

How the natural environment can support children and young people

October 2022

Natural England Evidence Information Note EIN067

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Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

Contents

Purpose of briefing.....	3
Extent of the issue	3
Summary statement.....	5
Theories of how the natural environment can support children and young people	6
Review of the evidence.....	7
Links between natural environments and physical health for children	7
Links between natural environments and mental health for children	8
What is the cost effectiveness of interventions?	10
Implications for policy, service delivery and research	10
Policy and service delivery	10
Research gaps	11
References	13
Glossary.....	17

Purpose of briefing

This briefing note is one of a series that summarises evidence of the links between the natural environment and a range of outcomes. They are based on rapid reviews, not systematic reviews. Please refer to the Methodology (EIN069) document for further details on the method and search strategy. They build on the evidence but are not comprehensive and should be read together with the original notes:

- [EIN015 Connection to Nature](#)
- [EIN018 Links between natural environments and mental health](#)
- [EIN019 Links between natural environments and physical activity](#)
- [EIN020 Links between natural environments and physiological health](#)
- [EIN021 Links between natural environments and obesity](#)

This briefing focuses on how the natural environment can support children and young people. The notes are aimed at: policy makers, practitioners, practice enablers (including Natural England), local decision makers, and the wider research community. They highlight some of the implications for future policy, service delivery and research. It is intended that this note will help to inform practitioner planning, targeting and rationales, but not the identification of solutions or the design of interventions. Barriers to access or use of natural environments are not considered in this note. This briefing can be read in parallel with [EIN063: Links between natural environments, learning and health](#). Please see EIN069 for methodology and glossary. Words marked with an asterisk are defined in the glossary.

Extent of the issue

Childhood activities within the natural environment can include playing, walking, cycling, nature conservation (e.g., picking up litter or recycling) and gardening, amongst many other activities. Children's experience with the natural environment changes with age.¹ These nature experience changes can be identified as happening across four main age groups which can be summarised as:

- Early childhood: age of wonder
- Middle childhood: age of physical engagement
- Adolescent/teenage years: age of detachment because of increasing socialisation; and
- Post 19 years old: age of re-engagement, leading to adult values, attitudes, and actions.

Trends in children's engagement with the natural environment over the years include: a decrease in children playing outdoors; a decrease in children playing in spaces close to home, such as the street; and an increase in play in designated spaces.¹ All of these can result in a reduction of opportunities for children to engage with the natural environment.

Reasons for disengagement with nature include a culture of fear, fuelled by the media, which is underlain with fear about danger and safety, traffic, other physical hazards, litigation, and negative images including socioeconomic related concerns such as gang crime.^{2,3,3} Those on lower incomes and minority groups have less access to nature.¹ In addition, indoor activities such as watching television, the internet, mobile phones and playing computer games, compete with children's time with respect to spending time outdoors in the natural environment.⁴

Evidence from the Monitor of Engagement with the Natural Environment (MENE) national survey of children and young People in England (2018/19 data)¹ shows that approximately two-thirds of children aged between 6 and 12 years spent time outdoors in leisure at least once a week. More recent survey data (2021) from the smaller Childrens People and Nature (C-PANS) survey⁵ based on children aged 8 to 15 years old in England showed that 59% of children and young people said they had spent time outside in their garden, if they had one. This same survey also found that being outside made 85% of children and young people feel "very happy".

Of the MENE data only 29% of those aged 16 to 24 years spent time outdoors once or twice a month. In the last month most children had visited greenspaces in urban environments – mostly parks and playgrounds (69%) followed by countryside (35%) and the coast (16%).¹ Most children spent time in their local outdoors natural areas (70%) with fewer (25%) visiting places further away. Most visits occurred with an adult accompanying them (71%) and only 17% of visits were those spent without any adults.¹ Comparing the MENE 2018/2019 and C-PANS data with MENE 2013/14 data, there has been a comparative decline in proportion of children spending time outside without adults being there.

Level of deprivation is associated with the time children spend outdoors.¹ Those living in the most deprived areas of the UK were less likely to spend time outside frequently compared to those living in more affluent areas. 61% of children in the most deprived areas spent time outside every week compared to 81% in the most affluent areas.¹ Children living in the most deprived areas visited the countryside, coast, and urban green space less times than those in the most affluent areas. Children living in the Yorkshire and Humber region were the most likely to have spent time in nature in the previous month, those in the North East were the least likely to have done so.¹

Children from minority ethnic backgrounds were found to be less likely to spend time outdoors than children from white backgrounds.¹ 56% of children from minority ethnic backgrounds spent time outdoors once a week, compared to 70% of white children.¹ Children from white backgrounds were much more likely to spend time in the countryside or the coast than children from other backgrounds.¹ More research is needed to explore the reasons why these ethnicity-based differences occur.

