

Young children's opportunities for unstructured environmental exploration of nature: Links to adults' experiences in childhood

Shelby Gull Laird
Laura McFarland-Piazza
Sydnye Allen
Charles Sturt University, Australia

Submitted July 13, 2014; accepted September 2, 2014

Acknowledgements:

This research was supported by a Charles Sturt University Sustainability Grant

Outdoor environmental education and provision of unstructured exploration of nature are often forgotten aspects of the early childhood experience. The aim of this study was to understand how adults' early experiences in nature relate to their attitudes and practices in providing such experiences for young children. This study surveyed 33 parents and early childhood educators at an Australian university-located early childhood service about their own childhood experiences in nature and their current provision of such experiences with their children. Participants completed an online questionnaire consisting of the Nature Relatedness Scale – Short Form (Nisbet et. al, 2009; Nisbet & Zelenski, 2013) and the Inclusion of Nature in Self Scale (Schultz, 2002). Questions regarding adults' knowledge and behaviour on gardening and sustainability topics were also included. Results indicate that although most participants were strongly engaged in unstructured nature experiences as children, few of them provided such experiences for their children. Implications for environmental education in early childhood settings and the home setting are discussed.

Keywords: connection to nature, nature experiences, early childhood, outdoor education, risk taking, childhood experience, environmental education

Environmental sustainability is a growing global concern, as humans are currently living beyond the available resources in the world. According to Chawla and Flanders Cushing (2007), education for children, families, educators and the community around maintaining our natural resources is the key to making substantial changes in practices. Research indicates that modelling of attitudes toward environmental sustainability by adults, and rich, direct experiences in the natural environment contribute to children's development of environmental attitudes (Chawla, 1998). In fact, adults who show sensitivity in their attitudes toward the environment are likely to self-report that their early experiences in the natural environment contributed to their attitudes (Chawla, 1998). Children must develop inter-relationships with people and places in order to develop a deep concern for their environment and engage in sustainable practices (Wilson, 1984). In order to be effective, environmental education needs to give children a sense of wonder about the natural world in which they live, as well as a sense of joy in being in that natural world (Campbell & Jobling, 2012). However, many children today fail to experience regular opportunities to connect with their natural world, resulting in a "disconnection" from nature (Davis, 2005; Louv, 2005). This is unfortunate as studies have indicated that children gain their most powerful understandings of their natural environment through direct exploration of the environment (Lekies & Beery, 2013; Thomas & Thompson, 2004).

E.O. Wilson (1984) helped to develop the modern concept of "biophilia" as the idea that humans have an innate connection to other life and the natural world. This suggests an evolutionary connection to nature is expected as a usual state for humans, though debate does continue (Joye & van den Berg, 2011). The concept of connection to nature has been expanded upon and studied by environmental psychologists and behaviourists who debate if the connection is an innate emotional connection, cognitive construct or both (Perrin & Benassi, 2009). Connection to nature seems to hold its greatest value as a predictor variable for pro-environmental attitudes and pro-environmental behaviours (Brügger, Kaiser, & Roczen, 2011; Mayer & Frantz, 2004; Nisbet, Zelenski, & Murphy, 2009; Schultz, Shriver, Tabanico, & Khazian, 2004), but may also have implications in terms of physical and mental health in urban areas (Conn, 1998; Hartig, Evans, Jamner, Davis, & Garling, 2003; Van Den Berg, Hartig, & Staats, 2007).

Connection to nature in early childhood

If connection to nature is something innate and fixed then it cannot be changed. If it is mutable, then can connection to nature be increased or even decreased by external factors? As it turns out, many authors have posited that connection to nature is partially innate and partially mutable and that it influences to a certain extent a person's environmental attitudes and behaviours (Brügger, et al., 2011; Mayer & Frantz, 2004; Nisbet, et al., 2009; Schultz, et al., 2004). It has been suggested that effective environmental education, or simply quality time spent outdoors, could increase connection to nature in individuals (Ernst & Theimer, 2011). Outdoor education seeks to connect participants, largely children, with the natural world through both exposure in

activities such as camping, bushwalking and hiking, and intense outdoor experiences such as mountain climbing and survival skills. Environmental education tends to use more subtle approaches, through scientific investigations in the outdoor environment, guided nature walks, and explorations of natural environments in order to develop environmental knowledge and thinking skills.

Children experience nature through exploration of the world around them but are limited by the opportunities provided to them by adults. Classic work by Chawla (1999) shows that many ecologists remember experiences outdoors as children and even note these experiences as one of the reasons why they chose their current careers. These stories can also be found anecdotally, including an unusual story about shooting seagulls on the beach which illustrates the experiences in nature and even destruction of nature experienced by a young John Muir that helped him to develop as a conservationist (Sobel, 2012). Sobel goes on to suggest this ability to be destructive with nature may even help to increase a child's connection to nature (2012).

