

Changing behaviour: Physical (in)activity

Mark Uphill

Executive summary

There are many reasons why engaging in physical activity is advantageous yet the recommended 'dose' of physical activity has been challenged and for many individuals, seems difficult to attain.

Where decisions to promote physical activity are based on the costs of physical inactivity, evidence suggests that a range of interventions are cost effective. No one 'magic bullet' will enhance levels of physical activity, rather multiple concurrent strategies are needed. National co-ordination, and enhanced leadership inside and outside of government, will facilitate the planning, promotion, evaluation and investment in human resources and interventions.

Overview

Compared to our ancestors we are spending increasing amounts of time in environments that reduce our physical activity and increase sitting time.¹ Although the benefits of regular physical activity for individuals' physical and mental health are widely accepted, a majority of the population are not sufficiently active to accrue these benefits. This report provides an outline of the challenges associated with enhancing levels of physical activity, reports on the cost-effectiveness of interventions designed to enhance physical activity and concludes with some recommendations for physical activity promotion in the UK.



Background information

Physical inactivity is one of the leading causes of non-communicable diseases such as coronary heart disease, diabetes, and certain types of cancer.^{2,3} With technological advances in recent decades serving to create occupations, transportation, and household tasks that require less exertion, this figure is expected to rise.² Second, there is a growing body of evidence suggesting a positive association between physical activity and psychological wellbeing,⁴ less depression,⁵ enhanced cognitive function,⁶ improved symptoms associated with attention deficit hyperactivity disorder,⁷ and a slowing down in the advancement of Alzheimer's disease.⁸ Third, physical activity is a key determinant of energy balance, and is thus important to weight-control and obesity.⁹ Finally, regular physical activity is associated with both enhanced social¹⁰ and economic¹¹ capital. Internationally, it has been conservatively estimated that (a) physical inactivity cost health care systems \$58.3 billion in 2013, in which high-income countries bear a larger proportion of economic burden.¹²

The terms physical activity and exercise are often used interchangeably, but there are subtle differences. Physical activity is used here to describe 'any bodily movement produced by skeletal muscles that results in energy expenditure'¹³ and could involve walking, gardening, and stair climbing for example. In contrast, exercise represents a subset of physical activity that comprises planned, structured, repetitive movements that someone engages in for the purpose of improving or maintaining physical fitness. For many, exercise can be perceived as hard work or unpleasant,¹⁴ which has often led to the promotion of 'active living'.¹⁵

'The potential benefits of physical activity to health are huge. If a medication existed that had similar effect, it would be regarded as a "wonder drug" or "miracle cure".'¹⁶

The challenge

Most adults are aware of the benefits of engaging in regular exercise with 70 per cent of adults suggesting that they would like to do more physical activity.¹⁶ Despite knowledge of the advantages associated with engaging in regular physical activity, most people do not take sufficient exercise to accrue the physical and psychological benefits of exercise. For instance, the Health Survey for England (2009)¹⁷ indicated that only 39 per cent of men and 29 per cent of women aged 16 and over met the government's recommendations for physical activity, based on self-report data. In children aged 2 to 15 years, 32 per cent of boys and 24 per cent of girls were classified as meeting government recommendations. In 2013 most individuals (90 per cent) did not know the current guidelines for physical activity in this country (see Table 1).¹⁸ Indeed awareness and knowledge about the benefits of physical activity are arguably not enough to influence changes in physical activity behaviour. For example, an evaluation of the Government's 'Change for Life' campaign suggests an enhanced awareness, but little change in attitudes or behaviour.¹⁹

Table 1: Recommended levels of physical activity (Department of Health, 2011)

Under-fives	180 minutes (three hours) each day, once a child is able to walk.
Children and young people (5–18 year olds):	60 minutes and up to several hours every day of moderate to vigorous intensity physical activity. Three days a week should include vigorous intensity activities that strengthen muscle and bone.
Adults (19–64 years old) and older people (65+)	150 minutes (two and half hours) each week of moderate to vigorous intensity physical activity (and adults should aim to do some physical activity every day). Muscle strengthening activity should also be included twice a week.

