

# Exercise, Health and Mental Health

Emerging relationships

Edited by  
Guy E. J. Faulkner and  
Adrian H. Taylor

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# Exercise, Health and Mental Health

**Can a sedentary lifestyle have an adverse effect on mental health?**

**Does exercise help people cope better with chronic physical illness, mental health problems, sleep disorders, and smoking cessation?**

**What research is needed on the role of exercise for promoting mental health?**

As alternative approaches to health and social care gain wider acceptance, exercise is being adopted as a strategy for mental health promotion in a variety of settings.

*Exercise, Health and Mental Health* provides an introduction to this emerging field and a platform for future research and practice. Written by internationally acclaimed exercise, health, and medical scientists, this is the first systematic review of the evidence for the psychological role of exercise in:

- treating and managing mental health problems including dementia, schizophrenia, and drug and alcohol dependence
- coping with chronic clinical conditions including cancer, heart disease, and HIV/AIDS
- enhancing well-being in the general population – by improving sleep, assisting in smoking cessation, and as a way of addressing broader social issues such as antisocial behavior.

Adopting a consistent and accessible format, the research findings for each topic are summarized and critically examined for their implications. For students and researchers, the book provides an authoritative guide to current issues and future research. For exercise professionals, health practitioners, and policymakers, it is a basis for the development of evidence-based practice.

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# Acknowledgments

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# Foreword

The study of psychological processes in physical activity and health has grown considerably in recent years. “Exercise psychologists” study the psychological antecedents of physical activity and use their theoretical perspectives to inform the design and implementation of interventions to change sedentary lifestyles. In addition, involvement in physical activity can have important psychological benefits. Although we have known this for a very long time, it is only relatively recently that a systematic approach has been adopted to the accumulation of evidence. This has involved the use of experimental trials, largescale surveys, and detailed qualitative studies. Many have been brought together in well-cited meta-analytic reviews where the “effects” of exercise and physical activity have been assessed on anxiety, stress reactivity, depression, mood, and cognitive functioning. In addition, reviews exist on the links between physical activity and self-perceptions including self-esteem and health-related quality of life.

In 2000, Ken Fox, Steve Boutcher, and I pulled together this literature in an edited volume with the intention of providing a current consensus of knowledge. The feeling at the time was that we needed to summarize what we knew and needed to know about these key psychological outcomes. Less was known about the role of physical activity in important health-related conditions and behaviors such as smoking or alcohol consumption. It is here that Guy Faulkner and Adrian Taylor have done so well in bringing together an important collection of papers and provided a unique look at the role of physical activity.

These issues are far from trivial. While many accept that “exercise is good for you,” mentally and physically, few understand its importance in helping people cope with debilitating and difficult conditions such as heart disease and HIV, or with common behavioral problems of alcoholism or smoking addiction. Coupled with the physical benefits, physical activity may not be the “magic bullet” we are looking for, but it comes a lot closer than most things!

Guy and Adrian, with this book, have enabled the field to take a step forward and to move from the evidence based on psychological outcomes to the newer area of the (psychological) role of physical activity in a variety of conditions including important social issues such as social inclusion. With their extensive experience and wisdom in the field, and their open-minded approach to a wide variety of research methods and questions in their own research, they are well placed to lead us onto new and exciting avenues for the role of physical activity in health-related behaviors.

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# Foreword

Exercise psychology is the study of brain and behavior in physical activity and exercise settings. It is a new field, but it is based on old ideas. The ancient Greek physician, Hippocrates, recommended physical activity for the treatment of mental illness. In 1632 the British theologian, Robert Burton, warned about the risks of a sedentary lifestyle, “Opposite to Exercise is Idleness or want of exercise, the bane of body and minde, . . . one of the seven deadly sinnes, and a sole cause of Melancholy.” William James, the father of American Psychology, stated in 1899 that . . . “muscular vigor will . . . always be needed to furnish the background of sanity, serenity, and cheerfulness to life, to give moral elasticity to our disposition, to round off the wiry edge of our fretfulness, and make us good-humored and easy of approach.”

Though the study of consciousness and subjective experience is the defining feature of psychology that distinguishes it from other disciplines such as physiology and sociology, areas of modern psychology vary in their emphasis on physiological, behavioral, cognitive, or social questions and methods. Since the field of exercise psychology is concerned with mental health and health-related behaviors within both clinical settings and secular populations it also encompasses approaches from the fields of psychiatry, clinical and counseling psychology, health promotion, and epidemiology.