Louv (2005) suggests people in many western cultures lack exposure to the natural world to such an extent they are suffering from "nature-deficit disorder." This disorder derives from lack of exposure to nature impacting the person's ability to function. Indeed, many studies have shown health benefits for individuals who spend time in nature, including greater attention (Kuo, & Taylor, 2004), increased sense of well-being (Nisbet, et al., 2011; Zhang, Howell & Iyer, 2014) and better overall health (Keniger, Gaston, Irvine & Fuller, 2013). If, in fact, humans are suffering from nature-deficit disorder, it would seem reasonable that this lack of exposure to nature is causing it. Reasoning suggests that outdoor exposure is the solution, but a large collective assumption exists that simply taking children outside and talking about the environment should fix this disconnect, particularly with "careful planning and facilitation of the nature experience" (Preston, 2004, para. 4). If this is the case, then with increased outdoor exposure, connection to nature should increase. This increase should also result in an increase in positive environmental attitudes and positive environmental behaviours over the long term.

The family environment and experiences in nature

Malone (2007) argues that due to parental anxieties, many middle class parents in Australia restrict children's outdoor activities to the point that it negatively affects their social, psychological, cultural, and environmental knowledge and skills. For example, a national study found that 1 in 20 Australian children reported never leaving inside their homes to play (Allen & Hammond, 2005). In another study involving four to eight year old children living in Victoria, cameras were given to children to reflect the places they went and activities in which they participated. Half of the 50 children included pictures of driving in the backseat of a car (Malone, 2006). It can be argued that "protectionist paradigms" of parenting and the phenomenon of "bubble wrapping" children is dramatically affecting children's experiences of their environment and their foundation

for environmental knowledge (Malone, 2007).

Chawla and Cushing (2007) have shown a convincing relationship between extensive childhood experiences in nature and the formation of pro-environment beliefs and lifestyles later in life. Research findings suggest that participation in nature activities during childhood, as well as examples of parents, teachers and other role models who show an interest in nature, are key factors that predispose people to become interested and active in nature in the future (Chawla & Cushing, 2007). Research has shown that adults repeatedly attribute their environmental interests or action extended time spent outdoors in natural areas during childhood, as well as parents or other family members who role-modelled action in the environment (Chawla, 1999). In a study of adult environmentalists in Norway and the US (Chawla, 1999), it was found that most attributed their early childhood experiences and experiences within the family as being important to predisposing them to particular attitudes regarding nature. This, then, influenced them to take up career opportunities in the environmental field.

The early childhood education environment and experiences in nature

Although there has recently been an emphasis by researchers on school-based environmental education, there has been very little research focused on early childhood education and environmental education (Elliot & Davis, 2009; Edwards & Cutter-Mackenzie, 2011). However, the importance of environmental sustainability and connection to nature are emphasized in Australia's national early childhood curriculum document, The Early Years Learning Framework (EYLF) (Department of Education, Employment and Workplace Relations [DEEWR], 2009). Environmental education is referenced in relation to 'Learning Environments' as an aspect of practice, and as a subcategory of Learning Outcome Two: 'Children are connected with and contribute to their world' (Edwards & Cutter-Mackenzie, 2011). This outcome refers to a specific subcategory of environmental education; namely, 'children become socially responsible and show respect for the environment'. The emphasis on environmental education in the EYLF highlights recent policy developments in which environmental education is viewed to be important in children's early learning experiences (Department of the Environment, Water, Heritage and Arts, 2009; United Nations Educational, Scientific and Cultural Organisation [UNESCO], 2008). Despite the emphasis on environmental education in the EYLF, Elliott and Davis (2009) argue that there are very few early childhood centres or kindergartens in Australia (and internationally) that demonstrate exemplary environmental education and sustainability practices.

Research aims

Children today have fewer opportunities to spend time in nature compared to 20-30 years ago and often, this time in nature requires explicit and purposeful adult planning (Golden, 2010; Torquati & Barber, 2005), possibly resulting in 'Nature deficit disorder' (Louv, 2005, p. 36). Early childhood is a critical time to encourage children's

connectedness to nature because it is a time where children are naturally curious (Torquati, Gabriel, Jones-Branch, & Leeper-Miller, 2011). Experiences in the natural world can help children understand life cycles, make predictions, understand seasons, and develop an awareness of the interdependence between plants, animals, rain and sun (Torquati et al., 2011). Captivating children's interests in nature during early childhood, particularly within the family setting, can nurture positive dispositions toward nature that can last into adulthood (Chawla, 1998).

Based on this evidence, the aims of the current study are: to explore beliefs, behaviours and practices related to exploration of the natural environment. Specifically, we seek to understand how adults' early experiences in nature, particularly unstructured experiences, relate to their attitudes and practices in providing such experiences for young children.

METHODS

This research project was funded by an internal University sustainability grant, titled "Green Kids: Developing Children's Knowledge of Environmental Sustainability Through Learning About Bush Tucker and Bush Walking." Ethics approval was obtained by the university ethics committee. Informed consent was explained in detail in the initial advertisement. Implied consent was granted by submitting anonymous surveys. All participants were advised that they were able to terminate participation by contacting the researchers at any time during and after participation in the research study. Anonymity was maintained by assigning numeric codes to each survey.

