



Synthesis on the benefits of nature exposure to physical health and well-being

Juvelyn D. Capili*

Cagayan State University, Philippines

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Abstract

Biodiversity can be explored in a number of emerging movements and schools of thought that are changing how we value and care for nature. Nature exposure has been linked to a plethora of health benefits, but the mechanism for this effect is not well understood. This study generally presents synthesis of research papers revealing the benefits of nature exposure to human well-being. Thirteen research articles were systematically analysed to unleash the theoretical explanations and underpinnings of the benefits of nature to physical health. Evidences found that intentional, indirect, and incidental interaction with nature provides psychological, cognitive, physiological, and social benefits. Overall, evidence suggests that connecting with nature is one path to establish good health and well-being. The advantages of contact with nature as a potential wellbeing intervention are discussed, and examples of how this research is being applied to reconnect individuals to nature and improve wellbeing are given. Finally, this study provides key directions for future research to design landscapes and programs that promote high quality interactions between people and nature in a rapidly changing world.

*Corresponding Author: Juvelyn D. Capili ✉ gilbertmagulod_rdecsulasam28@yahoo.com

Introduction

Ecosystems offer necessary services driven by provision, regulation, and support functions (Weber, 2007). It is clear they also offer a health service arising from direct activities in contact with nature. Recognition of the potential contribution of natural ecosystems to human population health may contribute to addressing issues related to inactivity, obesity, mental ill-health, and alternative chronic diseases. Many of these pressing health challenges also are connected to sedentary and indoor lifestyles.

Literature shows that exposure to natural places will result in positive psychological state outcomes (Hartig, *et al.*, 2003). At the population level, there are associations between health and proximity to green spaces (Mitchell *et al.*, 2008). Thus, inexperienced house is vital for psychological state and regular engagement is joined with longevity and minimized risk of mental ill-health (Takano, 2002). however as quite half the world's population currently board urban settlements, daily environmental contact is turning into rarer (UNPFA, 2007), suggesting the growing importance of access to native green space for each quality of life and also the property of cities and cities (Chiesura, 2004; Maas *et al.*, 2009).

It is conjointly well-known that physical activity improves each physical and psychological state of all age teams (CDCP, 1996). Therefore "green exercise", consisting of activity in inexperienced places (in the presence of nature), is foretold to get positive health outcomes (Ulrich, *et al.*, 1991), accrue ecological data (Wells, *et al.*, 2007), foster social bonds (Kawachi, *et al.*, 1997), and influence behavioural selections (Maas *et al.*, 2006). In economic terms, there ought to be value savings if natural places are each protected (Matthews *et al.*, 2000) and used as sites for activity, therefore generating health edges.

There is evidence indicates that nature can make positive contributions to our health, help us recover from pre-existing stresses or problems, have an 'immunising' effect by protecting us from future stresses, and help us to concentrate and think more clearly (Pretty *et al.*, 2005).

While many studies demonstrate that natural environments enhance health or encourage healthy behaviours, and a few examine variation in these effects by socioeconomic status (de Vries *et al.*, 2003; Maas *et al.*, 2006; Grahn *et al.*, 2003), the potential role for access to green environments to influence socio-economic inequality in health at a population level has, as far as we are aware, received no attention. There is increasing interest in the potential role of the natural environment in human health and well-being. However, the evidence-base for specific and direct health or well-being benefits of activity within natural compared to more synthetic environments has not been systematically assessed.

This study systematically synthesizes researches regarding the effects of green exercise to human physical health. It aims to provide systematic review on the evidence whether there are added benefits of activities in natural environments to well-being.

Materials and method

Research Design

Searching for relevant data was conducted within 19 electronic libraries/databases. Articles were also searched for using web search engines and within the websites of public health and environmental organisations. A range of activity/health/well-being-associated keywords (e.g. exercise, health, restoration, depression) in combination with a range of environment-related keywords (e.g. park, green, outdoors, countryside) were used to search databases.

The bibliographies of included articles were also checked for any additional references.

Articles were included in the review provided that the collection of data on any measure of health or wellbeing after direct exposure to a natural environment and after exposure to a synthetic environment. Excluded from the review were: studies which investigated the effects of environmental hazards (e.g. air pollution), studies focusing on hypotheses regarding athlete/exercise performance, and studies that were purely descriptive.

From all articles that met the review criteria, basic information was extracted into a standardised spread sheet, which included details of the environment, activity, participants, types of outcomes being measured, and the methodology used to collect data.

Data Synthesis

Quantitative synthesis was focused on any comparisons of the *same* activity in each environment (natural and synthetic) to investigate the specific effect of environmental setting. This was to ensure consistency in the interpretation of effect sizes from different studies. Four articles which met the review inclusion criteria were not included in the meta-analysis on this basis (Brown & Bell, 2007). In addition, given that the review included studies measuring a broad range of different outcomes, a threshold number of four studies measuring the same outcome was chosen in order to decide whether to pursue a meta-analysis on a particular outcome.