C-PANS⁵ survey data (2021) covering the impact of Covid-19 on nature and children's access shows that during Covid-19 only 16% of children and young people said that worry around coronavirus stopped them from spending more time outside. However, disabled

children and young people were more likely than non-disabled children to state they did not go outside due to worries about coronavirus, and additionally referred to concerns such as “other people there make me feel uncomfortable”.⁵ Also, children and young people from minority groups were more likely than white counterparts to say that worry about coronavirus was a reason for not spending time outdoors.⁵

The C-PANS⁵ survey also asked children how connected to nature they felt and 44% stated they had a high sense of connection. Those from lower income households were less likely to say they felt part of nature, and less likely to agree that looking after the environment was important to them. Unlike the previously mentioned literature, Asian/Asian British children and young people reported a stronger sense of connection to nature than white children and young people.⁵

Summary statement

Predominantly, research has been conducted into children’s exposure to nature (proximity, time spent in nature and quality of nature) and the impact on health. In addition, a new, emerging evidence base has looked at the benefits of “Connection to Nature”. Nature connectedness can be defined as “a measurable psychological construct that moves beyond contact with nature to an individual’s sense of their relationship with the natural world”.⁶ The evidence presented in this summary about children and young people and nature is mostly derived from nature exposure studies. Some studies may have looked at both exposure and connection to nature and conflated the two concepts. For more evidence on the benefits of connection to nature please see EIN068

Evidence suggests that there are positive associations between exposure to nature and children’s mental and physical health. Even though there is a need for more and higher quality evidence, existing evidence suggests that exposure to nature is beneficial to children. Systematic reviews* have found that the strongest evidence is for links between nature exposure and increased levels of physical activity, lower levels of obesity, and improvements in mental health and cognitive performance.* Evidence for beneficial effects of nature for attention levels and mood improvement and cognitive performance were also found.

The closer the proximity to nature, and therefore ease of access to green space*, the more beneficial the relationship to health. The evidence base suggests that public health as well as wider policy should ensure equitable access to nature for children close to home, where they learn, play and live.

Whilst there is growing evidence to show the beneficial effects of the natural environment for children’s health, there is still need for further development of the evidence base as set out below. Most studies that have been compiled in the systematic reviews are cross-sectional* in design, and further randomised controlled trials* are needed to establish causal* relationships. Most research only observed short-term impacts of exposure to nature, (interventions of less than 6-months). Therefore, more longitudinal* research

following children through the life course is needed. Researchers also need to know more about the way children interact with nature and what characteristics of the natural environment are optimum for children's wellbeing.

The C-PANS⁵ survey has begun to generate data about how children and young people engage with the natural environment through environmental, educational, youth or play organisations. Here, 88% of children surveyed said they had spent time outside whilst at school in the past week. Children stated that this outdoor activity was not just their PE lessons, but also included other activities (although these activities were not explicitly stated).

The recent Covid-19 pandemic and the inequalities of access to green space in society have highlighted the importance of access to nature for children. Closure of school playgrounds, parks and restriction of travel reduced children's chances to play in nature. Some families have less access to green space due to inequalities in access. This is particularly pronounced in minority groups and those with lower incomes.⁷ Emerging studies indicate that nature connection and wellbeing during Covid-19 were important and continue to add to the body of literature evidencing levels of deprivation are related to nature access.⁸ Future research should focus on the impact of unequal access to green space in relation to children's health and wellbeing.

