

CHILDREN'S INTERESTS AND ORIENTATIONS TOWARDS NATURE: VIEWS FROM YOUNG CHILDREN IN ENGLAND

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Abstract

Environmental education has historically aimed to foster life-long interests and orientations towards supporting and protecting nature, although it remains less clear how these views might associate with different aspects of education and life, and hence how they might be supported and fostered. In order to gain new insights, 679 children in England between 7 and 10 years of age were surveyed. On average, children expressed positive enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature (reflecting orientations towards supporting/protecting nature), and interest in learning about nature, with girls conveying more positive views than boys. Children's enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature, and interest in learning about nature were all positively predicted by more frequent watching of nature/wildlife media and reading of books about nature/wildlife. Children's enjoyment/appreciation of nature and interest in learning about nature were also both positively predicted by their confidence/enjoyment in their learning at school and by their aspirations in life/learning. Children's empathy/affinity for animals and oneness/responsibility for nature were also both positively predicted by their sense of belonging within school. Numerous other insights were also revealed. Overall, the findings show many potential avenues to support children's views, providing insights for education and policy.

Keywords: Environmental attitudes, nature connection, learning about nature, empathy

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4. Introduction

Supporting and protecting nature are increasing concerns in many countries (United Nations, 2015). Science education, biology education and environmental education aim to inspire interest, curiosity, and understanding about the natural world (Royal Society of Biology, 2019), which may also help future generations to protect the natural environment. Previous research indicates that supporting and protecting nature associates with people holding orientations and affinities towards nature (often referred to as 'nature connection') focused around enjoyment and appreciation of nature (e.g. Mackay & Schmitt, 2019). However, most of the research has only been undertaken with adults. In order to gain new insights, the research presented here surveyed primary school children (aged between 7 and 10 years) in England, and considered what might associate with their enjoyment and appreciation of nature, sense of oneness with and responsibility towards nature (reflecting orientations towards supporting/protecting nature), and other views about nature.

1.1 Appreciating, supporting, and protecting nature

Children and young people often value nature, recognise and appreciate the diverse experiences that can be possible in nature, and associate natural places with positive feelings and/or relaxation (Bonnett & Williams, 1998; Wiens, Kyngäs, & Pölkki, 2016). Primary school children in England have particularly conveyed their appreciation of animals and plants (Harvey, Hallam, Richardson, & Wells, 2020). Primary school children in England have also expressed concern with the welfare of animals, emphasised that people need the environment to live, and conveyed their awareness of environmental concerns (Bonnett & Williams, 1998). Children across various other countries have frequently conveyed empathy and sympathy for nature, recognition of dependency between people and nature, and recognition of the impacts that people have on nature (Aaron & Witt, 2011; Chawla, 2020; Collado, Íñiguez-Rueda, & Corraliza, 2016; Rios & Menezes, 2017; Strife, 2012).

Considered from a wider perspective, children across England typically express positive affinities and orientations towards nature (e.g. Hughes, Rogerson, Barton, & Bragg, 2019). These affinities/orientations are often referred to as 'nature connection' (or equivalent terms such as 'nature relatedness'), and have been considered as aggregations of numerous aspects including: inherently valuing experiences of nature and enjoying being in nature; feeling in harmony and connected with nature; having affinities towards and appreciation of wildlife; feeling a perceived responsibility and sympathy for nature; and/or recognising the importance or value of nature as an aspect of someone's personal identity (e.g. Tam, 2013). Measures of nature connection have been found to associate with positive attitudes towards the environment (Mackay & Schmitt, 2019) and with actions and behaviours that support/protect the environment (Diessner, Genthôs, Praest, & Pohling, 2018).

