

Outdoor Exercise, Well-Being and Connectedness to Nature

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ABSTRACT

Positive outcomes from contact with nature on well-being have been presented by restorative environments research. Additionally, studies in the area of exercise recognize the physical and psychological benefits, and more recently, those related to outdoor practice, particularly in natural environments. Present study combines these two research areas, analysing the relationship between outdoor physical exercise and well-being, verifying the role of connectedness to nature in this respect. Participants are 282 practitioners of outdoor and indoor physical exercise who, answering a questionnaire, self-reported their exercise level, exercise subjective experience, affect and connectedness to nature. Differences between the two types of indoor and outdoor physical activity are reported, highlighting the benefits of outdoor exercise practicing. Participants who combine outdoor with indoor physical activity report more positive emotions and well-being associated with exercise, and their connectedness to nature is a significant predictor of well-being. Finally, we discuss implications for promotion of healthy lifestyles.

Keywords: Outdoor exercise; physical activity; well-being; connectedness to nature.

RESUMO

Exercício Físico Outdoor, Bem-Estar e Conectividade com a Natureza

Os benefícios do contacto com a natureza no bem-estar são suportados pela pesquisa sobre ambientes restauradores. Estudos na área do exercício físico reconhecem igualmente benefícios físicos e psicológicos do exercício *outdoor*, particularmente em ambientes naturais. Combinando estas duas áreas, pretendemos estudar a relação entre o exercício físico *outdoor* e o bem-estar, e o papel da conectividade com a natureza nessa relação. Participam 282 praticantes de exercício físico, que responderam a um questionário relatando o nível de actividade física, a experiência subjectiva com o exercício, o estado afectivo e a conectividade com a natureza. Os resultados mostram que os praticantes de exercício *outdoor* e *indoor* relatam mais emoções positivas e melhor bem-estar associado ao exercício que os praticantes apenas *indoor*. Além disso, a conectividade com a natureza é um preditor do bem-estar naquele grupo de praticantes. Discutem-se as implicações dos benefícios do exercício *outdoor* na promoção de estilos de vida saudáveis.

Palavras-chave: Exercício físico outdoor; actividade física; bem-estar; conectividade com a natureza.

RESUMEN

Ejercicio Físico Outdoor, Bienestar y Conectividad con la Naturaleza

Los beneficios del contacto con la naturaleza en el bienestar son apoyados por la investigación de los entornos de restauración. Estudios en el ejercicio físico también reconocen los beneficios físicos y psicológicos del ejercicio *outdoor*, especialmente en entornos naturales. Este estudio investiga la relación entre el ejercicio *outdoor* y el bienestar, y el rol de la conectividad con la naturaleza. Los 282 practicantes de ejercicio contestaron un cuestionario informando el nivel de actividad física, la experiencia subjetiva con el ejercicio, las emociones y la conectividad con la naturaleza. Los practicantes de ejercicio *outdoor* y *indoor* reportan más emociones positivas y mejor bienestar asociado con el ejercicio que los practicantes solamente en entorno *indoor*. La conectividad con la naturaleza es un predictor de bienestar en el grupo de practicantes *outdoor* y *indoor*. Se discuten las implicaciones de los beneficios del ejercicio *outdoor* en la promoción de estilos de vida saludables.

Palabras clave: Ejercicio físico outdoor; actividad física; bienestar; conectividad con la naturaleza.

INTRODUCTION

Sense of physical and mental health is often identified as an outcome from the practice of physical activity and exercise. The increase in physical activity improves the actual health status (Warburton, Nicol, & Bredin, 2006). Also, contact with nature, in the form, of contemplative activity or a more active way such as walking or cycling is seen as an important way for people to gain and perceive psychological well-being (Hartig, Evans, Jamne, Davis, & Garling, 2003). These contributions of physical activity and contact with nature to health and quality of life have been studied by exercise, health psychology and environmental research domains (Biddle & Mutrie, 2008; Frumkin, 2001; Maas et al., 2009).

The positive effects of physical activity and exercise on physical and mental health are widely accepted by exercise researchers (Blair, Cheng, & Holder, 2001; Mitchell, 2013). Evidence from extensive literature indicates that nearly all studies show positive effects on psychological well-being, including mood and affect, self-esteem, enjoyment, cognitive functioning, personality, sleep and subjective well-being (Biddle & Mutrie, 2008). There is also strong evidence of the positive effectiveness of regular physical activity on physical health: physically active people have higher levels of health-related fitness, a lower risk profile for developing a number of disabling medical conditions (*e.g.* cardiovascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis) and less premature death than people who are inactive (Veloso, Matos, Carvalho, Diniz, 2012; Warburton et al, 2006).

More recently, outdoor exercise is associated with several affective benefits and motivation to participate in further physical activities, but the impacts of different types of outdoor environments on psychological and emotional well-being still need to be investigated (Focht, 2009; Marselle, Irvine & Warber, 2013).

