces whether or not they engage in formal processes (Wood 2021). Engaging young people in conversations about their experience in different environments is crucial for identifying the kinds of leisure spaces and play opportunities they value (von Benzon 2018). For example, Waite et al. (2023) argue that assumptions made about barriers, or employing simplistic solutions can serve to reinforce and maintain existing cycles of exclusion and non-participation. This research sought to understand young people's experiences of places they choose to access in order to establish what they like about these environments, what they might use them for, and what features they would choose in the design of new outdoor leisure spaces.

This research sought young people's views as part of a green space redevelopment project on the suburban fringe on the UK South Coast which proposed a new bike park. It adopted a youth-centred approach to research design recognising our role as adult facilitators is to provide and create a space for young people to be welcomed, respected and heard, moving away from conceptualisations of giving youth voice which assumes a model upon which young people must be granted the ability to speak (Woodgate, Tennent, and Barriage 2020). The centring of youth voice provides a critical lens for developing methods for working with young people in research that reflect their agency as social actors (Heath et al. 2009).

Data collection consisted of online small group interviews in friendship groups (to a maximum of three people). Small group interviews aim at addressing the power imbalance between researchers and participants, to embed the research activity within a more relatable online setting for participants, and to support safeguarding (McGarry 2015). Before interviews took place, participants were asked to submit photographs of local outdoor places they liked to use. Photographs were

utilised as a context setting tool to connect researchers with young people's choices of activities, spaces and materialities, acting as prompts[1] to discuss their everyday leisure practices without preconditioning or directing participants to focus on 'nature' (Owens and McKinnon 2009). Interviews were semi-structured covering four broad areas; introductions to themselves and their local area (utilising photo elicitation), the qualities and use of local outdoor spaces, covid restrictions and the role of outdoor spaces, and ideas for outdoor space design.

Participation was open to young people aged 12–16 years old. This age range was chosen to be inclusive of those young people who would be accessing outdoor spaces independent of the family unit. Participation was advertised via a local secondary / sixth form school, and secondarily through social media pages for the proposed new bike park. Inclusion criteria stipulated that participants must live within 5 miles of the proposed bike park location to ensure they were familiar with local provision and need. A total of 26 participants completed the data collection during July and August of 2021, of which 18 regularly took part in mountain biking or BMX (all of whom were male). The median age of participants was 13 years. Four participants identified as female and 22 as male. All participants attended state funded secondary schools across 4 schools in total (Table 1).

Participants were drawn from suburban and semi-rural communities located on the fringe of a national park and with direct access to coastal and estuarine environments and 5–10 miles from the nearest city. The area has seen recent population growth and house building pressures, creating new demands on existing greenspaces. The area is within a UNESCO designated urban biosphere reserve well served by national cycle routes and footpaths giving direct access to high quality and diverse green spaces whilst also hosting a number of urban outdoor leisure spaces such as parks and gardens, recreation grounds, play areas, urban nature reserves and informal sport spaces including skate parks and bike jumps.

The research was subject to an enhanced ethics review according to the lead researchers' institutional protocols, acknowledging the relative powerlessness of young people in the research process, who are less likely to have informed knowledge of the nature of research, and whose participation may be influenced by adult gatekeepers (Heath et al. 2009). Both participant and parental / guardian assent was obtained in advance. Interviews lasted between 35 and 50 min and were hosted online via the Zoom platform using password protected access. Parents were invited to be present if they wished, although no parent chose to. Interviews were video recorded for the purpose of transcription and participant's contributions were anonymised at the point of transcription.

Participation was voluntary and participants received a £25 online voucher to incentivise participation and encourage more diverse voices outside of existing user communities to take part and to compensate for the involvement of time, which was approximately two hours to complete both phases. Whilst Heath et al. (2009) raise caution about the use of incentives in youth research as it can act as a form of coercion for participation, this research used incentives to broaden the participant sample beyond those with an existing interest in the development of a bike park.

Table 1. Participant details and interview group composition.

Interview group	Participant code	Age	Gender	Interview group	Participant code	Age	Gender
1	A	13	M	7	N	14	M
	B	13	M		O	15	M
	C	13	M		P	13	M
2	D	12	M	8	Q	15	M
	E	12	M		R	15	M
3	F	14	F	9	S	13	M
	G	14	F		T	13	M
4	H	12	M	10	U	15	F
	I	12	M	11	V	16	M
5	J	13	M	12	W	13	M
	K	12	M		X	13	M
6	L	15	F	13	Y	12	M
	M	15	M		Z	12	M

After anonymising the data, the initial step in analysis saw the organisation of data via coding, whereby the observed meaning within the text was sorted systematically into categories (Guest, MacQueen, and Namey 2012). A list of 88 data driven codes was developed, acting as a focus for interpretation of the data. The second stage of analysis was to consider the relationships between the data and to refine the labelling of codes to consider what they are, what they are not, and how they relate to each other (Guest, MacQueen, and Namey 2012) which resulted in a list of 27 s order codes. Visual data was also coded and integrated at this point. Theming was the third stage of analysis, whereby the codes were revisited to consider the meanings of participant data in the context of the research aims, in a more concept driven approach (Gibbs 2007).