Children's nature connection has been found to associate with visiting and/or otherwise engaging with nature (e.g. Szczytko, Stevenson, Peterson, & Bondell, 2020). In children and adults, nature connection has linked with other activities such as watching wildlife, reading books about the natural world, and watching nature-related media (e.g. Hunt, et al., 2017). Children's reported nature connection has also been found to associate with their perceptions of their family's values towards nature (Cheng & Monroe, 2012). Having and/or perceiving more local nature near their home, or otherwise living close to nature, has also been found to

associate positively with nature connection for children and adults (Shanahan, et al., 2017), which highlights the contextual importance of having access and/or opportunity to engage with nature. Girls often express higher nature connection than boys, and younger children often express higher nature connection than older children, although it remains unclear why (Hughes, Rogerson, Barton, & Bragg, 2019; Richardson, et al., 2019). It remains unclear whether differences in children's views about nature can be completely explained by differences in their engagement with nature, and/or whether these difference link with other aspects of their lives such as their education.

1.2 Interests and learning about nature

Research has often focused on orientations towards appreciating, supporting, and protecting nature, and less (but some) research has focused on children's interests towards learning about nature. Engaging in informal and/or extra-curricular activities, such as reading books and watching media about science, links with children's general interests in science (Bonnette, Crowley, & Schunn, 2019), and children's interests in biology have been found to relate to their experiences in nature and engagement with nature-related media (Uitto, Juuti, Lavonen, & Meisalo, 2006). Children's connections to nature (encompassing their enjoyment in experiencing nature), previous experiences in nature, and family values towards nature have all been found to associate with their interest in participating in nature-based activities and their interest in environmentally-friendly practices (Cheng & Monroe, 2012). Children's interest in learning about aspects of nature has often been found to have been fostered by outdoor learning experiences (Hinds, 2011) and by environmental education programmes (Ballantyne, Fien, & Packer, 2001). Experiences of outdoor learning have also been found to help develop children's interests and motivations towards specific areas of their studies, such as natural history (Stern, Powell, & Ardoin, 2008). Outdoor learning can also provide memorable experiences (Dierking & Falk, 1997; Liddicoat & Krasny, 2014), which can sometimes help foster children's interest in engaging with nature and increase their environmental awareness and behaviours to protect/support nature (Liddicoat & Krasny, 2014). Nevertheless, more insights would benefit education and also wider understanding; for example, it remains unclear how children's views about nature, including their interest in learning about nature, relate to their wider views about their education, such as their confidence in undertaking their schoolwork and their sense of school belonging.

1.3 Research aims

Biology education aims to facilitate children's interests towards learning about the natural world, while environmental education and wider policies across England aim to help children to support and protect nature (e.g. Department for Environment, Food and Rural Affairs, 2018; Knapp, 2000). Nevertheless, it remains less clear what might help foster these various views and behaviours. In order to gain new insights, the research presented here surveyed primary school children in England. The research considered the children's self-reported engagement with various activities in daily life and their views about nature and learning. The analysis focused on revealing independent predictors of the children's enjoyment/appreciation of nature, empathy/affinity for animals, sense of oneness/responsibility for nature, and interest in learning about nature.

2. Methods

The research was approved by the ethics committee of the host institution. Children in schools and children attending outdoor learning activities at nature reserves and wildlife centres in

England were invited to participate; parental information sheets and consent materials were disseminated and collected via the children's schools and/or by reserve/centre staff. Questionnaires were completed before any activities were undertaken, in order to gain insights into children's general views.

2.1 Participants

The research considered the questionnaire responses of 679 children: 356 (52.6%) identified as girls and 321 (47.4%) identified as boys. The children were aged between 7 and 10 years old (on average, 8 years old), and were based within various regions of England.

2.2 Questionnaires

A questionnaire was designed to cover a range of areas, encompassing validated items and also new items in order to explore under-researched issues. For most items on the questionnaire, children expressed their agreement or disagreement against various statements, with response categories of 'Strongly disagree' (scored as 1), 'Disagree' (2), 'Neither agree nor disagree' (3), 'Agree' (4), and 'Strongly agree' (5).

