

QUT Digital Repository:  
<http://eprints.qut.edu.au/>



This is the accepted version of this journal paper:

Brymer, Eric George and Cuddihy, Thomas and Sharma-Brymer, Vinathe (2010) *The role of nature-based experiences in the development and maintenance of wellness*. *Asia-Pacific Journal of Health, Sport and Physical Education* , 1(2). pp. 21-27.

© Copyright 2010 Australian Council for Health, Physical Education  
and Recreation Inc.

## **The Role of Nature-Based Experiences in the Development and Maintenance of Wellness**

Eric Brymer, Thomas F. Cuddihy, Vinathe Sharma-Brymer

Institute of Health and Biomedical Innovation and School of Human Movement  
Studies

Queensland University of Technology,

Brisbane

QLD Australia 4059

Correspondence:

Dr Eric Brymer

School of Human Movement Studies

Queensland University of Technology

Kelvin Grove Campus

Brisbane, QLD Australia 4059

[Eric.brymer@qut.edu.au](mailto:Eric.brymer@qut.edu.au)

Ph: 61 7 31383511

**Words: 6629**

### **Abstract**

Wellness is now seen as central to redefining the National Health agenda. There is growing evidence that contact with nature and physical activity in nature has considerable positive effects on human health. At the most basic level humanity is reliant on the natural world for resources such as air and water. However, a growing body of research is finding that beyond this fundamental relationship exposure to the non-human natural world can also positively enhance perceptions of physiological, emotional, psychological and spiritual health in ways that cannot be satisfied by alternate means. Theoretical explanations for this have posited that non-human nature might 1) restore mental fatigue, 2) trigger deep reflections, 3) provide an opportunity for nurturing and 4) rekindle innate connections. In this paper the authors show how human wellness is strongly connected to their relationship with the natural world. This paper points to how non-human nature could be better utilised for enhancing human health and wellness.

**Key words:** Health, wellness, natural world, ecopsychology

## **Introduction**

*“Send your children out to renew themselves, so to speak, send them to regain in the open fields the strength lost in the foul air of our crowded cities”*

*(Rousseau, 2008, p. 40, trans. 2008)*

The natural environment has a profound influence on human health (Barton & Pretty, 2010; Brymer, 2009; Brymer & Oades, 2009; Brymer, Schweitzer, & Sharma-Brymer, 2010; Gorrell, 2001; Leather, Pyrgas, Beale, & Lawrence, 1998; Maas et al., 2009; Maas, Verheij, Groenewegen, de Vries, & Spreeuwenberg, 2006; Maller et al., 2008; Reser, 2008; Townsend & Moore, 2005; Weber & Anderson, 2010). In a recent review of the health benefits of exposure to nature Maller et al. (2008) stated: “That the natural environment is a key determinant of health is unquestionable” (p. 5). This is also recognised by the Australian Psychological Society and outlined in a position statement published in 2008 which stated “It is clear that the well being and integrity of natural ecosystems and the biophysical environment are integral to human health and well being” (Reser, 2008, p.4). At the most basic level humanity is reliant on the natural world for resources such as air and water. However, a growing body of research is finding that beyond this fundamental relationship exposure to the non-human natural world can also positively enhance perceptions of physiological, emotional, psychological and spiritual health in ways that cannot be satisfied by alternate means (Burls, 2007; Herzog & Strevey, 2008; Louv, 2009b; Maller et al., 2008; Pryor, Townsend, Maller, & Field, 2006; Roszak, 1992; Schultz, 2002; Townsend & Moore, 2005; Wilson, 1984).

However, since the industrial revolution, the development of an urbanised lifestyle has reduced opportunities for contact with the natural world (Maller et al., 2008; Townsend & Moore, 2005). Recently, the Australian Bureau of Statistics (Australian Bureau of Statistics, 2006a, 2006b) reported that adults spend less than 20 minutes per day outdoors. Conversely, more than half of their daily leisure time, two hours and twenty minutes, was spent on audio-visual media (Australian Bureau of Statistics, 2006a, 2006b). In 1997 Australian adults reported spending approximately 27 minutes a day outdoors and 130 minutes a day on audio visual media (Australian Bureau of Statistics, 2006a, 2006b). This trend of decreased time outdoors is continuing.

Research focusing on young people also shows that young people are spending less time outdoors (Hofferth & Sandberg, 2001; Rydberg, 2007a, 2007b). Hofferth and Sandberg (2001) reported that American children under the age of 12 years spent on average 34 minutes a week outdoors compared to 12 hours a week watching television. Between 1997 and 2003 the proportion of 9-12 year olds who spent time playing outside declined by 50 percent (St George, 2007). Louv (2008) considered this disconnection a crisis which he termed “Nature Deficit Disorder.”

Essentially, a growing body of research from disciplines such as psychiatry, ecology, psychology, planning, medicine, health, leisure and recreation is demonstrating that the natural world is essential for human health. The aim of this article is to outline how the natural world influences one aspect of the health continuum, human wellness.

### **Human Wellness and the Common Dimensions: A Brief Overview**

As a holistic concept wellness is still a developing field of study and as such definitions of wellness have evolved over time. However, the core of the “human wellness” concept is the promotion of a positive and optimal state of health. For the

purposes of this article human wellness is defined as the “positive component of optimal health” (Corbin, Welk, Corbin, & Welk, 2009, p. 4). Thus, human wellness focuses on the development of a lifestyle that encourages ultimate health. Whereas good health might be considered as freedom from illness and disease, wellness is about continuing the journey towards an optimal state of individual health (Corbin et al., 2009; Myers, Sweeney, & Witmer, 2000; Roscoe, 2009). From this perspective a focus on wellness is also a proactive approach to reducing the chances of illness, especially those that are associated with poor lifestyle (Corbin et al., 2009).