Results and discussion

The database search yielded an oversized range of articles that reflects the widespread discussion on

nature and health. Several articles were rejected supported title and/or abstract because the articles might be classed as either clearly impertinent, involved with a lot of general discussion, or were substance on health and activity in nature.

All articles known as relevant were revealed in peer-reviewed journals. Studies were included if they presented findings about one or more benefits of interacting with nature in some form.

Studies were excluded if they reported the benefits of nature for humans but did not focus on a specific interaction at an individual level, given that our focus was on interactions. Table 1 presents the thirteen articles reviewed in this paper showing significant findings that exposure and types of interaction to nature promotes types of benefits to the psychological, physiological, cognitive, and social well-being of individuals. In identifying the articles, search terms were combinations of “nature”, “interaction”, “benefit”, “health” and “biodiversity”. The articles employed systematic reviews, mixed method design, experimental, and survey.

Table 1. Previous Studies Conducted on the Benefits of Nature to Wellbeing.

Title/ Author	Methods	Findings	Types of Interaction	Types of Benefits
1 Bell, S. L., Phoenix, C., Lovell, R., & Wheeler, B. W. (2014). Green space, health and wellbeing: Making space for individual agency. <i>Health & Place, 30</i> , 287-292.	Mixed Method Approach	Green space studies could usefully consider changes in wellbeing priorities over time.	Intentional/ Indirect/ Incidental	Psychological/ Physiological
2 Thompson Coon, J., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. H. (2011). Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A systematic review. <i>Environmental science & technology, 45</i> (5), 1761-1772.	Systematic Review Analysis	Participating in indoor and outdoor activity which suggests some beneficial effects gained from performing physical activity in outdoor natural environments	Intentional/ Indirect/ Incidental	Cognitive/ Psychological
3 Keniger, L., Gaston, K., Irvine, K., & Fuller, R. (2013). What are the benefits of interacting with nature?. <i>International journal of environmental research and public health, 10</i> (3), 913-935.	Systemic Article Review	Natural settings can have multiple beneficial effects to the psychological, cognitive and physiological well-being.	Intentional/ Indirect/ Incidental	Psychological Cognitive/ Physiological / Social
4 Tyrväinen, L., Ojala, A., Korpela, K., Lanki, T., Tsunetsugu, Y., & Kagawa, T. (2014). The influence of urban green environments on stress relief measures: A field experiment. <i>Journal of Environmental Psychology, 38</i> , 1-9.	Review	Short-term visits to urban nature areas have positive effects on stress relief.	Intentional/ Indirect/ Incidental	Psychological / Cognitive
5 Mitchell, R. (2013). Is physical activity in natural environments better for mental health than physical activity in other environments?. <i>Social Science & Medicine, 91</i> , 130-134.	Review	Experimental studies show physical activity in natural environments may be better for mental health than activity elsewhere.	Intentional/ Indirect/ Incidental	Cognitive and Psychological
6 Russell, R., Guerry, A. D., Balvanera, P., Gould, R. K., Basurto, X., Chan, K. M., ... & Tam, J. (2013). Humans and nature: how knowing and experiencing nature affect well-being. <i>Annual Review of Environment and Resources, 38</i> , 473-502.	Review	The balance of evidence indicates conclusively that knowing and experiencing nature makes us generally happier, healthier people.	Intentional/ Indirect/ Incidental	Psychological Cognitive/ Physiological / Social
7 Gladwell, V. F., Brown, D. K., Wood, C., Sandercock, G. R., & Barton, J. L. (2013). The great outdoors: how a green exercise environment	Review	The synergistic combination of exercise and exposure to nature and thus the 'great outdoors'	Intentional/ Indirect/ Incidental	Psychological Cognitive/ Physiological / Social