Data gathering

Staff and families were located in a regional city in New South Wales, Australia, which has a population of approximately 88,000 people. Seventy three families (including thirteen staff members) from an early childhood service on the university campus were invited to participate. Information sheets were emailed to families and hard copies were distributed to staff pigeon holes. A link was provided for participants to access an online survey via SurveyMonkey.com if they chose to participate.

Staff and parents completed the Inclusion of Nature in Self Scale (Schultz, 2002) and the Nature Relatedness Scale – Short Form (Nisbet et. al, 2009; Nisbet & Zelenski, 2013) One of the first scales used to measure connection to nature was the Inclusion of Nature in the Self (INS) scale (Schultz, 2001, 2002). This scale consists of one pictorial question and builds upon the earlier scale for inclusion of other in the self (IOS) developed to evaluate interpersonal relationships (Aron, Aron, & Smollan, 1992). This scale has been widely used and evaluated and consistently scores well for reliability over time (Bruni, Fraser, & Schultz, 2008; Liefländer, Fröhlich, Bogner, & Schultz, 2012; Schultz, 2002). The Nature Relatedness (NR) scale was created by Nisbet, Zelenski and Murphy (2009) to create a more deep understanding of the "affective, cognitive, and physical relationship

individuals have with the natural world” (Nisbet et al., 2009). This scale is a relatively new scale and has been used on a limited basis, though more examples continue to emerge in the literature of its use (Nisbet, Zelenski & Murphy, 2011). The philosophical concept behind these scales encompasses the historical and modern idea of connection to nature and attempts to capture empirically that which has previously been captured anecdotally and qualitatively. These responses and those of other quantitative questions are described using descriptive statistics.

Questions regarding adults’ knowledge and behaviour on gardening and sustainability topics were also included. Two items from the full-length survey are presented. “Do you have memories of spending meaningful time outside as a child?” and “Describe the ways in which you create opportunities for children to learn about nature and environmental sustainability.” Identifying information (eg. Names and Towns) was removed during data analysis. Data were systematically reviewed to identify themes within each set of answers to the questions and coded, then analysed for overarching concepts within the data (Glaser & Strauss, 2009) that might connect underlying themes between the two different questions and the responses.

RESULTS

About the sample

The survey was distributed as noted above to approximately 73 parents and educators at the early childhood service for children ages six weeks to six years. A total of 33 responses were received, for a return rate of approximately 45% but not all participants answered all questions. All but one respondent was female (n=31 female, n=1 male), and all had finished at least Year 12, with 12 having obtained a postgraduate degree of some kind. The survey participants consisted of about two thirds parents of children attending the early childhood service and about half staff with some overlap due to parents who also worked at the centre.

All participants chose important, 4, or very important, 5 (n=32) to the question: ‘How important is it to you that children gain experiences outdoors in nature?’ with a mean response of 4.94 (sd=0.25). This sample represents a group of parents and teachers who are highly educated and who want children to have experiences outdoors in nature. These results may not reflect those of a sample of parents and teacher who are not similar in gender, education, locale and importance placed on natural interaction.

Connection to nature and environmental behaviours

Out of this sample, 32 participants completed the two connection to nature scales included in the online survey. This group of parents and educators averaged a 3.99 (sd=0.75) out of 5 on the NR Short Form scale and a 4.5 (sd=1.37) out of 7 on the INS scale. These results indicate our sample may be more connected to nature overall,

though a comparative sample is unavailable. The early childhood service is located on a university campus marketed as sustainable, so therefore may attract parents and teachers who are more connected to nature overall.

The respondents to this survey also seem to place strong positive values on the environmental behaviours indicated in Figure 1. Parents and early childhood educators think each of the environmental behaviours listed are at least 'somewhat important' with the exception of 'buying organic food' and 'alternative transportation.' These results are not unexpected given that results of a similar survey with residents local to this suburb also placed less importance on these two factors (Laird & Black, 2013).

Caring and gardening

The respondents were quite familiar with caring activities and only five indicated they did not garden as children and only six did not give examples of their gardening experiences. Almost all respondents to this survey, indicated that they have taken care of an indoor plant (n=32) or a household pet (n=31) (see Figure 2). More than half had taken care of chickens and farm animals and planted trees, ornamental plants and vegetable gardens. Only a small percentage had ever taken care of native animals, but in Australia this sort of care might require a special license or certification and would not be common. Some of the gardening experiences are included in the discussion below regarding open-ended responses. It should be noted that gardening experiences for children are largely supervised by adults, but that they could classify as a structured or unstructured activity in which children participate. The structure of a gardening activity largely depends on the adult supervising the activity and the amount of freedom they provide to the children to explore, pick and dig. Here we assumed gardening was a more unstructured activity, as it was managed in that way at the early childhood centre participating in the study.

