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| **Contact with nature in educational settings might help cognitive functioning and promote positive social behaviour** Thirty-nine children (age 18months to 36 months) for four different childcare settings in Italy participated in the study. Each child’s performance was systematically observed over four identified phases of their daily routines: entrance, structured educational activity, free play, post free-play. This research indicates that “*spending time in contact with outdoor nature brings about various positive outcomes to children in terms of cognitive capacities, regulation of affective states and positive social behaviour*.” The researchers conclude from these findings that contact with nature can serve as a buffer to stressors experienced by young children at childcare. Carrus, G., Passiatore, Y. Pirchio, S., Scopelliti, M., (2015). Contact with nature in educational settings might help cognitive functioning and promote positive social behaviour. Psyecology, 6(2), 191-212. |

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| **Children’s environmental education influences parental knowledge and household environmental behaviour**The study results suggest that the environmental knowledge of the participating students was positively influenced by the environmental education provided by attending wildlife clubs; the duration of participation and awareness of related issues. These results are believed to be linked to the practical, hands-on, field-based experiences offered by the wildlife club outside of learning that occurs in school. This study offers valuable quantitative data that support the potential for a causal link from children’s environmental education to the desired environmental behaviour change within their household. Further, “by providing evidence of child to parent transfer of education-dependent knowledge, this study suggests that children can be ‘effective agents’ for the environment” at least within their immediate social structures. Damrell, P., Howe, C., Milner-Gulland, E.J., (2013). Child-orientated environmental education influences adult knowledge and household behaviour. Environmental Research Letters, 8(1), 1-15. |
| **Children find winter play attractive and challenging**Children (age 4-6) in a Norwegian Nature Kindergarten participated in this study which was conducted during the coldest time of the year. Winterscape is generally understood “to be a cold, white or grayish environment, partly or fully covered by snow and ice.” In this study it refers to “an environment for play and growth that children shape, understand and make their own through their activities.” This understanding of winterscape highlights how the environment – rather than being neutral and a backdrop for children’s play – is “always becoming” in response to the children’s activity. This concept is consistent with the idea of “affordances” which refer to possibilities for various activities. Affordances emerge “from a combination of the surroundings and the ways in which the individual child understands its possibilities.”The researchers found that play in/with snow and ice provides opportunities for children to develop knowledge and skills regarding who they are and who they can become. The children found the winterscape attractive and challenging. Jostein Rønning Sanderud, Kirsti Pedersen Gurholt & Vegard Fusche Moe (2019) ‘Winter children’: an ethnographically inspired study of children being-and-becoming well-versed in snow and ice, Sport, Education and Society, DOI: [10.1080/13573322.2019.1678124](https://doi.org/10.1080/13573322.2019.1678124) |

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| **Poverty affects children’s experience of wild places**Research about the health impact of the John Muir Trust Award found that “*1 in 10 participants had never visited a wild place before their award involvement.*” and that “*Those living in the poorest circumstances were over 6 times more likely to have had no previous experience of wild places*.”Mitchell, D. and Shaw, R. (2009) *Health Impacts of the John Muir Award* Glasgow University’s Public Health and Health Policy Unit.  |

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| **A “draw-and-write” technique provides various insights into preschool children’s relationship with nature**Over 200 students from four kindergartens and 13 nursery classes in Kastamonu, a city in Northwest Turkey, participated in this study which found:1. 85.8% of the children used a positive tone in talking about their relationships with nature.
2. 70.8% of the children preferred to draw a natural area as their setting
3. Younger children tended to talk about their relationships with nature in more positive terms than older children.
4. Girls tended to emphasize natural areas more than boys. Girls were also more likely than boys to draw picking fruit as an activity, while boys tended to depict tree climbing as their favourite activity.
5. The children included animals more often than plants in their drawings; and, in many cases, included human figures and “man-made devices” (cars and bikes).
6. Many of the children’s drawings depicted play as an activity performed in nature.