Notably, physical activity in nature has considerable positive effects on human health (Brymer, Cuddihy, & Sharma-Brymer, 2010). Studies about outdoor physical exercise show that this type of activity, particularly in natural environments, promotes several physical and emotional benefits such as vitality, psychological restoration, and well-being (Hug, Hartig, Hansmann, Seeland, & Hornung, 2009; Pretty, Peacock, Sellens, & Murray, 2005; Ryan et al., 2010). Also, green exercise – exercising in natural settings – is usually associated with increased energy, vitalization, reduced stress or positive mood (Coon et al., 2011; Pretty et al., 2005). Furthermore, some physical benefits were also

associated with outdoor walking programs: lower the risk of cardiovascular disease and obesity (Kahn et al., 2002).

In the psychological and mental health perspective the well-being is generally conceptualized with both negative and positive affective states. These states can be dichotomized in terms of psychological distress (*e.g.*, anxiety, depression, stress related emotions) and psychological well-being (*e.g.*, positive affect) (McAuley & Courneya, 1994). This study addresses the psychological responsiveness to exercise or subjective feelings states related to exercise practice, and general positive and negative affective states (Galinha & Pais-Ribeiro, 2005a).

Environmental psychologists have been studying the effects of contact with nature on well-being, stress and fatigue recovery (*e.g.* Kaplan, 1995; Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009; Ulrich et al., 1991). In fact, these physical and psychological benefits related to being immerse in nature are motivations for searching to be in this situation in many different ways such as visiting a protected natural area or an urban green area (*e.g.* Home, Hunziker, & Bauer, 2012; Loureiro, 1999).

Contact with nature happens when one is exposed to a degree of natural environments and may occurs in many different situations such as working with a view to an urban park, seating and reading in front of the seaside, tracking or running on a forest. These encounters with nature in natural environments as a forest, mountain or seaside, or in urban areas as an urban park, or even in indoor real or virtual settings as home or exposure to pictures, are linked to several positive and restorative outcomes related to physical and mental health (Carrus et al., 2013; Hartig et al., 2010).

Recovering from stress during and after being exposed to a natural content scene happens when this kind of context evokes positive emotions and physiological responses associated with stress reduction (Ulrich et al., 1991). Natural environments may also have the properties that induce and help the recovery of individual attentional capacities (Kaplan, 1995). Moreover, being present and immerse in nature has been demonstrated as having vitalising properties, meaning the perception of higher physical and mental energy, which has been considered as a way to promote and improve health status and wellness (Ryan et al., 2010).

Natural environments present greater restorative qualities as people experiencing these contexts present better health and report more sense of well-being (Depledge, Stone, & Bird, 2011; Frumkin, 2001). These benefits from the exposure to natural settings seem to be mediated by a sense of belonging,

embeddedness and connection to nature, tapped by the connectedness to nature concept (Mayer & Frantz, 2004; Olivos, Aragonés & Amérigo, 2011). The concept of connectedness to nature represents the individuals' experiential sense of oneness with the natural world. Usually this concept is measured by the connectedness to nature scale (CNS), a measure of individuals' trait levels of feeling connected to the natural world, integrating cognitive and emotional experiences (Mayer & Frantz, 2004). Being outdoors and in contact with the natural environment is a way for people to satisfy the need to have direct experience in natural world, and the emotional and cognitive experiences associated may have important positive effects on well-being (Mayer et al., 2009; Tauber, 2012).

Research about the associations between physical activity, contact with nature and health are still poorly investigated (Hartig, Mitchell, de Vries, & Frumkin, 2014). This study aims to combine the research on outdoor exercise with the research on contact and connectedness to nature and their relations to well-being. The main aim is to analyse the relationship between outdoor physical exercise and well-being, verifying the role of connectedness to nature in this respect. Particularly, we aim to explore whether physical exercise in outdoor environments, namely natural ones, is positively related with well-being, and if connectedness to nature is related to well-being, among those who are physical active individuals.

METHOD

Participants and Procedure

Participants are 282 Portuguese adults that participated on a larger study about physical exercise and its psychological correlates, in the metropolitan area of Lisbon. They were invited to participate on a study about adherence to physical exercise and completed the questionnaire while they were for a session in a fitness centre or in an outdoor exercise activity (e.g. urban park, streets, pinewood near city, riverside, beach), after giving their informed consent. Data collection was done between February and April 2013.

From these, 56.4% (N=159) were individuals that practice physical exercise on indoor (e.g. fitness centre, sport hall) and/or outdoor (e.g. walking, running, cycling, on the street, park, forest, beach) environments, and the others (43.6%; N=123) were individuals with exercise practice only on a fitness centre or other indoor environment.