Materialities of outdoor spaces

Participants discussed accessing a range of these spaces in their local area as an assemblage of spaces and materialities that supported their leisure practices and a desire to live well. Broadly, the outdoors was positioned in opposition to sedentary and indoor activities such as screen time.

> Um, fresh air is good for you, healthy. Um, it's exciting and also, it's just better than sitting inside all day isn't it?. (S.13)
> I just hate staying indoors. (Z.13)

This positioning of the outdoors as healthy influenced their perceptions of outdoor spaces, with many participants discussing issues such as litter and vandalism as contrasting with their expectations of the outdoors and natural spaces.

> These should be an outside sort of space in like the natural, in the nature and stuff, not with litter. (C.13)

Some participants talked about enjoying nature specifically, although many did not. Those that did described finding it 'fascinating' (E.12). Four young women took part in the research and all of them discussed more-than-human elements of outdoor spaces in their reasoning of the appeal of outdoor spaces:

> The wildlife, and the view, and the landscape. (F.14)
> Nature is something that comes to mind, like plants and trees and just somewhere that's sort of pretty to walk around. (L.15)

A common theme amongst both male and female participants emerged around valuing the feeling of space that being outdoors provides. Participants described how they would design outdoor spaces and many accounts discussed open space as a key feature:

> A lot of room is quite nice so it's not really, so you're not really like close together to people, and you have quite a lot of space. (D.12)

Participant 12 described an ideal open space as somewhere spacious, easily accessed and which allows young people freedom in making choices about how to use those spaces.

> 'Something that's probably uh, easily accessible, spacious, uh, engaging, um, for people to just kind of meet up and I don't know, use their imaginations to do whatever they need to or want to do' (L.15)

In addition to accessing formally managed spaces, 18 respondents discussed regularly accessing 'hidden green spaces' such as unvisited sections of public parks, private wooded areas, farmland, or neighbourhood green spaces with mountain bikes. These were located on the suburban fringe, easily accessible from their homes to support regular access but hidden from public view where possible. These hidden spaces were usually accessed intensively, sometimes everyday over a period of months, before being destroyed or 'found out', resulting in participants moving activities to new areas. Participants discussed these spaces as supporting a variety of cycling practices such as riding trails, practicing dirt jumping, designing and building dirt jumps, but also for spending extended time in their social groups. In mountain biking communities these hidden spaces are referred to

as illegal or unofficial jump spots and attain important cultural status because of the exclusivity of access, the lack of rule and regulations, and increased possibilities for incorporating risk in the design, building and riding of jumps (King and Church 2013; O'Keefe 2022).

Seeking seclusion from adults is an important part of the appeal of accessing informal leisure spaces in youth (Rupprecht, Byrne, and Lo 2016). A group of three participants below hint at this desire for seclusion in discussing their experience of selecting a location to start an illegal jump spot:

> The idea was that it'd be as far out of the way as possible. (O.15)
> Yeah, we built jumps under the A27. It's like … next to the river. (P.13)
> Like barely anyone was there, so it's … like along the path. So quite a quiet place. (Q.15)

These participants describe a piece of land hidden between a public footpath and some farmland under a raised section of dual carriageway approximately 1 km outside of the nearest town. Similar to the findings of Gundersen et al. (2016), young people did not select places perceived as attractive by adults, but instead because of their capacity for seclusion, and consequently more freedom in their use. The spaces chosen were not large plots, but often small areas such as the less used parts of existing spaces such as park edges, or sections of private land that others would pass by:

> Me and (A) have gone down to *** Rec and gone in these small little woods there and we built this fantastic tiny kicker. (C.13)
> We built it out of the way in basically this place full of brambles. (O.15)

Making spaces was not supplementary to the sport but a key feature of their leisure experience, and their skill development. As participant 15 attests, 'that's the main fun of it, is being able to make your own thing'. Below, participant 4 discusses creative play in 'the forest', referring to a small piece of woodland on the suburban fringe.

> Um, so at the moment, sometimes we just go into the forest and take our bikes and just kind of, well sometimes we kind of use sticks and stuff to try and make our own jumps in there. (D.12)

Freedom to decide on the form of activity taking place is identified as motivating for children and young people's continuing engagement with nature (Waite et al. 2023). Free choice of what to do in these spaces facilitates a sense of agency and ownership in the practice (also see von Benzon 2018; O'Keefe 2022), embedded through repeated use of hidden places and use of possessive's such as 'ours'. For example, participant 3 describes jump building as 'your own mark', linking their feelings of ownership to their embodied labours.

> It's like our place that we've built with our hands. (O.15)

Control in the design and building of what they perceived to be their own leisure space emerged as important to the success of these spaces in sustaining interest and engagement. One participant described how they don't actually participate in the riding of these jumps, instead their interest lies in the making of jumps and trails and the creation of a space for themselves.

