

# Connection to Nature: evidence briefing

## Purpose of briefing

This briefing note is one of a series that summarises evidence of the relationships between the natural environment and a range of outcomes. This briefing focuses on the concept 'Connection to Nature'. The notes are aimed at: policy makers, practitioners, practice enablers (including Natural England, Natural Resources Wales etc.), local decision makers, and the wider research community. They highlight some of the implications for future policy, service delivery and research. It is intended they will inform practitioner planning, targeting and rationales, but not the identification of solutions or design of interventions. Barriers to access or use are not considered in these notes. The other briefings in the series published so far cover physical activity, obesity, physiological health, learning, and mental health. The notes consider evidence of relevance to the UK and outcomes for both adults and children. Please see [EIN016](#) for methodology, glossary and evaluation resources.

## Extent of the issue

- There is concern that significant proportions of the population (particularly children and young people) are 'disconnected' (whether physically, spiritually or emotionally) from the natural world.
- This disconnection from nature is argued to be detrimental to health and wellbeing.
- It is thought the types of factors which influence 'disconnection from nature' range from increasing urbanisation and a "*loss of respect, humility, and empathy with nature*" to the relative attractions of "*indoor sedentary entertainment*" [1].
- In response agencies and bodies such as Natural England and the US Fish and Wildlife Service, and many non-governmental organisations including the Wildlife Trusts, The National Trust and the RSPB, have developed

a variety of programmes to support and improve people's emotional or cognitive connection to nature.

## Summary statement

Connection to nature is one of a set of constructs<sup>1</sup> which refer to an individual's subjective sense of their relationship with the natural world. There is emerging evidence that connection to nature is associated with certain wellbeing, educational outcomes and pro-environmental behaviours. A variety of factors may have a role in the development of connection to nature including contact with the natural world, childhood experience, certain interventions, and socio-cultural status. Connection to nature may be an important influence on other environmental behaviours, practices and beliefs. Currently the evidence base is small (this is likely due to the relatively recent interest in assessing and understanding connection to

# Natural England Access to Evidence Information Note EIN015

## Connection to Nature: evidence briefing

nature) and much of the existing research is drawn from the types of studies which cannot reveal direction of effect and causality. The evidence is further limited by the lack of adjustment for potential cofounders, lack of consideration of longer term outcomes, and use of atypical sample populations. These factors limit our current understanding of connection to nature and definite conclusions cannot be drawn. Further robust research is needed to inform potential delivery and intervention options.



© Natural England

### Review of the evidence

#### What is connection to nature?

Connection to nature (CTN hereafter) is one of a set of constructs which refer to an individual's subjective sense of their relationship with the natural world [2]. CTN relates to a person's sense of their interconnectedness with nature or their sense of inclusion in nature. It is hypothesised that CTN may mediate health and wellbeing gains from exposure to or use of the natural environment, and may play a role in pro-environmental attitudes and behaviours. The research literature refers to the concept of CTN as both a *trait*, in that stable differences between individuals and groups of people can be observed, but also as a *state*, reflecting the point that it is thought to vary in the short term according to exposures, experiences or contexts [2, 3].

#### Assessing connection to nature

There are several ways in which researchers go about assessing CTN and associated constructs, some have used qualitative approaches [4] and others have applied one of several quantitative tools [1, 3, 5-12]. The different quantitative tools typically use self-report and aim to measure different aspects of CTN (see [3 and 5] for more details). There are ongoing efforts to establish the reliability and validity of the quantitative tools<sup>2</sup> [13].

#### What factors influence connection to nature?

How CTN develops or is maintained is not yet well understood. It is hypothesised that contact with or exposure to the natural world, childhood experience, and socio-cultural factors may be important. Intentional (rather than passive) interactions with nature are also argued to be important [14, 15]. Existing evidence, while generally positive, is drawn from studies which tend to be small scale, unadjusted for potential confounders, and undertaken in populations with potential for bias.

- One study found that the amount of time people spent outdoors was a predictor of levels of CTN [16] however other studies have found no relationship [1, 8].
- Research from Australia found that local environmental type or state had little association with residents' levels of CTN. However domestic yards and gardens, and demographic factors such as neighbourhood and general activity levels did have a moderately positive association with both wellbeing and CTN [17].
- Efforts to increase CTN through structured programmes or deliberate exposure to nature have mixed results [14]. One set of studies found that exposure to nature was associated with increased CTN (only assessed in the short term), with the greatest effects seen following exposure to *actual* nature compared to *virtual* nature [18]. A second set of studies

# Natural England Access to Evidence Information Note EIN015

## Connection to Nature: evidence briefing

found mixed evidence (results depended on the scale used and again only assessed in the short term) as to whether structured environmental programmes for children led to increased CTN [8].