More specifically, human wellness is generally considered to be the integration of various dimensions that, when combined effectively, enhance an individual’s quality of life and their ability to contribute to society (Hettler, 1980). The most common of these dimensions are emotional wellness, physical wellness, social wellness, intellectual wellness, occupational wellness and spiritual wellness (National Wellness Institute, 2009). Whereas good health in each of these dimensions is characterised by freedom from illness, wellness is characterised by an individual’s journey to achieving optimal functioning (Corbin et al., 2009).

From this standpoint emotional wellness is therefore conceptualised as “an awareness and acceptance of feelings, as well as a positive attitude about life, oneself and the future” (Roscoe, 2009, p. 218). As such emotional wellness is not just freedom from emotional or mental illness rather emotional wellness is the ability to constructively and positively deal with personal feelings and daily events.

Physical wellness is about the proactive effort to maintain physical activity and good nutrition coupled with the maintenance of healthy lifestyle choices. Physical wellness is also about acceptance of physical states and a focus on the journey towards

realising personal potential (Roscoe, 2009; Sackney, Noonan, & Miller, 2000). A physically well person will be undertaking regular physical activity, making healthy dietary choices and effectively utilising medical services. Social wellness emphasises the quality of interactions with others. A socially well person cultivates effective relationships that enhance the quality of life for all people involved and is willing to both receive and give support (Corbin et al., 2009; Horton & Snyder, 2009). Intellectual wellness concerns learning for learning's sake. A person who is intellectually well searches for mental stimulation for its own sake (Horton & Snyder, 2009). Occupational wellness describes the fit between the work place and the worker. High occupational wellness correlates with high levels of perceived work satisfaction and life enrichment (Scheer & Lockee, 2003). Spiritual wellness is the realisation of a shared connection to a greater power and the search for purpose and meaning. A spiritually well person will feel fulfilled (Roscoe, 2009). In contrast to all the other dimensions spiritual wellness and spiritual health are considered synonymous (Corbin et al., 2009). Spiritual wellness is typically construed as being fundamental to all other wellness dimensions (Chandler, Holden, & Kolander, 1992).

In the following sections the authors first outline studies that demonstrate the link between human wellness and exposure to the non-human nature and then outline current theoretical explanations for these findings.

### **Nature and Wellness**

For centuries psychologists and philosophers have recognised the importance of the natural world to human health and wellbeing (Deloria, 1994; Dewey, 1958; Harvey, 2000; Jung, 2008; Knudtson & Suzuki, 1996; Marano, 2008; Watts, 1970; Watts, 2003). In recent years, the relationship between the natural world and health has been

explored from various perspectives. Examples include ecopsychology, outdoor education and recreation, wilderness and adventure experiences, “green exercise” (physical activity in green spaces), psychiatry, public health and horticulture (Brymer, 2009; Brymer & Cuddihy, 2009; Brymer & Oades, 2009; Brymer et al., 2010; Doucette, Ransom, & Kowalewski, 2007; Duncan, 1998; Herzog & Strevey, 2008; Noddings, 2006; Wilson, 1984). Researchers have described the benefits of viewing nature (Leather et al., 1998), connecting with nature (Kaplan & Talbot, 1983), green spaces in urban environments (Tzoulasa et al., 2007), brief encounters in nature (Hull, 1992; Woolley, 2003) and extended encounters in nature (Hull & Michael, 1994) and even the difference between exposure to virtual nature and actual nature (Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009). In the following sections the authors review literature that focuses on the role of the natural world for the development of human wellness.

Exposure to nature has been shown to improve emotional wellbeing and relieve stress (Leather et al., 1998), increase positive mood (Maller, Townsend, Pryor, Brown, & St Leger, 2006), enhance life skills (Mayer & Frantz, 2005), reduce mental fatigue and increase concentration (Maller et al., 2008) and reduce the tendency for aggressive behaviour (Kuo & Sullivan, 2001). Mayer, Frantz, Bruehlman-Senecal and Dolliver (2009) reported on three studies that examined the effects of exposures to nature on positive affect and the ability to reflect on a life problem. A 15 minute walk in a natural setting was compared to similar walk in an urban setting, watching a video of nature and watching a video of an urban setting. They found that both emotional wellness and the ability to reflect on a life problem were enhanced by exposure to actual and virtual nature as compared to urban settings. The influence of actual nature was most acute. They stated that besides the psychological benefits demonstrated



through their studies; their previous research also indicated that people who felt more connected to nature were more likely to demonstrate caring by engaging in eco-friendly acts.

Doucette, Ransom and Kowalewski (2007) described a winter camp of seven to ten days in the Canadian Arctic involving high school students between 1995 and 2006. The instructors included both aboriginal guides and non-aboriginal high school teachers and visiting university professors. The aim of the camp was to facilitate an experience where students were experientially introduced to “nature as nurture” for humanity as distinct from learning about nature in the class room. The authors concluded that teaching nature as nurture resulted in an improved ability to handle fear, improved self-confidence, improved self-reliance and improved understanding of the benefits of social cooperation.