Title/ Author	Methods	Findings	Types of Interaction	Types of Benefits
can benefit all. <i>Extreme physiology & medicine</i> , 2(1), 3.		could be used as a powerful tool to help fight the growing incidence of both physical inactivity and non-communicable disease.		
8 Alcock, I., White, M. P., Wheeler, B. W., Fleming, L. E., & Depledge, M. H. (2014). Longitudinal effects on mental health of moving to greener and less green urban areas. <i>Environmental science & technology</i> , 48(2), 1247-1255.	Panel data review	Moving to greener urban areas was associated with sustained mental health improvements, suggesting that environmental policies to increase urban green space may have sustainable public health benefits.	Intentional/ Indirect/ Incidental	Psychological Cognitive/
9 Rook, G. A. (2013). Regulation of the immune system by biodiversity from the natural environment: an ecosystem service essential to health. <i>Proceedings of the National Academy of Sciences</i> , 110(46), 18360-18367.	Systematic Review	green spaces to be designed to optimize health benefits and will provide impetus from health systems for the preservation of ecosystem biodiversity.	Intentional/ Indirect/ Incidental	Physiological
10 Lachowycz, K., & Jones, A. P. (2013). Towards a better understanding of the relationship between greenspace and health: development of a theoretical framework. <i>Landscape and Urban Planning</i> , 118, 62-69.	Article review	The framework highlights how mediators – such as use of greenspace and perceptions of the living environment – drive associations between access and both physical and psychological health outcomes.	Intentional/ Indirect/ Incidental	Psychological Cognitive/ Physiological / Social
11 Nieuwenhuijsen, M. J., Kruize, H., Gidlow, C., Andrusaityte, S., Antó, J. M., Basagaña, X., ... & Garcia, J. (2014). Positive health effects of the natural outdoor environment in typical populations in different regions in Europe (PHENOTYPE): a study programme protocol. <i>BMJ open</i> , 4(4), e004951.	Evaluative Research	There is positive interconnections between natural outdoor environments and better human health and well-being.	Intentional/ Indirect/ Incidental	Psychological Cognitive/ Physiological / Social
12 Pasanen, T. P., Tyrväinen, L., & Korpela, K. M. (2014). The relationship between perceived health and physical activity indoors, outdoors in built environments, and outdoors in nature. <i>Applied Psychology: Health and Well-Being</i> , 6(3), 324-346.	Survey Method	The results indicate that nature provides an added value to the known benefits of physical activity. Repeated exercise in nature is, in particular, connected to better emotional well-being.	Intentional/ Indirect/ Incidental	Psychological Cognitive/ Physiological / Social
13 Wheeler, B. W., Lovell, R., Higgins, S. L., White, M. P., Alcock, I., Osborne, N. J., ... & Depledge, M. H. (2015). Beyond greenspace: an ecological study of population general health and indicators of natural environment type and quality. <i>International journal of health geographics</i> , 14(1), 17.	Correlational Research	Positive associations were observed between good health prevalence and the density of the greenspace types,	Intentional/ Indirect/ Incidental	Psychological Cognitive/ Physiological / Social

As to the topology of benefits gained from natural environment, an enormous range of benefits from interacting with nature has been studied in the reviewed literature. Likewise, there were varieties of interaction evident from a review of the chosen literature: indirect, incidental and intentional (Table 1). Consequently, the majority of studies centered on psychological, Cognitive, Physiological, and Social.

Interaction with nature will increase vanity and mood, scale back anger, and improve general psychological well-being with positive effects on emotions and behaviour. These interactions can even have positive effects on psychological feature operate like educational performance and therefore the ability to perform mentally difficult tasks. in addition, this review suggests that interactions with nature might have physical health edges like stress reduction or reduced mortality rates moreover as social, together

with facilitating social interaction or reducing crime and violence in urban areas.

Understanding the benefits of interacting with nature is important for maintaining and improving human well-being in a rapidly urbanising world. For example, evidence that living in close proximity to green spaces delivers health benefits could be used to design landscapes with broader societal benefits such as reductions in health spending or crime rates. However, without a clear view of the quality of evidence, and information on any potential thematic or geographic bias in the available information, it is difficult to come to clear conclusions about which particular features of the environment, including their ecological characteristics, might deliver these benefits. There are various possible ways in which natural areas may promote public health. A natural environment may provide an environmental setting

for an activity or exercise programme, thus promoting increased physical activity (Kaczynski *et al.*, 2007). The evidence that exercise and physical activity alone have positive impacts on health is well established. Physical activity has been shown to lead to improved physical fitness and health.

There is also some evidences that physical activity can have positive benefits for mental health, for instance, lowering depression. This may be through a combination of the physiological effects as well as participation in social activities and engagement with others (Wipfli *et al.*, 2008).

A recent study that combined data from a range of different green exercise programs found consistent positive benefits (Barton & Pretty, 2010).

Conclusion

This study generally presents synthesis of research papers revealing the benefits of nature exposure to well-being. Thirteen research articles were systematically analysed to unleash the theoretical explanations and underpinnings of the body of literature. Evidences found that intentional, indirect, and incidental interaction with nature provides psychological, cognitive, physiological and social benefits. Overall, evidence suggests that connecting.

With nature is one path to establish good health and well-being. The advantages of contact with nature as a potential wellbeing intervention are discussed and examples of how this research is being applied to reconnect individuals to nature and improve wellbeing are given. Finally, this study provides key directions for future research to design landscapes and programs that promote high quality interactions between people and nature in a rapidly changing world.

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