

Social Psychology in Sport and Exercise

Linking Theory to Practice

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10 The Outdoors

10.1 Learning objectives

The purpose of this chapter is to examine the social context of exercising outdoors, its importance in developing social networks, and its restorative effects on physical and mental health and well-being. The key objectives are:

- to understand the benefits of exercising in the outdoor environment for a range of populations. Discussion focuses on the physical, psychological and social benefits for individuals and groups;
- to discuss the proposed mechanisms underlying the green space effect;
- to consider the range of activities that can be undertaken in the outdoor environment, with emphasis on the social attributes developed through participation;
- to discuss the green space effect on physical, psychological, and social well-being, with consideration of the type and intensity of the exercise itself and the salient characteristics of the outdoor environment;
- to discuss the practical implications of the research for physical activity practitioners, policymakers, and urban planners for creating an optimal social and environmental context for the green space effect in an outdoor setting.

10.2 Introduction to the context

The outdoor setting provides spaces and opportunities for a range of individuals to engage in various activities (e.g., walking, cycling, gardening) that appeal to all age groups. The outdoor setting is a positive physical environment where social aspects (e.g., cohesion, relatedness, mastery) can be developed through participation in physical activity, with additional benefits to psychological well-being via exposure to the natural environment. Such exposure has been shown to result in positive psychological well-being and reduce symptoms of depression and anxiety (Hartig et al. 2003; Pretty et al. 2003). Barton and Pretty (2010) called upon health practitioners to recognise the potential positive contribution of natural ecosystems to human population

health, particularly in addressing issues related to physical inactivity, obesity, and mental health. Historically, large, publicly funded city parks were created to provide places for recreation and encourage social interaction. In 2014 the United Kingdom had approximately 27,000 urban parks; it is estimated that in England 33 million people annually make in excess of 2.5 billion visits to parks. This suggests that access and usage of parks and green spaces is prevalent yet the extent to which this impacts on physical, psychological, and social well-being has not been fully established. Exposure to nature has been shown to influence physiological markers, including decreased resting heart rate, blood pressure, and adrenaline, noradrenaline, and cortisol levels (Gladwell et al. 2012). Access to green space has been shown to be important for mental health and improved quality of life, particularly in aging populations (Thompson Coon et al. 2011). The social benefits of green environments have also been highlighted by Sugiyama and colleagues (2008), who associated a green environment with recreational walking and social cohesion and interaction. The overall positive influence of the outdoor environment, in particular green space, on physical, psychological, and social well-being is known as the 'green space effect'.

Performing physical activity in green spaces and other natural environments may have additional benefits above and beyond the well-documented physical and psychological ones experienced when exercising indoors. Combined, physical activity and natural environments appear to offer potentially greater benefits to physical, psychological, and social well-being than either one in isolation. Since the year 2000, research evidence has become abundant for the concept of 'green exercise', which has been defined by Pretty and colleagues (2005) as physical activities undertaken whilst exposed to natural environments. It has been linked to positive physical, psychological, and social outcomes – including improvements in social networking, companionship, social connectedness, and escape from modern life – and has been shown to help individuals accrue ecological knowledge, gain a sense of mastery, and influence other health-behaviour choices (Kawachi et al. 1997). In the research literature self-esteem and mood regularly appear as the primary outcome measures to ascertain the effects of green exercise (e.g., walking, cycling, golf) and nature-based interventions (e.g., social and therapeutic horticulture, wilderness therapy, green gyms); the majority of findings support the green exercise effect on psychological well-being. Green exercise has been advocated by mental health services practitioners, as being physically active in green environments can play a pivotal role in reducing social isolation (Richardson et al. 2005), and recommended as a viable treatment option for individuals with depression who do not want to rely solely on antidepressants (Barton, Griffin, and Pretty 2012). The importance of access

exposure, with many now advocating its economic benefit to the United Kingdom. In 2013, the Woodland Trust chief executive, Sue Holden, stated that increasing individuals' access to green space could save the National Health Service an estimated £2.1 billion per year (BBC News 2013).

10.3 Proposed mechanisms underlying the green space effect

Psychologically, natural environments have been shown to have restorative effects, which are defined by Hartig (2004, 273) as 'the process of renewing, recovering, or re-establishing physical, psychological and social resources or capabilities diminished in ongoing efforts to meet adaptive demands'. According to Pretty (2004) there are three levels of engagement with nature that can create a restorative effect. The first is viewing nature, as through a window, in a book, on television, or in a painting. The second is being in nature's presence incidental to another activity, such as walking or cycling to work, reading on a garden seat, or talking to friends in a park. The third is active participation and involvement with nature, such as gardening, farming, trekking, or running. Pretty (2004) suggests that each level plays a pivotal role in understanding the effect of green space and green exercise on physical, psychological, and social well-being.