The desire to seek out brief nature-based experiences is increasing (Eagles, 2001). While this trend has been in practice in the western countries for some time now mostly for leisure (Scherl, 1989), developing countries are catching up. This is especially true for young adults. One of the reasons is that wilderness experiences can increase perceived wellness in youth and young adults coming from fast-paced city lifestyle. Researchers have found that wilderness experiences improve self-perception (Young & Crandall 1984), measures of well-being (Russell, 2005), self-concept (Kaplan, 1984) and improved occupational, emotional, physical and intellectual wellness (Miner, 1990; Priest, 1990).

An early research finding, focusing on using wilderness activities for improving self-concept recommends the importance of long and continued wilderness participation (Schreyer, Williams, & Haggard, 1990). Schreyer et al. highlighted the role of

wilderness *values* in the process of self-concept formulation and concluded that wilderness settings are important for the enhancement of human wellness.

Other studies that demonstrate the positive role of being with nature include Gorrell's (2001) reflections on his experience of a 10-day Outward Bound course in the Costa Rica Rainforest. After the course, he wrote that he felt "a stronger sense of confidence and trust in myself" (2001, p.68). Interactions with animals (Antonioli & Reveley, 2005; Muscat, 2001), such as experiences with dolphins have been associated with developments in emotional and psychological wellness.

Natural or green spaces have also been shown to promote physical activity and physical wellness (Booth, Owen, Bauman, Clavisi, & Leslie, 2000; Pretty, Griffin, Sellens, & Pretty, 2003). A study carried out in Australia, found that moderate to energetic gardening can provide the level of physical activity necessary to reduce the risk of mortality in high risk groups (Holbrook, 2009). Research studies published in the UK, Europe and USA are increasingly finding that physical activity in green spaces have benefits beyond physical activity alone (Corkery, 2004; de Vries, Verheij, & Groenewegen, 2001; Giles-Corti & Donovan, 2003; MIND, May, 2007; Mitchell & Popham, 2007; News, NA; Pretty, Hine, & Peacock, 2006; Pretty et al., 2007; Pretty, Peacock, Sellens, & Griffin, 2005; Pryor, Carpenter, & Townsend, 2005; Rappe, Koivunen, & Korpela, 2008; Russell, 2002; Sempik, 2008; Takano, Nakamura, & Watanabe, 2002; Thompson, Corkery, & Judd, 2007). For example, Takano et al. (2002) found that nearby green spaces seem to encourage walking groups among senior citizens which also enhances their social and physical wellness. Pretty, Hine and Pretty (2007) found that a regular walk in an urban green space can increase subjective experiences of mental and emotional wellness. Buzzell (2008) described a

new social-environmental initiative designed to channel worry and concern about the future (eco-anxiety) into constructive and enjoyable community activities and actions.

A study carried out by MacKay & Neill (2009) investigated the effects of physical activity in green spaces on anxiety levels. They found that whilst intensity and duration did not impact on state anxiety, higher degrees of perceived “greenness” of the exercise environment were associated with greater reductions in state anxiety. The researchers suggested that green exercise warranted further investigation for its potential physical and mental health benefits. In particular they outlined the need for improved measuring and understanding of the role of the presence of greenery in the environment.

Harris (2009) reported that gardening provided an opportunity to develop self-esteem in refugee and migrant communities in Queensland. Other studies have shown that gardeners have a higher life satisfaction and rate their health and physical activity levels higher than non-gardeners (Waliczek, Zajicek, & Linebereer, 2005).

Horticultural activities (such as gardening) have also been linked to improved levels of social, physical and occupation wellness (D'Abundo & Carden, 2008).

The natural world can also foster social and occupational wellness (Greene, 2009; Ruter, 2009). Ruter (2009) showed how agriculture has been used for the development of social and occupational wellness in India. Community gardening and farming is employed to advance vocational opportunities and provide a means for fostering community peace and *mindful* association with nature. Greenleaf & Williams (2009) have argued for the use of ecological perspectives as a medium for supporting social justice advocacy, thus reflecting *mindful* practices for healthy community living. In addition, studies in the US have found that workers report less stress and higher job satisfaction if their workplace includes views of nature (Kaplan,

1993; Kaplan & Kaplan, 1989). These benefits seem to cross cultural boundaries (Greene, 2009; Ruter, 2009).

Researchers have established positive links between nature and improved behaviour in children and young adults (Banderoff & Scherer, 1994; Han, 2009; Humberstone & Lynch, 1991; Kuo & Taylor, 2004; Louv, 2009a; Noddings, 2006; Riebel, 2001; Robertson & Kiewit, 1998; Russell, 2002, 2003). Exploration in the outdoors, gardens, backyards, parks, wilderness and many such environments encourage and nurture curiosity, engagement, focused learning, mindfulness and reflective practice. (Han, 2009; Pretty et al., 2009; Said, 2006; Stolar, 2009; Ungar, Dumond, & McDonald, 2005; Wells, 2000). Taylor and others (Kuo & Taylor, 2004; Taylor, Kuo, & Sullivan, 2001) have also demonstrated that nature exposure has a positive influence on concentration and the behaviour of children diagnosed with Attention Deficit Disorder.

Research is also finding that opportunities to connect with nature when a child are important for the promotion of wellness for future adults. For example, Mayer and Frantz (2005) considered that opportunities to connect with nature in childhood promotes the value of green spaces for refuge from stress and anxiety (Mayer & Frantz, 2005).