Parent and teacher childhood experiences and opportunities they create for children

This section discusses two open-ended response questions used for analysis in this paper. Parents and teachers were asked to describe their outdoor experiences as children and in a separate question in the survey described current opportunities they create for children outside. Results were grouped into themes and described below.

Caring activities including helping in the garden or with the animals. About half of the survey respondents (17) indicated that they provide opportunities for children to help in the garden or feed the animals in caring activities. Many indicated strong encouragement for children to participate in caring activities specifically for the purpose of caring about the earth. One respondent noted,

'It is important that they get to grow and care for and become responsible for their local environment so they can develop ideas about the greater environment around us.'

Other caring behaviours were more simple and involved direct action such as one respondent who noted a simple caring act:

'We rescue worms from the gutters and put them on the garden at home.'

Many respondents noted they have their children help with gardening duties or feeding animals such as chickens. Caring for gardens and animals was reflected in the childhood memories of experiences parents shared. Approximately one third of respondents (10) indicated that they had childhood memories of experiences caring for plants or animals. Childhood experiences of respondents included helping parents or grandparents in the garden, helping collecting firewood for winter and feeding or caring for livestock, including chickens.

Consumptive behaviours and collecting. Eight participants indicated that, as children, they participated in consumptive outdoor behaviours, such as berry picking or harvesting, but only half of that number indicated they provide that same experience for children. Adults remembered such activities as "fishing for yabbies," "picking feral fruit," "collecting eggs," and "catching anything and everything." Three participants noted they provide opportunities for children to pick fruit or vegetables from a garden and one noted "catching yabbies" as something they encourage children to do while outside.

Destructive or constructive play. Fourteen participants indicated they had, as children, engaged in some sort of engineering destructive or constructive behaviour, such as cubby house building, digging, making "things" and artistic creations and catching bugs. Specific experiences recalled include "using plants (particularly flowers) in our dramatic play," "digging holes and burying objects," "playing with insects," and many mentioned building and making their own cubby houses and one even noted "building bunkers underground." Opportunities provided to children for destructive or constructive behaviour were less common (11 participants). Noted were: "make things," "making collages from natural things we find on walks," and "digging in the garden," and "making piles out of rocks." A few participants noted encouraging the opposite of destructive behaviours, such as "bug catchers but then letting them go" and "respect for animals and plants (gentle behaviours)."

Appreciation, enjoyment, spiritual (includes bushwalking). Twenty participants indicated they enjoyed their experiences outdoors as children, either spiritually, just that it was fun or that they were walking aimlessly to enjoy being outdoors. Specific examples include "going for walks with siblings," "walking barefoot," "spend all day outside playing in the trees," and "lying on the soft grass looking up at the sky." One

participant even said directly, "I really enjoyed playing outside as a child." Only 8 respondents indicated that this sort of experience is one they try to provide for children. These responses mostly consisted of noting bushwalks or playing outdoors for enjoyment. One adult noted,

"I think he really enjoys this one on one time with nature, where he is allowed to just 'be' with nature."

Unsupervised exploration or freedom. Nineteen participants indicated that unsupervised play, exploration and freedom were part of their childhood experiences outdoors in nature, but only 6 participants indicated they try to include these experiences into what they provide for children. Recalled experiences included memories such as, "played in the farm paddocks at the end of our street," "childhood spare time was spent in the bush," "leaving the house and not returning until dinner time," and "being able to roam free, explore." Many participants noted that they feel like they spent a lot of time or a large percentage of their childhood outdoors. There were at least two adults who recalled being "locked outside" daily to play particularly during the summer. Many of the opportunities provided for children fell under the idea of allowing children to explore their environment, but only one participant noted they allow children to have time free of supervision.

Along with this concept of unsupervised play, there was also a sense in the childhood experiences, mentioned several times by the participants that they learned about awareness, limitations and control of their own bodies through their explorations outdoors as a child, including a sense of pride in achievements. This aspect of outdoor play was not listed as something provided in experiences for children.

Teaching about the outdoors. Many participants indicated they try to provide lessons for children while outdoors, but no one remembered an experience where they were outside as a child with an adult who provided similar lessons. Examples of opportunities noted include, "looking and talking about the trees, birds, sky, etc.," "explaining to them why what we are seeing is important," "need to understand the needs of the environment where we live," "we show him things/animals and explain what they are and what they do" and that nature is the "best place to learn and experience." The focus of these comments is overwhelmingly using nature to illustrate points about the environment and sustainability to children. The answers seem to indicate there is a good deal of time spent telling children why nature is important while outside.