> I like making them, he like's using them. (D.12)

These participants confirm the findings of earlier studies identifying the importance of suburban-fringe marginal spaces in enabling choice and agency to pursue unstructured play unsupervised by adults and organisations (Bruni et al. 2017; Rupprecht, Byrne, and Lo 2016; Gundersen et al. 2016; Gotfredsen et al. 2022. Haartsen and Strijker 2010). The practice of jump building provided a chosen encounter with more-than-human materialities which is prevented in other 'visible' settings. The ecological materialities of green spaces on the urban fringe such as 'sticks' and 'brambles' was drawn upon in participants accounts as enabling the seclusion, enclosure and resources to pursue their own creative choices.

Relationality and embodied knowledges

Young people's participation in jump building provided a creative outlet and their use of hidden green spaces was predicated on its affordance for embodied engagement. They expressed satisfaction at their own skills and abilities to create their own leisure spaces that then supported their skill progression.

> It's just like, after you've made something, actually like riding it, and actually like knowing that it works, it's quite a nice feeling. (E.12)
> It sort of feels good that you've made your sort of exercise and excitement and stuff. (A.13)

Self-building in hidden spaces was very involved, both cognitively and physically. Accounts described the physical labour involved in the practice, for example participant 14 emphasises that 'it's hard work, digging'. Some participants discussed the design, planning of jump builds as a kind of sensory learning about where and how to build jumps in relation to the material features of the surrounding environment and the kinds of embodied experiences it could accommodate:

> We used to build like a mini trail there. Because there was like, it was perfect for like a mini little trail to make like, because there's like a teensy little slope to go down, hit like a berm, then do a jump. (B.13)

Participants showed an intense engagement with the matter of these spaces for example in the extract below describing the durability of substrate, and strategies for attending to challenges of erosion.

> You have to build the jumps out of chalk, otherwise they get trampled and the, uh, the problem, like Mainline is sort of lower down where the chalk is, but with Moto it's built on dirt and, uh, which is why the lip keeps on getting trampled. So we need to get some more chalk up there, and actually in a mix and make it stronger. (N.14)

This extended to the attention paid to existing structures requiring young people to think carefully about how best to co-create the space alongside other (invisible) users. In the example below, participants discuss designing and building a new set of jumps they named 'Moto' to complement an existing youth self-build they call Mainline.

> We've made our own line with bigger jumps, yeah, and so there are three lines now. There's like a pump tracky small line, and then there's Mainline which is more dirt jumps and they're not very steep, and then there's Moto, which is longer, bigger jumps. That's the one that we built. (N.14)

For Payne (2000), the body is the site of action, having the capacity to act competently (or incompetently). The accounts of these participants describe a practical and embodied knowledge which arises from the 'action' in itself as argued by action competence perspectives (Ideland 2016). The affective attunement to what the setting could become, has been observed in other lifestyle sport settings, such as urban parkour (Saville 2008) or DIY skateparks, and is what Hollett and Vivoni (2020) argue creates a space of and for learning. Repetitious engagements with space so that participants can gain an intricate knowledge of the material properties, surfaces, textures of space, permitting types of skilled performance to emerge through encounters with matter.

> It's like you build it and then you ride, you feel like you've achieved it and then, once you've done it you look add a bit more into it, just like build what you want to like try. (J.13)

Improving the sport quality of the space is presented as an ongoing practice. There was great attention to the improvement of technique and personal competency including engagement with social media to access expertise from within the wider sporting community to inform their own building projects.

> So we, before we were putting, like they on GMBN [2]they said to put a log on it and then build over the log, but we couldn't find any, so we were using bricks, but then they were falling apart. Um, so we just started, we found, um, like a bit that was covered by leaves. We took some of the leaves off and, like digging in there a little bit and then sort of just packing it down tightly, and then, and then it wasn't falling apart as easy. (J.13)

> We sort of looked on, like tons of videos of how to build berms, how to build jumps, we sort of just followed by those and d then after a while we sort of like started making them our own way, almost. (E.12)

Participants described a sense of personal investment in these activities in terms of skill acquisition, sometimes valuing progression in their land-based skills as much as in their riding. Participant 16 comments 'this is something to do other than like just riding the whole time'. Investment in tools and equipment was noted, to facilitate self-build activity.

> We were actually quite into it, like our mate bought like a proper shovel, shovels and like a wheelbarrow and stuff and we actually made it really well. (Q.15)

Young people are driven to use hidden green spaces because of their affordance for experimentation and playfulness. Connections with material natures are therefore mediated through the intrinsic qualities of the spaces they have chosen to inhabit, and the sorts of activities this facilitates (von Benzon 2018).

Negotiating other users and action competence

From an action competence perspective some environmental actions are deemed by young people to be more appropriate than others (Ideland 2016). Those who participate in informal leisure in green spaces without adults are viewed with suspicion (Haartsen and Strijker 2010; Trell, van Hoven, and Huigen 2014), and as these participant accounts demonstrate, are frequently subject to intervention and prevention. Every account of accessing hidden green spaces provided in this research described the resultant demolition or restrictions imposed on them once their use had been discovered.