- Canadian and British studies of discrete interventions to encourage greater awareness and appreciation of, and contact with the natural world (the David Suzuki Foundation's 30x30 Nature Challenge and the Wildlife Trust's 30 Days Wild, respectively) found some evidence to suggest participation in the intervention and related activities may be associated with increases in CTN [2, 10, 19, 20].

### Does connection to nature influence other environmental behaviours and perceptions?

There is a small amount of evidence which suggests that the degree to which one feels a connection to nature may be associated with the frequency and type of visits made to the natural environment and may be one of a variety of factors which influence certain pro-environmental behaviours and beliefs [21-24]. As of yet, the evidence base is small and cannot indicate the direction of any relationship.

- A study of conservation volunteering suggested that CTN contributed to participant desire to benefit the environment through volunteering [25].
- 'Connectivity with nature' was found to be positively associated with environmental concern and pro-environmental behaviours in a sample of US landowners [26]. CTN was found to have a modest association with vegetation management behaviours in a sample of US farmers [27].
- 'Nature relatedness' was found to correlate positively with the frequency of time spent in nature and outdoors [28]. Canadian research found greater motivation to visit parks amongst those with higher CTN [14, 15]. A further study found that levels of 'nature orientation' was

associated with the frequency and duration of visits to local parks, with non-park users tending to have lower levels of 'nature relatedness' than regular park users [29].

- In a study carried out in the southwest of England CTN appeared to have an association with responses to different environmental conditions; participants who had higher levels of CTN rated clean and seaweedy beaches more positively than those with lower CTN [30].

### Is there an association between connection to nature and health, wellbeing and educational outcomes?

There is some evidence to suggest that higher levels of CTN relate positively to outcomes such as better wellbeing, quality of life and educational performance. However, again the research base is small and due to the types of research designs used and lack of adjustment for confounding factors, our understanding of the direction of effect and strength of association is limited.

- A (non-systematic) meta-analysis of 8,500 participants found small but significant association between CTN and happiness indicators [19].
- Positive associations between CTN and affect, autonomy, and personal growth (aspects of wellbeing) have been found in several studies [7, 12, 31-33].
- A review of studies suggested that there is some evidence of associations between CTN and life satisfaction and mood [31].
- A study found positive associations between 'nature relatedness' and reduced levels of cognitive anxiety [34].
- There is some evidence of an association between higher levels of CTN in children and higher achievement in English examinations (though not Maths) [35].

# Natural England Access to Evidence Information Note EIN015

## Connection to Nature: evidence briefing

### Does connection to nature vary according to social demographic group?

As of yet there is little consistent evidence regarding whether or how rates of CTN may differ amongst or between different population groups. Current evidence is drawn from small scale studies and may not be comparable/poolable (due to variation in method and tools used).

- Canadian research has indicated that CTN varies according to age, life satisfaction, and perceived state of physical and mental health [14, 15].
- A small study from the US found some evidence that socioeconomic status is a possible moderating variable on levels of CTN [21].
- A small scale Canadian study found no evidence that CTN varied significantly between urban and rural youths [36].
- A German study found younger children and university-track pupils (the highest tier in the German secondary school system) had higher 'inclusion in nature' scores than older children and general-education-track (the middle tier of the secondary school system) pupils [37].



© Natural England/Peter Wakely

### Implications for policy, service delivery and research

#### Policy and service delivery

- The small body of evidence suggests that CTN may be a factor in determining whether or not people are motivated to visit natural

environments, this should be considered in future intervention design.

- The emerging evidence that CTN may have a role in influencing the wellbeing effects of the natural environment could be considered in intervention design [38].

#### Research

- Future studies of the health, wellbeing and developmental impacts of exposure to nature and in relation to pro-environmental behaviours could consider CTN as a potential explanatory mechanism or mediating factor [4, 10, 39]. Where relevant, future quantitative studies should seek to adjust models for confounding factors.
- The construct validity and reliability of existing and new tools should be examined further [3, 8]. Researchers could explore the potential of using implicit approaches (i.e. assessing CTN without requiring individuals self-report their own subjective assessment of their CTN) in new tools.
- There is a need for an exploration of CTN in different population groups and in relation to different environment types, spaces and experiences. The integration of CTN scales into existing large scale panel surveys would contribute to this need.
- Further research could seek to explain the many ways in which humans interact with nature (including artistic and other types of representations of nature), how this changes through time, and the subsequent impact on CTN [8, 10, 16]. The use of qualitative and other methodologies could be used to explore the richness, depth and implications of CTN [4, 40, 41]. There is a need for research which explores how CTN can inform environmental planning and conservation strategies [42].
- Additional applied research (with outcomes assessed over longer time periods) could help guide the development of interventions to increase CTN or nature based interventions which seek to use CTN as a pathway to other

# Natural England Access to Evidence Information Note EIN015

## Connection to Nature: evidence briefing

outcomes [1]. Improving our understanding of how CTN develops through childhood, and whether/how CTN is or is not maintained through to adulthood would help identify key intervention points.