In the first group – outdoor/indoor physical exercise – participated 82 women (29.1%) and 77 men (27.3%),

with a mean age of 33 years old ($SD=10.94$; Min=18; Max=74). In the second group – indoor physical exercise – participants were 82 men (29.1%) and 41 women (14.5%), and their mean age was 32 years old ($SD=11.26$; Min=18; Max=69).

Materials

The questionnaire was part of a larger research and, for the purpose of present study, participants completed the CNS – Connectedness to Nature Scale (Mayer & Frantz, 2004), the PANAS (Galinha & Pais-Ribeiro, 2005b), measuring positive and negative mood, and the SEES – Subjective Exercise Experiences Scale (McAuley & Courneya, 1994) for measure of the global psychological responses to physical exercise.

The CNS (Mayer & Frantz, 2004) is a one-dimensional scale with 14 items (e.g. “I think of the natural world as a community to which I belong”), and a modified Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) ($\alpha=.85$). The Portuguese version of PANAS (Galinha & Pais-Ribeiro, 2005b) has 20 items for two dimensions, with 10 items each, positive and negative affect (e.g. “Active”, “Disturbed”), using a modified Likert-type scale ranging from 1 (very slightly or not at all) to 5 (extremely) (α of positive affect=.87, α of negative affect=.77). Psychological feelings about exercise are evaluated using SEES (McAuley & Courneya, 1994). This scale is composed for 12 items, organized in three dimensions, namely positive well-being (4 items; e.g. “Strong”; $\alpha=.80$), psychological distress (4 items; e.g. “Unhappy”; $\alpha=.70$) and fatigue (4 items; e.g. “Tired”; $\alpha=.88$). This scale uses a Likert-type scale ranging from 1 (nothing) to 7 (very much). As shown, all measures in the study present good values for reliability.

Questions about physical activity, namely for indoor and outdoor exercise practice were included and also for demographics data (birth date and gender). Exercise was evaluated including items as the type of exercise practiced, number of times and minutes in a week (exercise frequency) for total and for indoor and outdoor exercise (natural and urban environment), average time (minutes) of exercise per session, and subjective evaluation of intensity of exercise practice (scale from 0=none, 5=strong to 11=maximum).

RESULTS

Participants have an average of number of times in a week of physical exercise of 4.18 ($SD=1.37$), 3.93 times in indoor exercise ($SD=1.85$) and 2.27 times in outdoor activity ($SD=1.41$).

The average time of exercise per session is of 1.16 hours ($SD=0.59$), with participants evaluating their intensity of exercise activity as strong ($M=5.62$; $SD=2.15$).

The mean number of hours of physical activity per week is 6.71 ($SD=4.39$). Participants with outdoor exercise spend an average of 3 hours per week in urban settings ($SD=2.74$), and 2.44 hours in natural environments ($SD=2.13$).

To compare the two groups of participants (indoor physical exercise and outdoor/indoor physical exercise) according to their physical activity intensity, we conducted several *t*-tests. The indoor group and the outdoor/indoor group differ in their evaluation of intensity of physical activity and in the number of hours of physical activity per week. People who practice exercise in both outdoor and indoor contexts spend more time in physical activity (number of hours per week) ($M_{out/indoor}=7.42$, $SD=4.99$, $M_{indoor}=5.82$, $SD=3.19$, $t(267)=-3.192$, $p<.01$) as well as they evaluate their activity as more intense ($M_{out/indoor}=5.99$, $SD=2.16$, $M_{indoor}=5.20$, $SD=2.01$, $t(268)=-3.056$, $p<.01$) (Table 1).

Outdoor exercise and well-being

We used *t*-tests to analyse the psychological differences between indoor and outdoor/indoor exercise practitioners. Important differences exist between the group of participants with outdoor/indoor physical activity and the group of practitioners with indoor physical activity.

Well-being state is better among participants that practice physical activity in an outdoor environment than others who only have indoor practice. Individuals in the outdoor/indoor group have more positive affect

($M=37.97$, $SD=5.94$, $t(234)=-2.97$, $p<.05$) and more positive well-being related with exercise ($M=21.89$, $SD=3.96$, $t(269)=-2.48$, $p<.01$) than participants in the indoor physical activity group (Table 1).

Outdoor exercise, connectedness to nature and well-being

To analyse the relationship between connectedness to nature and well-being in exercise practitioners, several regression analysis were conducted, controlling for exercise practice (subjective intensity and exercise hours per week). No effects were found for the amount of physical activity (of hours per week).

The prediction of well-being by connectedness to nature in the two groups is different, with significant results mainly for the outdoor/indoor group, despite no significant differences found between the two groups for the level of connectedness to nature ($M_{out/indoor}=3.41$, $SD=.67$, $M_{indoor}=3.43$, $SD=.65$, $t(276)=.221$, $p>.05$) (Table 1).