The findings suggest starting environmental education at an early age and enabling children to spend more time engaging with nature are important.Ahi, B., Atasoy, V., (2019). A phenomenographic investigation into preschool children's relationships with nature through drawings. International Research in Geographical and Environmental Education, 28(4), 281-295. [http://dx.doi.org/10.1080/10382046.2019.1649248](%20http%3A/dx.doi.org/10.1080/10382046.2019.1649248)  |

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| **Nature is a buffer of life stress**Nearby levels of nature moderate the impact of stressful life events on the psychological well-being of children. The life stress impact is lower among children with high levels of nearby nature than among those with little nearby nature.Wells, N.M., and Evans, G.W.(2003) Nearby Nature: A Buffer of Life Stress Among Rural Children Environment and Behavior. Vol. 35:3, 311-330 |

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| **Nature experiences during childhood can have long-lasting consequences on attitudes toward and tolerance of wildlife**This research looked at the influence of childhood nature experience on attitudes and tolerance towards problem-causing animals in Singapore with more than 1000 residents. The overall findings indicate that nature experiences during childhood can have long-lasting consequences for attitudes toward and tolerance of wildlife. This research highlights “the importance of childhood nature experience in shaping adult perceptions of wildlife and their willingness to coexist with wildlife.”Ngo, K.M., Hosaka, T., Numata, S., (2019). The influence of childhood nature experience on attitudes and tolerance towards problem-causing animals in Singapore. Urban Forestry & Urban Greening, 41, 150-157. [http://dx.doi.org/10.1016/j.ufug.2019.04.003](%20http%3A/dx.doi.org/10.1016/j.ufug.2019.04.003) |

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| **Greenness of residential neighbourhoods is associated with less problematic behaviour in children**This study examined the association between the greenness of children’s residential area and their neurobehavioral health in South Korea. It looked at levels of anxiety, depression, withdrawal and sleep complaints. It also considered rule-breaking and aggressive behaviours and attention problems. Over 1800 children aged 6-18yrs old were involved in the study. The findings add support to the research-based understanding that greenness in urban neighbourhoods offer numerous benefits for the residents. Lee, M., Kim, S., Ha, M., (2019). Community greenness and neurobehavioral health in children and adolescents. Science of the Total Environment, 672, 381-388. [http://dx.doi.org/10.1016/j.scitotenv.2019.03.454](%20http%3A/dx.doi.org/10.1016/j.scitotenv.2019.03.454) |

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| **Children’s involvement in outdoor play increases when they can easily access a variety of natural and other types of open-ended materials**This research indicates that “children are strongly attracted to and prefer playing with loose parts and moveable materials” in an outdoor play space. This research also indicates that easy access to a variety of play materials that can be used simultaneously in a preschool outdoor environment “can intensify children’s involvement in their play activities.”   Storli, R., Sandseter, E.B.H., Sando, O.J., (2020). Children’s involvement in free play and the use of play materials in the outdoor early childhood education and care environment. Children, Youth and Environments, 30(1), 66-82. |

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| **Access to neighbourhood parks and green space is linked to higher activity levels in children in Norway**This study analysed data from 23000 children. Results showed that: 1. Children with access to a park in their neighbourhood were more physically active during the summer than those without access to a park.
2. Children who lived in neighbourhoods with more green space were more physically active during the winter than children who lived in neighbourhoods with less green space.
3. Children living in more densely populated areas and with access to facilities such as playgrounds/ sports fields and schools participated more in organized activities and socialised more with friends than children in other neighbourhoods.

Nordbo, E.C.A., Raanaas, R.K., Nordh, H., Aamodt, G., (2019). Neighborhood green spaces, facilities and population density as predictors of activity participation among 8-year-olds: A cross-sectional GIS study based on the Norwegian mother and child cohort study. BMC Public Health, 19 [http://dx.doi.org/10.1186/s12889-019-7795-9](%20http%3A/dx.doi.org/10.1186/s12889-019-7795-9) |

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| **Physical coordination is affected by landscape**Two groups of pre-school children attending the same nursery were studied during a 9-month period. One group had daily access to natural landscape for at least 2 hours, the other group only occasional access. Significant differences were found in balance skills, coordination and agility. The researchers concluded, “*Nature affords possibilities and challenges for the children to explore their own abilities. The children feel more comfortable being in the natural environment and their knowledge about nature increases*.” Fjørtoft, I. & Sageie, J.(2001) *'The Natural Environment as a Playground for Children: The Impact of Outdoor Play Activities in Pre-Primary School Children'*, Early Childhood Education Journal 29(2): 111-117. |

