

Measuring connection to nature in children aged 8 - 12: A robust methodology for the RSPB

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Executive Summary

Introduction

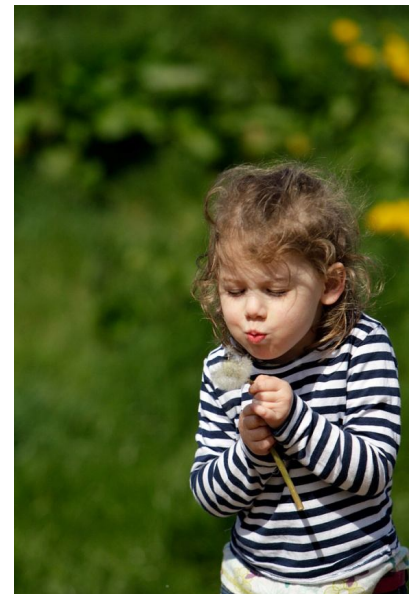
Children today have less contact with the natural world than 50 years ago and as a result are less connected to nature. At a time when the positive effects of interaction with nature for children are being continually supported, children are spending more time indoors in front of a television or computer screen. Without the opportunity and encouragement to get outdoors and engage with nature, children are missing out on the improvements to physical and mental health, personal and social development, cognitive functioning and life chances that previous generations have enjoyed. If this decline in connection continues the consequences for nature could also be catastrophic, as children who are not connected to nature and who do not value and respect nature when they are young are less likely to see the importance of taking care of it when they are older.

There is convincing evidence to show that exposure to the natural environment positively affects health and wellbeing¹. Research from a variety of outdoor settings, from the open countryside, fields and forests, remote wilderness, parks and open spaces, to street trees, allotments and gardens has shown that engaging with nature on a number of different levels (from simply viewing nature, to incidental exposure, through to active involvement in nature-based activities) can produce mental (and physical) health benefits. Natural, green environments are often perceived as places to relax, escape and unwind from the daily stresses of modern life, thus having a positive effect on our emotional wellbeing.

Empirical research has also demonstrated that nature experiences have a positive influence on children, helping them to develop positive values about nature and increasing psychological well-being². Contact with nature is important for children, is inseparably linked to their wellbeing and also promotes healthy personal

development³. Nature allows for unstructured play, generating a sense of freedom, independence and inner strength which children can draw upon when experiencing future incidents of stress⁴. Children whose homes have more nearby nature cope better with life stress than those whose homes lack nearby natural areas⁵. Children with ADHD (Attention Deficit Hyperactivity Disorder) may benefit from more time in contact with nature. In addition children's relationship with nature is a fundamental part of their development, allowing opportunities for self-discovery and natural environmental experience⁶.

Green spaces are also ideal surroundings for outdoor learning, where engaging with nature can lead to enhanced connectedness to nature and increased ecological literacy. One way to increase children's contact with nature, is within the formalised educational system, both in terms of i) the amount of exposure to nature in the learning environment and ii) actually learning about nature (green education). Natural environments are varied and changeable and so provide excellent opportunities for free explorative play and this type of unstructured play has been found to give greater opportunities for decision-making while at the same time promoting creative, diverse and imaginative play, which are all seen as important elements of a child's personal and cognitive development. In addition, free play in natural environments has also been shown to result in increased levels of social interactions which promote an aptitude for learning.



A number of campaigns, strategies and initiatives instigated by government, land managers, conservation organisations and educators, have recently emerged as part of this drive to re-connect our children to nature. The RSPB regularly runs education programmes and events on its wildlife sites across the country and is one of the organisations that

¹ Maas et al. 2006, Pretty et al. 2006, Van den Berg et al. 2007, Bird 2007, Weinstein et al 2009, Hansen-Ketchum et al. 2009, Barton and Pretty 2010, NEA 2011

² Wells and Evans 2003, Davis, Rea, and Waite 2006;

³ Kaplan & Kaplan 1989; Kahn & Kellert 2002; Bingley & Milligan 2004; Thomas & Thompson 2004; Louv 2005; Ward-Thompson *et al.* 2006, 2008

⁴ Wells & Lekies, 2006

⁵ Wells and Evans 2003

⁶ Bird, 2007

have recognised the importance of re-connecting our young people to the natural world.

The research

To date however there has been no robust scientific attempt to measure and track connection to nature amongst UK children. As a result, the RSPB commissioned the 'Green Exercise Research Team' at the University of Essex to establish a scientifically robust and logistically practical methodology to enable them to measure connection to nature in children aged between 8 and 12. In future, the RSPB aims to establish a baseline of connection to nature levels in children across the UK in order to map any longitudinal changes as a result of their nature-based education and recreational interventions. Informed by the results of this study, the RSPB will then use the most appropriate outcome measure in a UK-wide baseline survey of connection to nature in UK children, which is expected to be completed by the summer of 2013.

