

Nature Deficit Disorder: what do four-year olds think about nature?

“Nature Deficit Disorder(NDD) is the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses” (Louv, 2006: 35).

Introduction

This study investigated Nature Deficit Disorder, and the ways in which four-year olds perceive ‘Nature’. The study considered how ‘Nature’ is constructed around children, investigating why a child might be denied or deficient in their access to ‘Nature’. The reference to a ‘Disorder’- which might be interpreted as a medical condition - was scrutinised. The study employed the mixed methodological approach to research using ‘The Mosaic Approach’ involving children and adults. Data was collected through focus groups and questionnaires.

Context of the study and brief literature review

Nature Deficit Disorder (NDD), is not a medical diagnosis, but a colloquialism constructed by protagonist Richard Louv, a passionate advocate of the benefits gained from immersion in ‘Nature’, and consequently the potential disadvantages linked to a disconnection from nature (Louv, 2006, 2010, 2012). Louv vehemently campaigned about the detrimental consequences about children detachment with nature and the possible impact may has on children’s mental and physical health (Louv,2010: 26). Margaret McMillan (1919), a pioneer of the nursery school movement and early childhood education was a great advocate of children’s immersion in nature. Her pedagogical approach endorsed sustained bare foot play in flooding sunlight to ward off anaemia and rickets, also inspiring a gayness of mood. This was combined with the growing and consumption of fresh vegetables to support good health and nutrition and stave off obesity and malnutrition. She stated:

‘The restless hands of toddlers should be occupied with access to open green spaces, trees to climb, ponds to wade in and wildlife to chase, in harmony with Nature’s own scheme, gay as the butterflies or the blossoms that greet the sun” (McMillan, 1919:32).

The EYFS (DfE, 2017) suggests a unique child learns by leading their own play and exploration under the guidance of an adult, labelling effective characteristics of learning as:

‘Playing and exploring, active learning and creating and thinking critically’ (DfE, 2017: 10).

This ethos of exploration is reinforced by the Ofsted in their promotion of Cultural Capital in the 2019 Early years inspection framework. The report issued in 2019 stated that:

‘Cultural capital is the essential knowledge that children need to prepare them for their future success... settings must help children experience the awe and wonder of the world in which they live’ (Ofsted, 2019: 31).

The global importance of environmental education was emphasised and supported by development of UNESCO’s Belgrade Charter (1975) which demanded a global definition regarding environmental education. This was embedded in the Tbilisi Declaration (1977) which outlined the intentions of delivering the programme worldwide, endorsing environmental education, through the implementation of criteria such as environmental

knowledge, conservation skills and awareness, participation in eco-friendly projects promoting immersion in and understanding of global dilemmas (McComas, 2002: 667).

Louv's (2009) theory of nature Deficit Disorder suggested that society and cultural attitudes, poor urban/suburban design and institutions were unconsciously criminalising nature play; this was in consensus with the Children and Nature Network. It was suggested that parents restricted their children's unsupervised outdoor play based on what could be considered epistemological fears for their safety, relating to crime, drugs, abduction, increased traffic and sexual predators (Louv, 2006; Charles and Wheeler, 2012). Furthermore, Bandura's Social Learning Theory (1965) supports Louv's reference to social and cultural attitudes, suggesting that children learn through imitation, their interactions with 'Nature' are dependent upon how they have observed others interacting. If a child is bombarded with negativity (*don't climb/run or you will fall-/strangers are dangerous/the sun will burn your skin*) an environment of fear and anguish is perpetuated, particularly in relation to the great outdoors potentially leading to sedentary, risk averse children (RAND, 2019). Consequently, parents and practitioners must consider this 'duality of structure within society' and the contradictory messages they transmit to children (Giddens, 1979).

Louv (2006) infers that such a risk averse society might result in a 'Nature Deficiency Disorder' or an associated condition such as Obesity, Attention Deficit Disorder (ADHD) and/or Child and Adolescent Mental Health Issues (NHS, 2018; RAND, 2019).