DISCUSSION AND CONCLUSIONS

The participants in this study expressed a strong connection to nature themselves and valued children having experiences outdoors in nature. They also had rich experiences in the outdoor environment and fond memories from their own childhoods of being

outdoors in a variety of situations. According to previous studies, a feeling of connection to nature predicts pro-environmental attitudes and pro-environmental behaviours (Brügger, et al., 2011; Mayer & Frantz, 2004; Nisbet, et al., 2009; Schultz, et al., 2004) and formative outdoor experiences predict pro-environmental behaviours as well (Chawla, 1998; 1999). Thus, it is surprising that although the participants in our study discussed various ways they encourage experiences with nature for children, they did not emphasise unstructured exploration of nature, even though they themselves had fond memories of this as children.

In line with Davis (2005) and Louv (2005), our sample seems to reflect a decrease in unstructured, unsupervised play in the outdoors, with participants indicating that although they had many unstructured experiences in nature as children, they may not be providing similar experiences for today's children. Although they reported that they encourage children's experiences in nature, these experiences were largely supervised and structured. What are the impacts of this lack of independent exploration and freedom in the natural environment?

Sobel (2012) suggests that the "don't touch" mentality of many environmental educators has created a situation where children do not get the chance to participate in the destructive play so often described by many older generations in their childhood stories. Our data show this destruction was a common experience for participants in their own childhood, yet they reported providing limited opportunities for children to do the same. Even when catching bugs, there is sure to be a lesson for the child in "respect for animals and plants (gentle behaviours)."

In addition to promoting an appreciation for nature, unsupervised outdoor play may also promote risk taking behaviour. Risk taking experience in early childhood is now seen as crucial for developing a well-rounded ability to accurately assess potential risks as children get older, as well as developing social competence (Greenfield, 2004). Tranter (2005) suggests that children need freedom to take risks in play because it allows them to test their own limits in the physical, social and emotional domains. There is some concern that children do not currently participate in risk-taking experiences until much later in life. Little and Wyver (2008) suggest that adults' fears about the unknown and concern for children's safety has resulted in overprotective parenting, whereby risk taking behaviour is discouraged. Furedi believes this perception of risk as something bad that needs to be avoided is a recent phenomenon, whereas once 'taking risks was seen as a challenging aspect of children's lives' (Furedi, 2001, p. 25).

Our findings related to unstructured experiences in nature also have implications for early childhood education settings. In the present study, gardening, animal care, bush walking and general free play in nature were identified as important learning opportunities for children, which must be facilitated by early childhood educators. However, although such unstructured experiences in nature are recognised as being

important for children, with the current focus on health and safety, as well as fears of litigation in early education settings today, unsupervised and unstructured play is not always encouraged. New, Mardell and Robinson (2005) suggest that these concerns are seriously impacting on early childhood educators' provision of activities and opportunities for risk taking behaviour. 'Whether out of fears that children will actually come to serious harm or, more likely, to avoid accusations of irresponsibility, teachers now maintain constant supervision over children's activities even as they discourage or avoid potentially "unsafe" activities' (New et al., 2005, p. 4). The problem with limiting such opportunities is that it denies children the opportunity to learn about risk and how to manage it in the real world (Shepherd, 2004).

The present study does have some limitations which will impact generalizations of the findings. Firstly, the sample was very highly educated and was drawn from a children's service situated on a University campus known for its emphasis on environmental sustainability. Thus, this study could be replicated at different centres with variable socio-economic and demographic representation and data compared between the two groups. Secondly, it was not possible to ascertain which participants were parents and which were educators. Future studies could examine more specifically how families and early childhood educators can work together to support authentic experiences for children in the natural environment, with an emphasis on an awareness of sustainable practices. Additionally, the perspectives of career educators could be incorporated into future studies to elucidate ways in which regulations have impacted upon children's nature exploration and risk taking opportunities.

The importance of allowing children to have unsupervised access to natural play areas is still being determined by researchers worldwide. In Australia, it seems that little progress has been made towards creating "unsupervised" play opportunities for children in the early childhood setting. As adults begin to remember their own childhood experiences outdoors and feel the excitement they once felt at building their first cubby house or finding their first beetle, it can be difficult to understand why they do not want similar experiences for their own children. Perhaps more emphasis should be placed on working through environmental education with parents and families in order to educate them on how to create wild play areas in their own backyards, blocks or local parks. Much more research is needed to understand if these early childhood experiences with unsupervised nature play can create a citizenry more connected to nature and the land and more importantly to see if children lacking these experiences will become as excited about the environment as previous generations and still seek to protect it.