The aim of the current edited collection of reviews is to “consider what research evidence exists to support the emerging use of physical activity and exercise as a mental health promotion strategy in a range of conditions and populations, and how it can guide practitioners and researchers in the context of increasing concern for evidence-based practice.” Rather than constraining the topics to the usual suspects of depression, anxiety, and self-esteem, editors Taylor and Faulkner rightfully expand the book’s scope to other clinical concerns of contemporary importance to public health, namely, sleep disorders, smoking, alcohol and substance abuse, schizophrenia, dementia, delinquency and quality of life among cancer survivors, and patients with HIV disease or congestive heart failure. When I addressed some of these topics in a review of physical activity and mental health for the National Association of Sport and Physical Education in the USA 20 years ago, there was hardly any evidence upon which to draw conclusions or make professional recommendations. It’s gratifying to now see interest in these important areas mature, and it’s about time that someone accumulated the evidence in a way that can help guide practitioners and researchers alike. Well done.

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# Exercise and mental health promotion

GUY E. J. FAULKNER AND ADRIAN H. TAYLOR

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The mind–body link (e.g., healthy body ↔ healthy mind) has long been recognized but increasingly society is engaging in sedentary work, travel, domestic, and leisure activities. Many of the psychological consequences of sedentary behavior, and conversely physical activity, were identified in a previous text *Physical Activity and Psychological Well-Being* (Biddle *et al.*, 2000a). This text provided an invaluable review of the evidence for the role of exercise in improving well-being in relation to anxiety, depression, mood, self-esteem, and cognitive functioning. It also raised many issues for the researcher and practitioner concerned with both the prevention and treatment of mental health problems. The book also identified a number of emergent areas of research that were not assessed which adds further scope to the exciting and as yet untapped potential that exercise may offer within the growing field of mental health promotion and enhancement of quality of life. The current edited collection provides a unique overview of this emerging case for exercise and the promotion of mental health for all of us in general, and for individuals with mental illness and those coping with clinical conditions.

## WHAT IS MENTAL HEALTH PROMOTION?

Mental health can be seen as the emotional and spiritual resilience which enables us to enjoy life and cope with adversity such as physical disability, pain, cravings, and stress,

while also surviving pain, disappointment, and sadness. It is a positive sense of well-being and an underlying belief in our own and others' dignity and worth (Health Education Authority, 1997). Mental health may be central to all health and well-being, as it has been shown that how we think has a significant impact on physical health. Critically, since everyone has mental health needs, the need for mental health promotion is universal and of relevance to everyone (DoH, 2001). Mental health promotion is concerned with (1) how individuals, families, and organizations think and feel, (2) the factors which influence how we think and feel, individually and collectively, and (3) the impact that this has on overall health and well-being (Friedli, 2000). Overall, mental health promotion seeks to strengthen individuals and communities.

We now have a convincing body of literature that supports the role of physical activity and exercise as strategies for promoting mental health (see Table 1.1; Biddle *et al.*, 2000a; DoH, 2004). Physical activity may also be an innovative and effective way of enhancing the balance between physical and mental health (New Freedom Commission on Mental Health, 2003). We use physical activity as a general term that refers to any movement of the body that results in energy expenditure above that of resting level (Caspersen *et al.*, 1985). Exercise is often, but incorrectly, used interchangeably with

Table 1.1 Physical activity and psychological well-being: a research consensus

DOMAIN	WHAT WE KNOW
Anxiety and stress (Taylor, 2000)	<ul style="list-style-type: none"> <li>• Exercise has a low–moderate anxiety-reducing effect</li> <li>• Exercise training can reduce trait anxiety and single exercise sessions can result in reductions in state anxiety</li> <li>• The strongest anxiety-reduction effects are shown in randomized controlled trials</li> <li>• Single sessions of moderate exercise can reduce short-term physiological reactivity to, and enhance recovery from, brief psychosocial stressors</li> </ul>
Depression (Mutrie, 2000)	<ul style="list-style-type: none"> <li>• There is support for a causal link between exercise and decreased depression</li> <li>• Epidemiological evidence has demonstrated that physical activity is associated with a decreased risk of developing clinically defined depression</li> <li>• Evidence from experimental studies shows that both aerobic and resistance exercise may be used to treat moderate and more severe depression, usually as an adjunct to standard treatment</li> <li>• The anti-depressant effect of exercise can be of the same magnitude as that found for other psychotherapeutic interventions</li> <li>• No negative effects of exercise have been noted in depressed populations</li> </ul>
Emotion and mood (Biddle, 2000)	<ul style="list-style-type: none"> <li>• Physical activity and exercise have consistently been associated with positive mood and affect</li> <li>• Meta-analytic evidence shows that aerobic exercise has a small–moderate effect on vigor (+), tension (–), depression (–), fatigue (–) and confusion (–), and a small effect on anger (–)</li> </ul>