Two major theories have been proposed to explain restorative environments' positive effect on physical, psychological, and social well-being. These are the psychophysiological stress recovery theory and the attention restoration theory. The former theory, proposed by Ulrich and colleagues (1991), is based on patterns of affective and aesthetic responses to the visual stimuli an environment presents. The theory postulates that restoration can occur when a scene elicits feelings of mild to moderate interest, pleasantness, and calm. These positive feelings of affect replace negative feelings of affect, resulting in a reduced physiological arousal. Ulrich and colleagues have suggested that natural environments offer a restorative advantage over artificial environments due to their more favourable visual stimuli.

The attention restoration theory (Kaplan 1995, Kaplan and Kaplan 1989) is primarily concerned with restoration from attentional fatigue. As a person's direct attention mechanism is largely under voluntary and effortful control, it can become fatigued. It is proposed that restorative environments (e.g., natural ones) facilitate recovery from directed attentional fatigue when an individual experiences fascination, conceptualised by Kaplan and Kaplan (1989) as a mode of attention that has an involuntary quality, does not require effort, and does not have capacity limitations. When someone relies on fascination in an ongoing activity, demands on the central inhibitory

According to Kaplan and Kaplan (1989), there are four progressive stages of restoration. The first stage, 'clearing the head', refers to an individual allowing random thoughts to wander through the mind and eventually fade away. The second stage is known as 'recharging directed attention capacity', a consequence of stage 1 of restoration. Stage 3 involves an individual's ability to tune into unbidden thoughts or matters on the mind due to reduced internal noise and enhanced cognitive quiet, which are facilitated by soft fascination. The final and deepest stage involves 'reflections on one's life, on one's priorities and possibilities, on one's actions and one's goals' (197). Kaplan and Kaplan suggested that attention restoration is enhanced when exploration of the environment and aesthetic features in it engage what they refer to as 'effortless attention or fascination'. This is aligned to stages 3 and 4 of progressive restoration, where soft fascination and deep reflection are evoked more readily by natural environments compared to other environments. In summary, the restorative effects of the natural environment have been shown to have a positive effect on physical, psychological, and social well-being. This can be achieved by replacing negative affect and cognitions with positive affect and cognitions via favourable visual stimuli presented in the natural environment. Alternatively, the natural environment can allow an individual to recharge directed attentional capacity through four progressive stages of restoration.

10.4 Outdoor activities and psychosocial development

Individuals and groups can participate in a wide range of outdoor activities, the most common being walking and cycling. Walking, frequently reported as the most popular recreational activity in the United Kingdom, is considered the most accessible form of exercise for all individuals: it is free, low impact, and requires no specialist equipment or training. Data from the Sport England (2009) survey found that 9.1 million adults in England, or 22% of the population, walked recreationally for at least 30 minutes in a four-week period. This was almost twice as many as reported swimming (5.6 million, 13.4%) and more than twice those that reported going to the gym (4.5 million, 10.7%). Data from the Scottish Household Survey (Scottish Government 2013) are similar: walking was the most popular form of exercise for adults. Overall, 59% reported walking for 30 minutes for recreational purposes in a four-week period, while 10% reported cycling during the same period.

Walking addresses many of the reported barriers to being more active: lack of time, money, poor health and well-being and physical limitations. It is also accessible to people from groups that could most benefit from being

more active; for example, older adults and adults from poorer areas. Walking is associated with increased social interaction, reduced crime and fear of crime, increased perceptions of safety, social capital development, and an enhanced network of interactions between individuals and their communities. Walking as part of an organised group is often recommended as a way of enhancing mental health and well-being, and exercise referral schemes have started to incorporate walking programmes in their service provision (see Ch. 9). Walking as part of a group has the additional benefit of providing an opportunity for social interaction, communication, a sense of relatedness, and cohesion with other walking group members. The United Kingdom now has thousands of programmes and initiatives to encourage individuals to walk for health and well-being.

According to the cited survey data, cycling is the UK's second most popular outdoor activity. Since the success of professional cyclists on the Tour de France and in the 2012 London Olympic Games, the number of those cycling for recreational purposes is estimated to have increased. Between October 2011 and October 2012 in England, the number of individuals cycling once a week increased by 200,000, with an estimated 1.9 million people cycling once a week (Sport England 2012). The annual distance cycled has also increased by 20% since 1998, from 4 billion to 5 billion kilometres in 2011 (www.ctc.org.uk). As with walking, cycling as part of a group has the additional benefit of providing the opportunity for social interaction, communication, a sense of relatedness, and cohesion with other cycling group members. Since 2010, the number of cycling groups that individuals of varied abilities and ages can join has increased.