- A collaboration of research partners representing the Strategic Research Groups for Learning in Natural Environments and Outdoors for All recognised the strategic research need and are leading development of a more strategic approach to research in this area.

### References

1. Zylstra, M.J., et al., Connectedness as a Core Conservation Concern: An Interdisciplinary Review of Theory and a Call for Practice. Springer Science Reviews, 2014. 2(1): p. 119-143.
2. Capaldi, C.A., R.L. Dopko, and J.M. Zelenski, The relationship between nature connectedness and happiness: a meta-analysis. *Frontiers in Psychology*, 2014. 5.
3. Tam, K.-P., Concepts and measures related to connection to nature: Similarities and differences. *Journal of Environmental Psychology*, 2013. 34: p. 64-78.
4. Bell, S.L., et al., Green space, health and wellbeing: making space for individual agency. *Health & Place*, 2014. 30: p. 287-292.
5. Bragg, R., et al., Measuring connection to nature in children aged 8-12: A robust methodology for the RSPB 2013, University of Essex.
6. Mayer, F.S. and C.M. Frantz, The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, 2004. 24(4): p. 503-515.
7. Wolsko, C. and K. Lindberg, Experiencing Connection With Nature: The Matrix of Psychological Well-Being, Mindfulness, and Outdoor Recreation. *Ecopsychology*, 2013. 5(2): p. 80-91.
8. Ernst, J. and S. Theimer, Evaluating the effects of environmental education programming on connectedness to nature. *Environmental Education Research*, 2011. 17(5): p. 577-598.
9. Cheng, J.C.-H. and M.C. Monroe, Connection to Nature. *Environment and Behavior*, 2012. 44(1): p. 31-49.
10. Richardson, M., et al., 30 Days Wild: Development and Evaluation of a Large-Scale Nature Engagement Campaign to Improve Well-Being. *PLoS ONE*, 2016. 11(2): p. e0149777.
11. Schultz, P.W., Inclusion with Nature: The Psychology Of Human-Nature Relations, in *Psychology of Sustainable Development*, P. Schmuck and W.P. Schultz, Editors. 2002, Springer US: Boston, MA. p. 61-78.
12. Nisbet, E., J. Zelenski, and S. Murphy, Happiness is in our Nature: Exploring Nature Relatedness as a Contributor to Subjective Well-Being. *J Happiness Stud*, 2011. 12.
13. Perrin, J.L. and V.A. Benassi, The connectedness to nature scale: A measure of emotional connection to nature? *Journal of Environmental Psychology*, 2009. 29(4): p. 434-440.
14. Wright, P. and C. Matthews, Building a culture of conservation: Research findings and research priorities on connecting people to nature in parks. *Parks* 2015. 21(2).
15. Lemieux, C.J., et al., Human health and wellbeing motivations and benefits associated with protected area experiences: An opportunity for transforming policy and management in Canada PARKS, 2012. 18(1): p. 71.