Theories of how the natural environment can support children and young people

The relationship between children and the natural environment is a complex one. A series of theories have been developed by academics to try to explain these complexities. These theories can be categorised as:

1. Children have a natural affinity, or innate relationship, with the natural environment. The "Ecological imagination of childhood" theory describes how children enjoy nature and learn, experiment, create and find their own identity;⁹ the "Biophilia hypothesis" suggests that contact with nature is an innate, evolutionary human need¹⁰ and the "Eco-psychological approach" theory, like the biophilia hypothesis, suggests that children are born with an innate sense of having a relationship with their environment.¹¹
2. Children see opportunities in the natural environment and use them. Approaches include the "Theory of affordances" where children see opportunities to use the landscape in a way that it may not have been specifically designed or managed for¹² and "Phenomenal landscape" theory of how the landscape is used and experienced.¹³
3. Assumptions about children and the natural environment are a result of *romantic notions*, not always related to the reality of an experience. Examples include the "Prospect

and refuge theory” where people prefer to look out onto greenery from within the home.¹⁴

Review of the evidence

Links between natural environments and physical health for children

The evidence about the physical health benefits of engagement with the natural environment for children are to some extent limited. However, being outdoors is widely acknowledged as providing opportunities for moderate exercise and this in turn aids the physical health of children. A variety of research has explored the benefits of play and being outdoors for children’s physical and mental health (see below for evidence in sections). However, it is not clear how much of these benefits are from the play or activity, or the play or activity being undertaken in the outdoors, or natural environment. Much of the research has not identified the location of the activity as a separate variable. The impact of Covid-19 on children’s mental health in the context of nature exposure is just emerging in the literature. Evidence for health conditions follows:

Cardiovascular and metabolic health

A systematic review¹⁵ of 16 studies into issues such as blood pressure, heart rate, insulin or glucose measures and blood lipids found positive results in less than half of the studies. Therefore, there was no conclusive evidence that children’s cardiovascular health is supported by the natural environment. However, this may be due to a lack of research in this area.

Asthma or allergy

A systematic review¹⁵ found emerging evidence for the impact of nature on children’s allergies or asthma. Most studies evaluated residential green space proximity and found a positive link between nature exposure and reduction in asthma and allergies. However, the authors conclude that more research is needed to confirm these findings.

Obesity

A cross-sectional study of children in Nepal¹⁶ found that distance to green space was the most significant predictor of obesity. A systematic review¹⁵ found moderate evidence that the natural environment can prevent obesity in children. Of a collection of 45 studies assessing green residential green space and BMI, 27 found positive correlations between nature and childhood obesity.

Physical activity

A systematic review of 296 studies looking at the impact of nature on children's health¹⁵ reported on 108 studies (mostly cross-sectional) looking at nature and children's physical activity. Overall, 71 of the 108 studies found positive health promoting associations, and three negative associations were reported. Most studies were in the context of activities in residential green space using objective accelerometry (speed of movement) measures of physical activity. A separate systematic review pooling 23 studies¹⁷ also found that green space exposure in early childhood was associated with reduction of likelihood of obesity and increased physical activity.

Links between natural environments and mental health for children

A wide ranging and fairly large evidence base exist to show the beneficial effects of nature for children's mental health, cognitive development, and the prevention of developmental disorders* (see below for details of referring studies). The impact of Covid-19 on children's mental health in the context of nature exposure is just emerging in the literature. The benefits of nature for children have been shown to include:

- A reduction in, and recovery from, stress and anxiety
- Improved capacity to concentrate or pay attention
- Self-regulation when pressures become too much
- Better academic performance
- Reduction in attention deficit hyperactivity disorder symptoms

Cognitive development and education

A range of literature has identified that cognitive and social skills are developed, increased, or enhanced by experiences with the natural environment.

- A systematic review¹⁸ of 12 studies found that access to green space helped to improve memory, competence, self-discipline, and overall cognitive development in children. These findings were confirmed in a subsequent systematic review¹⁹ of 223 studies. A further systematic review²⁰ also agrees with these findings but states that more research is needed to determine long-term outcomes in the real world for children across different age groups.
- 84 studies were pooled in a systematic review²¹ which concluded that immersive nature-experiences were associated with benefits for self-esteem, self-efficacy, resilience, and academic and cognitive performance.
- A systematic review¹⁵ found low evidence for academic attainment and learning in children to be impacted by the natural environment. 22 out of 27 studies (mostly cross-sectional) looking at school and residential green space proximity found positive associations between nature and academic learning.