References

- Allen, E. & Hammond, P. (2005, February 14) Modern kids prefer the great indoors, *The Courier Mail*, Brisbane, p. 1.
- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, 63(4), 596-612. doi: 10.1037/0022-3514.63.4.596.
- Brügger, A., Kaiser, F. G., & Roczen, N. (2011). One for all?: Connectedness to nature, inclusion of nature, environmental identity, and implicit association with nature. *European Psychologist*, 16(4), 324-333. doi: 10.1027/1016-9040/a000032.
- Bruni, C. M., Fraser, J., & Schultz, P. W. (2008). The value of zoo experiences for connecting people with nature. *Visitor Studies*, 11(2), 139-150.
- Campbell, C. & Jobling, W. (2012). *Science in early childhood*. Melbourne: Cambridge University Press.
- Chawla, L. (1998). Significant life experiences revisited: A review of research on sources of environmental sensitivity. *The Journal of Environmental Education*, 29(3), 11-21.
- Chawla, L. (1999). Life paths into effective environmental action. *The Journal of Environmental Education*, 31(1), 15-26.
- Chawla, L. & Flanders Cushing, D. (2007). Education for strategic environmental behaviour. *Environmental Education Research*, 13(4), 437-452. doi: 10.1080/13504620701581539.
- Conn, S. A. (1998). Living in the earth: Ecopsychology, health and psychotherapy. *The Humanistic Psychologist*, 26(1-3), 179-198. doi: 10.1080/08873267.1998.9976972.
- Davis, J. (2005). Educating for sustainability in the early years: Creating cultural change in a child care setting. *Australian Journal of Environmental Education*, 21, 47-55.
- Department of Education, Employment and Workplace Training [DEEWR] (2009). *Belonging, Being and Becoming: The Early Years Learning Framework for Australia*. Canberra, ACT. Commonwealth of Australia.
- Department of the Environment, Water, Heritage and the Arts (2009). *Living Sustainably: The Australian Government's National Action Plan for Education for Sustainability*. Canberra, ACT: Author.

- Edwards, S. & Cutter-Mackenzie (2011). Environmentalising early childhood education curriculum through pedagogies of play. *Australasian Journal of Early Childhood*, 36(1), Retrieved from http://www.earlychildhoodaustralia.org.au/australian_journal_of_early_childhood/ajec_index_abstracts/environmentalising_early_childhood_education_curriculum_through_pedagogies_of_play.html.
- Elliot, S. & Davis, J. (2009). Exploring the resistance: An Australian perspective on educating for sustainability in early childhood. *International Journal of Early Childhood*, 42(2), 65-77.
- Ernst, J., & Theimer, S. (2011). Evaluating the effects of environmental education programming on connectedness to nature. *Environmental Education Research*, 17(5), 577-598. doi: 10.1080/13504622.2011.565119.
- Furedi, F. (2001). *Paranoid parenting: Abandon your anxieties and be a good parent*. London: Penguin.
- Glaser, B. G., & Strauss, A. L. (2009). *The discovery of grounded theory: Strategies for qualitative research*. Transaction Publishers.
- Golden, A. (2010). Exploring the forest: Wild places in childhood. *Voices of Practitioners*, 12, 1-11. Retrieved from: www.naeyc.org/publications/vop/articles.
- Greenfield, C. (2004). 'Can run, play on bikes, jump the zoom slide, and play on the swings': Exploring the value of outdoor play. *Australian Journal of Early Childhood*, 29(2), 1-5.
- Hartig, T., Evans, G. W., Jamner, L. D., Davis, D. S., & Garling, T. (2003). Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology*, 23(2), 109-123. doi: 10.1016/s0272-4944(02)00109-3.
- Joye, Y., & van den Berg, A. (2011). Is love for green in our genes? A critical analysis of evolutionary assumptions in restorative environments research. *Urban Forestry & Urban Greening*, 10(4), 261-268. doi: 10.1016/j.ufug.2011.07.004.
- Keniger, L. E., Gaston, K. J., Irvine, K. N., & Fuller, R. A. (2013). What are the benefits of interacting with nature? *International Journal of Environmental Research and Public Health*, 10(3), 913-935.
- Kuo, F. E., & Taylor, A. F. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: evidence from a national study. *American Journal of Public Health*, 94(9), 1580.

- Laird, S. G., & Black, R. (2013). Thurgoona and Wirlinga Community Understanding & Knowledge of Biodiversity. Retrieved from http://www.alburyconservationco.org.au/wp-content/uploads/2013/10/Thurgoona-Wirlinga_Community_Biodiversity_Laird2013.pdf.
- Lekies, K. S., & Beery, T. H. (2013). Everyone needs a rock: Collecting items from nature in childhood. *Children Youth and Environments*, 23(3), 66-88.
- Liefländer, A. K., Fröhlich, G., Bogner, F. X., & Schultz, P. W. (2012). Promoting connectedness with nature through environmental education. *Environmental Education Research*, 1-15. doi: 10.1080/13504622.2012.697545.
- Little, H. & Wyver, S. (2008). Outdoor play: Does avoiding the risks reduce the benefits? *Australian Journal of Early Childhood*, 33(2), 33- 40.
- Louv, R. (2005). Last child in the woods: Saving our children from nature deficit disorder. Chapel Hill, NC: Algonquin Books.
- Malone, K. (2006) *Building a child friendly community children's research workshops pilot study report, City of Bendigo*. Wollongong, University of Wollongong.
- Malone, K. (2007). The bubble-wrap generation: Children growing up in walled gardens. *Environmental Education Research*, 13(4), 513-527.
- Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, 24(4), 503-515. doi: 10.1016/j.jenvp.2004.10.001.
- New, R. S., Mardell, B., & Robinson, D. (2005). Early childhood education as risky business: Going beyond what's 'safe' to discovering what's possible. *Early Childhood Research and Practice*, 7(2), ecrp.uiuc.edu/v7n2/new.html.
- Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2009). The nature relatedness scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior*, 41(5), 715-740. doi: 10.1177/0013916508318748.
- Nisbet, E. K., & Zelenski, J. M. (2013). The NR-6: A new brief measure of nature relatedness. *Frontiers in Psychology*, 4. doi: 10.3389/fpsyg.2013.00813.

- Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2011). Happiness is in our nature: Exploring nature relatedness as a contributor to subjective well-being. *Journal of Happiness Studies*, 12(2), 303-322. doi: 10.1007/s10902-010-9197-7.
- Perrin, J. L., & Benassi, V. A. (2009). The connectedness to nature scale: A measure of emotional connection to nature? *Journal of Environmental Psychology*, 29(4), 434-440. doi: 10.1016/j.jenvp.2009.03.003.
- Preston, L. (2004). Making connections with nature: bridging the theory--practice gap in outdoor and environmental education. *Australian Journal of Outdoor Education*, 8(1), 12.
- Schultz, P. W. (2001). The Structure of Environmental Concern: Concern for Self, Other People, and the Biosphere. *Journal of Environmental Psychology*, 21(4), 327-339. doi: 10.1006/jevpe.2001.0227.
- Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck & P. W. Schultz (Eds.), *Psychology of sustainable development*. Dordrecht: Kluwer Academic Publishers.
- Schultz, P. W., Shriver, C., Tabanico, J. J., & Khazian, A. M. (2004). Implicit connections with nature. *Journal of Environmental Psychology*, 24(1), 31-42. doi: 10.1016/s0272-4944(03)00022-7.
- Shepherd, W. (2004). Children's services: Dangerous places for children? *Rattler*, 69 (Autumn), 23-26.
- Sobel, D. (2012). Look, don't touch--The problem with environmental education. *Orion*.
- Thomas, G. & Thompson, G. (2004). A child's place: Why environment matters to children: A green alliance demos report. Retrieved from: <http://www.green-alliance.org.uk/uploadedFiles/Publications/A%20Childs%20Place%20Final%20Version.pdf>.
- Torquati, J. & Barber, J. (2005). Dancing with trees: Infants and toddlers in the garden. *Young Children*, 60(3), 40-46.
- Torquati, J.C., Gabriel, M., Jones-Branch, J., & Leeper Miller, J. (2011). Environmental Education: A Natural Way to Nurture Children's Development and Learning. In A. Shillady (Ed.), *Spotlight on Young Children and Nature* (pp. 8-14). Washington, DC: NAEYC.

Tranter, P. (2005, November). *Strategies for building child friendly cities*. Paper presented at the Creating Child Friendly Cities Conference, Melbourne. [www.envict.org.au/file/Paul Tranter.pdf](http://www.envict.org.au/file/Paul%20Tranter.pdf).

United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2008). *The contribution of early childhood education to a sustainable society*. Paris: UNESCO.

Van Den Berg, A. E., Hartig, T., & Staats, H. (2007). Preference for nature in urbanized societies: Stress, restoration, and the pursuit of sustainability. *Journal of Social Issues*, 63(1), 79-96. doi: 10.1111/j.1540-4560.2007.00497.x.

Wilson, E. O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.

Zhang, J. W., Howell, R. T., & Iyer, R. (2014). Engagement with natural beauty moderates the positive relation between connectedness with nature and psychological well-being. *Journal of Environmental Psychology*, 38, 55-63.