# Natural England Access to Evidence Information Note EIN015

## Connection to Nature: evidence briefing

16. Russell, R., et al., Humans and Nature: How Knowing and Experiencing Nature Affect Well-Being. *Annual Review of Environment and Resources*, 2013. 38(1): p. 473-502.
17. Luck, G.W., et al., Relations between Urban Bird and Plant Communities and Human Well-Being and Connection to Nature. *Conservation Biology*, 2011. 25(4): p. 816-826.
18. Mayer, F.S., et al., Why Is Nature Beneficial?: The Role of Connectedness to Nature. *Environment and Behavior*, 2009. 41(5): p. 607-643.
19. Capaldi, C.A., et al., Flourishing in nature: A review of the benefits of connecting with nature and its application as a wellbeing intervention. *International Journal of Wellbeing*, 2015. 5(4).
20. Nisbet, E., Results of the David Suzuki Foundation 30x30 Nature Challenge English Survey May 1-31, 2013. 2013, Trent University.
21. Ingulli, K. and G. Lindbloom, Connection to Nature and Psychological Resilience. *Ecopsychology*, 2013. 5(1): p. 52-55.
22. Sparks, P., et al., Connectedness and its consequences: a study of relationships with the natural environment. *Journal of Applied Social Psychology*, 2014. 44(3): p. 166-174.
23. Gifford, R. and A. Nilsson, Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*, 2014. 49(3): p. 141-157.
24. Frantz, C.M. and F.S. Mayer, The importance of connection to nature in assessing environmental education programs. *Studies in Educational Evaluation*, 2014. 41: p. 85-89.
25. Guiney, M.S. and K.S. Oberhauser, Conservation Volunteers' Connection to Nature. *Ecopsychology*, 2009. 1(4): p. 187-197.
26. Dutcher, D.D., et al., Connectivity With Nature as a Measure of Environmental Values. *Environment and Behavior*, 2007. 39(4): p. 474-493.
27. Gosling, E. and K.J.H. Williams, Connectedness to nature, place attachment and conservation behaviour: Testing connectedness theory among farmers. *Journal of Environmental Psychology*, 2010. 30(3): p. 298-304.
28. Nisbet, E.K., J.M. Zelenski, and S.A. Murphy, The Nature Relatedness Scale: Linking Individuals' Connection With Nature to Environmental Concern and Behavior. *Environment and Behavior*, 2009. 41(5): p. 715-740.
29. Lin, B.B., et al., Opportunity or Orientation? Who Uses Urban Parks and Why. *PLoS One*, 2014. 9(1): p. e87422.
30. Wyles, K.J., et al., Factors That Can Undermine the Psychological Benefits of Coastal Environments: Exploring the Effect of Tidal State, Presence, and Type of Litter. *Environment and Behavior*, 2015.
31. Webber, J., J. Hinds, and P.M. Camic, The Well-Being of Allotment Gardeners: A Mixed Methodological Study. *Ecopsychology*, 2015. 7(1): p. 20-28.
32. Howell, A.J., et al., Nature connectedness: Associations with well-being and mindfulness. *Personality and Individual Differences*, 2011. 51(2): p. 166-171.
33. Cervinka, R., K. Roderer, and E. Hefler, Are nature lovers happy? On various indicators of well-being and connectedness with nature. *J Health Psychol*, 2012. 17(3): p. 379-88.
34. Martyn, P. and E. Brymer, The relationship between nature relatedness and anxiety. *J Health Psychol*, 2014: p. 1-10.

# Natural England Access to Evidence Information Note EIN015

## Connection to Nature: evidence briefing

35. Richardson, M., et al., The Impact of Children's Connection to Nature: A Report for the Royal Society for the Protection of Birds 2015, University of Derby for RSPB.
36. Klassen, M.J., Connectedness to nature : comparing rural and urban youths' relationships with nature. 2010, Royal Roads University.
37. Liefländer, A.K., et al., Promoting connectedness with nature through environmental education. Environmental Education Research, 2013. 19(3): p. 370-384.
38. Richardson, M., et al., Nature: a new paradigm for well-being and ergonomics. Ergonomics, 2016: p. 1-14.
39. Nisbet, E.K. and J.M. Zelenski, Underestimating nearby nature: affective forecasting errors obscure the happy path to sustainability. Psychol Sci, 2011. 22(9): p. 1101-6.
40. Bell, S.L., et al., Seeking everyday wellbeing: The coast as a therapeutic landscape. Social Science & Medicine, 2015. 142: p. 56-67.
41. Richardson, M., J. Hallam, and R. Lumber, One Thousand Good Things in Nature: Aspects of Nearby Nature Associated with Improved Connection to Nature. Environmental Values, 2015. 24(5): p. 603-619.
42. Restall, B. and E. Conrad, A literature review of connectedness to nature and its potential for environmental management. Journal of Environmental Management, 2015. 159: p. 264-278.

### Further information

Natural England evidence publications can be downloaded from the publications and products catalogue:  
<http://publications.naturalengland.org.uk/>.  
For information on Natural England evidence publications contact the Natural England Enquiry Service on 0845 600 3078 or e-mail [enquiries@naturalengland.org.uk](mailto:enquiries@naturalengland.org.uk).

### Author

Rebecca Lovell, European Centre for Environment and Human Health and University of Exeter Medical School  
[r.lovell@exeter.ac.uk](mailto:r.lovell@exeter.ac.uk)  
<http://www.ecehh.org/people/dr-rebecca-lovell/>



European Centre for  
Environment & Human Health



### Copyright

This note is published by Natural England under the Open Government Licence - OGLv3.0 for public sector information. You are encouraged to use, and reuse, information subject to certain conditions. For details of the licence visit [Copyright](#). Natural England photographs are only available for non commercial purposes. If any other information such as maps or data cannot be used commercially this will be made clear within the note.

ISBN 978-1-78354-324-3

© Natural England and other parties 2016

# Natural England Access to Evidence Information Note EIN015

## Connection to Nature: evidence briefing

---

<sup>1</sup> Related concepts include: Connection with nature; Engagement with nature; Ecological identity; Affinity with nature; (certain types of) Place attachment; Nature orientation; Connectivity with nature; Environmental identities; Nature relatedness; Nature identity; and (types of) Sense of place.

<sup>2</sup> *Validity* relates to whether the tool actually measures what it is intended to measure and *reliability* relates to whether it consistently measures the same thing between individuals and populations.