Table 1.1 Continued

DOMAIN	WHAT WE KNOW
Self-esteem (Fox, 2000b)	<ul style="list-style-type: none"> <li>• A positive relationship between physical activity and psychological well-being has been confirmed in several large-scale epidemiological surveys using different measures of activity and well-being</li> <li>• Experimental trials support a positive effect for moderate intensity exercise on psychological well-being</li> <li>• Meta-analytic evidence shows that adopting a goal in exercise that is focused on personal improvement, effort, and mastery has a moderate–high association with positive affect</li> <li>• Meta-analytic evidence shows that a group climate in exercise and sport settings that is focused on personal improvement and effort has a moderate–high association with positive affect</li> <li>• Exercise can be used as a medium to promote physical self-worth and other important physical self-perceptions such as body image. In some situations, this improvement is accompanied by improved self-esteem</li> <li>• Physical self-worth carries mental well-being properties in its own right and should be considered as a valuable end-point of exercise programs</li> <li>• Positive effects of exercise on self-perceptions can be experienced by all age groups but there is strongest evidence for change for children and middle-aged adults</li> <li>• Positive effects of exercise on self-perceptions can be experienced by men and women</li> <li>• Positive effects of exercise on self-perceptions are likely to be greater for those with initially low self-esteem</li> <li>• Several types of exercise are effective in changing self-perceptions but there is most evidence to support aerobic exercise and resistance training, with the latter indicating greatest effectiveness in the short-term</li> </ul>
Cognitive functioning (Boutcher, 2000)	<ul style="list-style-type: none"> <li>• The majority of cross-sectional studies show that fit older adults display better cognitive performance than less fit older adults</li> <li>• The association between fitness and cognitive performance is task-dependent, with most pronounced effects in tasks that are attention-demanding and rapid (e.g., reaction time tasks)</li> <li>• Results of intervention studies are equivocal but meta-analytic findings indicate a small but significant improvement in cognitive functioning of older adults who experience an increase in aerobic fitness</li> </ul>
Psychological dysfunction (Szabo, 2000)	<ul style="list-style-type: none"> <li>• Exercise dependence is extremely rare</li> <li>• Many people suffering from eating disorders undertake high levels of physical activity</li> <li>• The personality characteristics of anorectics are significantly different from highly committed exercisers</li> </ul>

Source: Adapted from Biddle *et al.*, 2000b.

physical activity. However, exercise refers to a subset of physical activity in which the activity is purposefully undertaken with the aim of maintaining or improving physical fitness or health. Examples of exercise include “going to the gym,” jogging, brisk walking, taking an aerobics class, or taking part in recreational sport for fitness.

This relationship between physical activity and mental health may be critical for two reasons. The literature indicates that mental health outcomes motivate people to persist in physical activity while also having a potentially positive impact on well-being (Biddle and Mutrie, 2001). Furthermore, because physical activity is an effective method for improving important aspects of physical health such as obesity, cardiovascular fitness, and hypertension (see Bouchard *et al.*, 1994), the promotion of exercise for psychological well-being can be seen as a “win-win” situation with both mental and physical health benefits accruing (Mutrie and Faulkner, 2003). Undoubtedly, methodological concerns do exist concerning the research on the mental health benefits of exercise (e.g., Biddle *et al.*, 2000b; Lawlor and Hopker, 2001). This is significant, as the acceptance of exercise within health care services will be based on the strength of available evidence. Indeed, the previous text, edited by Biddle *et al.* (2000a), emerged from a commission by health service policy makers and practitioners to identify evidence for the role of exercise in enhancing mental health.