Aside from walking and cycling, outdoor activities that can develop social attributes include gardening, golf, rock climbing, skiing and other snow sports, horse riding, canoeing, and sailing. Of these, the one to which the literature has accorded notable interest regarding exercise's green space effect is gardening. Gardens are important for the psychological processes of self-esteem, self-efficacy, and personal identity (Bernardini and Irvine 2007). Gardening can give an individual a sense of achievement and mastery. In a report for the UK National Association for Mental Health (MIND) examining the mental health benefits of green activities and green care, gardening was the most popular outdoor activity in programmes across the United Kingdom (Peacock, Hine, and Pretty 2007). Overall, 52% of the participants engaged in gardening and allotment activities, 37% participated in regular walking, 3% ran, and 1% cycled regularly. A key focus of the report was on understanding participants' perceptions of the benefits of participating in green exercise. In addition to the physical benefits, the participants identified numerous psychosocial ones. The opportunity to be part of a group, have companionship, and be with like-minded people was an

reported that green activities inspired new friendships to develop. The sense of achievement and mastery was another psychosocial benefit of green space exercise, one that was particularly relevant for participants who engaged in gardening and allotment activities. Feeling relaxed, reduced stress levels, and increased coping were also cited as important benefits; participants reported feeling good about themselves through a heightened sense of self-worth, self-confidence, and self-esteem. Overall, exercising outdoors alone or as part of a group can elicit a wide range of psychosocial benefits, including laying the ground for social interaction and social capital, developing a sense of relatedness, gaining a sense of mastery and achievement, reducing levels of stress and anxiety, and enhancing self-worth and self-confidence by being outdoors. The next section examines whether these benefits of exercise are augmented by engaging with the outdoor environment compared to exercising indoors.

10.5 The green space effect of exercise on psychosocial well-being

Exercising in an outdoor setting, particularly one with green space, may have benefits above and beyond those experienced exercising indoors. This concept, debated in the literature since the early 2000s, has become a key aspect of the political agenda. The 'Be Active, Be Healthy' report (Department of Health 2009) has emphasised the need for provision of and access to high-quality green spaces to further promotion of physical activity. The impact of green space and the wider neighbourhood's physical environment on health and well-being in Scotland were recognised in the 'Equally Well' report (Scottish Government 2008). The literature has supplied evidence of the positive impact of exposure to natural environments on mental well-being, with green exercise linked to social networking and feelings of connectivity and companionship, increased appreciation of nature, improved self-esteem, and a means of escape from modern life (Thompson Coon et al. 2011). Anecdotal evidence suggests that long-term adherence to exercise programmes conducted in outdoor natural environments or urban green spaces may be superior to exercising in an indoor environment, but no empirical evidence to support this concept has yet been published.

10.5.1 Indoor vs. outdoor exercise: is there a green space effect?

One of the earliest studies comparing the effects of indoor and outdoor exercising was conducted by McMurray and colleagues (1988). They found that running for 10 miles, either indoors on a treadmill or outdoors, had no

the men were competitive runners, generalising the findings to the majority of the population is difficult, as they do not examine the green space effect on the most popular mode of outdoor activity, walking. Several other research studies have compared the effects of walking indoors and walking outdoors in relation to various outcome measures. To further understand the three levels of engagement with nature proposed by Pretty (2004), Plante and colleagues (2006) created three experimental conditions where 102 participants completed (1) a 20-minute brisk walk outside, (2) a 20-minute brisk walk on the treadmill whilst looking at a visual reality video of the outdoors, or (3) simply watched the visual reality video for 20 minutes. Findings provided partial support for the three levels of engagement (Pretty 2004), where greater energy was experienced whilst walking outside, whereas less energy was reported when viewing the virtual reality walk with no exercise. The findings suggest that individuals who engage in an exercise (walking) outdoors rather than indoors are more energised via the active participation and involvement with nature. This is comparable to the third level of engagement with nature, the one that can create a restorative effect, which in this instance was increased energisation.

Researchers suggest that the novel stimuli in outdoor environments provide a pleasant distraction from feelings of exertion, thus leading to greater enjoyment and more positive affect than indoor exercise. This concept was examined by Focht (2009), who compared a brief 10-minute outdoor walk to a treadmill in a laboratory environment for affective responses, enjoyment, and intention to walk for exercise. Findings showed that both walking conditions resulted in enhanced affective responses, and participants reported pleasant affective states, enjoyment, and intention to walk in future. However, as the findings also suggested that affective responses were related to enjoyment only when walking in the outdoor environment, the green space effect on exercise received partial support. Yet it is important to note that the study participants were self-reported active women; therefore, the generalisation of the findings to the majority of the population that can engage in walking outdoors is limited. Thompson Coon and colleagues (2011) attempted to explore the green space effect concept comparing indoor versus outdoor exercise. They published a systematic review of exercise participation in outdoor natural environments compared with exercise indoors for the effect of each on physical and mental well-being. In their review, only 11 studies met the relevant inclusion criteria, and these included 833 adults, the majority being young adults. A total of 13 different outcome measures were used to evaluate the effects of exercise on mental well-being, and four outcome measures were used to assess attitude to exercise. No studies assessed and compared exercise adherence indoors and outdoors. Based on their review, Thompson Coon and colleagues

that are not in evidence when similar exercise is done indoors. Yet all of the studies included in the review examined a single bout of either walking or running; therefore, the chronic effects of outdoor versus indoor exercise are yet to be investigated. Thompson Coon and colleagues also stressed that their review highlighted the paucity of high-quality evidence on which recommendations for green exercise could be based. There is a clear need for further research in this area.