Medical Considerations

The 21st century has seen a 'global childhood obesity epidemic'; in 2019, 41 million 0-5yr olds were declared clinically obese. Multiple factors have contributed to the epidemic, but an increase in sedentary lifestyles linked to a lack of outdoor play has been identified as one of the main factors (NHS, 2018; WHO, 2019; RAND, 2019). Legg (2018) for example identified that since 2012 there has been a 42% increase in children diagnosed with ADHD and the prevalence of child mental health issues are increasing globally. Legg further stated that there were a 66% increase in preschool children diagnosed with a mental health disorder. Paediatrician Dr Diller (2019) advised that a child displaying symptoms of ADHD can benefit from experience in 'nature', running, climbing, jumping free from external stimuli, but frequently these children are administered with psychotropic medications such as Ritalin to 'aid concentration'. Ritalin, although approved for paediatric use, has multiple side effects such as heart palpitations, insomnia, weight loss, weight gain, rebound hyperactivity and irritability between doses, the list is extensive. Longitudinal neurological studies of children with ADHD, indicated that impulsivity and hyperactive behaviours evident in children with ADHD, were largely responsive to excessive external stimuli such as sustained exposure to nature (Kuo and Taylor, 2004, 2009).

Louv (2006) hypothesises that there are significant correlations between the rise in NDD and ADHD, and correspondingly a reduction in the effects of ADHD following immersion in nature.

Methodology

The research pertaining to NDD requires a method supportive of data collection from a variety of children's social experiences and ecological systems. Accordingly, the mixed methodological paradigm was employed using 'The Mosaic Approach', introduced by Clark and Moss (2001). Clark defined this approach as '*a multi-method, polyvocal approach*,

bringing together different perspectives in order to create ‘with children’ an image of their worlds’ (Clark 2017:17). The application of an interpretivist research paradigm enabled the comprehensive investigation of profound quandaries such as ‘how do four-year-olds formulate their opinions’ (Bell:2010), and new phenomenon such as Louv’s proposed ‘Nature Deficit Disorder’ (Louv, 2006: 36).

Mixed methodological research was used to address the magnitude of potential correlations connecting several variables, such as the opinions of children, parents, practitioners, and the education system (Mukherji and Albon, 2015). Identification of common themes in such variables facilitated the development of legitimate strategies to cross reference and unify the data, reinforcing a holistic approach to concepts such as immersion in nature (Punch, 2007; Verschuren, 2011).

This research involved two child focus groups interview which were carried out within a pre-school setting, each consisting of five four-year old children. A questionnaire was read to them in the form of a relaxed interview (Morgan: 1998). The adult participants, comprising of the children’s parents and practitioners, were given the questionnaires to complete independently, which consisted of the following nine nature related questions. Data was analysed using these question. The analysis included both data collected from children and adults.

What is nature?

Both groups, children and adults, identified animals as an important part of nature, however the children were more detailed in their identification specifically identifying bees, butterflies, birds, and worms. This could be linked directly to their participation in a local ‘BUTTERFLY CONSERVATION PROJECT’. This reflects the EYFS curriculum in particular ‘Understanding the World’:

‘Understanding the world involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment’ (DfE, 2017: 23).

The data collected demonstrated that the children predominantly equate their definition of nature as relative to animals in their immediate environment. There were subtle anomalies such as Monkeys and the Duck Billed Platypus, these references were validated with trips to Zoos and the children’s book ‘Monkey and Me!’ (Gravett, 2007). Furthermore, the children specifically mentioned Koalas and Kangaroos; ‘Bush Fires’ were ravishing Australia throughout the data collection period, subsequently becoming a topical focus for discussion. The children’s knowledge of current affairs was reflective of Ofsted’s Cultural Capital requirements that *‘Children experience the awe and wonder of the world in which they live’ (Ofsted, 2019).*

The adult participants portrayed a broader view, valuing animals, the environment, and the elements equally, whilst holistically equating nature with life processes, time, evolution, elements, and emotions stating:

'Nature is the sun rising to wake us, food we eat to sustain us, the joy we feel looking at beautiful flowers, the feeling of sand between our toes, the refreshing water we drink and the silent darkness that helps us sleep!' (Adult).