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| **Children are significantly less physically active during preschool/childcare hours than outside care hours**The study involved 71 childcare centres, 65 preschools, and 1002 preschool children. Accelerometers worn by the children measured the frequency, intensity, and duration of their physical activity. Both boys and girls spent a significantly lower percentage of time being physically active during care hours than outside of care hours. The number of spaces with natural ground covering was important for boys’ physical activity. Hinkley, T., Salmon, J., Crawford, D., Okely, A.D., Hesketh, K.D., (2016). *Preschool and childcare center characteristics associated with children’s physical activity during care hours: An observational study.* International Journal of Behavioral Nutrition and Physical Activity, 13(117) |

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| **Early parenting practices, mothers’ physical activity level and screen time use predict level of outdoor play and screen-time in 2- to 5-year-olds**This longitudinal study took place in Sydney, Australia from 2007 to 2013. Early childhood years represent a critical time for establishing physical activity and sedentary behaviour patterns. 667 pregnant women participated.Findings indicated that mothers’ screen-time during pregnancy and children’s daily screen-time at age 1 predicted children’s daily screen-time across ages 2 to 5. The mother’s physical activity level, a baseline understanding of the importance of playing with her child, and practicing tummy time daily predicted children’s outdoor playtime across ages 2 to 5.These findings indicate that mothers played an important role in their children’s outdoor play and screen-time in the first years of life, and that children’s early exposure to screen devices could be associated with their later screen-time.Xu, H., Wen, L.M., Hardy, L.L., Rissel, C., (2016). *A 5-year longitudinal analysis of modifiable predictors for outdoor play and screen-time of 2- to 5-year-olds.* International Journal of Behavioral Nutrition and Physical Activity, 13(96) |

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| **‘Doses of nature’ for children with Attention Deficit Hyperactivity Disorder (ADHD)**Children with ADHD demonstrated improved concentration when completing a task, after a 20-minute walk in a city park. The difference was comparable to what is achieved with standard ADHD medication. "Doses of nature" might serve as a safe, inexpensive, widely accessible new tool in the tool kit for managing ADHD symptoms.Faber Taylor, A. and Frances E. Kuo, F.E., (2009) *Children with Attention Deficits Concentrate Better After Walk in the Park Journal of Attention Disorders*, Mar 2009; vol. 12: pp. 402 – 409 |

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| **The health benefits of the great outdoors**Greenspace exposure is associated with numerous health benefits in intervention and observational studies. This meta-analysis found that there were decreases in stress, heart rate, blood pressure, cholesterol, diabetes, hyper-tension and coronary heart disease. The findings should support practitioners and policymakers to give due regard to how they can create, maintain, and improve existing accessible greenspaces in deprived areas and develop strategies and interventions for the utilisation of such greenspaces by those who stand to benefit the most.Twohig-Bennett, C., Jones, A., (2018). *The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and healthy outcomes*. Environmental Research, 166, 628-637. |

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| **The impact of outdoor learning cannot be assumed. It depends on the activities undertaken and how they are facilitated**The delivery of outdoor learning, the aims and focus of the experience make a noticeable difference to what is learned. “*Simply ‘being outdoors’ is not sufficient for young people to express an ethic of care for nature or develop an understanding of natural processes. These things seem to be learned when they are an explicit aim of experiential activities and when they are mediated in appropriate ways.” (Key finding 14).*Nicol, R., Higgins, P., Ross, H. and Mannion, G. (2007) *Outdoor education in Scotland: a summary of recent research* Scottish Natural Heritage, Further research section. |

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| **New perspectives**New insights into innate skills and learning styles of children. Murray & O’Brien (2006) found that Forest School provide a basis for staff to gain different perspectives of the children they work with. The Forest School enables both children and staff to see each other in a different environment whilst, at times, facing similar challenges, such as bad weather. Staff are able to build a picture of the whole child and see how the outdoors can support their educational needs without sole emphasis placed on academic development.*(Forest Kindergarten Pilot, Psychological Services Evaluation Report. North Lanarkshire Council. (2011)* |