Nature and children's mental health protection

The evidence about the benefits of experiencing the natural environment for mental health is, if anything, stronger. A number of systematic reviews in this area report positive benefits of exposure to nature for children and adolescents. Evidence from the literature includes:

Nature proximity or exposure studies

- A cohort study^{*22} based in four European cities found that adults who had experienced low levels of nature in childhood had, when compared to adults with high levels of childhood nature exposure, significantly worse mental health.
- A systematic review of 186 studies looking at the impact of either “screen time” or “green time”⁴ found that high levels of screen time appeared to be linked with unfavourable psychological outcomes while green time appeared to be associated with favourable psychological outcomes. Young people from more deprived areas may be more affected by high screen time and low green time.
- A systematic review of 12 studies¹⁸ found that access to green space was associated with improved wellbeing, overall health and cognitive development for children.
- 71 out of 85 studies in one systematic review¹⁵ found positive associations between exposure to natural environments and mental health. These findings were also found in separate systematic reviews^{23–27}.
- A scoping review^{*28} of 20 papers found a positive association between nature exposure and mental health outcomes for young people who had experienced trauma.
- A qualitative study^{*31} looking at the perceived therapeutic benefits of surf therapy for adolescents found that this intervention may promote mental health protective factors for teenagers. However, a survey of the benefits of green and blue space on adolescent mental health in Bulgaria³² only found a protective effect for green space, and not blue space.
- Interestingly, a Finnish online survey of parents³³ found that parents with poor mental wellbeing were more likely to perceive barriers to visiting nature and were less likely to take their children to visit nature.
- A novel randomised controlled trial³⁴ of nature-related activities, perceived stress and gut microbes found that there were changes in microbes, connection to nature and a reduction in perceived stress levels.

Nature Connectedness studies

- A report commissioned by The Wildlife Trusts²⁹ found that children's wellbeing was increased after they had spent time connecting with nature.

- A survey of Canadian adolescents³⁰ found that outdoor play and nature connectedness was associated with fewer psychosomatic symptoms in girls (such as headaches and gastrointestinal distress).
- A survey of parent's views undertaken during the Covid-19 pandemic with 376 families⁸ with young children found that two thirds of parents reported an increase in their children's connection to nature. The authors suggest this may be due to having more time available and increased awareness or interest in nature. The same survey also found that children who experienced a decrease in their connection to nature showed increases in sadness and anxiety. Authors also found that the increase in nature connectedness during the Covid-19 pandemic was more pronounced for children from affluent families.

Nature and the prevention of developmental disorders in children

An emerging evidence base exists to support the beneficial effects of exposure to nature in terms of preventing the emergence of developmental disorders in children.

- A systematic review¹⁸ found that access to green space can improve symptoms of attention deficit hyperactivity disorder and improves attention restoration.
- A longitudinal study with data collected from all children born in New Zealand found that rurality and more exposure to green spaces was strongly and independently associated with a reduced risk of attention deficit hyperactivity disorder³⁵.
- A cohort study of children and attention deficit hyperactivity disorder risk showed that those in early childhood with less access to green space had a greater chance of developing this disorder.^{35,36}

What is the cost effectiveness of interventions?

Despite the evidence pointing towards the benefits of nature connection and nature exposure in childhood, currently no evidence has been found to show the cost effectiveness of nature-based interventions for children. This demonstrates the need for further research in this important area.

Implications for policy, service delivery and research

Policy and service delivery

Evidence strongly suggests a positive benefit for children from exposure to the natural environment. Public health policy needs to recognise the important role that access to nature has for children in terms of their physical, social, cognitive and emotional

development. Safe access to good quality natural environments should be a focus for public health policy.

- Access to natural environments should be equal for all. Surveys show that levels of deprivation and some ethnic backgrounds may result in less access to outdoor space for children. These inequalities may have been amplified due to the Covid-19 pandemic. Policy should focus on providing access to those who may not easily get to go to natural outdoor spaces. This should be done by the creation of high quality, accessible greenspace in urban deprived areas
- Schools and educational organisations should be supported to provide learning opportunities in natural outdoor spaces for children from all backgrounds.
- Barriers for parents accessing nature with their children (e.g., transport or awareness of accessible outdoor spaces nearby) should be investigated, and adults should be supported to gain confidence and access outdoor nature spaces with their children.
- Time spent in nature may “buffer” any negative health impacts of excessive screen time, therefore nature may be a useful public health resource for youth psychological well-being.
- There is evidence of a range of environmental, educational, youth and play organisations which are providing and facilitating events which allow children to engage in the natural environment. Most of these organisations do not keep data on numbers of children involved in their activities because they see this as less important than undertaking the activities themselves or bidding for funding for future projects. Some of the interventions identified, most notably education and play, are underpinned by a range of government policy initiatives.
- Organisations supporting children’s access to nature (e.g., Scouting Association) should be encouraged to engage in research projects to show the impact of their programmes.

