

<b>Institution:</b> University of Essex
<b>Unit of Assessment:</b> 26 – Sport and Exercise Sciences, Leisure and Tourism
<b>Title of case study:</b> Green Exercise: Benefits to health and well-being from exercise in green surroundings
<p><b>1. Summary of the impact</b></p> <p>The term ‘Green Exercise’ was first coined at the University of Essex to describe physical activity undertaken in ‘green’ surroundings. Essex research demonstrates and quantifies the associated benefits to health and well-being. This research has stimulated changes to the policies and practices of health and environmental organisations, and has also been used in the private sector to support a consumer engagement campaign. Most notably, the mental health charity Mind used the findings of Essex research as part of a successful Big Lottery bid. This led to <i>Ecominds</i>, a £7.5M, 5 year programme supporting 130 environmental projects nationwide, which have improved the mental health of participants via green activity engagement.</p> <p><b>2. Underpinning research</b></p> <p>Exercise has long been acknowledged as a primary determinant of both physical and mental health. It is also widely recognised that contact with the natural environment can have positive effects on mental well-being. In 2003, researchers at the University of Essex formally proposed the synergistic benefits of adopting physical activity whilst at the same time being directly exposed to nature. This concept was coined ‘Green Exercise’ (Pretty et al., 2003) and initiated a rigorous scientific research programme. Combining expertise in sports science, physiology, psychology and environmental sciences, this programme has demonstrated that Green Exercise can yield benefits to both health and well-being and that, additionally, it can increase the likelihood of participant understanding of and care for nature.</p> <p>Based in the School of Biological Sciences, the research has been led primarily by Jules Pretty (Professor of Environment and Society), Dr Jo Barton (née Peacock, as Research Officer, Senior Research Officer and Lecturer) and Dr Rachel Bragg (née Hine, as Research Officer and Senior Research Officer). More recently, significant contributions have also been made by Drs Carly Wood, Valerie Gladwell, Dominic Micklewright, Gavin Sandercock and Murray Griffin. The group’s research has developed using both laboratory- and field-based approaches. Initial laboratory studies, starting in 2003, analysed the Green Exercise concept within a controlled setting by comparing the health outcomes of viewing rural or urban scenes whilst exercising on a treadmill. The researchers at Essex were the first interdisciplinary group to quantify a synergistic health benefit. This research showed that exercising with green views improved self-esteem and mood, and reduced mean arterial blood pressure much more than exercise would alone, thus demonstrating the importance of the chosen exercise environment (Pretty, 2004).</p> <p>Complementing the laboratory-based studies, since 2004 the group have conducted a number of field studies involving over 1,500 participants and all externally funded by key stakeholders (see, for example, Pretty et al., 2007). This has extended to also include evaluation of a variety of nature-based projects at both community and national levels. Standardised questionnaires were used to quantify changes in key mental health parameters such as self-esteem and mood after participating in a range of Green Exercise activities. This research shows that Green Exercise, across all ranges of intensity, duration or green environmental setting can serve to improve self-esteem, whilst reducing feelings of anger, tension and depression. The health message stemming from this research has important implications for the sedentary population, as it encourages a realistic and achievable transition to an active lifestyle. Significantly, the research also demonstrated that there are associated benefits available to participants across a broad range of health and fitness statuses.</p> <p>Researchers at Essex are internationally recognised for being the first group to conceptualise a ‘dose of nature’ for improving psychological health. In 2010, a unique secondary multi-study analysis was used to inform an optimal dose of Green Exercise according to activity type, and environmental and participant characteristics. The concept of a dose of nature suggests several</p>

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questions relating to the activities (in terms of the type, duration and intensity), types of green places (e.g. urban green space, countryside, waterside, wilderness, woodlands) and participant characteristics (age, sex, health status). The research established a 'dose-response' curve and showed that the greatest changes in self-esteem and mood appear after the first five minutes of exercise, suggesting an immediate mental health impact (Barton and Pretty, 2010). The publication of this research stimulated a significant amount of interest. An editorial commentary, which drew upon this and subsequent publications to summarise 'The Benefits of Being Green', appeared in the November 2012 issue of *Environmental Science and Technology* (ES&T). Referring to the 2010 'dose of nature' publication, the commentary states that "the paper was an instant success – it was publicized widely and featured as one of the most down-loaded articles of 2010 in ES&T".