Where is nature?

During the interviews, the children discussed whether nature could be inside. This culminated with one child observing that there were spiders and flies inside; the group conceded this, consequently agreeing that nature could be found both inside and out. Another child observed, that if you looked through the window you could see nature but you were still inside, this is an excellent example of the development of personal, social and emotional skills; explaining knowledge and understanding, listening to others, and compromising (Early Education, 2012).

The children discussed 'African' animals such as lions and hippopotamuses, connecting them to the 'Lion King', and the Amazon Rainforest; some shared stories of travels to Brazil, Australia, and Canada, demonstrating an extensive wealth of knowledge and experience. This was potentially reflective of, and respondent to the socio-economic opportunities presented to them, which suggests access to extensive cultural capital (Bourdieu cited in Huang, 2019).

Who uses nature?

Independently, the children quantified their answers explaining that; sheep and llamas made wool for jumpers, cows eat grass to make milk, bees collect pollen to make honey and children can ride horses (this discussion evolved debating whether chickens ate eggs or not). The ethnographical relevance of the sample group is highly relevant, with some of them living on or near working farms, potentially possessing experiential rural knowledge that a comparable urban cohort may not. The adults substantiated this rural viewpoint stating;

'We use nature for everything in the countryside, for industry, work, play, survival and enjoyment' (Adult).

The children demonstrated their understanding of global habitats such as scorpions in the desert, bats in caves, sharks in the ocean and Blue Footed Boobies in the Galapagos Islands. When asked how they knew this, they referenced watching television and 'YouTube' on their I-pads. Louv suggests that the accelerated use of technology to access '*secondary bi-sensory*' experiences (sound and sight) in place of primary experiential learning, is contributing to the depersonalisation of childhood: resulting in a sensual atrophy he terms '*cultural autism*' which in turn proliferates the impact of Nature Deficit Disorder (Louv, 2010:26).

Why do we need nature?

This question offered comparable responses from both groups believing we need nature and the sun to grow food, for plants and animals. The adults used positive, emotive language to verbalise their connection with nature as a means of; thriving, surviving, connecting, grounding, breathing, relaxing, experiencing joy and regulating mental health describing nature as '*the essence of life*' (Adult). Accordingly, 38 % of the adults identified needing nature for 'survival' and 18% to bolster their mental health, intimating that nature is significant for self-preservation, a view supported by RAND (2019).

How do we use nature?

The definition of nature is multifaceted consequently generating a multiplexity of responses, with correlations between the groups citing food production, recreation and building as relevant uses of nature. The adults additionally listed gardening, tourism, relaxation, raising livestock, industry, beauty, medicine, feeling happy and healthy and holidays as uses of nature. This question generated some negative responses from both groups;

'If Donald Trump chops down all the trees, it makes Australia on fire and the koalas will die' (Child).

The children theorised that Donald Trump, the current president of the USA, was directly responsible for the bush fires in Australia; it might be assumed that this opinion was devised from overheard conversations in their social groups.

The sample group reside in an area of outstanding beauty, a National Park, consequently conservation is high priority and emotive topics such as global warming generates much local interest (Haynes, 2020). This collective feeling might sway opinion towards a more ecologically culpable ethos, demonstrated by the following adult statement;

'It's hard to think of an area of unadulterated nature that hasn't been adapted for our own human gain...we use it and abuse it!' (Adult).

Is nature safe or dangerous?

(This might be considered a leading question, on reflection the binary choice of answers presented and the influential reference to danger must be considered.)

The children identified that 95% of all 'nature,' as dangerous but upon further analysis it became apparent that these were the opinions of the adults in their lives. The children identified sticks, muddy puddles and running as dangerous but simultaneously disputed their classification, protesting that it was the 'grown ups' that said they could not play with sticks or jump in puddles, remonstrating;

'We want to play swords and guns with sticks but were not allowed...we want to go outside in the rain and jump in muddy puddles, but were not allowed...I want to run superfast but we not 'lowed' to run inside 'cos' it's dangerous and we not 'lowed' run outside 'cos it's slippy', but I'm superman and superman runs!' (Child).