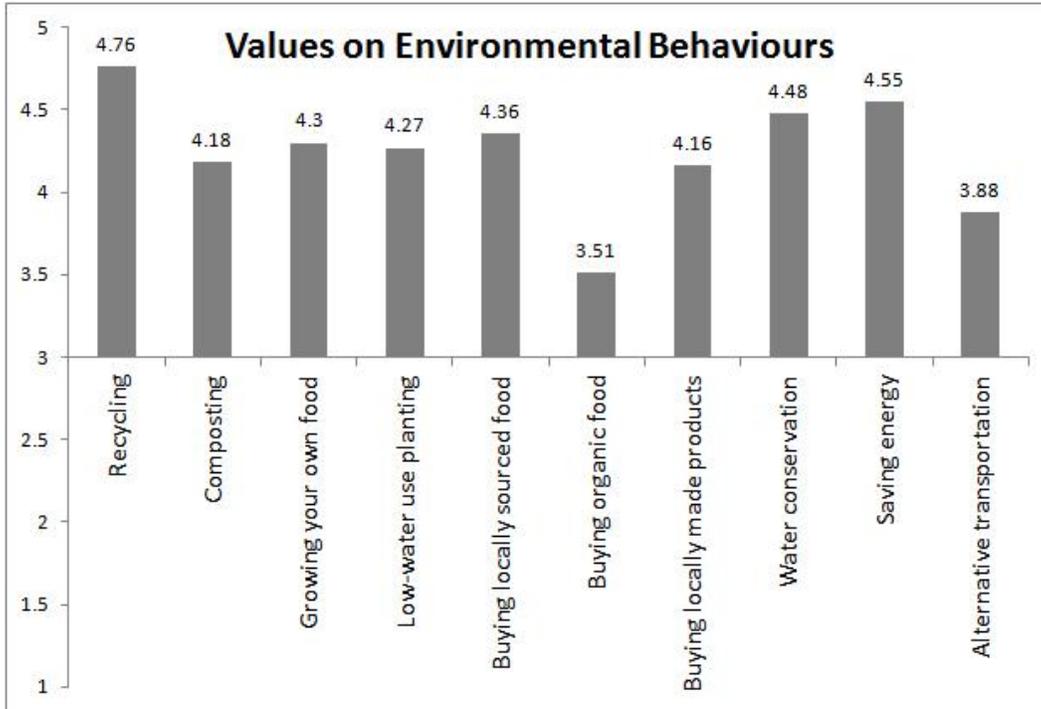


Figure 1. Values on environmental behaviours. Each respondent was asked how important each environmental behaviour was to them (n=33), with a 5 indicating it was “very important” and a 1 indicating “very unimportant”.

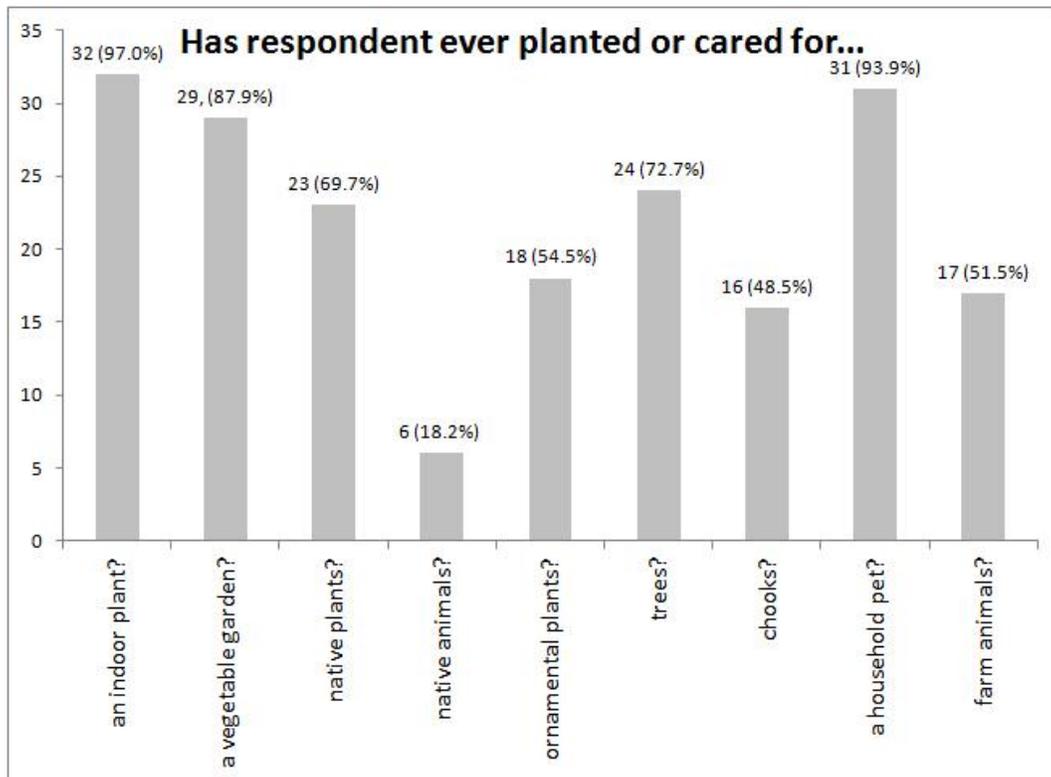


Figure 2. Caring behaviours. Each respondent was asked if they have ever cared for the plant or animal types listed (n=33). Responses indicate total numbers of participants indicating a “yes” for care.

Dr. Shelby Gull Laird is a Lecturer in the School of Environmental Sciences and Institute of Land, Water and Society at Charles Sturt University, Albury, NSW, Australia. She can be reached at shelby.gull.laird@gmail.com.

Dr. Laura McFarland-Piazza is a Lecturer in the School of Education at Charles Sturt University, Albury, NSW, Australia. She can be reached at lpiazza@csu.edu.au.

Dr. Sydnye Allen is the former Director at Murray Childcare Centre and Adjunct Lecturer in the School of Teacher Education at Charles Sturt University, Bathurst, NSW, Australia. She can be reached at sdyanallen@gmail.com.