### 3. References to the research [can be supplied by HEI on request]

- Pretty, J., M. Griffin, M. Sellens and C.J. Pretty (2003) Green Exercise: Complementary roles of nature, exercise and diet in physical and emotional well-being and implications for public health policy. *CES Occasional Paper 2003-1. University of Essex*. Available at: <http://www.outdoorfoundation.org/pdf/GreenExercise.pdf> [Accessed 7 November 2013]
- Pretty, J. (2004) How nature contributes to mental and physical health. *Spirituality and Health International* 5(2), 68-78. DOI:10.1002/shi.220
- Pretty, J., J. Peacock, M. Sellens and M. Griffin (2005) The mental and physical health outcomes of green exercise. *International Journal of Environmental Health Research* 15(5), 319-337. DOI:10.1080/09603120500155963
- Pretty, J., J. Peacock, R. Hine, M. Sellens, N. South and M. Griffin (2007) Green exercise in the UK countryside: effects on health and psychological well-being. *Journal of Environmental Planning and Management* 50(2), 211-231. DOI:10.1080/09640560601156466
- Barton, J., R.E. Hine and J. Pretty (2009) The health benefits of walking in greenspaces of high natural and heritage value. *Journal of Integrative Environmental Sciences* 6(4), 261-278. DOI:10.1080/19438150903378425
- Barton, J. and J. Pretty (2010) What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. *Environmental Science & Technology* 44, 3947-3955. DOI:10.1021/es903183r
- Barton, J., M. Griffin and J. Pretty (2012) Exercise, nature and socially interactive based initiatives improve mood and self-esteem in the clinical population. *Perspectives in Public Health* 132(2), 89-96. DOI:10.1177/1757913910393862

Though not claimed as a University output, the following November 2012 *Environmental Science & Technology* editorial summarises recent Essex research in the field of Green Exercise:

The Benefits of Being Green (2012) [editorial] *Environmental Science & Technology* 46, 11487. DOI:10.1021/es303987j

#### Research funding:

In the period 2003-13, funding for Green Exercise research at Essex has totalled approximately £560k, including:

- Pretty, Griffin, Sellens, South, *Making links between human health and countryside recreation*, Forestry Commission, Mar '04 – Dec '04, £51,398
- Gladwell, *Green exercise: The combined effect of the environment and exercise on cardiac and psychological health*, ESRC, Jan '09 – Dec '11, £236,195

The remaining ~£273k was received from 14 other external stakeholders, primarily health and environmental organisations (e.g. Mind, The British Heart Foundation and The National Trust).

### 4. Details of the impact

The extensive programme of research undertaken at Essex has demonstrated that Green Exercise can yield benefits both to health and well-being. These findings have significant implications, and through proactive dissemination and via externally commissioned projects, Essex's research has had an impact on the policies and practices of a number of health and environmental organisations. It has also informed a consumer engagement campaign in the private sector.

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**Impact on Mind:** For many years the British mental health charity Mind has campaigned to enhance the use of alternative treatments to help tackle the UK's growing problem of poor mental health. The charity recognised that Green Exercise had the potential to not only offer a cost-effective solution, but also to avoid the adverse side-effects often associated with clinical treatments. Following the group's research to explore the available benefits of Green Exercise to mental health (specifically amongst vulnerable groups), Mind commissioned Essex to undertake two Green Exercise studies in 2007. These studies found that people experiencing mental health distress were frequently using physical activities to help lift their mood, reduce stress, provide purpose and meaning, and reduce vulnerability to depression. Furthermore, it was shown that such activity helped develop motivation and self-esteem, and that contact with other people was helping to reduce isolation, provide support and improve social skills.

In recognition of their significance, Mind published the results of the studies in the 2007 report *Ecotherapy: The Green Agenda for Mental Health*. This called for the concepts of Green Exercise to be considered amongst mainstream treatment options [see corroborating source 1]. A letter of support from Mind's Community Portfolio Manager details how the report was then used to support a successful Big Lottery funding bid, to develop the 'Ecominds' grant programme [2]. Beginning in 2008, this was a £7.5M, five year initiative which facilitated 130 environmental projects nationwide, promoting mental health via green activity engagement [3]. Mind's Community Portfolio Manager explains how:

"Ecominds projects help people living with mental health problems get involved in green activities to improve confidence, self-esteem, and their physical and mental health. Participants learn about exercise, healthy eating, recycling and sustainable environments, whilst all the while finding support and friendship, and gaining employment training. By engaging with their local communities many projects are also transforming derelict land and helping to break down the stigma of mental health. [...] In summary, Ecominds projects are having a profound impact upon a significant proportion of our population, and widespread health and wellbeing benefits have been reported nationwide. Green Exercise researchers at Essex played an important role in helping this outcome to be achieved".

*Community Portfolio Manager, Mind*

The extensive impact of Ecominds-funded projects, along with widespread positive feedback from project participants, is also summarised in the 2013 report *Ecominds Directory of Projects 2009-2013* [4]. Although many Ecominds activities have now completed their original funded work, most of the 130 projects are still providing some type of environmental activity for participants, and many have successfully obtained new funds to continue their activities [5]. Since the launch of Ecominds, Essex researchers have also remained actively involved in the programme, undertaking evaluation exercises [6].