Research gaps

- Most empirical evidence comes from studies with cross-sectional methodology, therefore further research should be undertaken using randomised controlled trials which may show more causal relationships between nature and children’s health.
- Longitudinal studies showing the long-term effects of nature on children and adult’s health and lives need to be conducted.
- There is some evidence from England about the influence that childhood experiences of the natural environment have on adult values and behaviours. Further research in this area is required in terms of how pro-environmental behaviours can be supported to develop.
- Risk and fear of risk is a barrier to children and young people benefitting from engaging with the natural environment. Research is needed to identify how real the risks are and the differences of perception of these risks between children and adults and between the perceptions and the reality of the risks.

- There is, however, a lack of evidence from Europe and particularly England about the different experiences of the natural environment for the different stages of development: stage of wonder/natural attraction, stage of exploration/physical engagement, stage of detachment/socialisation and then re-engagement. Research investigating development focused on these four age groups would therefore be valuable.
- Researchers also need to know what characteristics of the natural environment are optimum for children's wellbeing. Future research to determine the specific benefits of different green space and blue space would be useful to determine which gives the maximum impact for children.
- Future research should include cost benefits and social returns on investment in relation to nature-based interventions and health, education, and wellbeing.

References

1. Natural England. (2019) *Monitor of Engagement with the Natural Environment - Children and Young People Report*.
2. Matthews, H., Taylor, M., Sherwood, K., Tucker, F., & Limb, M. (2000). Growing-up in the countryside: children and the rural idyll. *Journal of rural studies*, 16(2), 141-153. doi:10.1016/S0743-0167(99)00059-5
3. Worpole, K. (2003). *No Particular Place to Go: children, young people and public space*. Groundwork UK.
4. Oswald, T. K., Rumbold, A. R., Kedzior, S. G., & Moore, V. M. (2020). Psychological impacts of “screen time” and “green time” for children and adolescents: A systematic scoping review. *PloS one*, 15(9), e0237725. doi:10.1371/journal.pone.0237725
5. Natural England. *The Children’s People and Nature Survey for England: Summer Holidays 2021 (Official Statistics)*. Available at: www.gov.uk/government/statistics/the-childrens-people-and-nature-survey-for-england-summer-holidays-2021-official-statistics/the-childrens-people-and-nature-survey-for-england-summer-holidays-2021-official-statistics . (Accessed June 2022)
6. University of Derby. *Nature connectedness research group*. Available at: www.derby.ac.uk/research/centres-groups/nature-connectedness-research-group/ (Accessed June 2022).
7. Mitra, R., Moore, S. A., Gillespie, M., Faulkner, G., Vanderloo, L. M., Chulak-Bozzer, T., Rhodes, R. E., Brussoni, M. & Tremblay, M. S. (2020). Healthy movement behaviours in children and youth during the COVID-19 pandemic: Exploring the role of the neighbourhood environment. *Health & Place*, 65, 102418. doi:10.1016/j.healthplace.2020.102418
8. Friedman, S., Imrie, S., Fink, E., Gedikoglu, M., & Hughes, C. (2022). Understanding changes to children's connection to nature during the COVID-19 pandemic and implications for child well-being. *People and Nature*, 4(1), 155-165. doi:10.1002/pan3.10270
9. Cobb E. (1977) *The Ecology of Imagination in Childhood*. New York: Columbia University Press.
10. Kellert SR and D. (1998) *National Study of Outdoor Wilderness Experience*. New Haven
11. Phenice, L. A., & Griffore, R. J. (2003). Young children and the natural world. *Contemporary Issues in early childhood*, 4(2), 167-171. doi:10.2304/ciec.2003.4.2.6