> We used to go there a lot and every time we would build them about a month later, someone would just come and just ruin them, I don't know why. (Q.15)
> So, we have two dirt jump spots, we have (a) and (b). Both are illegal and both have been threatened to be taken down by the council or by the landowner. (O.15)

Accounts describe a cyclical process of identifying a suitable location, designing and building a set of jumps and intensively accessing the site before activity was eventually discovered, either by local users, the council, or by other young people resulting in significant restrictions or complete prevention of use and sourcing of a new location.

> It got destroyed, and then we build it again then it got destroyed, but we've built another one. (J.12)
> Researcher: In the same place?
> Yeah, we just keep on building new ones and stuff. (J.12)

Participants accepted the inevitability of this, for example participant 1 suggested 'it's fun if it stays', yet the findings also demonstrate the development of action competence through negotiation. Action competence is focused on the interplay between action and reflection (Blythe and Harré 2020). Participants displayed this dynamic in their discussions of jump building.

> quite a lot of people would feel like, knocking it down or like, like, yeah, like just for a laugh and then also like, I feel like, what was I going to say? So there's like some people who would like, like the council, for example, we don't really want to get in trouble with them. And like, for example, we wouldn't go and build a huge jump line in the middle of [***] where it's really obvious because we might get in trouble for that. But we felt like if we did it somewhere, tucked away where no one could see, then if the council did find out, they wouldn't care as much because it's not getting in everyone's way. (J.13)

For Ideland (2016) the action competent child is qualified as brave, environmentally aware, and moral, and correspondingly, those outside of this become a non-desirable other. The discussion below between two participants demonstrates their frustration at their positioning as problematic.

> Every time people walk past it's – 'but you can't do it there, you're not allowed to do it there' and it's just, I don't know why they see a problem with it. It's not theirs so … (A.13)
> I know and they're not even walking there which was the most infuriating thing. (C.13).

> We're outside doing exercise, I don't see what their problem is. (A.13)

Participants follow the social discourse of being outside as 'good' for them to rationalise their activities. They recognise a hierarchy in the use of these spaces, claiming they are usually challenged by other (older) users who are accessing them for their own recreational needs which do not align with their own. Participants identified those users engage in more passive forms of access, such as dog walkers or older people who 'just like want the wildlife and stuff' (J.12).

> I feel like the main problem with it is, is that these people who tell us don't do the same things as us, like I'm sure if they even tried mountain biking they'd realise that there's not a lot around and that we almost need this this sort of thing, and like we wanna be building stuff, so it should be like almost encouraged in a way. (D.12)
> Researcher: So who is it do you think is telling you to stop doing it?.
> Just random people just walking around. People that are walking dogs. (D.12)

In other examples, participants described encounters with conservation groups, or adults acting to represent 'nature'. The example below relates to activities on the fringe of a local nature reserve.

> When they first approached us and told us about why we shouldn't be digging there and all, we were hacking away at some brambles, and then they said we weren't allowed to do that then offered, not offered, like asked us, if we could help take all the other brambles away on the path. Like none of their points really made any sense, and the council was like chopping loads of trees down by the path. I can't remember what it was, it might've been a disease, but it wasn't just one species of tree. It was like 5 metres either side of the path and just absolutely destroyed it. (O.15)

In the account above Participant 15 describes being encouraged into more desirable activities that served the needs of those with more power in these spaces. They highlight what they consider a contradiction in the prevention of their activities and the promotion of others they perceive to be more ecological damaging. It is argued that action competence often emerges in the context of controversial problems and develops young people's skills in handling environmental issues and the demand for innovative solutions (Sass et al. 2020). A sensitivity to the integrity of the environment as a result of their digging for jumps is demonstrated and acted upon:

> … we take the dirt out of lots of different places so there's not just a huge pit. (E.12)
> I feel like I get what they're trying to say. That it's grassland and that's fairly rare in the UK, because there is certain wildlife there. (O.15)

In action competence, this is the recognition that embodied practices extend to the surrounding environment and have consequences upon it (Payne 2000). Participants developed an understanding of the conservation issues attached to the places they accessed, but felt as though sometimes adults are 'kind of unreasonable' (N.14) to assume that their activities are implicitly damaging.

> They said that the habitat they're trying to preserve, was a chalky grassland, so I didn't know why they were complaining about the sapling because it's not part of the grassland. (N.14)

This shows an understanding of what was important to be conserved but that this did not extend to all nature. They are judicious and shrewd in their delineation of how environmental conservation should be practiced in the areas they co-reside in with nature.

Marginal nature spaces provide the opportunity for value formation (Owens and McKinnon 2009) in presenting moral quandaries between optimising the leisure experiences and knowing how to prevent damage to the natural environment. Payne (2000) describes this as embodied dissonance; a contradiction between acting bodies and the rationalised intentions of the individual. In building jumps, a cycle of action and reflection occurred whereby they learnt the rules of engagement, and how to modify the shape or structure of their build to achieve this balance and sustain their access.