Analysis of fairly recent mental health promotion policy documents (e.g., DoH, 2000; USDHHS, 1999) revealed rather limited inclusion of the role of physical activity, despite the fact that at least seven texts have appeared on the subject. The US Surgeon General’s Report on Mental Health (USDHHS, 1999) suggests that there are multiple and complex explanations for the gap between what is known through research and what is actually practiced. Indeed, the US National Advisory Mental Health Council (1998) noted that new strategies are required to bridge the gap between research and practice. Several reasons exist for why physical activity has not been widely prescribed in the promotion of positive mental health. First, mental health practitioners may not have access to the same research. This may have been true in the past, but electronic data searches make this less likely. Second, those conducting research on the psychological benefits of exercise may have been using different criteria for judging the effects. It is, therefore, important to consider the type of evidence available.

## THE EVIDENCE

It is important that any mental health promotion strategy such as the promotion of physical activity is based on sound evidence. However, it is important to recognize that what constitutes sound evidence, and how this is measured, is complex and open to debate (DoH, 2001). Evidence-based practice is defined by its adherents as the “conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett *et al.*, 1996, p. 71). Such evidence is principally gathered through randomized controlled trials (RCT):

It is when asking questions about therapy that we should try to avoid the non-experimental approaches, since these routinely lead to false-positive conclusions about efficacy. Because

the randomised trial, and especially the systematic review of several randomised trials, is so much more likely to inform us and so much less likely to mislead us, it has become the 'gold standard' for judging whether a treatment does more good than harm.

(Sackett *et al.*, 1996, p. 72)

Random selection of participants and random assignment to treatments is the most effective means of controlling threats to internal and external validity, while the inclusion of a control group rules out the possibility that something other than the experimental treatment (e.g., exercise) produces the results. As a minimum, the use of a control group should "be viewed as a necessary rather than a sufficient design requirement" (Morgan, 1997, p. 12) and a comparison treatment should be included to consider the effects compared to something else, such as normal treatment, when evaluating the role of physical activity. Ideally, either the investigators, research participants, or both, should not know who is receiving what treatment option. This "blinding" helps protect the study from bias due to the Hawthorne effect or Placebo effect (see Morgan, 1997). Clearly, RCTs will play an influential role in convincing policy makers and practitioners of the relative worth of physical activity as a mental health promotion strategy.

At the same time, mental health promotion itself has lagged behind the promotion of physical health (Sainsbury, 2000) and the evidence base is accordingly less extensive. In relation to exercise, Fox (1999, 2000a) outlined a number of suggestions as to why the evidence for the mental health benefits of exercise has not been widely translated into mental health service practice. For example, the recognition of evidence-based principles has only been relatively recent, with attention on academic rather than service outcomes. More specifically, studies have rarely addressed the cost-effectiveness of treatments or used intention-to-treat analyses, which entails including dropouts from studies in final analyses. Failing to do so is likely to positively bias the results. Overall, criteria for RCTs have rarely been satisfied (Faulkner and Biddle, 2001; Lawlor and Hopker, 2001).

Unfortunately, such designs may not be well-suited for the study of exercise and mental health. For example,

- An RCT may require modification of normal treatment or exercise promotion opportunities, thereby raising the issue of what is being evaluated (NHS Executive, 2001). A wide variation in clinical settings such as outpatient, inpatient and community settings may also influence attempts at generalization (Burbach, 1997; Morgan, 1997).
- The effects of exercise are likely to be a very individual experience with each "exerciser" relying on a unique exercise formula for maximum psychological benefit (Fox, 2000a). Individuals who are allocated to their non-preferred treatment may not experience great psychological benefit and as a result may dropout. This differential attrition introduces a nonrandom element into the design, and those who complete an exercise program may be atypically receptive, reducing attempts at generalization (Roth and Parry, 1997).
- Ensuring evaluators are blind to treatment conditions may be particularly difficult during exercise interventions. Specifically, when interviewing patients to assess progress, it is difficult to avoid exposure to information when patients will often recount their experiences.