**Impact on environmental organisations:** Green Exercise research has also had an impact on environmental organisations. This has primarily been through the use of research findings to inform organisational strategies and communication with the public. For instance, having adopted the term 'Green Exercise' following Essex's early research in 2003, in 2012 Natural England (NE) cited the Essex *Dose of Nature* paper in an evidence-based information pack, highlighting why the natural environment should form an integral part of public health [7]. Essex's work has also informed Natural England's own research strategies. For example, in 2010 Essex research was cited in a presentation by NE's strategic health advisor at a LEAF (Linking Environment and Farming) UK event [8]. Essex staff are also regularly invited to contribute to strategic research meetings at NE through the 'Outdoors for All' advisory group. Finally, Natural England drew upon Essex's Green Exercise research in their response to the 2011 Office for National Statistics consultation on how national well-being should be measured [9], to argue that proximity to nature is a significant determinant of health and well-being.

**Impact in the private sector:** In 2012 the sports bra manufacturer Shock Absorber launched a consumer engagement campaign entitled 'Get Out There' (GOT), to promote the benefits of exercising outdoors. Based on her extensive Green Exercise research at Essex, Dr Barton was

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asked to act as spokesperson and ambassador for the campaign. The campaign drew directly upon Essex's research, for instance, by promoting the findings that exercising outdoors can significantly boost mood and self-esteem. The GOT campaign was facilitated by the public relations company Iris PR, which reported the positive outcomes and widespread coverage that the campaign generated. This included 35 pieces of online coverage and 8 pieces of print coverage, contributing to over 40% more media deliverables than were originally targeted by the campaign. It is clear from the campaign evaluation that Barton's contribution to the project was an important factor in securing such widespread coverage, for example, by undertaking interviews with the Daily Telegraph and BBC Radio Nottingham [10, see pages 42, 69].

Finally, in a wider context and independently of the GOT campaign, it should be noted that the Essex group's public engagement and dissemination activities have been significant in heightening awareness and raising the public profile of Green Exercise research. Notably, within the REF2014 impact period, Essex research has featured on NHS Choices (the UK's largest health website) which, in 2010, highlighted the research showing that just five minutes of Green Exercise can boost mental health [11]. The same piece of research was drawn upon by the BBC [12], whose coverage has also featured Essex on a number of other occasions over the past five years [13] [14].

##### 5. Sources to corroborate the impact [All sources saved on file with HEI, available on request]

- [1] Mind, 2007. *Ecotherapy: The Green Agenda for Mental Health* [pdf] Available at: [http://www.mind.org.uk/assets/0000/2138/ecotherapy\\_report.pdf](http://www.mind.org.uk/assets/0000/2138/ecotherapy_report.pdf) [Accessed 5 July 2013]
- [2] Community Portfolio Manager, Mind
- [3] Mind, 2008. *Ecominds offers pots of Big Lottery Fund cash to local environmental projects* [online] Available at: [http://www.mind.org.uk/news/261\\_ecominds\\_offers\\_pots\\_of\\_big\\_lottery\\_fund\\_cash\\_to\\_local\\_environmental\\_projects](http://www.mind.org.uk/news/261_ecominds_offers_pots_of_big_lottery_fund_cash_to_local_environmental_projects) [Accessed 5 July 2013]
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- [5] Mind, 2013. *Welcome to our winter news update* [online] Available at: <http://charityemail.org.uk/t/CZC-19V57-193BJFZTE7/cr.aspx> [Accessed 25 September 2013]
- [6] Mind, 2011. *Welcome to the latest Ecominds update December 2011* [online] Available at: [http://www.mind.org.uk/help/ecominds/ecominds/newsletter/ecominds\\_newsletter-december\\_2011](http://www.mind.org.uk/help/ecominds/ecominds/newsletter/ecominds_newsletter-december_2011) [Accessed 5 July 2013]
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- [10] Shock Absorber, 2012. *#got campaign evaluation*
- [11] NHS Choices, 2010. *'Green exercise' and mental health* [online] Available at: <http://www.nhs.uk/news/2010/05May/Pages/Green-exercise-and-mental-health.aspx> [Accessed 5 July 2013]
- [12] BBC News, 2010. *'Green' exercise quickly 'boosts mental health'* [online] Available at: <http://news.bbc.co.uk/1/hi/health/8654350.stm> [Accessed 21 October 2013]
- [13] *The Secret Power of Trees*, 2012. [Radio programme] BBC, BBC Radio 4, 8 December 2012. 10.30. Available at: <http://www.bbc.co.uk/programmes/b01p7fgv> [Accessed 21 October 2013]
- [14] BBC News UK, 2013. *Gardening can help beat depression, study says* [online] Available at: <http://www.bbc.co.uk/news/uk-23311583> [Accessed 21 October 2013]