10.5.2 Characteristics of greenness and proximity of green space

To ensure a positive effect of green space on psychosocial well-being, the environmental aspects that support restoration and well-being need to be identified and included in the design of urban outdoor environments. This is particularly salient in today's society, where access to natural green space is decreasing due to the increase in urban settlements. The characteristics of green space and its impact on psychosocial well-being has been explored to some extent in the literature in relation to greenness and other specific aspects of the outdoor environment (e.g., wild vs tended forests) and the proximity of access to green space. In a study by Mackay and Neil (2010), the greenness of the outdoor environment was assessed in relation to state anxiety in 101 participants before and after they engaged in pre-existing outdoor activities. Consistent with previous research on green exercise, moderate short-term anxiety was reduced, yet interestingly the reduction was more marked in participants who perceived themselves to be exercising in more natural, green environments. Furthermore, greenness of the outdoor environment accounted for 5% of the reduction in anxiety, after controlling for pre-anxiety levels. This provides some evidence that the greenness of the outdoor environment could potentially influence an individual's psychosocial well-being.

The importance of the characteristics of the outdoor environment on enhancing psychosocial well-being was addressed by Pretty and colleagues (2005). In their study, 100 individuals ran for 20 minutes at light intensity on a treadmill. Whilst running, they were shown photos of rural outdoor scenes that were made to look 'pleasant' and 'unpleasant' and urban photos of outdoor scenes that were similarly manipulated. The control condition was running on the treadmill without the visual prompts. Exercising whilst viewing both rural and urban pleasant scenes resulted in a significantly greater rise in self-esteem in comparison to exercising with no visual prompts. Viewing unpleasant scenes reduced the positive effect of exercise on self-esteem. Though this provides further support for green exercise, it also demonstrates that the outdoor environment's characteristics need to be considered when

psychosocial well-being whilst walking in two conditions. Participants were randomly assigned to walking in either a wild or tended forest condition for 30 minutes in the morning and afternoon. The tended forest condition caused a stronger increase in positive affect relative to enhanced mood and calmness and a greater decrease in depression, anger, and lethargy levels before and after the walk. Overall, the study showed that ensuring tended forests (e.g., by creating accessible natural conditions with moderate density and low amounts of deadwood) could enhance positive affect and reduce negative affect for individuals walking in a natural environment.

A final consideration for urban planners aiming to ensure the outdoor environment is designed appropriately is the proximity of access to green space for individuals. Van den Berg and colleagues (2010) found that Dutch residents with a large amount of green space in a 3 km radius were less affected by stressful life events than those with a lower amount. Mitchell and Popham (2007) used UK census data for England to determine the association between the percentage of green space in an area and the standardised rating of self-reported 'not good' health. Findings showed that a higher proportion of green space in an area was associated with better health and well-being, yet the association depended upon the area's degree of urbanity and level of income deprivation. The authors also reported that the quality as well as quantity of green space may be significant in determining health benefits. This links to earlier discussions of salient outdoor characteristics that can enhance psychosocial well-being. Mitchell (2013) also found evidence of an association between access to green space to exercise and mental well-being in the Scottish population. Based on data from the Scottish Health Survey (2008), it was evident that risk of poor mental health was 50% less for regular users of woods and forests to exercise than for non-users. Recent findings have also shown individuals to be happier when living in urban areas with larger amounts of green space (White et al. 2014). In summary, access to green space can also impact on physical activity behaviours, with evidence suggesting that adults with better access to parks and other green environments tend to walk more (Giles-Corti et al. 2005; Li et al. 2005). Proximity, access, aesthetic pleasantness, and greenness could all help to create an optimal natural outdoor environment to enhance psychosocial well-being during physical activity.

10.5.3 Social interaction and the green space effect

As noted earlier, the outdoor environment provides a social context for developing a variety of psychosocial attributes through engaging with others, either informally, by sharing the green space itself (e.g., walking, running, gardening in a shared allotment) or

sense of belonging to a community. However, the relative influence of different types of exercise and social interaction on the green space effect needs further consideration. The association of perceived greenness of local areas with perceived physical and mental health was examined by Sugiyama and colleagues (2008), with a secondary focus on determining whether the association was influenced by the quantity of walking and social factors (social coherence and social interaction). Participants ($N = 1,895$) completed a mailed survey assessing physical and mental health, perceived neighbourhood greenness, amount of walking for recreation and transport, social coherence, local social interaction, and sociodemographic variables. Findings indicated that individuals who saw their local area as highly green had significantly greater odds of enhanced physical and mental health compared to those who did not perceive high greenness levels. Perceived greenness was also correlated with recreational walking and social factors. Walking for recreation seemed to explain the association between greenness and physical health, whereas such walking and social coherence only partly accounted for the relationship of greenness and mental health. Sugiyama and colleagues suggested that the restorative effects of natural environments may be involved in the residual association of the latter relationship. Overall, this study supported the concept that green environments that encourage people to walk for both recreation and transport could enhance physical and mental health. The authors recommended that to promote community health through enhancement of the environment, the planning and design of neighbourhood open spaces should place emphasis on the importance of 'walkable' green spaces.