12. Gibson J. (1978) *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.
13. Hart R. (1979) *Children's Experience of Place*. New York: Irvington.
14. Appleton J. (1975) *The Experience of Landscape*. New York: Wiley.
15. Fyfe-Johnson, A. L., Hazlehurst, M. F., Perrins, S. P., Bratman, G. N., Thomas, R., Garrett, K. A., Hafferty, K. R., Cullaz, T. M., Marcuse E. K. & Tandon, P. S. (2021). Nature and children's health: a systematic review. *Pediatrics*, 148(4). <https://pubmed.ncbi.nlm.nih.gov/34588297/>
16. Manandhar, S., Suksaroj, T. T., & Rattanapan, C. (2019). The association between green space and the prevalence of overweight/obesity among primary school children. *The International Journal of Occupational and Environmental Medicine*, 10(1), 1. <https://pubmed.ncbi.nlm.nih.gov/30685772/>
17. Islam, M. Z., Johnston, J., & Sly, P. D. (2020). Green space and early childhood development: a systematic review. *Reviews on environmental health*, 35(2), 189-200. <https://pubmed.ncbi.nlm.nih.gov/32167931/>
18. McCormick, R. (2017). Does access to green space impact the mental well-being of children: A systematic review. *Journal of pediatric nursing*, 37, 3-7. <https://pubmed.ncbi.nlm.nih.gov/28882650/>
19. Mygind, L., Kurtzhals, M., Nowell, C., Melby, P. S., Stevenson, M. P., Nieuwenhuijsen, M., ... & Enticott, P. G. (2021). Landscapes of becoming social: A systematic review of evidence for associations and pathways between interactions with nature and socioemotional development in children. *Environment international*, 146, 106238. <https://pubmed.ncbi.nlm.nih.gov/33189991/>
20. Norwood, M. F., Lakhani, A., Fullagar, S., Maujean, A., Downes, M., Byrne, J., ... & Kendall, E. (2019). A narrative and systematic review of the behavioural, cognitive and emotional effects of passive nature exposure on young people: Evidence for prescribing change. *Landscape and Urban Planning*, 189, 71-79.
21. Mygind, L., Kjeldsted, E., Hartmeyer, R., Mygind, E., Bølling, M., & Bentsen, P. (2019). Mental, physical and social health benefits of immersive nature-experience for children and adolescents: A systematic review and quality assessment of the evidence. *Health & place*, 58, 102136. <https://pubmed.ncbi.nlm.nih.gov/31220797/>
22. Preuß, M., Nieuwenhuijsen, M., Marquez, S., Cirach, M., Dadvand, P., Triguero-Mas, M., ... & Zijlema, W. (2019). Low childhood nature exposure is associated with worse mental health in adulthood. *International journal of environmental research and public health*, 16(10), 1809. <https://pubmed.ncbi.nlm.nih.gov/31121806/>
23. Davis, Z., Guhn, M., Jarvis, I., Jerrett, M., Nesbitt, L., Oberlander, T., Sbihi, H., Su, J. & van den Bosch, M. (2021). The association between natural environments and

childhood mental health and development: A systematic review and assessment of different exposure measurements. *International Journal of Hygiene and Environmental Health*, 235, 113767.

24. Fleckney, P., & Bentley, R. (2021). The urban public realm and adolescent mental health and wellbeing: A systematic review. *Social Science & Medicine*, 284, 114242.
25. Tillmann, S., Tobin, D., Avison, W., & Gilliland, J. (2018). Mental health benefits of interactions with nature in children and teenagers: A systematic review. *J Epidemiol Community Health*, 72(10), 958-966. <https://pubmed.ncbi.nlm.nih.gov/29950520/>
26. Vanaken, G. J., & Danckaerts, M. (2018). Impact of green space exposure on children's and adolescents' mental health: A systematic review. *International journal of environmental research and public health*, 15(12), 2668. <https://pubmed.ncbi.nlm.nih.gov/30486416/>
27. Zhang, Y., Mavoia, S., Zhao, J., Raphael, D., & Smith, M. (2020). The association between green space and adolescents' mental well-being: a systematic review. *International journal of environmental research and public health*, 17(18), 6640. <https://pubmed.ncbi.nlm.nih.gov/32932996/>
28. Boddy, J., Slattery, M., Liang, J., Gallagher, H., Smith, A., & Agllias, K. (2021). Psychosocial Interventions Situated Within the Natural Environment with Young People Who Have Experienced Trauma: A Scoping Review. *The British Journal of Social Work*, 51(3), 1018-1040.
29. Sheldrake R, AR, & RMJ. (2019) *Children and Nature: A Research Evaluation for The Wildlife Trusts*.
30. Piccininni, C., Michaelson, V., Janssen, I., & Pickett, W. (2018). Outdoor play and nature connectedness as potential correlates of internalized mental health symptoms among Canadian adolescents. *Preventive Medicine*, 112, 168-175. <https://pubmed.ncbi.nlm.nih.gov/29679604/>
31. Drake, C. J., Keith, M., Dober, M. R., Evans, S., & Olive, L. S. (2021). A qualitative investigation into the perceived therapeutic benefits and barriers of a surf therapy intervention for youth mental health. *Complementary therapies in medicine*, 59, 102713. <https://pubmed.ncbi.nlm.nih.gov/33757830/>
32. Dzhambov, A. M., Markevych, I., Hartig, T., Tilov, B., Arabadzhiev, Z., Stoyanov, D., Gatseva, P. & Dimitrova, D. D. (2018). Multiple pathways link urban green-and bluespace to mental health in young adults. *Environmental research*, 166, 223-233. <https://pubmed.ncbi.nlm.nih.gov/29890427/>
33. Gustafsson, J., Ojala, A., Hiltunen, P., Engberg, E., Wiklund-Engblom, A., Törnwall, N., Roos, E. & Ray, C. (2021). Parental Mental Well-Being and Frequency of Adult-