> We've been told, um, kindly to, to maybe make them a little bit smaller so they're not as obvious but, um, we haven't been told to like take them down or anything. (J.12)
> You have to be really careful where you dig because it's like the bit up there in [***], we started another thing

> up the top where the dirt jumps used to be. But we had to take them down because of the complaints from the nature people. (N.14)
> We go there and every time we just make a jump a tiny bit bigger every time. (D.12)

These quotes resonate with Eames, Barker, and Scarff (2018), and Ideland (2016) who claim that authentic experiences shape action competence as individuals consider how they can instigate change through their actions. Beyond physical manifestations of action in the form of modifying t build and design, young people exercise agency in their decision making, and aim this at solving a particular issue. Some participants sought to formalise access and engage proactively with those who tried to prevent their activities. As articulated by participant Q (15):

> People would be prepared to fight for a dirt jump spot yeah. because it is so valuable for them. It's something they can spend, just spend hours and hours there.

Another participant describes their efforts to advocate for a solution to a dispute:

> We tried to sort of negotiate with the landowner and say like, could we have, because he has land up higher as well, could we have sort of an official spot. And we made like a PowerPoint thing. Cause he said, he'd look at it, but he didn't. (N.14)
> Researcher: You made a PowerPoint?
> Yeah, it was the advantages and disadvantages of having a dirt jump spot. (N.14)

These examples of free play in hidden green spaces demonstrate young people's capacities for reflective co-dwelling in the more-than-human-world. Hidden green spaces became spaces of everyday resistance and challenge as young people work the land, developing forms of 'diffuse citizenship' that can be mobilised to defend rights to it (Crouch and Parker 2003).

Conclusion

Young people's engagements with nature continue to be imagined through adult led, formalised 'interventions' such as scouts and guides that are accorded high status and presumed to do good (Waite et al. 2023), yet, as argued by Wood (2021, 177), 'children have a right to use the public sphere in their own playful way'. These findings demonstrate the role of independent free play in green spaces in developing nature connection founded on action competence. Informal free play such as those presented above creates the possibility for the kinds of authentic, embodied experiences demanded in the formation of action competence (see Eames, Barker, and Scarff 2018). Chosen encounters with more-than-human materialities placed emphasis on 'being' and 'doing' (also see King and Church 2013; Ideland 2016) and enabled the development of meaningful engagements with nature. Embodied intelligence represents a necessary condition for developing confidence and capability to address environmental and societal challenges and extends their own knowing's as active citizens (Payne 2000). Pro-environmental behaviour and attitudes were demonstrated across accounts indicating they understood conservation concerns and through self-build adaptation, developed new embodied knowledges of nature. In line with previous work (von Benzon 2018; King and Church 2013), however, young people did not discuss their experiences in terms of engagement with 'nature' but in terms of opportunities for adventurous play and for developing ownership.

This paper argues that understanding young people's use of outdoor environments is more than just measuring their connectivity to nature. As argued by Knoll and Roe (2017), balance should be sought between quantitative measures of effect, and qualitative approaches to explore how young people use and experience their environments. Previous work has suggested more emphasis be placed on developing a clear understanding of what is valued by young people so that policies and programmes can be developed that are aligned with their interests and abilities and involve a range of options (Waite et al. 2023). Our findings demonstrate that when young people access green spaces independently, they not only value space but they can develop the capacity to act as action competent citizens involved in everyday land-use decision making. This competency

involves social and relational activity that is often not recognised by discussions of post-nature affective relations focussed on the individual. The self-build activities in this research saw young people adapting nature spaces, working together as social groups and using social media to enhance and structure their engagement with greenspace. Young people face challenges in accessing these kinds of experiences requiring negotiation with other users, often directly in discussion and confrontation of adult imposed rules on legitimate forms of nature citizenship that reinforce a sense of hierarchy of users in green spaces (also see Waite et al. 2023).

This research contributes to knowledge building about cultural and social differences in the appropriation of 'edgeland' outdoor space, recognising that spaces on the suburban fringe can offer valuable opportunities for experiencing nature in youth, yet as highlighted by Glover (2019), continue to be under-utilised in their potential for providing social and ecological value which is accessible. There are diverse ways of connecting nature, with different cultural framings of nature influencing the perceived benefits, and as also argued by Snaith and Odedun (2023), policy makers, open space managers and education providers must be cognisant and responsive to these. Accommodating these forms of youth engagement with nature in greenspace and suburban fringe development is a further challenge for planning processes seeking to provide inclusive spaces of nature that enable conservation and promote physical activity. Nevertheless, these engagements can be significant for young people for developing their connections to nature.

Notes

1. Photographs were also analysed as part of the broader project but hidden green spaces were rarely captured in photographs (excluding one example) and were instead revealed during subsequent small group interviews.
2. GMBN stands for Global Mountain Biking Network, an online mountain biking community.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

Aminpoor, F., K. Bishop, and L. Corkery. 2020. "The Hidden Value of in-between Spaces for Children's Self-directed Play with Outdoor School Environments." *Landscape and Urban Planning* 194:103673. https://doi.org/10.1016/j.landurbplan.2019.103683.

Änggård, E. 2015. "How Matter Comes to Matter in Children's Nature Play: Posthumanist Approaches and Children's Geographies." *Children's Geographies* 14 (1): 77–90. https://doi.org/10.1080/14733285.2015.1004523.