The psychology

The initiation and maintenance of physical activity results from a combination of biological, psychological, social, and environmental factors (see Figure 1).²⁰ Engaging in physical activity is commonly conceptualised as a process²¹, although the phases and stages of that process have been debated.²² Such a process of course is embedded across the lifespan²¹ and different social and ecological contexts.²³ More specifically the determinants and barriers associated with physical activity can vary across time and situation and obtaining a ‘person-environment’ fit is likely to be important in bringing about increased levels of physical activity in the population.²⁴

To this end, theories, often developed in social psychology, have been applied in a physical activity context to examine the efficacy and effectiveness of interventions.²⁵ There are many theoretical approaches applied to understand the adoption and maintenance of physical activity, often with conceptual overlap, and a significant amount of variance in physical activity behaviour left unexplained.²⁶ Accordingly, there have been calls for theoretical integration, with the promise of reduced complexity, elimination of redundancy and the identification of the variables that do most of the ‘work’ in explaining behaviour.²⁶

Parallel to this theoretical impetus, there is often considerable heterogeneity in the reported effectiveness of interventions.²⁷ Accordingly, there have been calls for greater specification about the ‘active components’ of interventions,²⁸ and improved treatment fidelity (that is the extent to which a treatment is implemented as intended, and the degree to which two or more study arms differ along specific dimensions).²⁹ As an example to illustrate both of these concerns, ‘reflection’ is common to a number of models applied to physical activity (e.g. Self-Regulated Learning,³⁰ and Integrated model of Motivation and Coping³¹), yet is operationalised somewhat differently within each. Being clearer about both the type of reflections underpinning interventions, but also used by individuals within interventions when thinking about their engagement in physical activity, may confer benefits when trying to understand why some individuals sustain, and others relapse from physical activity programmes.³²

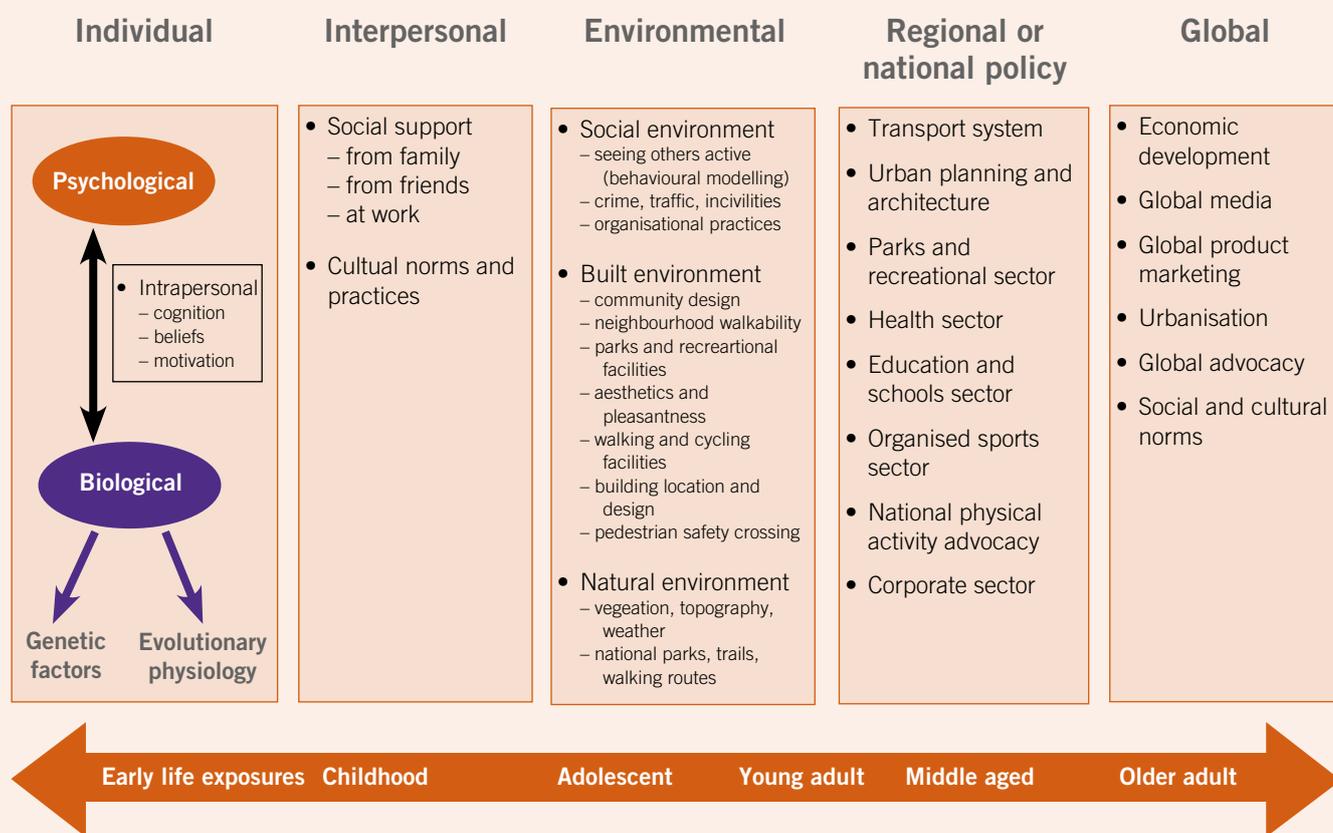


Figure 1: Adapted ecological model of the determinants of physical activity (from Bauman et al, 2012a)

The science of physical activity intervention development then is at an early and arguably exciting stage,³³ which is reflected in the section below.