- Given the small number of mental health patients that may be available at any one time, a multicenter trial, which is often prohibitive due to cost and hard to standardize across treatment centers, makes experimental work difficult (Mutrie, 1997).
- Small-scale schemes, in which patients become familiar with the support of specific exercise professionals, may result in better adherence. Adequately powered controlled trials may not, therefore, demonstrate optimal levels of adherence (NHS Executive, 2001).
- Finally, RCT's answer "a circumscribed set of questions and issues related to outcome rather than to process, and to efficacy rather than effectiveness" (Roth and Parry, 1997, p. 370). Efficacy describes what works under ideal or optimal conditions, usually when the dose of exercise is controlled and carefully monitored, while effectiveness refers to what works in typical clinical practice settings. That is, the external validity or generalizability of RCTs has been questioned. More practically, the cost of conducting RCT's may be overly prohibitive for many researchers.

Such difficulties do not make RCTs impossible and we hope that researchers continue to examine exercise as a mental health promotion strategy using such designs. However, while urging caution, we concur with "a more flexible and forgiving approach to the interpretation of the existing literature and the planning for future research" (Biddle *et al.*, 2000b, p. 161).

## QUASI-EXPERIMENTAL AND PRE-EXPERIMENTAL DESIGNS

A quasi-experimental study, like the RCT, attempts to minimize the possibility of bias in interpreting research findings. This approach is very similar to the RCT, although it lacks the random assignment of participants to treatment groups. Such designs may be particularly suited to research in applied settings, where control over the research setting is more difficult. Non-equivalent groups or time-series designs are examples of quasi-experiments.

In a pre-experimental study, only one group of participants receives the intervention. There may be a pre- and post-test but this design does not allow us to relate any changes in the variables of interest to the intervention *per se*. Typically, this type of design could be considered a pilot study that provides initial support for the consideration of a particular treatment that can then be tested using more rigorous research protocols.

## QUALITATIVE RESEARCH

Qualitative research comprises a wide range of research approaches but it is usually characterized by rich description and designs in which narrative is used to more closely represent the experience of participants. It is ideally suited to understanding the process by which events and actions take place and how views and attitudes change over time (Maxwell, 1996). For example, longitudinal involvement in the "field" of study offers an opportunity to explore perceptions of physical activity, the motives and barriers to involvement, and its role in promoting psychological well-being alongside the narrative

of participant's lives (see Faulkner and Biddle, 2004). An important objective may be to discover and "understand naturally occurring phenomena in their naturally occurring states" (Patton, 1980, p. 41). As Maykut and Morehouse (1994) remind us:

Qualitative researchers value context sensitivity, that is, understanding a phenomena in all its complexity and within a particular situation and environment. The quantitative researcher works to eliminate all of the unique aspects of the environment in order to apply the results to the largest possible number of subjects and experiments.

(p. 13)

Given the low number of research participants that a researcher may have access to in some settings, qualitative research designs may be insightful in examining the physical activity and mental health relationship. Qualitative studies concerned with how different patients perceive the role of exercise in treatment have been encouraged (Mutrie, 2000). Increasing attention has also been given to allowing patients and clients to discuss their experiences and have a voice regarding the improvement in their own quality of life (e.g., Faulkner and Layzell, 2000). Furthermore, Carless and Faulkner (2003) suggest that qualitative studies with a focus on change at the individual level do permit greater insight and understanding of person-level changes than are possible through an RCT.

Qualitative research can therefore focus on both efficacy and effectiveness questions. In terms of efficacy, participants may individually report on the effects of both acute and chronic exercise, which may reveal information about associated processes and mechanisms, and perhaps interactions with medication or other important factors such as type, frequency, intensity, and duration of exercise. In terms of effectiveness, participants may describe their experiences with the delivery of the exercise intervention, including the positive and negative role of others, and the favorability of the processes in which they enter, remain in, and exit exercise programs.

Overall, we would argue that it is the integration and awareness of this diversity of research designs and methodological approaches that will further understanding in exercise science in general, and physical activity and mental health in particular. We invite readers to critically assess the claims, made by the reviewers in this collection, in light of these methodological issues. We believe that a range of research designs, drawn from the diverse disciplines available, can all contribute to not only developing our evidence base to support the consideration of physical activity as a mental health promotion strategy but also our evidence-based *practice*.

## PURPOSE OF THE BOOK

The aim of the current edited collection of reviews is to consider what research evidence exists to support the emerging use of physical activity and exercise as a mental health promotion strategy in a range of conditions and populations, and how it can guide practitioners and researchers in the context of increasing concern for evidence-based practice.

Leading researchers have been recruited to produce systematic reviews that aim to minimize bias and use clear criteria for the inclusion of interventions. Priority has been