Bakker, K., and G. Bridge. 2006. "Material Worlds? Resource Geographies and the 'Matter of Nature'." *Progress in Human Geography* 30 (1): 5–27. https://doi.org/10.1191/0309132506ph588oa.

Birch, J., C. Rishbeth, and S. R. Payne. 2020. "Nature Doesn't Judge You – How Urban Nature Supports Young People's Mental Health and Wellbeing in a Diverse UK City." *Health & Place* 62), https://doi.org/10.1016/j.healthplace.2020.102296.

Blythe, C., and N. Harré. 2020. "Encouraging Transformation and Action Competence: A Theory of Change Evaluation of a Sustainability Leadership Program for High School Students." *The Journal of Environmental Education* 51 (1): 83–96. https://doi.org/10.1080/00958964.2019.1629381.

Braun, T., and P. Dierkes. 2017. "Connecting Students to Nature – How Intensity of Nature Experience and Student age Influence the Success of Outdoor Education Programs." *Environmental Education Research* 23:937–949. https://doi.org/10.1080/13504622.2016.12148.

Brown, K. 2014. "Spaces of Play, Spaces of Responsibility: Creating Dichotomous Geographies of Outdoor Citizenship." *Geoforum; Journal of Physical, Human, and Regional Geosciences* 55:22–32. https://doi.org/10.1016/j.geoforum.2014.05.002.

Bruni, C. M., P. L. Winter, P. W. Schutlz, A. M. Omatio, and J. J. Tabanico. 2017. "Getting to Know Nature: Evaluating the Effects of the Get to Know Program on Children's Connectedness to Nature." *Environmental Education Research* 23 (1): 42–62.

Chawla, L. 2020. "Childhood Nature Connection and Constructive Hope: A Review of Research on Connecting with Nature and Coping with Environmental Loss." *People and Nature* 2:619–642. https://doi.org/10.1002/pan3.10128.