Some items on the questionnaire were aggregated to provide single indicators ('factors' or 'scales'). These indicators were calculated as the arithmetic mean of the relevant items. Factor analysis showed that the relevant items could be aggregated into their respective indicators, and acceptable reliability (internal consistency across the items) was observed via Cronbach's alpha coefficients (as reported below).

2.2.1 Children's characteristics and contexts

The questionnaire asked for children's gender, age, and whether either of their parents (or guardians) went to university. The questionnaire also considered the children's views about their education and school context through indicators of:

- *Enjoying and being confident in learning* ('I usually do well in school work', 'I enjoy learning at school', and 'I can do most things at school if I try'; 3 items, Cronbach's alpha = 0.705);
- *Sense of belonging at school* ('I feel like I belong at my school', 'I get on well with my classmates', and 'I get on well with my teachers'; 3 items, Cronbach's alpha = 0.697);
- *Life/learning aspirations* ('Doing well in school will help me in the future', 'I have goals and plans for the future', and 'I think I will be successful when I grow up'; 3 items, Cronbach's alpha = 0.636).

These areas have been similarly measured in other research with children (e.g. Lereya, et al., 2016). Children's interests and motivations towards their studies have often been found to associate with numerous aspects of their education including their confidence and their sense of school belonging (e.g. Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018).

2.2.2 Children's activities and engagement with nature

The questionnaire measured children's engagement with various nature-related activities and aspects of life through specific items considering:

- *'I watch nature and wildlife programmes or videos'*;
- *'I read books about nature and wildlife'*;
- *'My parents encourage me to spend time outdoors in nature'*;
- *'I spend time outdoors in nature'*.

These were measured as engagement frequencies from ‘Never or almost never’ (scored as 1), ‘A few times a year’ (2), ‘A few times a month’ (3), ‘A few times a week’ (4), to ‘Every day or almost every day’ (5). Additionally, levels of agreement from ‘Strongly disagree’ (scored as 1), ‘Disagree’ (2), ‘Neither agree nor disagree’ (3), ‘Agree’ (4), to ‘Strongly agree’ (5) were used to measure:

- *‘I live near nature, such as a park, some woods, or the countryside’.*

Previous research with children and adults has highlighted the potential relevance of some of these activities/engagement (e.g. Hunt, et al., 2017; Uitto, Juuti, Lavonen, & Meisalo, 2006).

2.2.3 Children’s views about nature

The questionnaire considered the children’s views about nature through indicators of:

- *Enjoyment/appreciation of nature* (e.g. ‘Being outdoors makes me happy’, ‘Being in the natural environment makes me feel peaceful’; 7 items, Cronbach’s alpha = 0.814);
- *Empathy/affinity for animals and wildlife* (e.g. ‘I feel sad when wild animals are hurt’, ‘I enjoy touching animals and plants’; 4 items, Cronbach’s alpha = 0.756);
- *Sense of oneness/responsibility for nature* (e.g. ‘Humans are part of the natural world’, ‘People cannot live without plants and animals’, ‘My actions will make the natural world different’, ‘Picking up litter on the ground can help the environment’; 5 items, Cronbach’s alpha = 0.708).

These items/indicators were from the ‘Connection to Nature Index’, which was designed for use with children (Cheng & Monroe, 2012) and has been previously applied in England and the United Kingdom (e.g. Kerr, 2015).

The questionnaire also measured:

- *Interest in learning about nature* (‘I like learning about nature’, ‘I like learning about plants and animals’, and ‘I would like to learn more about nature in school’; 3 items, Cronbach’s alpha = 0.866).

Interest in learning about nature has sometimes been considered to reflect an aspect of children’s contextualised ecological/environmental orientation (Larson, Green, & Castleberry, 2011).