The spiritual value of non-human nature has also been explored from various traditions including Hinduism, Sufi practice, Indigenous life practices, Tibetan Buddhist meditation, Taoist practices, Buddhist tradition and also Western philosophical conventions (Hughes, 2008; Jung, 2008; Watts, 1970). For example, Taylor (2000, 2001) argued that experiences as diverse as shamanic rituals and extreme sports can result in a connection with non-human nature. Such experiences promote an understanding of ultimate meaning and the realisation of the

transformative power of nature. However, for this to happen the experience generally promotes a shift from the current anthropocentric or materialistic understanding where nature is deemed to be *other* to humankind and valued only for its worth to humanity (Mathews, 2006; Vining, Merrick, & Price, 2008). Instead the experience advances a realisation that humanity is simply a part of the natural environment (Sanford, 2007; Taylor, 2007).

In summary, research is amassing considerable evidence that non-human nature has a profound influence on human wellness. Exposure to virtual nature, opportunities to view nature through a window, experiences of brief encounters with nature, programs that emphasise extended encounters with nature and even bringing nature indoors seems to be beneficial for at least one of the dimensions of wellness. However, as wellness is dependent on the effective integration of all the dimensions it would seem that the strongest nature-based experiences are those where a person is exposed to nature in such a way that there is an opportunity for actual contact and the development of feelings of connection to non-human nature. In the following section the authors outline some theoretical perspectives on how exposure to nature might facilitate optimum wellness.

### **Explanations for these Findings**

Explanations for the role of nature in human wellness cross biological, psychological and genetic boundaries (Pilisuk, 2001; Wilson, 1984). For example, Pilisuk (2001) argued that the natural world provides an essential opportunity to experience being part of a larger natural ecology and an opportunity for selfless caring, where caring and nurturing are considered core components of emotional wellness. For Wilson (1984) human beings are so deeply connected to non-human nature that all human

functions, including wellness, are dependent on a positive relationship to non-human nature.

Segal (1997) argued that the natural world might act as a mirror whereby events in the more-than-human natural world allow participants to reflect on their own thoughts and feelings. This in turn exposes a new sense of self awareness and emotional development. Duncan (1998) also reported that natural settings can enhance self awareness and acceptance. However, he considered that measuring and understanding the psychological benefits of visiting wilderness remains one of the least developed and understood bodies of knowledge about wilderness.

Kaplan (1995) argued that nature has an abundance of characteristics that are necessary for mental restoration. Specifically, Kaplan believed that everyday life is filled with events that require an immense amount of direct psychological attention. Eventually and inevitably this effortful attention leads to mental fatigue: “Mental fatigue occurs when after prolonged and intense use, the capacity to direct attention is reduced and the capacity to ward off distractions diminishes” (Berto, 2005, p. 249). Exposure to nature provides a refuge from the need for focused attention because nature-based experiences do not need direct psychological attention. Being in nature provides an opportunity for being away from the everyday, for opening up feelings of fascination, for providing a sense of *extent* (a sense of something larger) as well as a deep realisation of a special compatibility. All of which combine to bring about a restorative effect. Kaplan called this effect *Attention restoration theory*.

Ecopsychology has also been presented as a means to understanding the relationship between non-human nature and human beings. Following the approach of many of the “Wisdom” and “traditional” perspectives those espousing ecopsychology accept that

human beings are simply a part of nature (Winter & Koger, 2004). That is, from an ecopsychological perspective, nature and humanity are ineradicably linked and modern urban lifestyles are promoting an alienation from non-human nature. Optimal wellness can only be achieved through the experiential realisation of this relationship (Armstrong, 1995; Roszak, 1992). Thus, exposure to nature might provide opportunities to reconnect with non-human nature and, as a result, enhance wellness.

There is a deeply bonded and reciprocal communion between humans and nature. The denial of this bond is a source of suffering both for the physical environment and for the human psyche, and the realization of the connection between humans and nature is healing for both. (Davis, 1998, p. 5)

Exposure to non-human nature has benefits for a variety of wellness related constructs. Theoretical perspectives suggest a range of possibilities 1) contact with nature acts as a medium for restoration, 2) contact with nature provides an opportunity for emotional care, 3) nature provides a mirror for in-depth reflection or 4) contact with nature provides an opportunity to rekindle an innate union. That is theoretical perspectives point to broad possibilities as to why being in nature enhances wellness. However, while the evidence points to a positive relationship between exposure to nature and human wellness the nature of this relationship is still unclear (Maller et al., 2008). That is, while research has amassed considerable evidence that exposure to non-human nature provides considerable benefits to human wellness, it is still unclear how nature supports these benefits.

## **Conclusion**

For this article the authors defined wellness as a journey towards optimal health and shown how this can only be realised through the integration of various dimensions. From this perspective wellness is typically characterised by a balance of the physical, emotional, social, spiritual, occupational and intellectual dimensions. A growing body of evidence-based literature supports the notion that contact with nature and physical activity in nature has a profound positive influence on human wellness. Exposure to virtual nature, opportunities to view nature through a window, experiences of brief encounters with nature, programs that emphasise extended encounters with nature and even bringing nature indoors seems to be beneficial for at least one of the dimensions of wellness. Explanations for these findings include those that emphasise an opportunity to nurture and care for nature, an opportunity for restoration and the reconnection with an innate aspect of being human.