Child Nature Visits: The Mediating Roles of Parents' Perceived Barriers. *International journal of environmental research and public health*, 18(13), 6814. <https://pubmed.ncbi.nlm.nih.gov/34201931/>

34. Sobko, T., Tse, M., & Kaplan, M. (2016). A randomized controlled trial for families with preschool children-promoting healthy eating and active playtime by connecting to nature. *BMC Public Health*, 16(1), 1-11. <https://pubmed.ncbi.nlm.nih.gov/27296723/>
35. Donovan, G. H., Michael, Y. L., Gatzliolis, D., Mannetje, A. T., & Douwes, J. (2019). Association between exposure to the natural environment, rurality, and attention-deficit hyperactivity disorder in children in New Zealand: a linkage study. *The Lancet Planetary Health*, 3(5), e226-e234. <https://pubmed.ncbi.nlm.nih.gov/31128768/>
36. Thygesen, M., Engemann, K., Holst, G. J., Hansen, B., Geels, C., Brandt, J., Pederson, C. B., & Dalsgaard, S. (2020). The association between residential green space in childhood and development of attention deficit hyperactivity disorder: a population-based cohort study. *Environmental health perspectives*, 128(12), 127011. <https://pubmed.ncbi.nlm.nih.gov/33351671/>

Glossary

Please see EIN069 for a full glossary

Blue space	Outdoor environments—either natural or manmade—that prominently feature water and are accessible to people, e.g., the collective term for rivers, lakes or the sea.
Causal, causality, causation	When something has an actual effect on something else- and is not simply correlated with it.
Cognitive performance	The mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.
Cohort	Cohort studies are a type of longitudinal study—an approach that follows research participants over a period of time (often many years)
Cross-sectional	A cross-sectional study involves looking at data from a population at one specific point in time.
Developmental disorders	Developmental disorders are impairments in a child's physical, cognitive, language, or behavioural development. They can impact everyday functioning and usually last throughout a person's lifetime.
Green space	Green space refers to land that is partly or completely covered with grass, trees, shrubs, or other vegetation. Green space includes parks, community gardens, and cemeteries.
Gross and fine motor skills	Gross motor skills pertain to skills involving large muscle movements, such as independent sitting, crawling, walking, or running. Fine motor skills involve use of smaller muscles, such as grasping, object manipulation, or drawing.
Longitudinal	A long-term study in which a Cohort is visited at different time points to get a long-term understanding of an effect.
Qualitative	Qualitative data describes qualities or characteristics. It is collected using questionnaires, interviews, or observation, and frequently appears in narrative form. For example, it could be notes taken during a focus group, or responses from an open-ended questionnaire.

Randomised Control Trial	The randomised control trial (RCT) is a trial in which subjects are randomly assigned to one of two groups: one (the experimental group) receiving the intervention that is being tested, and the other (the comparison group or control) receiving an alternative (conventional) treatment.
Scoping review	A review that is less rigorous than a Systematic review or Meta-analysis.
Systematic review	A systematic review is a summary of all of the literature on a particular topic, that meets pre-defined eligibility criteria

About Natural England

Natural England is here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

Further Information

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Citation

This Evidence Note should be cited as:

Seers, H., Mughal, R., and Chatterjee, H. 2022. *How the natural environment can support children and young people: evidence briefing*. EIN067. Natural England.

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Catalogue code: EIN067