2.3 Analytical approaches

Statistically significant results are indicated through p-values less than 0.05. Magnitudes of difference between averages are quantified through Cohen’s D-values (Cohen, 1988). Associations between the children’s responses were explored through predictive modelling, which reveals the independent association between a predictor and the outcome while accounting for all of the other predictors. Predictive modelling was undertaken via linear ordinary-least-squares (OLS) estimation (linear regression). The models showed acceptable fit and the various residual histograms and plots highlighted that the underlying assumptions were met. Predictive (independent) associations were quantified as standardised coefficients (β -values).

3. Results

On average (Table 1), the children expressed positive views concerning nature and their learning, around the ‘Agree’ response category (values of 4 on the 1-5 scale from strong

disagreement to strong agreement). The children also expressed somewhat frequent engagement with the various nature-related activities, around the 'A few times a month' response category (values of 3 on the 1-5 frequency scale). Compared to boys, on average, girls reported more frequent reading of books about nature/wildlife and more positive views for confidence/enjoyment in learning, sense of belonging in school, enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature, and interest in learning about nature.

3.1 Predictive associations

Predictive modelling considered the children's characteristics and contextual experiences and views as predictors of the children's enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature, and interest in learning about nature (Table 2). This highlighted that higher aspirations in life/learning and more frequent watching of nature/wildlife media and reading of books about nature/wildlife positively predicted enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature, and interest in learning about nature.

3.1.1 Enjoyment/appreciation of nature

The children's enjoyment/appreciation of nature was most strongly predicted by 'I spend time outdoors in nature', together with the other nature-related activities, confidence/enjoyment in learning, aspirations in life/learning, but was negatively predicted by being a boy (compared to being a girl).

3.1.2 Empathy/affinity for animals

The children's empathy/affinity for animals was positively predicted by their wider educational views (aspirations in life/learning, and sense of belonging in school), by the various nature-related activities, by living near to nature, but was negatively predicted by being a boy (compared to being a girl).

3.1.3 Oneness/responsibility for nature

The children's sense of oneness/responsibility for nature was positively predicted by their sense of school belonging, living near to nature, watching nature/wildlife programmes/videos, reading books about nature/wildlife, encouragement from parents to spend time outdoors, and aspirations in life/learning. When accounting for these aspects of life, 'I spend time outdoors in nature' had no association with the children's sense of oneness/responsibility for nature.

3.1.4 Interest in learning about nature

The children's interest in learning about nature was positively predicted by aspirations in life/learning, watching nature/wildlife programmes/videos, sense of school belonging, reading books about nature/wildlife, spending time outdoors, and confidence/enjoyment in learning, but was negatively predicted by being a boy (compared to being a girl).

Table 1: Sample summary and gender differences

Indicator (1-5 scales unless otherwise shown)	All		Gender: Girls		Gender: Boys		Gender difference	
	M	SD	M	SD	M	SD	Cohen's D	Sig. (p)
Gender (0=girls, 1=boys)	.47	.50	-	-	-	-	-	-
Parents/guardians went to university (0=no, 1=yes)	.65	.48	.64	.48	.66	.47	.037	.664
Age (years)	8.36	.86	8.44	.88	8.27	.81	.207	.007
Confidence/enjoyment in learning	4.30	.75	4.39	.68	4.19	.81	.279	<.001
Aspirations in life/learning	4.51	.66	4.54	.62	4.48	.70	.093	.242
Belonging in school	4.37	.76	4.45	.75	4.28	.76	.232	.004
'I spend time outdoors in nature'	3.66	1.32	3.72	1.29	3.58	1.34	.104	.191
'I watch nature and wildlife programmes or videos'	2.99	1.49	3.05	1.45	2.91	1.53	.095	.240
'I read books about nature and wildlife'	2.84	1.44	2.95	1.45	2.71	1.42	.166	.041
'My parents encourage me to spend time outdoors in nature'	3.38	1.52	3.42	1.52	3.33	1.52	.060	.442
'I live near nature, such as a park, some woods, or the countryside'	4.13	1.21	4.13	1.22	4.13	1.20	.004	.964
Enjoyment/appreciation of nature	3.97	.83	4.14	.72	3.79	.91	.431	<.001
Empathy/affinity for animals	4.45	.72	4.52	.67	4.38	.77	.192	.016
Oneness/responsibility for nature	4.33	.72	4.39	.67	4.26	.76	.185	.020
Interest in learning about nature	4.24	.95	4.37	.88	4.10	1.00	.294	<.001