In the majority of research examining the relationship between physical activity and social support, social support emerges as a strong positive correlate (Trost et al. 2002). Consideration of the importance of social support in green environments whilst exercising needs to be examined. Staats and Hartig (2004) proposed that the company of a friend could enable and enhance restoration to different degrees in different environments. They suggested that this could be done by making time in the environment more enjoyable, drawing attention away from everyday demands, either via the social interaction itself or through mutual exploration of the environment. The influence of social interaction on psychosocial well-being whilst exercising outdoors is a relatively limited research area. In order to address this research gap, Johansson, Hartig, and Staats (2011) examined the psychological benefits of walking, moderated by the presence of company and the outdoor environment. Their findings identified that when one walked in a park, feelings of revitalisation increased more when walking was done alone rather than with a friend. Yet when walking along urban streets, feelings of revitalisation increased only when walking with a friend: they showed

of exhaustion increased whilst walking alone, yet feelings of exhaustion did not increase with a friend present. Overall, the authors concluded that certain psychological benefits of a brisk walk vary with the influence of the immediate social context (i.e., walking with a friend) and features of the outdoor urban environment, including such natural features as greenery and water. This supports the data noting the importance of key characteristics and features in the outdoor environment in enhancing psychosocial well-being. Yet it also provides partial support for the unique role of social interaction whilst engaging in green exercise.

The impact of social interaction alongside exercise in a natural environment was further explored in an intervention study conducted by Barton and colleagues (2012). All participants involved in the study ($N = 53$), were between 21 and 83 and experienced a range of mental health conditions. The study evaluated three existing group-based health promotion initiatives: a social club (indoor activity, no exercise, social component), a swimming group (indoor activity, exercise, no social component), and a walking group (outdoor activity, exercise, social component). Self-esteem and mood were assessed before and after each session, and participants attended one session per week for six weeks. Participants in all three groups experienced improved self-esteem and mood after a single session, yet over the six weeks, the change in self-esteem was significantly greater in the walking group than in the swimming and social club groups. This supports the concept that social interaction whilst exercising in the outdoors, in green space, could benefit psychosocial well-being. However, the fact that no group in this study exercised alone in an outdoor environment limits the conclusions that can be drawn in relation to the independent contribution of social interaction and connectedness and the natural environment on psychosocial well-being.

Research examining social integration and interaction of communities through green space exercise is relatively limited. In their conceptual model of the role of parks in public health, Bedimo-Rung, Mowen, and Cohen (2005) outlined the antecedents, behaviours, and outcomes of park usage. In this model, psychological and social benefits of both being physically active in parks and park visitation were emphasised, alongside physical health, economic, and environmental benefits. Yet it is very difficult to measure the psychological and social benefits to be gained from being in green space whilst being physically active. In addition, the experiences of individuals who may access green spaces independently yet socially interact there due to the outdoor environment – for example, dog walkers – needs further exploration. In their review of dog ownership, physical activity, and health, Cutt and colleagues (2007) found that dogs provide an important form of

Collis 2000). However, to our knowledge there is no research examining social interactions amongst groups of dog walkers.

10.5.4 Intensity, frequency, and type of green exercise

With the majority of the literature suggesting that there is a green space effect on psychosocial well-being, particularly when participating in green exercise, there has been a focus on ascertaining the optimal amount of green exercise needed to gain these established benefits. This concept was explored by Pretty and colleagues (2007), who looked at ten green exercise case studies in the United Kingdom where 253 individuals engaged in green exercise activities (walking, cycling, horse riding, fishing, canal boating, conservation activities). Self-esteem (Rosenberg 1965) and total mood disturbance using the profile of mood states measure (McNair, Lorr, and Dropleman 1992) were assessed before and after the individuals engaged in activity. In relation to all types of green exercise, both self-esteem and mood significantly improved following participation, yet the enhancements were not influenced by the type of green exercise activity undertaken and were comparable for all types of green exercise activity. This provided initial evidence that green exercise activity brings mental health benefits regardless of the level of intensity, duration, or type of green activity undertaken.