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| **Time in ‘wild’ nature matters**“Domesticated” nature activities such as picking flowers or planting seeds while having a significant, positive effect, did not have as great an influence as that of “wild” nature on environmental attitudes and had only a marginal effect on environmental behaviours.Wells, N. M., & Lekies, K. S. (2006). *Nature and the life course: pathways from childhood nature experiences to adult environmentalism*. Children, youth and environments, 16(1), 1-24. |

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| **Natural settings help children focus and enhance cognitive abilities**Proximity to, views of, and daily exposure to natural settings increases children’s ability to focus and enhances their cognitive abilities. Wells, N.M. (2000) *At Home with Nature: Effects of 'Greenness' on Children's Cognitive Functioning* Environment and Behavior. Vol. 32, No. 6, 775-795. |

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| **The ripple effect**Families go into woodlands more and view risk taking differently. Nursery staff gain new skills which inform and changes nursery practice. Murray & O’Brien (2006) highlight the impact of forest school spreads far beyond the children who attend. There are also ‘ripple effects’ throughout the family, the wider community and the child’s school. Many parents have noted that their child’s enthusiasm for forest school means that they bring that experience home. This can result in changes to hobbies, interests and behaviour, with parents supporting their child’s interest in the outdoors at home.*(Forest Kindergarten Pilot, Psychological Services Evaluation Report. North Lanarkshire Council. (2011)* |

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| **Child who free play in wild natural environments are more likely to have pro-environmental behaviours and attitudes as adults**When children become truly engaged with the natural world at a young age, the experience is likely to stay with them in a powerful way shaping their subsequent environmental path. People who have had frequent childhood experiences in natural spaces are more likely to visit such places as adults.Ward Thompson, C., Aspinall, P., & Montarzino, A. (2008) *The childhood factor - Adult visits to green places and the significance of childhood experience* Environment and Behaviour, 40(1), 111-143. |

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| **Vegetation diversity protects against childhood asthma**The researchers assessed the association between the natural environment and asthma in 49,956 New Zealand children born in 1998 and followed up until 2016. Children who lived in greener areas were less likely to be asthmatic.Donovan, Geofrey H., Gatziolis, D., Longley, I., Douwes, J. (2018). *Vegetation diversity protects against childhood asthma: results from a large New Zealand birth cohort*. Nature Plants. 4(6): 358-364. https://doi.org/10.1038/s41477-018-0151-8.  |

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| **Green areas and Attention Deficit Disorder (ADD)** Results from a study of children with ADD indicate that children function better than usual after activities in green settings. The “greener” a child’s play area, the less severe his or her attention deficit symptoms. Taylor, Andrea Faber; Frances E. Kuo; and William C. Sullivan, (2001) *Coping with ADD: The Surprising Connection to Green Play Settings* Environment and Behavior, Vol. 33, No. 1, January 2001 |

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| **Could nature help children rise out of poverty?** The authors explore some possible explanations for how greenness might promote social mobility through related research to this study:1. There is a positive association between greenspace exposure and academic achievement.
2. Children with limited exposure to nature are more vulnerable to illness and prone to behavioural challenges, conditions placing them at greater risk for academic difficulties.
3. Exposure to greenness can promote cognitive functioning which plays an important role in academic success.
4. Multiple studies provide evidence of a link between exposure to greenness and creative performance.
5. The development of emotional intelligence including such skills and traits as self-regulation, self-awareness, empathy, social skills, and intrinsic motivation.

While this study found only a weak association between greenness and children’s social mobility, mounting evidence supports increasing the provision of green space in children’s neighbourhood environments as a way of improving their chances of a physically, emotionally, socially, and economically healthy future.Browning. M.H.E.M., Rigolon, A., (2019). Could nature help children rise out of poverty? Green space and future earnings from a cohort in ten U.S. cities. Environmental Research [http://dx.doi.org/10.1016/j.envres.2019.04.016](%20http%3A/dx.doi.org/10.1016/j.envres.2019.04.016) |

**Colour coding:**

* Green – environmental understanding, behaviours and actions. Developing a positive connection to, or relationship with, nature.
* Purple – physical health, activity and development
* Yellow – mental and spiritual health and development
* Orange – social impact, poverty
* Blue - General