Notes: Means ('M'), standard deviations ('SD'), and the magnitude ('D'; Cohen's D) and statistical significance ('Sig. (p)'; p-value) of the differences between girls and boys are reported. Significant p-values ($p < .05$) and the associated magnitudes are highlighted in bold for clarity.

Table 2: Predictive models

Predictor	Enjoyment/appreciation of nature		Empathy/affinity for animals		Oneness/responsibility for nature		Interest in learning about nature	
	β	Sig. (p)	β	Sig. (p)	β	Sig. (p)	β	Sig. (p)
Intercept/constant	NA	<.001	NA	<.001	NA	<.001	NA	.011
Age (years)	-.049	.120	-.044	.228	.043	.216	-.053	.106
Gender (0=girls, 1=boys)	-.145	<.001	-.085	.020	-.036	.293	-.100	.002
Parents/guardians went to university (1=yes, compared to no)	-.067	.069	.028	.517	-.026	.523	-.065	.091
Parents/guardians went to university (1=missing, compared to no)	-.036	.329	-.007	.866	.000	.999	.022	.565
Confidence/enjoyment in learning	.127	.004	-.092	.073	.042	.384	.135	.003
Aspirations in life/learning	.105	.007	.165	<.001	.096	.025	.180	<.001
Belonging in school	.071	.084	.177	<.001	.224	<.001	.165	<.001
‘I spend time outdoors in nature’	.216	<.001	.145	.001	.058	.149	.156	<.001
‘I watch nature and wildlife programmes or videos’	.136	<.001	.153	<.001	.146	<.001	.170	<.001
‘I read books about nature and wildlife’	.197	<.001	.106	.013	.117	.003	.158	<.001
‘My parents encourage me to spend time outdoors in nature’	.176	<.001	.042	.317	.139	<.001	.051	.168
‘I live near nature, such as a park, some woods, or the countryside’	.020	.549	.128	.001	.170	<.001	.003	.930
Explained variance (via adjusted R-squared)	47.6%		27.9%		37.2%		43.5%	

Notes: Standardised predictive coefficients (β) and their statistical significance (‘Sig. (p)’ ; p-value) are reported. Significant p-values ($p < .05$) and the associated coefficients are highlighted in bold for clarity.

4. Discussion

The results presented here provide numerous insights for education and policy. On average, children expressed positive enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature, and interest in learning about nature, with girls conveying more positive views than boys. The importance of nature-related activities was highlighted: children's enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature, and interest in learning about nature were all positively predicted by more frequent watching of nature/wildlife media and reading of books about nature/wildlife. Enjoyment/appreciation of nature, empathy/affinity for animals, and interest in learning about nature were also positively predicted by spending time outdoors in nature. The importance of children's wider educational contexts and views was also highlighted: children's enjoyment/appreciation of nature and interest in learning about nature were both positively predicted by their confidence/enjoyment in their learning at school and by their aspirations in life/learning. Children's empathy/affinity for animals and oneness/responsibility for nature were also both positively predicted by their sense of belonging within school. Essentially, there may be many ways to promote and foster children's views.