During the data collection process both groups referred to extensive flooding in their 'local environment'; which lead to some restrictions on play, this clearly infuriated the children protesting that:

'We're not allowed to go outside because of the stinky, slippery mud, and the garden was all flooded' (Child).

However, the adults recognised this as the wider implications of countrywide flooding, referencing global warming and climate change stating:

'With the huge power of the planet natural disasters occur often, the balance of Nature is fragile and can be threatened...we must work in conjunction with it and learn from it, to make it safer ...we don't respect or planet and now we have 'Global Warming' (Adult).

One must consider why some adults enforce such restrictive boundaries on perceived risks when the pioneers of Early Education, such as the McMillan sisters endorsed risky play; it might be suggested that this is responsive to the fear of litigation (Gill, 2005, 2007; Hillman et al 1992).

The children identified 95% of everything classified as 'nature' as dangerous, similarly the adults identified 78.5%. Some children warned that all berries are poisonous, provoking a heated discussion culminating in agreement that wild berries were poisonous, but shop berries were ok. They then listed 'dangerous' plants in the garden, such as nettles, thistles and brambles identifying 33% of plants as dangerous, whilst only 3% of adults identified the same threats, which might suggest that this fear was a projection instilled in the children as a precautionary measure by those responsible for their welfare (Gill, 2005, 2007; Hillman et al 1992).

The adults identified 78.5% of 'Nature' as dangerous, specifically 56% natural disasters, in concurrence 22% of the children agreed, supporting social learning theory as significant in relation to the formulation of children's opinions (Bandura, 1965).

When do we use nature?

The children interpreted the question to mean 'when can you play outside?', it's clear from their answers that they consider their access to 'nature/outside' as something that is out of their control, dependent on weather, time, and adult permission. This supports Louv's theory that children have minimal free access to nature compared to their forebearers (Louv, 2006).

At this juncture the adults became more emotive in their responses, expressing passionate opinions such as;

'Nature governs who we are and how we feel, our very existence, we would spend all day every day fully immersed in nature if we could' (Adult).

This quote supports the suggestion that immersion in nature is beneficial to mental health and that conversely a disconnection may be detrimental to mental health (Legg, 2018; RAND, 2019).

Do you spend enough time in Nature?

This question demonstrated the greatest equivalence between both groups, with 82% of the children and 75% of the adults stating that they did not spend enough time in nature. Several of them longing to increase their immersion in nature, whilst regretting that the constraints of work-life balance did not allow this, highlighting this as the catalyst for their relocation to the countryside;

'Living in the countryside we are blessed, but perhaps not appreciating it or even realising the importance of it, it's an incredible life balance which we embrace!' (Adult).

The adult response to this question demonstrates the personal power to regulate their engagement with nature, conversely the children appeared to feel restricted in their access, protesting:

'We want to play outside all day, inside is boring, we want to go out in the rain and jump in muddy puddles and big school has forest school; they have mud slides and campfires'(Child).

The unrequited desire to 'play' outside all day, infers that the children perceive the adults in their lives as enforcers of unreasonable sanctions oppressing their freedom of choice. Several children mention 'Forest School' which is extremely popular in the locality, but the sessions are semi-structured, adult led and not representative of free play and exploration in a natural environment.

Anything else?

The child interviews ended in a barrage of explosive statements and laughter with the children wishing to add the following;

'Peppa pig likes muddy puddles... I have new wellies... fairies live in the forest with the unicorns, but NOT dragons, well sometimes dragons...Cat-boy would get the dragons and chase them away...and superman would catch the fairies and squash them...and batman will eat them! (Child).

The adults concluded with several philosophical statements, such as ;

'Nature is wonderment and despairing power at the same time, incredibly it gives life, joy and vitality and yet can take it so cruelly, it is beyond human control indiscriminate of time and humanity!...We love nature... it is everywhere, you just need to open your eyes and enjoy it!'(Adult).