However, optimal wellness is reliant on the effective integration of all the wellness dimensions and spiritual wellness is commonly considered to be central to other wellness dimensions. From this perspective, the nature-based experiences that are most likely to augment optimal wellness are those where a person is exposed to nature in such a way that there is an opportunity for actual contact and feelings of connection.

Exposure to nature is beneficial for human wellness. However the evidence presented in this article also points to the need for further research into the precise nature of this relationship. For instance, further empirical research might investigate the specific role of different components of the natural world in addressing different types of human health and wellness issues. In this way evidence can better inform health practitioners and policy makers about how best to encourage nature-based experiences. This will benefit humanity immensely.



## References

- Antonioli, C., & Reveley, M. A. (2005). Randomised controlled trial of animal facilitated therapy with dolphins in the treatment of depression. *British Medical Journal*, *331*(7527), 1231-1239.
- Armstrong, J. (1995). Keepers of the earth. In T. Roszak, M. E. Gomes & A. D. Kanner (Eds.), *Ecopsychology: Restoring the earth, healing the mind* (pp. 316-324). Berkeley: Sierra Book clubs.
- Australian Bureau of Statistics (2006a). *Sports and Physical Recreation: A Statistical Overview, Australia, 2009*. Canberra: Australian Bureau of Statistics.
- Australian Bureau of Statistics (2006b). *Time use on recreation and leisure activities: Australia*. Canberra: Australian Bureau of Statistics.
- Banderoff, S., & Scherer, D. (1994). Wilderness family therapy: An innovative treatment approach for problem youth. *Journal of Child & Family Studies*, *3*, 175-191.
- Barton, J., & Pretty, J. (2010). What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. *Environmental Science and Technology*, *44*(10), 3947-3955.
- Berto, R. (2005). Exposure to restorative environments helps restore attentional capacity. *Journal of Environmental Psychology*, *25*(3), 249-259.
- Booth, M. L., Owen, N., Bauman, A., Clavisi, O., & Leslie, A. (2000). Social-cognitive and perceived environment influences associated with physical activity in older Australians. *Preventive Medicine*, *31*, 15-22.
- Brymer, E. (2009). Extreme sports as a facilitator of ecocentricity and positive life changes. *World Leisure Journal* *51*(1), 47-53.
- Brymer, E., & Cuddihy, T. (2009, 7-10, July). *Ecological perspectives and wellness* Paper presented at the Creating Active Futures: Edited proceedings of the 26th ACHPER International Conference, Brisbane, Australia.
- Brymer, E., & Oades, L. (2009). Extreme Sports: A positive transformation in courage and humility. *Journal of Humanistic Psychology*, *49*(1), 114-126.
- Brymer, E., Schweitzer, R., & Sharma-Brymer, V. (2010). *Ecotherapy as an intervention for generalised anxiety*. Paper presented at the International Congress 2010, Healthy Parks Healthy People.
- Burls, A. (2007). People and green spaces: Promoting public health and mental well-being through ecotherapy. *Journal of Public Mental Health*, *6*(3), 24-39.
- Buzzell, L. (2008). Community ecotherapy: The transition town movement. (Autumn). Retrieved 21/9/2009, from <http://thoughtoffering.blogs.com/ecotherapy/2008/09/autumn-2008.html>
- Chandler, C. K., Holden, J. M., & Kolander, C. A. (1992). Counselling for spiritual wellness: Theory and practice. *Journal of Counseling and Development*, *71*, 168-175.

- Corbin, C. B., Welk, G., Corbin, W., & Welk, K. A. (2009). *Concepts of fitness and wellness: A comprehensive lifestyle approach* (8th ed.). New York: McGraw Hill.
- Corkery, L. (2004). Community gardens as a platform for sustainability. *Journal of Environmental Education.*, 20(1), 69-75.
- D'Abundo, M. L., & Carden, A. M. (2008). "Growing Wellness": The possibility of promoting collective wellness through community garden education programs. *Community Development*, 39(4), 83-95.
- Davis, J. (1998). The transpersonal dimensions of ecopsychology: Nature, nonduality and spiritual practice. *The Humanistic Psychologist*, 26(1-3), 69-100.
- de Vries, S., Verheij, R. A., & Groenewegen, P. P. (2001). *Nature and health: The relation between health and green space in people's living environment*. Paper presented at the Euro Leisure-Congress.
- Deloria, E. (1994). The Buffalo people. In J. Rice (Ed.), *The Buffalo people*. (pp. 94-126). Albuquerque: University of New Mexico Press.
- Dewey, J. (1958). *Experience with nature*. New York: Dover Publications Inc.
- Doucette, C., Ransom, P., & Kowalewski, D. (2007). Nature and nurture: Teaching eco-pragmatism to high-school students at a winter camp in the Canadian Arctic. *Children, Youth and Environments*, 17(4), 227-236.
- Duncan, G. (1998). The psychological benefits of wilderness. *Ecopsychology On-Line*, 6(September). Retrieved 7/9/2009, from <http://www.ecopsychology.athabasca.ca>
- Eagles, P. F. J. (2001). Trends in park tourism: Economics, finance and management. *Journal of Sustainable Tourism*, 10(2), 132-153.
- Giles-Corti, B., & Donovan, R. (2003). Relative influences of individual, social environmental, and physical environmental correlates of walking. *American Journal of Public Health*, 93(9), 1583-1589.
- Gorrell, C. (2001). Nature's path to inner peace. *Psychology Today*, 34(4), 62-68.
- Greene, T. (2009, 10-13th May 2009). *Re-building lives, building community, constructing gardens*. Paper presented at the Proceedings of the environmental research event 2009, Noosa, Queensland, Australia.
- Greenleaf, A. T., & Williams, J. M. (2009). Supporting social justice advocacy: A paradigm shift towards an ecological perspective. *Journal for Social Action in Counselling and Psychology*, 2(1), 1-14.
- Han, K.-T. (2009). Influence of limitedly visible leafy indoor plants on the psychology, behavior, and health of students at a junior high school in Taiwan. *Environment and Behavior*, 41(5), 658-692.
- Harris, N. (2009). Nutrition in the garden. Retrieved July, 4, 2009, from <http://www.griffith.edu.au/health/school-public-health/research/nutrition-garden>
- Harvey, A. (2000). Nature as revelation and source of healing. In *The direct path: Creating a journey to the divine using the world's mystical traditions* (pp. 234-248). London: Broadway Books.