More recently Barton and Pretty (2010) further explored this concept. They conducted a meta-analysis to examine the 'dose of green exercise', a term they defined as representing the linked relationship between duration of exposure, intensity of activity, and type of green space. In total, ten studies ($N = 1,252$) were included in their meta-analysis; all used the same measures of psychosocial well-being, Rosenberg's self-esteem scale (1965) and the profile of mood states (McNair et al. 1992). Their results showed that acute short-term exposures to facilitated green exercise improved both self-esteem and mood, irrespective of duration, intensity, location, gender, age, and health status. The dose-response relationship between duration in green exercise and self-esteem and mood displayed distinct U-shapes (see Figure 10.1). The greatest change in both was seen in the initial five minutes of exercise, suggesting that it has an immediate effect on psychosocial well-being. Relative to the intensity needed to elicit maximum psychosocial benefits during green exercise, light intensity seems to benefit self-esteem the most. It was also shown that as exercise intensity increased, self-esteem increased to a lesser extent. Conversely, the dose-response relationship between mood and intensity followed a U-shape curve, where improvements in mood were greatest for light and vigorous activity. Again, both findings provide evidence that physical activity of light intensity is sufficient to elicit psychosocial benefits, which is important to consider when explaining the green space effect of walking to those who are less

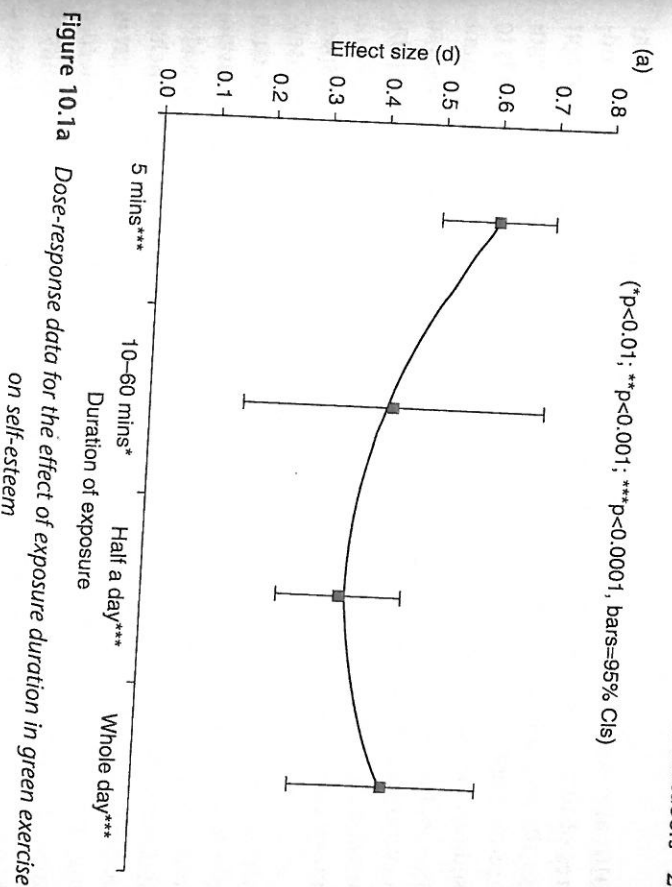


Figure 10.1a Dose-response data for the effect of exposure duration in green exercise on self-esteem

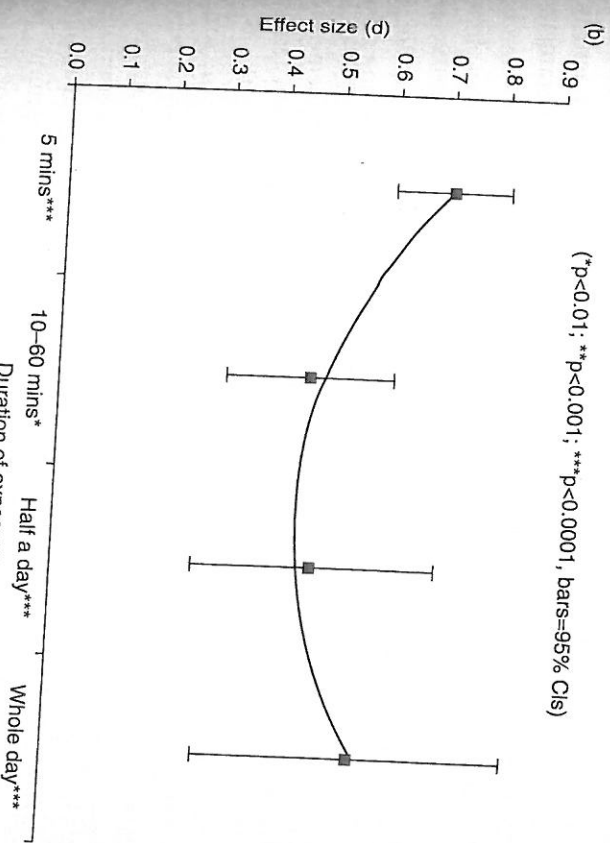


Figure 10.1b Dose-response data for the effect of exposure duration in green exercise on total mood disturbance.

Source: Reprinted with permission from Barton, J. and Pretty, J. (2010). What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. *Environmental Science and Technology*, 44(10), 3947-3955. Copyright © 2010.

