

Article Title:

'The world is best experienced at 18 mph'. The psychological well-being effects of cycling in the countryside: An Interpretative Phenomenological Analysis

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Biographical Note on authors:

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James T. Beale is a BPS chartered psychologist and HCPC practitioner psychologist. James currently works at the University of East London where he has held an academic post since 2002. James is the current Programme Leader for the MSc in Applied Sport and Exercise Sciences. James has a specific research interest in the psychological mechanisms that underlie the benefits of exercising in natural environments.

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Abstract

Green Exercise (GE) refers to physical activity conducted whilst simultaneously engaging the natural environment. A substantial body of literature has now been accumulated that establishes that carrying out exercise in this way has significantly greater psychological wellbeing benefits than the non-GE equivalent. Hitherto, seldom has consideration been given to the individual meanings that doing GE has. This study, therefore, sought to understand the lived experience of the phenomenon amongst a group of serious male recreational road bicyclists aged between mid-30s and early 50s who routinely rode in the countryside. Eleven bicyclists participated in semi-structured interviews. Data were analysed using Interpretative Phenomenological Analysis (IPA). This revealed themes of mastery and uncomplicated joys; my place to escape and rejuvenate; and alone but connected. Findings indicate that green-cycling served to enhance the participants' sense of wellbeing and in doing so helped them cope with the mental challenges associated with their lives. It is suggested that green-cycling merges the essential qualities of natural surroundings – including its aesthetic, feelings of calm and a chance for exploration – with the potential for physical challenge and, facilitated by modern technology, opportunities for prosocial behaviours. It also identifies how green-cycling may influence self-determined behaviours towards exercise regulation, suggesting more satisfying and enduring exercise experiences.

Keywords: Green Exercise; green-cycling; wellbeing; Interpretive Phenomenological Analysis; Self-Determination Theory; nature

1 **Introduction**

2 The last decade has seen a rise in the overall numbers of people participating in recreational
3 bicycling in the UK¹. The roots of this increase appear to stem from several sources including
4 its presence in public health campaigns. Bicycling is identified as an effective way of
5 achieving the recommended level of exercise to improve physical and psychological
6 wellbeing (UK Department of Health 2011, 2013, National Institute of Health and Care
7 Excellence 2012, 2014). Bicycling is also commonly associated with the outdoors and as such
8 can permit extended exposure to the natural environment. Green Exercise (GE) refers to the
9 phenomenon in which physical activity is conducted in parallel to direct contact with nature
10 (Pretty *et al.* 2005).

11 Physical activity has been evidenced as making a material improvement to
12 individual's mental health – both in well populations (Harvey *et al.* 2010) and amongst those
13 suffering from diagnosed mental illnesses (e.g. Zschucke *et al.* 2013). However, research
14 shows how acute bouts of GE are substantially more beneficial to psychological wellbeing
15 than the same exercise carried out indoors or in built outdoor environments (e.g. Bratman *et al.*
16 *et al.* 2015). Specifically, it leads to further increases in self-esteem and mood (Pretty *et al.*
17 2005); greater alleviation of depression (Barton *et al.* 2012); more psychological restoration
18 (Bodin and Hartig 2003); additional stress reduction (Hansmann *et al.* 2007) and a lessening
19 of state and trait cognitive anxiety (Marytn and Brymer 2016).

20 A number of theories have sought to explain how nature facilitates psychological
21 wellbeing. Amongst these is Psycho-Evolutionary Theory (PET), which concerns stress
22 reduction (Ulrich *et al.* 1991). It emphasises how humans, when surrounded by visually
23 pleasant scenes that include natural features, feel calm – moderating negative affect and
24 summoning more positive emotions, such as joy. Another prominent and influential
25 framework linking interactions with nature and psychological wellbeing is Attention
26 Restoration Theory (ART) (Kaplan and Kaplan 1989). ART proposes that natural scenery is
27 an inherently fascinating stimuli and engaging with it only captures involuntary attention (IA)
28 – referred to by the Kaplans as soft fascination. As a result of IA, directed attention – a finite
29 resource that is deployed when attending to cognitively taxing stimuli, including those
30 encountered in urban or built settings – is restored (Kaplan and Berman 2010, Valtchanov and

¹ Nearly 2 million people are reported to be riding their bicycles recreationally per week in England. Over 250,000 more adults are thought to be routinely partaking in recreational bicycle rides in 2016 than 2006 (Sport England 2016). British Cycling, the sport's national governing body for the UK, is projecting a 21% year-on-year increase in membership (British Cycling 2015a).