Cheng, J. C. H., and M. C. Monroe. 2012. "Connection to Nature: Children's Affective Attitude toward Nature." *Environment and Behavior* 44 (1): 31–49. https://doi.org/10.1177/0013916510385082.
Cloke, P., and O. Jones. 2005. "Unclaimed Territory': Childhood and Disordered Space(s)." *Social & Cultural Geography* 6 (3): 311–333. https://doi.org/10.1080/14649360500111154.
Crouch, D., and G. Parker. 2003. "'Digging-up' Utopia? Space, Practice and Land use Heritage." *Geoforum; Journal of Physical, Human, and Regional Geosciences* 34 (3): 395–408.
Danic, I. 2012. "The Everyday Occupation of Space by Teenagers in a Deprived Neighbourhood: Conflict without Mobilisation." *Population, Space and Place* 18 (5): 659–668. https://doi.org/10.1002/psp.1701.
DEFRA. 2018. "A Green Future: Our 25 Year Plan to Improve the Environment". *HM Government*. https://assets.publishing.service.gov.uk/media/5ab3a67840f0b65bb584297e/25-year-environment-plan.pdf.
Eames, C., M. Barker, and C. Scarff. 2018. "Priorities, Identity and the Environment: Negotiating the Early Teenage Years." *Journal of Environmental Education* 49 (3): 189–206. https://doi.org/10.1080/00958964.2017.141519.
Gearey, M. 2022. "Paludal Playscapes: Wetland as Heterotopic Ludic Spaces." *Shima* 16 (1): 6–25. https://doi.org/10.21463/shima.112.
Gibbs, G. R. 2007. *Analyzing Qualitative Data*. London: SAGE Publications. https://doi.org/10.4135/9781849208574.
Gibson, J. J. 1977. "The Theory of Affordances." In *Perceiving, Acting, and Knowing: Toward an Ecological Psychology*, edited by R. Shaw, and J. Bransford, 67–82. Hillsdale, NJ: Erlbaum.
Glover, J. 2019. Landscape Review Final Report. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/833726/landscapes-review-final-report.pdf.
Goodenough, A., S. Waite, and N. Wright. 2024. "Place as Partner: Material and Affective Intra-play between Young People and Trees." *Children's Geographies* 19 (2): 225–240. https://doi.org/10.1080/14733285.2020.1783435.
Gotfredsen, A. C., D. Enlund, I. Goicolea, and E. Landstedt. 2022. "Precarious Leisure in a Teenage Wasteland? Intertwining Discourses on Responsibility and Girls' Place-Making in Rural Northern Sweden." *Journal of Youth Studies* 25 (10): 1350–1366. https://doi.org/10.1080/13676261.2021.1957086.
Guest, G., MacQueen, K. M., and Namey, E. E. 2012. Themes and Codes. In *Applied Thematic Analysis*. SAGE Publications. https://doi.org/10.4135/9781483384436
Gundersen, V., M. Ska, L. O'Brien, L. C. Wold, and G. Follo. 2016. "Children and Nearby Nature: A Nationwide Parental Survey from Norway." *Urban Forestry & Urban Greening* 17 (1): 116–125.
Haartsen, T., and D. Strijker. 2010. "Rural Youth Culture: *Keten* in the Netherlands." *Journal of Rural Studies* 26 (2): 163–172.
Heath, S., R. Brooks, E. Cleaver, and E. Ireland. 2009. *Researching Young People's Lives: An Introduction*. London: SAGE Publications. https://doi.org/10.4135/9781446249420.
Hollett, T., and F. Vivoni. 2020. "DIY Skateparks as Temporary Disruptions to Neoliberal Cities: Informal Learning through Micropolitical Making." *Discourse: Studies in the Cultural Politics of Education* 42 (6): 881–897. https://doi.org/10.1080/01596306.2020.1742095.
Ideland, M. 2016. "The Action Competent Child: Responsibilization through Practices and Emotions in Environmental Education." *Knowledge Cultures* 4 (2): 95–112.
Jorgensen, A., and M. Tylecote. 2007. "Ambivalent Landscapes – Wilderness in the Urban Interstices." *Landscape Research* 32 (4): 443–462.
Kahn Jr., P. H., and T. Weiss. 2017. "The Importance of Children Interacting with big Nature." *Children, Youth and Environments* 27 (2): 7–24. https://doi.org/10.7721/chilyoutenvi.27.2.0007.
King, H., H. Beazley, L. Barclay, and A. Miller. 2024. "Re-imagining Child-Nature Relationships in Ecotourism: Children's Conservation Awareness through Nature Play and Nature-Based Learning." *Children's Geographies* 22 (4): 497–512. https://doi.org/10.1080/14733285.2024.2308008.
King, K., and A. Church. 2013. "We Don't Enjoy Nature Like That': Youth Identity and Lifestyle in the Countryside." *Journal of Rural Studies* 31:67–76. https://doi.org/10.1016/j.jrurstud.2013.02.004.
Knoll, M., and J. Roe. 2017. "Ten Questions concerning a new Adolescent Health Urbanism." *Building and Environment* 126:496–506. https://doi.org/10.1016/j.buildenv.2017.10.006.
Krettenauer, T. 2017. "Pro-environmental Behavior and Adolescent Moral Development." *Journal of Research on Adolescence* 27 (3): 581–593. https://doi.org/10.1111/jora.12300.
Louv, R. 2005. *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Chapel Hill: Algonquin Books.
Mabey, R. 1973. *The Unofficial Countryside*. London: Collins.
Martz, C. J., R. L. Powell, and B. Wee. 2022. "The Impact of COVID-19 Lockdowns on Youth Relationships with Nature: A Socio-Spatial Perspective." *Children, Youth and Environments* 32 (1): 128–151. https://doi.org/10.1353/cye.2022.0005.
Matthews, H., M. Limb, and B. Percy-Smith. 1998. "Changing Worlds: The Microgeographies of Young Teenagers." *Tijdschrift Voor Economische en Sociale Geografie* 89 (2): 193–202.
McGarry, O. 2015. "Repositioning the Research Encounter: Exploring Power Dynamics and Positionality in Youth Research." *International Journal of Social Research Methodology* 19:339–354.
Moore, R. C. 1986. *Childhood's Domain*. London: Croom Helm.