- Herzog, T. R., & Strevey, S. J. (2008). Contact with nature, sense of humor, and psychological well-being. *Environment and Behavior*, 40(6), 747-776.
- Hettler, B. (1980). Wellness promotion on a university campus. *Family and Community Health*, 3(1), 77-95.
- Hofferth, S. L., & Sandberg, J. F. (2001). How American children spend their time. *Journal of Marriage and Family*, 63(2), 295-308.
- Holbrook, A. (2009). *The Green We Need: An investigation of the benefits of green life and green spaces for urban dwellers' physical, mental and social health*. Newcastle: Nursery and Garden Industry Australia, Nursery and Garden Industry Australia and SORTI, The University of Newcastle.
- Horton, B. W., & Snyder, C. S. (2009). Wellness: Its impact on student grades and implications for business. *Journal of Human Resources in Hospitality and Tourism*, 8, 215-233.
- Hughes, C. (2008). Jung and the wilderness. *Spirituality*, (July 17, 2008). Retrieved from <http://www.ecoafrika-travel.com>
- Hull, R. B. (1992). Brief encounters with urban forests produce moods that matter. *Journal of Arboriculture*, 18(6).
- Hull, R. B., & Michael, S. E. (1994). Nature-based recreation, mood change, and stress reduction. *Leisure Sciences*, 17, 1-14.
- Humberstone, B., & Lynch, P. (1991). Girls concepts of themselves and their experiences in outdoor education programmes. *The Journal of Adventure Education and Outdoor Leadership*, 8(3), 27-31.
- Jung, C. G. (2008). *The Earth has a Soul: C.G. Jung on nature, technology and modern life*. Berkeley, CA: North Atlantic Books.
- Kaplan, R. (1984). Wilderness perception and psychological benefits: An analysis of a continuing program. *Leisure Sciences*, 6(3), 271-290.
- Kaplan, R. (1993). The role of nature in the context of the workplace *Landscape and Urban Planning*, 26(1-4), 193-201.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. NY: Cambridge University Press.
- Kaplan, R., & Talbot, J. F. (1983). Psychological benefits of a wilderness experience. In I. Altman. & J. F. Wohlwill. (Eds.), *Behaviour and the natural environment*. (pp. 163-203). New York: Plenum Press.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15(3), 169-182.
- Knudtson, P., & Suzuki, D. (1996). *Wisdom of the elders*. Australia: Web Publication by Mountain Man Graphics.
- Kuo, F. E., & Sullivan, W. C. (2001). Aggression and violence in the inner city: Effects of environment via mental fatigue. *Environment and Behavior*, 33(4), 543-571.
- Kuo, F. E., & Taylor, F. A. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health*, 94(9), 1580-1586.

- Leather, P., Pyrgas, M., Beale, D., & Lawrence, C. (1998). Windows in the workplace, sunlight, view, and occupational stress. *Journal of Environment and Behavior*, 30(6), 739-762.
- Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder* Chapel Hill: Algonquin.
- Louv, R. (2009a). How nature can transform education. *Psychology Today*. Retrieved 11/10/2009, from <http://www.psychologytoday.com/blog/people-in-nature/200809>
- Louv, R. (2009b). *Last child in the woods: Saving our children from nature-deficit disorder*: Atlantic Books.
- Maas, J., Verheij, R. A., de Vries, S., Spreeuwenberg, P., Schellevis, F. G., & Groenewegen, P. P. (2009). Morbidity is related to a green living environment. *Journal of Epidemiological Community Health*, 63, 967-973.
- Maas, J., Verheij, R. A., Groenewegen, P. P., de Vries, S., & Spreeuwenberg, P. (2006). Green space, urbanity, and health: How strong is the relation? *Journal of Epidemiology and Community Health* 60(7), 587-592.
- MacKay, G., & Neill, J. (2009). The effect of 'green exercise' on state anxiety and the role of exercise duration, intensity, and greenness: A quasi-experimental study. [Unpublished thesis]. *Psychology of Sport and Exercise* 11(3), 238-245.
- Maller, C., Townsend, M., Pryor, A., Brown, P., & St Leger, L. (2006). Healthy nature healthy people: 'Contact with nature' as an upstream health promotion intervention for populations. *Health Promotion International*, 21(1), 45-54.
- Maller, C., Townsend, M., St.Ledger, L., Henderson-Wilson, C., Pryor, A., Prosser, L., et al. (2008). Healthy parks healthy people: The health benefits of contact with nature in a park context: a review of current literature (2nd ed.). In *Social and Mental Health Priority Area, Occasional Paper Series*. Melbourne, Australia: Faculty of Health and Behavioural Sciences.
- Marano, D. A. (2008). Soil salvation. *Psychology Today*, 41(5), 57-58.
- Mathews, F. (2006). Beyond modernity and tradition: A third way for development? *Ethics and the Environment*, 11(2), 85-113.
- Mayer, F. S., & Frantz, C. (2005). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, 24, 503-515.
- Mayer, F. S., Frantz, C. M., Bruehlman-Senecal, E., & Dolliver, K. (2009). Why is nature beneficial?: The role of connectedness to nature. *Environment and Behavior*, 41(5), 607-643.
- MIND ( May, 2007). Ecotherapy: The green agenda for mental health. MIND.
- Miner, J. (1990). The creation of outward bound. In C. Miles & S. Priest (Eds.), *Adventure education* (pp. 56-66). Pennsylvania: Venture.
- Mitchell, R., & Popham, F. (2007). Greenspace, urbanity and health: Relationships in England. *Journal of Epidemiological Community Health*, 61(8), 681-683.
- Muscat, M. (2001). Dosphinswim: Finding your 'first self' in the deep blue sea. *Alternative Therapies*, 7(2), 98-99.