1 Ellard 2015). In addition to cognitive fatigue, depleted directed attention is associated with
2 negative affective states, such as withdrawal and irritability (Duvall and Sullivan 2016).
3 Exposure to nature has been found to alleviate these (Berman *et al.* 2008) whilst
4 simultaneously eliciting feelings of pleasure (see Pearson and Craig 2014 for a review), a
5 finding replicated when carried out together with exercise (Calogiuri *et al.* 2015, Rogerson
6 and Barton 2015).

7 Whilst crucially PET and ART offer explanations for nature’s restorative effects, they
8 do not fully account for the additive influence of physical activity. In contrast, the Ecological
9 Dynamics Approach (EDA) (Brymer *et al.* 2014) posits that natural environments provide
10 more functional opportunities to undertake activities that might give challenging, complex
11 and intense affordances, or invitations, which enables a range of emotions or behaviours to be
12 experienced, such as confidence, calm and mindfulness. Building on EDA, Rogerson *et al.*
13 (2016a) have proposed a model outlining how individuals perceive an environment’s
14 affordances. The model incorporates three physical components: individual, exercise and
15 environment. Acting upon each other they create a fourth element: an interactive processes
16 component. This component comprises psychological and physiological processes within the
17 individual that determines the facilitation or constraint of psychological affect (Rogerson *et*
18 *al.* 2016a).

19 Despite steps to convincingly evidence the efficacy of GE and marshalling theories to
20 explain its action; a gap in understanding how the individual directly experiences the
21 phenomenon is acknowledged in literature (e.g. Martyn and Brymer 2016). Indeed, Rogerson
22 and colleagues have referred to some of these phenomenological complexities as the ‘black
23 box’ (Rogerson *et al.* 2016a, p. 177), thus heralding qualitative investigation. To the authors’
24 knowledge, few studies have expressly sought to qualitatively examine the experience of
25 exercisers when engaging in GE, nor to take a bicyclist’s perspective. This limited
26 understanding comes despite a substantial leap in recreational bicycling participation (Sport
27 England 2016). The demographic held most responsible for this rise has been collectively
28 labelled as MAMIL (Middle-Aged Man in Lycra) (Casciani 2010, Oxford English
29 Dictionary), which is a perceptible sub-culture within road bicycling (Aldred *et al.* 2015). In
30 addressing these gaps in knowledge, the study seeks to do so from the perspective of this
31 burgeoning group – specifically those who prioritise green-cycling – as they typically devote
32 substantial amounts of time and resource to the pursuit.

33 By using Interpretative Phenomenological Analysis (IPA) to examine in detail this
34 group and how they make sense of their green-cycling experience, it should be possible to

1 better understand the meanings it has for them. What specific aspects enrich the activity and
2 how it might be perceived to influence their lives. Going further, it is contended that this
3 study may give rise to some insights for practitioners and policy makers into effective ways
4 nature might be incorporated into physical activity to further enhance its positive effects.
5 Accordingly, the overarching aim was to explore how male, middle-aged, serious recreational
6 bicyclists experience riding in the countryside and the unique meanings it holds for them.
7 Additionally, it sought to examine the importance of green-cycling to perceived psychological
8 state and identify the ways it influences attitudes to road bicycling.

10 **Method**

12 *Methodology and philosophical underpinnings*

14 Interpretative Phenomenological Analysis (IPA) draws together three areas of the philosophy
15 of knowledge: phenomenology; hermeneutics; and idiography (Eatough and Smith 2008). It
16 seeks to discover how individuals ‘are making sense of their personal and social world’
17 (Smith and Osborn 2008, p. 53). Reflecting the study’s aim to understand the individual’s
18 experience of green-cycling and both the novelty of the pursuit and the seemingly complex
19 motivations of the group, IPA was considered appropriate. For IPA, meanings and beliefs
20 manifest in talk or writing. By analysing these words, the essence of the unique lived
21 experience might be traced (Smith and Osborn 2008). IPA adopts a dual interpretive process,
22 described as the double hermeneutic, whereby the researcher makes sense of the participant
23 making sense of their experience (Eatough and Smith 2008, Shaw 2010). Accordingly, IPA
24 recognises both the subjectivity of the participant’s and the researcher’s experience and hence
25 the speculative character of the analysis process (Smith *et al.* 2009). Whilst the centrality of
26 the individual’s experience is prized in IPA, its procedures, nonetheless, allow for
27 generalisations to be drawn, albeit cautiously. Indeed, Smith and colleagues have explained
28 how IPA’s focus on the ‘details of the individual... brings us closer to significant aspects of
29 the general’ (2009, p.32). Thus in doing so, it can further enlighten existing nomothetic
30 research (Smith *et al.* 2009).