Regarding the group who performs physical exercise only in indoor environments, connectedness to nature didn't have an important predictor role, unless the little prediction effect found for positive affect, $R^2_{Adj}=.157$, $F(2,102)=10.663$, $p<.001$, $\beta_{intensity}=.387$, $p<.001$, $\beta_{connectedness}=.183$, $p=.046$. For these individuals, psychological well-being related with exercise, is primarily explained by their evaluation of physical activity intensity, $R^2_{Adj}=.151$, $F(1,96)=18.283$, $p<.001$, $\beta_{intensity}=.40$, $p<.001$. Connectedness to nature is a significant predictor of well-being for participants in the outdoor/indoor exercise group. A positive relationship is observed also for evaluation of physical activity intensity and well-being. Connectedness to nature and exercise

TABLE 1
Exercise, affect, psychological exercise experience and connectedness to nature

Measure	Outdoor/Indoor Group		Indoor Group		t-test
	M	SD	M	SD	
Subjective exercise intensity	5.99	2.16	5.20	2.01	-3.06**
Exercise (hours per week)	7.42	4.00	5.82	3.19	-3.19**
PANAS					
Positive affect	37.97	5.94	35.76	6.22	-2.97**
Negative affect	13.01	3.72	13.20	4.58	.37
SEES					
Positive well-being	21.89	3.96	20.59	4.06	-2.48*
Psychological distress	4.87	1.82	4.71	1.70	-.71
Fatigue	15.02	6.34	15.17	5.94	.19
Connectedness to nature (CNS)	3.41	.67	3.43	.65	.22

* $p<.05$; ** $p<.01$

intensity perception predict positive affect, $R^2_{Adj} = .182$, $F(2,140) = 16.789$, $p < .001$, $\beta_{connectedness} = .239$, $\beta_{intensity} = .374$, and predict psychological well-being related with exercise, $R^2_{Adj} = .207$, $F(2,115) = 16.232$, $p < .001$, $\beta_{connectedness} = .197$, $\beta_{intensity} = .431$. Connectedness to nature also negatively predicts the outdoor/indoor group psychological distress related with exercise, with no effects found for subjective intensity, $R^2_{Adj} = .032$, $F(1,120) = 5.036$, $p < .05$, $\beta = -.201$.

DISCUSSION AND CONCLUSIONS

The purpose of this study was to analyse associations between outdoor exercise practice and reported well-being by physical active individuals, as well as to explore the relations with their connectedness to nature.

The group of individuals with exercise practice in both outdoor and indoor environments (outdoor/indoor group) reported more positive affect and psychological well-being related with exercise practice than the indoor group, thus showing the psychological benefits of outdoor settings during physical activity. These results are consistent with previous research arguing that contact with nature is a predictor of human health and well-being, giving the benefits for human affect, psychological well-being, or stress and fatigue recovery (e.g. Collado & Corraliza, 2012; Mayer et al., 2009; Ryan et al., 2010). Researchers on physical exercise and health also have been discussing the positive effects that outdoor exercise may elicit on human health and wellness (e.g. Focht, 2009; Mitchell, 2013).

We also intended to explore the role of connectedness to nature, namely for individuals with exercise activity practice in outdoor environments. Results show that for those who practice physical exercise in indoor and outdoor environments (natural or urban), and following intensity of exercise effect, connectedness to nature predicts positively their positive affect, psychological well-being and negatively psychological distress. In fact, the contact with nature during an outdoor exercise practice may be an important predictor and potentiate the positive effects of outdoor activity on well-being (Pretty, Griffin, Sellens, & Murray, 2003). In future research, it would be important to better explore the differentiation between natural and urban settings regarding potential effects on human well-being.

Present findings regarding differences between the two types of indoor and outdoor exercise highlight the benefits of outdoor exercise practicing for individual well-being. The combination of indoor with outdoor activity can be an important factor in promoting psychological well-being, along with the physical

benefits of physical exercise, helping to promote the adoption of active and healthy lifestyles. Also, the combination of exercise and exposure to nature, suggested by green prescriptions by healthcare practitioner and services, could be useful as a tool to help improve motivation and adherence to physical activity and also help to ameliorate public human physical and psychological health (Gladwell, Brown, Wood, Sandercock, & Barton, 2013; Marselle et al., 2013).

Also, there are some implications for urban planning, as improving the accessibility to recreational areas for physical activity practice, promote green items (trees and other plants) in streets and urban parks, in order to create environments that promote the psychological benefits related to health and well-being (Coon et al., 2011; Maas, Verheij, Groenewegen, de Vries, Spreeuwenberg, 2006). On the other hand, health clubs can promote physical exercise by creating extensions to indoor exercise programs in outdoor environments. Some initiatives have already been seen through the "running clubs" that some health clubs have instituted for their clients.

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