The aim of this present study was to review the methodology for and fieldtest 3 different measures designed to assess connection or relatedness to nature in children – with an emphasis on 'trait' measures. These measures included:

- Connection to Nature Index – CNI (Cheng and Monroe 2010)
- Inclusion of Nature in Self - INS (Schultz 2002)
- Nature Relatedness Scale – short form version – NR-6 (Nisbet et al 2008)

This study adopted a 4 stage process:

Stage 1- Review of existing connection to nature measures

For each of the 3 measures of connection to nature the original context in which the measures were developed was examined, including: the validation process; original population (age range, educational level and any other relevant characteristics); whether used as a measure of state or trait; and the statistical factor analysis.

Stage 2 – Field test: Analysis of data from the study population

A field study was then designed, conducted and Stage 2 of the research process was an analysis of the study population, their connection to nature levels and an examination of whether levels of connection varied depending on a number of variables such as age; gender; location; order and format of measures within the composite questionnaire.

Stage 3 – Field test: How the 3 measures used in the study performed

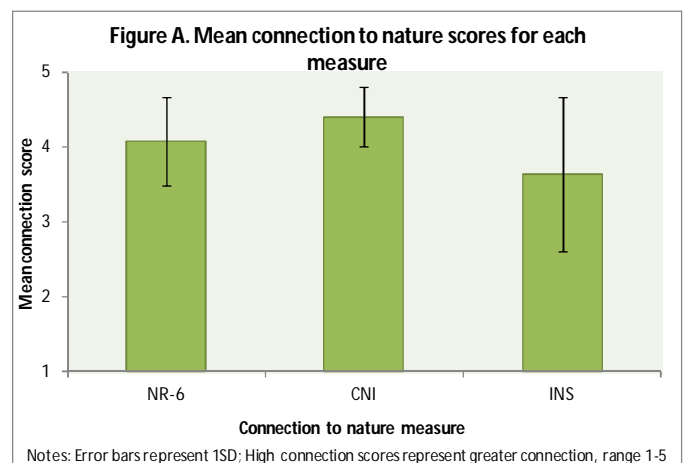
Stage 3 of the research process was to assess how the 3 measures performed with the study population in terms of i) statistical reliability and effectiveness of results and ii) ease of understanding and practicality of administration.

Stage 4 – Choice of most appropriate connection to nature measure for RSPB

The outcome measure deemed to be the most appropriate (i.e. most effective, practical to administer and to understand) was chosen.

Key findings

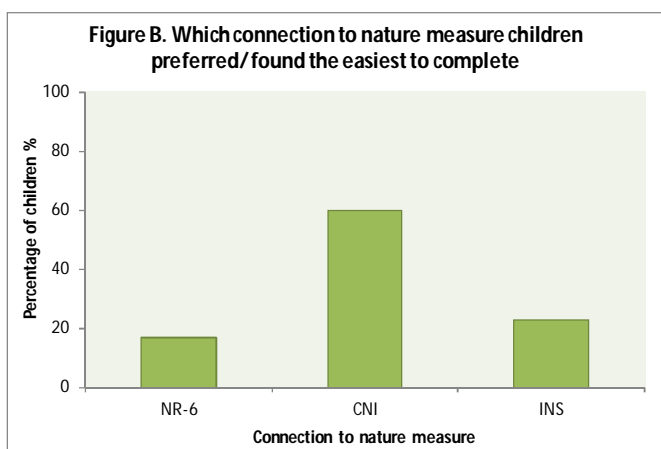
- In total, 76 children took part in the research, of which 47% were boys and 53% were girls. Ages of the children ranged between 7 and 13 years, although the majority were below 10 years old.



- The majority of children were able to understand and successfully complete all 3 of the connection to nature measures used in this field test and all 3 instruments produced acceptable results. In this study, all of the children's connection to nature measures yielded mean scores of above 3.5, with the NR-6 and CNI giving mean values above 4, implying that the children were quite highly connected to nature (Figure A). The children participating in this study appeared to have higher levels of connection to nature, when measured by CNI, than those of a similar group of children in the US.
- Although the study was not designed with a control group or as a comparison between indoor and outdoor locations, the data suggested that for all 3 connection to nature measures mean scores were slightly higher for those children who had completed questionnaires whilst taking part in

outdoor sessions when compared to those who had been inside at school. This finding was not found to be statistically significant, but has implications for future research.

