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COMMENT

Physical activity in modern society: is there also an environmental benefit?

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Higgins (2005) has shown that increased human physical activity in the USA could lead to both improvements in physical health and reductions in oil consumption by motor vehicles, thereby also reducing carbon emissions. It is an intriguing idea and, as the health costs of obesity are so high, the potential health and environmental savings could be vast. These questions deserve wider attention, as all the trends suggest that consumption of both fossil fuels and food calories (combined with more sedentary lifestyles) will continue to rise in the coming years.

There are some questions about the assumptions made in the analysis, though Higgins (2005) was realistic in the discussion. One question is on the substitutability of walking or cycling for current car transport. Some driving cannot be replaced by walking (for example driving to the supermarket for weekly shopping), and many cities and rural roads do not make it easy to walk or cycle (perhaps more so in the USA than the UK). Some of the envisaged walking may be an entirely new activity, such as in the countryside, and some people may need to drive to get to where they can walk. The walking targets also assume one hour per day, which is double the current public health recommendations in both the USA and UK (Centers for Disease Control and Prevention 1996; DCMS [Department of Culture, Media and Sport] 2002; Department of Health 2004).

Another problem centres on the cycling, which assumes riding at $20\,km\,h^{-1}$, which would appear excessive for recreational cyclists. A more valid $10\,km\,h^{-1}$ would reduce the author's calculated oil saving benefit by a further half. There may also be health costs associated with walking and cycling (such as breathing polluted air), though more walking and cycling would of course reduce levels of pollution. In addition, many people in very poor heath can only engage in very limited amounts of physical activity. In contrast, healthier people who are less obese are likely to reduce excessive food consumption (though very active people do need to consume more calories), which would have a positive effect on the environmental costs of food transport ('food miles') arising from moving food from farm to plate (Pretty *et al.* 2005*a*). A quarter of all freight on UK roads, for example, is carrying food (DLTR [Department of Local Government, Transport and the Regions] 2002).

Higgins (2005) identifies the carbon savings if all the annual health costs of obesity (in the USA, some US$ 117 billion) were spent on carbon reductions. This again assumes that all of this sum would be available to switch from health care to other activities. Such savings would not necessarily create new money, although they would reduce health care costs. In addition, obesity and associated conditions (such as type II diabetes and hypertension) arise because of both over-consumption of food calories and sedentary behaviour. Getting people off their sofas to walk more to reduce environmental costs is one challenge; getting them to eat better is yet another.

Along with diet, physical activity is an important determinant of health and well-being. People in both industrialized countries and urban settlements in developing countries have become increasingly sedentary in all aspects of daily life, including during leisure time, in travelling to and from work, and during work itself. In Europe, there has been a dramatic fall in physical activity over the past 50 years, with on average 2 MJ (500 kcal) less energy output per day in adults (Eurodiet 2001), equivalent to the running of a marathon each week (National Audit Office 2001). Yet the public health consequences of these changes have not been widely discussed or accepted (DCMS 2002). The recent Eurodiet (2001) study states 'the importance of physical activity has been underestimated for many years by both doctors and policy-makers'. A key question, therefore, centres on what urban planners should do to optimize both the health and environmental benefits of exercise and transportation.

Although similar trends have occurred across Europe and North America, the UK compares badly with many countries. In the 1970s, 90% of primary school children walked to school; today 10% walk and 90% travel by car. In the UK, the annual distance walked by each individual has fallen from $410\,km\,yr^{-1}$ in the 1970s to $298\,km^{-1}\,yr^{-1}$ in 2000 (DLTR 2002). Cycling in Europe varies from a low of $70\,km\,yr^{-1}$ in Greece to a high of $850\,km\,yr^{-1}$ in Denmark and the Netherlands, with Britons ($77\,km\,yr^{-1}$) well below the average for all 15 EU countries. Popkin (1998) coined the phrase 'nutrition transition' to describe how urbanizing societies have adopted new diets, with severe health consequences. Echoing Popkin's phrase, we believe that modern societies have also gone through an 'activity transition' in recent decades, with people no longer physically active in the workplace, nor in travelling to and from work, nor during leisure time (Pretty *et al.* 1995*b*). This has very significant health consequences for whole populations.

Our research on the potential benefits of 'green exercise' has shown that there may be further benefits not identified in the Higgins (2005) analysis. Physical activity in the presence of nature brings additional mental health benefits, which are also economic benefits (Pretty 2004; Pretty *et al.* 2005*b*). In the face of widespread and growing threats to the natural environment, two major arguments have come to dominate,

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namely the environment should be conserved for ethical (see Leopold 1949) or economic (see Costanza *et al.* 1997) reasons. Relatively little attention, though, has been paid to the potential emotional benefits. Nature and living things, it seems, tend to make most people feel good. This idea that the quality of nature affects mental health has not greatly affected either the planning of our urban and rural environments or public health priorities (Frumkin *et al.* 2004).

Exposure to nature appears to be good for us, whether it is observed through a window or directly experienced. Undertaking physical activity of many types (such as walking, running, boating, fishing, horse-riding and conservation activities) improves self-esteem and mood, thus reducing stress and blood pressure (Pretty 2004). It could be that the exercise-based activity identified by Higgins (2005) in green places would not only benefit physical health and reduce carbon footprints, but also improve personal well-being as well as increase the amount of time spent in the presence of nature. This in turn could have positive conservation outcomes, as exposure to green places may increase ecological literacy (Orr 1993) and the capacity to care for environments and habitats under pressure (Lopez 1998).

Although there are already large numbers of people participating in green exercise in the UK (for example 1.5 billion day visits to the countryside annually, 5 billion visits to urban parks annually, 5 million regular anglers and 15 million gardeners), the critical indicator of obesity incidence continues to increase (up from 6% to 22% of the adult population in the past 20 years). At the same time, the number of people suffering extreme stress in the workplace is in excess of 5 million people. The findings of our green exercise research suggest that therapeutic applications could be effective. This is termed 'green care', namely the use of both wild habitats and farms for promoting mental and physical health (Hassink 2003). Green care thus extends the notion of multifunctionality in European agriculture, whereby farmers under the reform of the Common Agricultural Programme will no longer receive public payments for food production, but are able to receive financial support for the provision of environmental goods and services. These services have, to date, centred on protection of wildlife and biodiversity, flood protection, amenity and landscape provision, and carbon sequestration.

Green exercise could link policy priorities for farming, conservation, countryside and health agencies. Physical activity in green places is good for individuals. It may also be good for conservation objectives if such presence increases ecological literacy and people's likelihood to care for the environment and threatened biological diversity.

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