(2010) also wanted to explore the influence of the characteristics and features of the outdoor environment on psychosocial well-being. Their findings showed that green spaces with water (beaches, rivers) brought larger improvements in self-esteem and mood than other green spaces categorised (urban green space, countryside, wilderness, woodlands). This adds to the research on the importance of key features of the outdoor environment in enhancing psychosocial well-being, an area that urban planners need to be aware of when designing new outdoor settings to expand social capital and engagement and enhance health and well-being.

Overall, there does appear to be some support for the green space effect of exercise on psychosocial well-being, in particular enhanced self-esteem and mood. Exercising outdoors in natural environments rather than indoors could add the benefits of increased social interaction, restoration, and enhanced affective states. However, in order to maximise these added benefits, salient features of the outdoor environment are needed, including greenness, pleasantness, tidiness, presence of water, and having a green space in close proximity to access. As for the amount of green exercise needed to enhance psychosocial well-being, it appears that short, acute bouts of light-intensity green exercise are sufficient. As the type of green exercise activity has no effect on psychosocial well-being, it should be determined by personal preference. These are key considerations for physical activity practitioners utilising the outdoors in their physical activity programmes and initiatives.

10.6 The green space effect in action

Since the mid-2000s, use of green space whilst exercising has increased, with exercise programmes focusing on the green space effect implemented in both the public and private sectors. These programmes, often termed 'green gyms', aim to support individuals who garden or improve the local environment while providing opportunities for physical activity and social interaction. In 2004 the Department for Health's policy document on public health urged communities to use green gyms. In 2008 Yerrell evaluated 52 UK green gym projects commissioned by the British Trust for Conservation Volunteers; 703 participants in green gym programmes completed an introductory questionnaire assessing motives for joining the programme, perceptions of health-related quality of life, and self-reported levels of physical activity. A continuation questionnaire was provided three months later, and 194 participants completed it within three to six months of joining the green gym programme. Contribution to the environment, health, confidence, skills, and training were the most commonly cited benefits of green gyms in the community. This supports anecdotal evidence on the positive

mastery and confidence. There was also evidence of increased self-reported physical activity in those participants who completed the follow-up questionnaire after three months. Despite not being statistically significant, this increase provides partial evidence that green gym programmes contribute to increased physical activity and provide a range of psychosocial benefits. In 2014 in Scotland, Dr Ruth Jepson, at the University of Stirling, was engaged in conducting a year-long study comparing indoor and outdoor exercise habits through GP-referral schemes. The research was commissioned and undertaken by the Scottish Collaboration for Public Health Research and Policy, located in the University of Edinburgh, and the University of Stirling's Centre for Population Health and Public Health Research. The study has aimed to recruit 100 participants; half would be referred to indoor activities, such as swimming, gym sessions, and classes, and half to outdoor exercise, such as gardening (green gym), walking, or golf. Adherence levels, to be assessed in the different activity types. At time of writing, the study was ongoing but expected to end in 2015. As the first of its kind in Scotland, it was hoped that the project would help councils and leisure trusts plan future health programmes and facilities, including new outdoor spaces, green gym environmental programmes, and walking routes.

Researchers at the European Centre for Environment and Human Health at the University of Exeter (www.eceh.org/research/#blue-gym) have been examining the psychological and physical health benefits of exercising while exposed to a natural water environment, termed a 'blue gym'. As of late 2014, they were conducting a range of studies focusing on the blue gyms' psychological and physical health benefits; one study, examining the importance of water for restorativeness (White et al. 2010), used 120 photographs of natural and built scenes, half of which contained 'aquatic' elements. Proportions of 'aquatic/green/built' environments in each scene (e.g., 1/3, 2/3) were also standardised. Preferences, affect, and perceived restorativeness ratings for the photographs were assessed. Findings suggested that both natural and built scenes containing water were associated with higher preferences, greater positive affect, and higher perceived restorativeness than those without water. Findings also suggested that images of built environments containing water were generally rated just as positively as natural green space. This provides preliminary evidence that exercising in or near natural water may have additive benefits for psychosocial and physical health compared to exercising in green spaces. At time of writing, the concept was being explored further by Dr White and colleagues in a controlled study focusing on the psychophysiological responses to indoor cycling in different environments. Participants were asked to cycle indoors for 15 minutes whilst viewing images and soundscapes.

their heart rate, blood pressure, mood, and arousal levels were monitored pre- and post-exercise.

10.7 Summary

The outdoor environment is an important social setting where a variety of psychosocial benefits can occur through exercise and physical activity. The outdoor environment, characterised by natural green space, is particularly salient for population groups often labelled 'hard to reach' (i.e., low-activity adults, older adults, adults from socio-economically poorer areas), as it offers the opportunity to exercise with few perceived barriers. The psychosocial benefits to be gained by exercising outdoors in a range of activities (walking, gardening, cycling) include restorative effects and improved mood, development of social networks and of a sense of relatedness, and an increased sense of mastery. Urban planners in the private and public sectors need to consider the key features of outdoor environment for which additive benefits for physical and psychosocial health and well-being, as well as social capital, have been documented. The green space effect of exercise and the impact of green gyms and blue gyms on physical and mental well-being are relatively new areas of research, yet there is a growing body of research evidence that individuals should be advised to move outdoors to gain the benefits of nature whilst engaging in regular physical activity.