Conclusion

Society presents a dichotomy of beliefs in relation to nature, celebrating the extensive benefits to health whilst simultaneously catastrophising the magnitude of potential 'dangers' awaiting the naivety of childhood. The perceived threat of criminal behaviour or abuse towards children hypothetically leads to increased 'protected' indoor play and screen time, consequently compounding associated sedentary health complications, whilst the fear of a litigious society dictates excessive risk assessment for most outdoor activities subsequently limiting access to 'risky play'. Children learn by example, exploration and investigation, if they are not allowed the freedom to do so, society will continue to experience an increase in conditions which are potentially linked to 'Nature Deficit Disorder'.

The potential repercussions on mental health, during and after the COVID 19 global pandemic lockdowns are catastrophic, and the tsunami of behaviour and emotional difficulties that children will experience 'when' schools re-open fully is immeasurable. The concerns and theories pertaining to NDD will pale from existence in the shadow of Coronavirus, but the plethora of research already in existence may be a beneficial drop in the ocean of recovery that humanity must sail.

Jinny Sykes

BA Hons, Early Childhood.

References

- Bandura, A. (1965) *Influence of models' reinforcement contingencies on the acquisition of imitative responses*. *Journal of personality and social psychology*, 1(6), 556-589
- Bell, J. (2010) *Doing Your Research Project, A guide for first-time researchers in health, education and social science: The Analysis of Documentary Evidence*. Berkshire: Open University Press
- Charles, C. & Louv, R. (2009) *Children's nature deficit: What we know – and don't know*; Children and Nature Network, September, 1-32. [Available online] <http://www.childrenandnature.org/research-library/pdf> (Accessed Online 03/03/20)
- Charles, C. and Wheeler, K. (2012) *Children & Nature Worldwide: An Exploration of Children's Experiences of the Outdoors and Nature with Associated Risks and Benefits/Children and Nature Network (2012): pp27-30* [Available online] <http://www.childrenandnature.org/downloads/CECCNNWorldwideResearch.pdf>. (Accessed online 11/01/20)
- Clark, A. and Moss, P. (2011) *Listening to Young Children: The Mosaic Approach*. London: NCB and JRF
- Department for Education (DfE) (2014) *National Curriculum Statutory Guidance; National curriculum in England: English programmes of study* [Available Online] <https://www.gov.uk/government/publications/national-curriculum-in-england-english-programmes-of-study/national-curriculum-in-england-english-programmes-of-study#lower-key-stage-2--years-3-and-4> (Accessed online 08/04/20)
- Department for Education (DfE) (2017) *The Early Years Foundation Stage Statutory Framework (EYFS)* [Available online] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/596629/EYFS_STATUTORY_FRAMEWORK_2017.pdf (Accessed online 23.01.20)
- Diller, L. (2019) *The What, When and How of taking Ritalin*; Frontline [Available Online] <https://www.pbs.org/wgbh/pages/frontline/shows/medicating/drugs/diller.html> (Accessed online 2/2/20)
- Early Education (2012) *Development Matters in the Early Years Foundation Stage* [Available online] <https://foundationyears.org.uk/files/2012/03/Development-Matters-FINAL-PRINT-AMENDED.pdf> (Accessed online 11.04.20)
- Faber Taylor, A. & Kuo, F. E. (2006) *Is Contact with Nature Important for Healthy Child Development?: State of the evidence*. In C. Spencer & M. Blades, (Eds.), *Children and their environments* pp. 124-140 Cambridge: Cambridge University Press
- Faber Taylor, A. & Kuo, F. E. (2011) *Could Exposure to Everyday Green Spaces Help Treat ADHD? : Evidence from children's play settings*. *Journal of Applied Psychology: Health and Well-Being*. 3(3), 281-303.
- Giddens, A. (1979) *Central Problems in Social Learning Theory*. London: Macmillan
- Gill, T. (2005) *Let our Children Roam Free*: Ecologist Online, September [Available online] http://mail.actionpa.org/pipermail/paee_actionpa.org/attachments/20070907/3cb42a73/attachment-0001.doc (Accessed online 03/03/20)