Motta, R., and M. Ferreira. 2022. "The Children-Nature Interrelationship in Outdoor Early Childhood Education: When Children and Bamboo co-construct a 'Secret Hideaway'." *Journal of Adventure Education and Outdoor Learning* 22 (4): 385–402. https://doi.org/10.1080/14729679.2022.2087193.
Natural England. 2020. Nature Connectedness Among Adults and Children in England (JP032) http://publications.naturalengland.org.uk/publication/6005041314136064.
Natural England. 2021. Impact of COVID-19 on Engagement with Green and Natural Spaces Natural England Report PANS003. 15th September 2021. Kantar Public and Natural England.
O'Keefe, P. 2022. "Young Peoples' Constructions of DIY Dirt Jumps in Melbourne, Australia, throughout the COVID-19 Lockdowns." *Applied Youth Studies* 5:177–134.
Owens, P. E., and I. McKinnon. 2009. "In Pursuit of Nature: The Role of Nature in Adolescents' Lives." *Journal of Developmental Processes* 4 (1): 43–58.
Payne, P. 2000. *Embodiment and Action Competence. Critical Environmental and Health Education: Research Issues and Challenges*. Copenhagen: The Danish University of Education, 185–208.
Petersen, Lars Kjerulf. 2013. "The Materiality of Everyday Practices in Urban Greenspace." *Journal of Environmental Policy & Planning* 15 (3): 353–370. https://doi.org/10.1080/1523908X.2013.766576.
Piccininni, C., V. Michaelson, I. Janssen, and W. Pickett. 2018. "Outdoor Play and Nature Connectedness as Potential Correlates of Internalized Mental Health Symptoms among Canadian Adolescents." *Preventive Medicine* 112:168–175. https://doi.org/10.1016/j.ypmed.2018.04.020.
Potter, J., M. Cannon, and K. Cowan. 2024. "Children's Production of Place and (Third) Space during COVID 19: Den Building, Filmmaking and the Postdigital in the Play Observatory." *Global Studies of Childhood* 14 (1): 9–25. https://doi.org/10.1177/20436106241231810.
Richardson, M., A. Hunt, J. Hinds, R. Bragg, D. Fido, D. Petronzi, and M. White. 2019. "A Measure of Nature Connectedness for Children and Adults: Validation, Performance, and Insights." *Sustainability* 11:3250. https://doi.org/10.3390/su11123250.
Roberts, M. S., and P. Farley. 2011. *Edgelands*. London: Random House.
Rupprecht, C. D., J. A. Byrne, and A. Y. Lo. 2016. "Memories of Vacant Lots: How and why Residents Used Informal Urban Green Space as Children and Teenagers in Brisbane Australia, and Sapporo, Japan." *Children's Geographies* 14:340–355. https://doi.org/10.13140/RG.2.1.2642.7042.
Sass, Wanda, Jelle Boeve-de Pauw, Daniel Olsson, Niklas Gericke, Sven De Maeyer, and Peter Van Petegem. 2020. "Redefining action competence: The case of sustainable development." *The Journal of Environmental Education* 51 (4): 292–305. https://doi.org/10.1080/00958964.2020.1765132.
Saville, S. J. 2008. "Playing with Fear: Parkour and the Mobility of Emotion." *Social & Cultural Geography* 9 (8): 891–914. https://doi.org/10.1080/14649360802441440.
Schneider, J., and S. Schaal. 2018. "Location-based Smartphone Games in the Context of Environmental Education and Education for Sustainable Development: Fostering Connectedness to Nature with Geogames." *Environmental Education Research* 24 (11): 1597–1610. https://doi.org/10.1080/13504622.2017.1383360.
Shultz, P. W. 2002. "Inclusion with Nature: The Psychology of Human-Nature Relations." In *Psychology of Sustainable Development*, edited by P. Schmuck, and W. P. Schultz, 61–78. Boston, MA: Kluwer Academic Publishers. https://doi.org/10.1007/978-1-4615-0995-0_4.
Skar, M., V. Gundersen, and L. O'Brien. 2016. "How to Engage Children with Nature: Why Not Just let Them Play?" *Children's Geographies* 14 (5): 527–540. https://doi.org/10.1080/14733285.2015.1136734.
Snaith, B., and A. Odedun. 2023. "Weeds, Wildflowers, and White Privilege: Why Recognizing Nature's Cultural Context Is key to Ethnically Inclusive Urban Greenspaces." *Journal of Race, Ethnicity and the City*, https://doi.org/10.1080/26884674.20232224115.
Soga, M., K. J. Gaston, Y. Yamaura, K. Kurisu, and K. Hanaki. 2016. "Both Direct and Vicarious Experiences of Nature Affect Children's Willingness to Conserve Biodiversity." *International Journal of Environmental Research and Public Health* 13 (6): 529.
Spannring, R., and S. Hawke. 2021. "Anthropocene Challenges for Youth Research: Understanding Agency and Change through Complex, Adaptive Systems." *Journal of Youth Studies* 25 (7): 977–993. https://doi.org/10.1080/13676261.2021.1929886.
Tillmann, S., D. Tobin, W. Avison, and J. Gilliland. 2018. "Mental Health Benefits of Interactions with Nature in Children and Teenagers: A Systematic Review." *Journal of Epidemiology and Community Health* 72:958–966. https://doi.org/10.1136/jech-2018-210436.
Trell, E.-M., B. van Hoven, and P. P. P. Huigen. 2014. "In Summer We go and Drink at the Lake': Young men and the Geographies of Alcohol and Drinking in Rural Estonia." *Children's Geographies* 12 (4): 447–463. https://doi.org/10.1177/20438206231217573.
von Benzon, N. 2018. "Discussing Nature, 'Doing' Nature: For an Emancipatory Approach to Conceptualizing Young People's Access to Outdoor Green Space." *Geoforum; Journal of Physical, Human, and Regional Geosciences* 23:79–86. https://doi.org/10.1016/j.geoforum.2018.05.004.
Waite, S., F. Husain, B. Emma Scandone, E. Forsyth, and H. Piggott. 2023. "It's Not for People Like (Them): Structural and Cultural Barriers to Children and Young People Engaging with Nature Outside Schooling."

Journal of Adventure Education and Outdoor Learning 23 (1): 54–73. https://doi.org/10.1080/14729679.2021.1935286.

Ward, C. 1978. *The Child in the City*. Harmondsworth: Penguin.

Wood, J. 2021. "Children as Heterotopians: Town Planning with and for Children." In *Place, Pedagogy and Play: Participation, Design and Research with Children*, edited by M. Khan, S. Bell, and J. Wood, 165–179. Abingdon: Routledge.

Woodgate, R. L., P. Tennent, and S. Barriage. 2020. "Creating Space for Youth Voice: Implications of Youth Disclosure Experiences for Youth-Centered Research." *International Journal of Qualitative Methods* 19. https://doi.org/10.1177/1609406920958974.

Wylie, J. 2007. Landscape. Routledge.