10.8 Case study

10.8.1 Setting the scene

John, a 73-year-old male, is retired and lives alone in an area of town categorised as having low socio-economic status. He had a relatively active lifestyle in the past and enjoyed both indoor (e.g., squash) and outdoor activities (e.g., cycling), yet due to mobility issues in recent years, he has become relatively inactive save for his daily walk to the shops. John has felt lonely and isolated over the past few months, in a recent visit to his GP, he was diagnosed with mild clinical depression. The GP offered John several treatment options adjunctive to his medication, one of which was to consider joining a local GP-referral programme. He advised John that interacting with others through exercise could provide distraction from his low moods and also help his mobility issues if the exercise was relatively moderate in nature. The GP provided John with information on the types of programmes available, including both indoor activities and outdoor activities.

How can John engage in appropriate outdoor activities to help alleviate

10.8.2 Assessing the situation

This situation has no specific socialising agent. The nature of the outdoor environment itself is what could contribute to enhancing John's psychosocial well-being through green exercise. The GP plays a key role in the programme's initial stages by helping increase John's awareness of the positive physical and psychosocial benefits to be gained by exercising outdoors and to also help John lower barriers to engaging in physical activity. John's barriers include cost, mobility issues, and low levels of self-efficacy for certain types of activities. In John's case, activity of low intensity would be most appropriate; for example, joining a walking group or a green gym programme of gardening activities.

10.8.3 Important role of the outdoor environment in behaviour change

As outlined by Pretty (2004) in his levels of engagement, in order to maximise the restorative benefits of being physically active in the natural environment outdoors, active participation and involvement with nature (e.g., walking or gardening) should be recommended to John. Joining a walking group could elicit for him a range of physical and psychosocial benefits, including increased social interaction and a sense of relatedness with others in the GP-referral walking group. Walking could also increase his perceptions of safety in his local community and also make him feel more connected to it. In addition, participating in a green gym gardening programme could give John a sense of mastery, accomplishment, and achievement. As both of these low-intensity activities can be undertaken outdoors and will allow John to become more active and independent, they could enhance his psychosocial well-being. They might also help to treat his mild depression via the combined benefits of restoration in a natural environment and green exercise.

10.8.4 Specific strategies for key socialising agents

Urban planners and environmental policymakers need to consider the following specific recommendations when designing and developing outdoor environments for engagement with nature on all three levels (viewing nature, being in nature's presence, active participation in exercise in a natural environment) so as to enhance physical and psychosocial well-being.

- Natural environments need to be in close proximity to urban areas to ensure ease of access and maximum usage.
- Natural environments need to have several key features: greenness, pleasantness, tidiness and water.

The following specific strategies need to be considered by physical activity practitioners when implementing green exercise programmes in local communities to enhance physical and psychosocial well-being.

- Based on the recommendations above, wherever possible, physical activity practitioners should develop programmes incorporating outdoor environments in close proximity to urban settlements (e.g., towns, cities), where the majority of potential participants in green exercise programmes will reside.
- They should offer a range of outdoor activities, as evidence shows that all green exercise programmes have similar physical and psychosocial benefits.
- They should emphasise to all potential programme participants that even short, acute bouts of light-intensity green exercise enhance psychosocial well-being.

10.9 Further study and recommended reading

The following literature is recommended for further reading on key concepts addressed in this chapter.

- Peacock, J., Hine, R., and Pretty, J. (2007). The mental health benefits of green exercise activities and green care. *Mind Week Report*.
- Yerrill, P. (2008). *National Evaluation of TCV's Green Gym*. Oxford: School of Health and Social Care, Oxford Brookes University.

Additionally, reading in the following relevant areas is recommended. The materials address other aspects of the outdoor environment that are not covered in this chapter but are central to understanding the green space effect of exercise.

- Eden, S., and Barratt, P. (2010). Outdoors versus indoors? Angling ponds, climbing walls and changing expectations of environmental leisure. *Area*, 42(4), 487–493.
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- Atkins, M. R., Johnson, D. M., Force, E. C., and Petrie, T. A. (2012). 'Do I still want to play?' Parents' and peers' influences on girls' continuation in sport. *Journal of Sport Behavior* 36 (40), 329–345.
- Babkes, M. L., and Weiss, M. R. (1999). Parental influence on cognitive and affective responses in children's competitive soccer participation. *Pediatric Exercise Science* 11, 44–62.
- Balmer, N. J., Nevill, A. M., and Williams, A. M. (2003). *Modelling human movement*. The Gower Press.