The evidence: From nudging to budging

There is an accumulating body of evidence to suggest that a range of individually-tailored and/or self-monitoring interventions such as goal setting, implementation intentions, motivational interviewing and reinforcement are associated with increased levels of physical activity.^{34,35,36} When examining studies conducted in the UK, there is less conclusive evidence that a range of environmental and workplace interventions may promote physical activity. Consideration of research conducted worldwide however, suggests this might be a promising avenue for further enquiry.³⁶

Although the advent of wearable technologies to enhance physical activity shows some early promise, the number of studies are small and generalisability is limited.³⁷ Indeed, evidence regarding the effectiveness of interventions to enhance physical activity is characterised by several biases. First, is the ‘evaluative bias’³⁸ – that is we know most about the effects of interventions likely to influence the smallest number of people (i.e. individually tailored behaviour change), and least about the effects of interventions likely to influence the largest number of individuals (i.e. population level) interventions. Second, is the ‘sustainability bias’ – that is most of what is known about the effectiveness of psychological interventions concerns relatively short-term changes in physical activity (< 6 months) and little about the long-term sustainability and cost-effectiveness of interventions. Third, is a sampling bias – that is typically interventions tend to under-represent those of low socio-economic status, black and ethnic minorities and those with disabilities.³⁹ Indeed, these groups are also likely to be less active than other populations.³⁹

Cost effectiveness of studies

There is an increasing amount of evidence supporting the cost-effectiveness of strategies to enhance physical activity.^{40,41,42} In a systematic review of brief interventions, pedometer use, motivational interviews, counselling on exercise and brief advice were the most effective interventions with respect to cost utility. Individualised interventions, although least cost-effective, are often associated the largest increases in physical activity.⁴¹

Confidence in the use of physical activity and exercise to promote healthy outcomes derives from both efficacy and effectiveness studies.⁴³ While the former refers to trials in which the ‘drug’ (exercise) has the ability to bring about the intended effect under ideal circumstances, effectiveness refers to studies in which the intended effect is observed in ‘real world’ settings.⁴³ More research examining the effectiveness of physical activity in bringing about the intended impact (e.g. reduction in adiposity) in the real world is necessitated.

Summary and recommendations:

For many, the ‘dose’ of recommended physical activity seems difficult to attain and sustain, and the effectiveness of such public health messages in bringing about change has been challenged.⁴⁴ It is plausible that individuals could achieve 150 minutes of physical activity and yet for the majority of time lead a sedentary life. With some evidence that sedentary behaviour and physical activity represent independent risk factors for all-cause mortality,⁴⁵ both reducing the amount of time spent sitting and enhancing physical activity seem complementary health messages that could be beneficial. Indeed, the greatest reduction in the risk of premature death is between inactive and moderately inactive populations and it has been estimated that a brisk 20 minute walk daily could reduce the risk of premature death by between 16 and 30 per cent.⁴⁵ Comparatively ‘small changes’ in behaviour (e.g. increasing number of steps taken per day by 2000) have been advocated in the US⁴⁷ and it remains to be seen whether initial ‘small steps’ in behaviour change lead to sustainable, larger effects. Indeed, many research designs employ ‘static’ interventions across individuals, and it could be that dynamic ‘adaptive’ interventions that change the dose of activity in response to individual variation in behaviour potentially produce stronger habit formation.^{47,48}

Given (a) the current prevalence of physical inactivity across ages and socio-economic backgrounds, and (b) the predicted decline in physical activity in the decades ahead, there is a need for national co-ordination involving multiple disciplinary areas to facilitate the planning, promotion and co-ordination of interventions.⁴⁹ For example, the Royal College of Physicians (RCP) note a scarcity of referral pathways and concerns regarding the quality assurance of physical-activity based ‘prescriptions’. From this perspective there is the need for well-trained physical activity behaviour change specialists. If this is already believed to be in place (e.g. HCPC regulation of Sport and Exercise Psychologists and/or Health Psychologists), or with some additional specifications to the training competencies could be relatively simply put in place, there is at a minimum a need to enhance awareness of, training for, and employment opportunities for, such individuals.

There is also the opportunity to intervene at particular life transitions such as university or pregnancy.⁵⁰ With regards to the latter, there is potential for enhancing the mother, father and prospective child’s physical activity levels. Indeed, the economic costs of physical inactivity have been estimated to cost

the National Health Service somewhere between £1 billion and £2 billion annually, and the cost of lost productivity to the wider economy to be around £5.5 billion.⁵¹ Continued research funding for the conduct and dissemination of high-quality research is imperative, particularly if we are to move from ‘nudging’ to ‘budging’ levels of physical inactivity.

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