- Myers, J. E., Sweeney, T. J., & Witmer, J. M. (2000). The wheel of wellness counseling for wellness: A holistic model for treatment planning. *Journal of Counseling and Development*, 78(3), 251-267.
- National Wellness Institute (2009). Six dimensional model of wellness Retrieved from [http://www.nationalwellness.org/index.php?id\\_tier=2&id\\_c=25](http://www.nationalwellness.org/index.php?id_tier=2&id_c=25)
- News, O. D. (NA). Research confirms urban green impacts residents' health. *Outdoor Design Source*. Retrieved 2/10/2009, from <http://www.odsnews.com.au/news?cid=11459&pid=6349931>
- Noddings, N. (2006). Animals and nature. In N. Noddings (Ed.), *Critical lessons: What our schools should teach* (pp. 147-169). New York: Cambridge University Press.
- Peacock, J., Hine, R., & Pretty, J. (2007). *Ecotherapy: the green agenda for mental health*. London: Mind , U.K.
- Pilisuk, M. (2001). Ecological psychology, caring, and the boundaries of the person. *Journal of Humanistic Psychology*, 41(2), 25-37.
- Pretty, J., Angus, C., Bain, M., Barton, J., Gladwell, V., Hine, R., et al. (2009). Nature, childhood, health and life pathways. Unpublished Occasional paper. Interdisciplinary Centre for Environment and Society, University of Essex.
- Pretty, J., Griffin, M., Sellens, M., & Pretty, C. (2003). *Green exercise: Complementary roles of nature, exercise and diet in physical and emotional wellbeing and implications for public health policy*: University of Essex.
- Pretty, J., Hine, R., & Peacock, J. (2006). Green exercise: The benefits of activities in green places. *Biologist*, 53(3), 143-148.
- Pretty, J., Peacock, J., Hine, R., Sellens, M., South, N., & Griffin, M. (2007). Green exercise in the UK countryside: Effects on health and psychological well-being. *Journal of Environmental Planning and Management*, 50(2), 211-231.
- Pretty, J., Peacock, J., Sellens, M., & Griffin, M. (2005). The mental and physical health outcomes of green exercise. *International Journal of Environmental Health Research*, 15(5), 319-337.
- Priest, S. (1990). The adventure experience paradigm. In C. Miles & S. Priest (Eds.), *Adventure Education* (pp. 157-162). Pennsylvania: Venture.
- Pryor, A., Carpenter, C., & Townsend, M. (2005). Outdoor education and bush adventure therapy: A socio-ecological approach to health and wellbeing. *Australian Journal of Outdoor Education*, 9(1), 3-13.
- Pryor, A., Townsend, M., Maller, C., & Field, K. (2006). Health and well-being naturally: 'contact with nature' in health promotion for targeted individuals, communities and populations. *Health Promotion Journal of Australia*, 17(2), 114-123.
- Rappe, E., Koivunen, T., & Korpela, E. (2008). Group gardening in mental outpatient care. *Therapeutic Communities*, 29(3), 273-284.
- Reser, J. P. (2008). *Psychology and the natural environment: A position statement prepared for the Australian Psychological Society*. Melbourne: the Australian Psychological Society Ltd.