- Gill, T. (2007) *No Fear: Growing up in a risk averse society*. London: Calouste
- Hillman, M. & Adams, J. G. U. (1992) Children's Freedom and Safety. *Journal of Environmental Educational*. 9(2),12-33 . [Available online] <http://www.colorado.edu/journals/cye/>. (Accessed online 09.02.20)
- Huang, X.(2019) *Understanding Bourdieu - Cultural Capital and Habitus*. *Review of European Studies*. 11. 45-48 [Available online] <https://www.researchgate.net/publication/335024564/Understanding-Bourdieu-Cultural-Capital-and-Habitus> (Accessed online10/04/20)
- Kuo, F. E. & Faber Taylor, A. (2004) A Potential Natural Treatment for Attention Deficit Hyperactivity Disorder: Evidence from a national study. *American Journal of Public Health*. 94(9), 1580-1586.
- Legg, T. J. (2018) *ADHD The Numbers: Facts, Statistics and You* [Available online] <https://www.healthline.com/health/adhd/facts-statistics-infographic> (Accessed online 10/01/20)
- Louv, R. (2006) *Last child in the woods: Saving our Children from Nature Deficit Disorder*. Chapel Hill: Algonquin Books.
- Louv, R. (2010) Do our Children have Nature Deficit Disorder?: Education Leadership pp24-31 [Available online] http://www.ascd.org/publications/educational_leadership/dec09/vol67/num04/Do_Our_Kids_Have_Nature-Deficit_Disorder.aspx (Accessed online 01.05.20)
- Louv, R. (2012) *The Nature Principle: Reconnecting with Life in a Virtual Age* Chapel Hill, NC: Algonquin Books
- McComas, W. F. (2002) The ideal environmental science curriculum: I. History, rationales, misconceptions & standards. *The American Biology Teacher*. 64(9), 665-672.
- McMillan, M. (1919) *The Nursery School* London: J.M. Dent and Sons Ltd
- Morgan, D.L. (1998) *The Focus Group Guidebook: Why should you use focus groups?* London: Sage
- Morgan, D.L. (2007) *Journal of Mixed Methods Research* 1(1): Paradigms Lost and Pragmatism Regained: Methodological Implications of Combining Qualitative and Quantitative Methods: pp49 [Available Online] <https://www.researchgate.net/publication/240730449Paradigms-Lost-and-Pragmatism-Regained-Methodological-Implications-of-Combining-Qualitative-and-Quantitative-Methods> (Accessed Online 23/02/20)
- Mukherji, P. and Albon, D. (2015) *Research Methods in Early Childhood: An Introductory Guide*. London: Sage
- Mukherji, P. and Albon, D. (2018) *Research Methods in Early Childhood: Planning your research study*. London: Sage
- National Health Service United Kingdom (NHS UK (2018) Attention Deficit Hyperactivity Disorder Comorbidities 2018 [available online] <https://digital.nhs.uk/data-and-information/publications/statistical/mental-health-of-children-and-young-people-in-great-britain/mental-h> (Accessed online 12.12.19)

Office for standards in education, children's services and skills(Ofsted)(2019) Early Years Inspection Handbook; Cultural Capital, [Available online] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/828465/Early_years_inspection_handbook.pdf (Accessed online 30.04.20)

Punch, K.F. (2007) *Introduction to Social Research*. London: Sage

RAND Europe (2019) A scoping study into the link between exposure to and our interactions with the natural environment and the mental health outcomes pp23-27 Cambridge: RAND Publications

United Nations Educational, Scientific and Cultural Organisation(UNESCO) (1975) *The Belgrade Charter* pp1-4 [Available online] https://www.activeremedy.org/wp-content/uploads/2014/10/unesco_1975_the_belgrade_charter.pdf (Accessed online 30.04.20)

Verschuren, P. (2011) *Why Methodology for Practice-orientated Research is a Necessary Heresy*; Generic models for problem solving. Hague: Eleven International Publishing

World Health Organisation (2019) *Facts and Figures on Childhood Obesity* [Available Online] <https://www.who.int/end-childhood-obesity/facts/en/> (Accessed online 02/02/20)