- In the examination of the performance of the 3 measures within the study, the CNI was found to have the highest internal consistency ($\alpha = .82$) although the NR-6 did display acceptable consistency ($\alpha = .77$). Of the CNI subscales, 'Enjoyment', 'Empathy' and 'Responsibility' showed acceptable internal consistency; however 'Oneness' did not.
- In terms of inter-measure correlations, the strongest, positive correlation was between NR-6 and CNI ($r = .57$). There was also a moderate, positive correlation between NR-6 and INS ($r = .49$) and a weak, positive correlation between INS and CNI ($r = .16$) which was not found to be statistically significant. The full CNI correlated strongly with all of its 4 subfactors (as expected), as did NR-6 moderately, with both measures most strongly correlating with 'enjoyment'. The subfactors of 'enjoyment' and 'empathy' correlated with INS even though the correlation with the full CNI was not significant



- On the whole, the majority of children (78-85%) told us that they did not have a problem understanding any of the 3 connection to nature measures. However adults were asked more frequently to explain the INS question than either the NR-6 or the CNI. Seventeen adults also scored the 3 measures for ease of completion by children - overall the CNI scored the highest and the INS the lowest.
- Children taking part in the research were asked which connection to nature measure that they liked the best or found the easiest to complete. The clear majority of children told us that they preferred the CNI questionnaire over the other two (Figure B).

Conclusions

Whilst accepting that all 3 measures performed reasonably well with the study population, taking all factors into consideration, the CNI was found to be the preferred measure; being the easiest to complete; a trait measure; with both an overall nature connection score and subfactor within it; specifically designed and validated for use with children in the chosen age group; and being statistically reliable.

There has been increasing recognition of the need to cultivate a love of nature in our children. Children are the future custodians of our natural places and the urge to protect nature comes together with love of nature. An ever growing array of initiatives has emerged, instigated by government, land managers, conservation organisations and educators alike, as part of the drive to re-connect our children to nature. To date however there has been no robust scientific attempt to measure and track connection to nature amongst UK children and the RSPB has acknowledged this need.

In this study the RSPB and the 'Green Exercise Research Team' at the University of Essex have fieldtested and chosen a robust and practical measure of connection to nature in children aged between 8 and 12 – the Connection to Nature Index. The RSPB will now use this measure to establish a UK-wide baseline of connection to nature levels in children across the UK to allow longitudinal comparisons and to enable further assessment of the effectiveness of such re-connection initiatives. Both this study and the planned future research will add to the evidence base, help to inform the debate on children's connection to nature and shape local and national policy.



Key Findings

- In total, 76 children took part in the research, of which 47% were boys and 53% were girls. Ages of the children ranged between 7 and 13 years, although the majority were below 10 years old.
- In this study, all of the children's connection to nature measures yielded mean scores of above 3.5, with the NR-6 and CNI giving mean values above 4, implying that the children were quite highly connected to nature.
- Using the NR-6, the children participating in this study appear to have higher levels of connection than the average adult (although the two populations may not be directly comparable). The children participating in this study appear to have higher levels of connection to nature, when measured by CNI, than those of a similar group of children in the US.
- Although this study was not designed to assess differences in connection to nature scores between locations or with a specific 'control' group, the data did suggest that for all 3 connection to nature measures, mean scores were slightly higher for children who completed questionnaires after they had taken part in outdoor sessions when compared to those who had been inside at school. This finding, was not statistically significant, but suggests that future research could examine this difference in more detail.
- The connection to nature scores from the 3 measures: NR-6, CNI and INS in this study were not found to be significantly affected by variables such as session location; the order and format of questionnaires; and the age or gender of children taking part. As a result, data in this research were analysed as one group.
- The performance of 3 the measures with the study population was examined in terms of i) statistical reliability; ii) inter-scale comparisons and correlations; and iii) ease of understanding and practicality of administration. The CNI was found to have the highest internal consistency ($\alpha = .82$) although the NR-6 did display acceptable consistency ($\alpha = .77$). Of the CNI subscales, 'Enjoyment', 'Empathy' and 'Responsibility' showed acceptable internal consistency ('Enjoyment' particularly so – $\alpha = .79$), however 'Oneness' did not. As the INS is a single-item measure, internal consistency was not measured.
- All of the scales differed from each other and both the two multi-item scales (CNI and NR-6) gave statistically higher connection to nature scores than the single-item scale (INS), although the effect size was small.
- In terms of inter-measure correlations, the strongest, positive correlation was between NR-6 and CNI ($r = .57$). There was also a moderate, positive correlation between NR-6 and INS ($r = .49$) and a weak, positive correlation between INS and CNI ($r = .16$) which was not found to be statistically significant. The full CNI correlated strongly with all of its 4 subfactors (as expected), as did NR-6 moderately, with both measures most strongly correlating with 'enjoyment'. The subfactors of 'enjoyment' and 'empathy' correlated with INS even though the correlation with the full CNI was not significant
- On the whole, the majority of children (78-85%) told us that they did not have a problem understanding any of the 3 connection to nature measures however; adults were asked more frequently to explain the INS question than either the NR-6 or the CNI. Seventeen adults also scored the 3 measures for ease of completion by children - overall the CNI scored the highest and the INS the lowest.
- Children taking part in the research were asked which connection to nature measure that they liked the best or found the easiest to complete. The clear majority of children told us that they preferred the CNI questionnaire over the other two.

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