- Riebel, L. (2001). Consuming the earth: Eating disorders and ecopsychology. *Journal of Humanistic Psychology, 41*(2), 38-58.
- Robertson, G., & Kiewit, d. S. (1998). Wilderness therapy with militarised youths in traumatised communities. *Community Development Journal, 33*(2), 139-144.
- Roscoe, L. J. (2009). Wellness: A review of theory and measurement for counsellors. *Journal of Counseling and Development, 87*, 216-226.
- Roszak, T. (1992). *The voice of the earth: An exploration of ecopsychology*. New York: Simon & Schuster.
- Rousseau, J. (2008). *Emile* (B. Foxley, Trans.). Charleston, SC: BiblioLife.
- Russell, K. C. (2002). Does outdoor behavioural healthcare work? A Review of studies on the effectiveness of OBH as an intervention and treatment. *Journal of Therapeutic Camping, 2*(1), 5-12.
- Russell, K. C. (2003). Assessing treatment outcomes in outdoor behavioural healthcare using the Youth Outcome Questionnaire. *Child and Youth Care Forum, 32*(6), 355-381.
- Russell, K. C. (2005). Two years later: A qualitative assessment of youth-well-being and the role of aftercare in outdoor behavioural healthcare treatment. *Child and Youth Care Forum, 34*(3), 209-239.
- Ruter, D. (2009). Vocational rehabilitation through agriculture - A story from India. . Retrieved from <http://www.ruter.nl/blog/>
- Rydberg, V. (2007a). Hands on, feet wet: The story of river crossing environment charter school: A review. *Children, Youth and Environment, 17*(4). Retrieved
- Rydberg, V. (2007b). Hands on, feet wet: the story of river crossing environment charter school: A review. *Children, Youth and Environment, 17*(4). Retrieved
- Sackney, L., Noonan, B., & Miller, C. m. (2000). Leadership for educator wellness: An exploratory study. *International Journal of Leadership in Education, 3*(1), 41-56.
- Said, I. (2006). *Gardening as restorative environment for children in Malaysia hospital setting*. Universiti Teknologi Malaysia.
- Sanford, A. W. (2007). Pinned on Karma rock: Whitewater kayaking as religious experience. *Journal of the American Academy of Religion, 75*(4), 875-895.
- Scheer, S. B., & Lockee, B. B. (2003). Addressing the wellness needs of online distance learners. *Open Learning: The Journal of Open and Distance Learning, 18*(2), 177-196.
- Scherl, L. M. (1989). Self in wilderness: Understanding the psychological benefits of individual-wilderness interaction through self-control. *Leisure Sciences, 11*, 123-135.
- Schreyer, R., Williams, D., & Haggard, L. (1990). Episodic versus continued wilderness participation - implications for self-concept enhancement. *Forest Service*.
- Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck & P. W. Schultz (Eds.), *Psychology of Sustainable Development* (pp. 61-78). Boston: Kluwer Academic.

- Segal, F. (1997). Ecopsychology and the uses of wilderness. *Ecopsychology On-Line*, 5. Retrieved 7/9/2009, from <http://ecopsychology.athabasca.ca/1097/segal.htm>
- Sempik, J. (2008). Green care: A natural resource for therapeutic communities. *Therapeutic Communities*, 29(3), 221-227.
- St George, D. (2007, June 19). Lost in the great indoors. *The Washington Post*,
- Stolar, C. (2009). Go outside and play. *Parks & Recreation*, 44(3), 36-38.
- Takano, T., Nakamura, K., & Watanabe, M. (2002). Urban residential environments and senior citizens' longevity in megacity areas: The importance of walkable green spaces. *Journal of Epidemiology and Community Health*, 56, 913-918.
- Taylor, A. F., Kuo, F. E., & Sullivan, W. C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior*, 33, 54-77.
- Taylor, B. (2000). Earth and nature-based spirituality (Part I): From deep ecology to radical environmentalism. *Religion*, 31(2), 175-193.
- Taylor, B. (2001). Earth and nature-based spirituality (Part II): From earth first! and bioregionalism to scientific paganism and the new age. *Religion*, 31(3), 225-245.
- Taylor, B. (2007). Surfing into spirituality and a new, aquatic nature religion. *Journal of the American Academy of Religion* 75(4), 923-951.
- Thompson, S., Corkery, L., & Judd, B. (2007). *The role of community gardens in sustaining healthy communities*. Paper presented at the State of Australian Cities: ANZAPS Conference.
- Townsend, M., & Moore, M. (2005). *Research into the health, wellbeing and social benefits of community involvement in the management of land for conservation*. Melbourne: Deakin University.
- Tzoulasa, K., Korpelab, K., Vennc, S., Yli-Pelkonenc, V., Kaźmierczaka, A., Niemelac, J., et al. (2007). Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review *Landscape and Urban Planning*, 81(3), 167-178.
- Ungar, M., Dumond, C., & Mcdonald, W. (2005). Risk, resilience and outdoor programmes for at-risk children. *Journal of Social Work*, 5, 319-338.
- Vining, J., Merrick, M. S., & Price, E. A. (2008). The distinction between Humans and Nature: Human perceptions of connectedness to nature and Elements of the natural and unnatural. *Human Ecology Review*, 15(1), 1-11.
- Waliczek, T. M., Zajicek, J. M., & Linebereer, R. D. (2005). The influence of gardening activities on consumer perceptions of life satisfaction. *HortScience* 40(5), 1360-1365
- Watts, A. (1970). *Nature, man and woman*. New York: Vintage Books.
- Watts, A. (2003). *Become What You Are*. Boston: Shambhala.
- Weber, D., & Anderson, D. (2010). Contact with nature: Recreation experience preferences in Australian parks. *Annals of Leisure Research*, 13(1&2), 46-69.

- Wells, N. M. (2000). At home with nature: Effects of "Greenness" on children's cognitive functioning. *Environment and behavior*, 32(6), 775-795.
- Wilson, E. O. (1984). *Biophilia: The human bond with other species* Cambridge: Harvard University Press.
- Winter, D., D., N., & Koger, S. M. (2004). *The psychology of environmental problems: second edition*. New York: Taylor and Francis.
- Woolley, H. (2003). *Urban open spaces*. London: Spon Press.