These results affirm and extend earlier research, which has linked children's affinities/orientations towards nature ('nature connection') with visiting and/or otherwise engaging with nature outdoors (e.g. Szczytko, Stevenson, Peterson, & Bondell, 2020), and with other activities such as watching wildlife, reading books about the natural world, and watching nature-related media (e.g. Hunt, et al., 2017). Previous research has often considered nature connection through aggregating enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature, and/or other views. The results presented here show the importance of considering these aspects separately, given that different arrays of predictors were relevant for each outcome. Children's empathy/affinities towards animals may be an important area for educators to consider. Recent research highlights that children appreciate animals and plants (Harvey, Hallam, Richardson, & Wells, 2020), and that children often characterise nature as being inseparable from living things such as wild animals and feel empathy and concern with the welfare of many aspects of nature including animals (Bonnett & Williams, 1998).

These results also reveal other new insights. Higher confidence/enjoyment in learning, aspirations in life/learning, and sense of school belonging independently and positively predicted the children's interest in learning about nature, while accounting for their personal characteristics and engagement with nature-related activities. Confidence/enjoyment in learning and sense of belonging in school have been found to link to various beneficial outcomes within education such as attainment (e.g. Allen, Kern, Vella-Brodrick, Hattie, & Waters, 2018). Essentially, children's views about nature may not necessarily link only with nature-related activities. Ensuing that children can feel supported and confident at school may help provide freedom to develop more specific learning interests.

4.1 Educational and wider implications

Various nature-related activities could be encouraged, facilitated, and/or integrated within education. The results presented here show that children's reports of more frequently watching nature/wildlife programmes/videos positively predicted their interest in learning about nature and sense of oneness/responsibility for nature. Children's reports of more frequently spending time outdoors in nature also positively predicted their enjoyment/appreciation of nature, empathy/affinity for animals, and interest in learning about nature (although had no predictive

association with oneness/responsibility for nature when accounting for the other predictors). Outdoor learning activities and excursions may be beneficial within education, as these have often helped foster children's interests and appreciation of wildlife (e.g. Lindemann-Matthies, 2005) and children's interests in learning about other aspects of nature (e.g. Hinds, 2011). Nevertheless, further research would need to consider associations in more detail; for example, spending time in nature might foster enjoyment/appreciation of nature and empathy/affinity for animals, which might then foster oneness/responsibility for nature.

Children, on average within this sample, manifested positive enjoyment/appreciation of nature, empathy/affinity for animals, oneness/responsibility for nature, and interest in learning about nature. Girls tended to convey more positive views about nature than boys, especially for their enjoyment/appreciation of nature, which affirms previous research (e.g. Richardson, et al., 2019). It may be beneficial to support children to find their own personally enjoyable ways to experience nature, which might involve different activities for different children. Future research may need to focus on considering why different children express different views; the presented results highlighted that gender differences in views could not be explained by differences in the children's contexts or engagement in particular nature-related activities.

The findings also suggest wider implications for biology education and environmental education. There may be many ways to promote and foster children's views, but different aspects of life may be more or less relevant for different outcomes. This is especially relevant when education has multiple aims or outcomes, such as fostering interests in learning about nature and also orientations towards supporting/protecting nature (considered as oneness/responsibility for nature within the research presented here). This broadly suggests that applying diverse and multiple approaches may be beneficial. Attempting to find one single nature-related activity that might foster any and every nature-related view in children may be difficult.

4.2 Limitations

The analysis considered children's questionnaire responses at only one time point, and so cannot definitively establish whether some views or aspects of life influence or entail other views or aspects of life. Additionally, the findings may not necessarily be generalisable to children of different ages and/or children in different contexts (such as in different areas of England and/or in different countries).

Many aspects of life may influence children's views, and the questionnaire could only consider a limited number of aspects within a reasonable length. Social-cognitive perspectives on learning and motivation highlight the relevance of someone's context and circumstances (including social contexts and norms) and someone's emerging identity, which link with their various attitudes and self-beliefs (including self-confidence and interest/enjoyment in various activities), which then link with their intentions/aspirations and actions (Eccles, 2009). This suggests further areas to explore when considering children's interest in learning about nature.

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