32 *Participants*

33 In line with IPA, purposive sampling was conducted. This sought males who identified as
34 road bicyclists and fell within the age bracket mid 30s and early 50s. These parameters were

1 set to align with the demographic responsible for driving the growth in UK recreational road
 2 cycling (British Cycling Factsheet 2015b). Additionally, participants had to be professionally
 3 employed, not primarily motivated by formal competition but riding road-racing bicycles in
 4 the countryside once a week with direct exposure lasting longer than an hour for the past two
 5 years. Distinctions such as whether they rode alone or in groups and the use of tracking
 6 technology did not feature in the selection criteria. The countryside was determined to be any
 7 outdoor environment perceived to be rural, away from urbanisation, where landscape features
 8 associated with nature were extensively predominant but which could be traversed by road. It
 9 was assumed that the cyclists' age and backgrounds would require them to negotiate and
 10 balance riding with other responsibilities, such as work and family demands. Due to the high
 11 degree of personal time and resource invested, it was also assumed that it was important to the
 12 participants.

13 On receiving University Ethics Board approval, men were recruited through postings
 14 on cycling-related online forums. Those expressing an interest were given an information
 15 sheet outlining the nature of the research and the inclusion criteria. Participants were made
 16 aware that involvement was voluntary and that they had the right to withdraw at any time. To
 17 ensure anonymity pseudonyms were used throughout. Participants were 11 male recreational
 18 road cyclists aged between 34 and 52 years ($M_{\text{age}} = 40.18$ years, $SD = 6.45$). All identified
 19 themselves as meeting the criteria for selection, an overview is provided (Table 1).

20

21 **Table 1.** Summary of participants.

22

Participant pseudonym	Age	Professional background	Length of time self-identified as serious recreational green road bicyclist (years)
Patrick	49	Public Servant	6
Francis	34	Public Servant	22
Joe	47	Corporate Executive	3
Alex	35	Writer and Journalist	11
Leon	37	Photographer and Artist	5
Richard	35	Designer	8
Andy	52	Corporate Executive	5

Stephen	41	Publisher	4
David	41	Lawyer	3
Philip	34	Public Servant	6
Sean	37	Teacher	19

1

2

3 ***Data Collection***

4 On giving consent, all the participants were involved in a confidential interview conducted at
5 a time and place of their convenience this reflected the busy professional schedules many
6 kept. Eight were held in meeting rooms located in open-plan offices where they worked, two
7 were carried out at participants’ homes, whilst one was completed in a public place where
8 privacy was assured. All reasonably practicable steps were taken to ensure the safety and
9 security of the researcher and participants.

10 A semi-structured interview framework was deployed. This is considered to be the
11 ‘exemplary method for IPA’ (Smith and Osborn 2008, p. 57) as participants are encouraged to
12 explore their experience and empowered to determine the shape of the story they tell. The
13 interview schedule was created based on the principles set out by Smith and Osborn (2008).
14 This encourages the development of an order of questions which amounts to a guide rather
15 than a list to be rigidly followed. The attendant flexibility enables the interviewer to modify
16 existing questions as necessary to pursue novel and interesting lines of enquiry as they
17 emerge (Eatough and Smith 2008). The interview schedule focused on three broad areas of
18 the participants’ experience covering: relationship with road bicycling; influence of the
19 countryside; and identity. Each interview was digitally-recorded and ranged from 35 minutes
20 to 1 hour and 15 minutes in length. The recordings were later transcribed verbatim.

21

22 ***Data analysis***

23 Adopting the guidelines set out by Smith and Osborn (2008) and Shaw (2010), the transcripts
24 were initially analysed by the lead author. To do this, the following stages were applied. A
25 transcript was read multiple times to establish a deep familiarity with the data. Once
26 acquainted, descriptive summaries of significant or interesting comments articulated by the
27 participant were noted. Following this, initial interpretations of what the descriptions might
28 mean were made. This sought to draw out the essential elements contained in the sections of

1 text thus elevating the degree of abstraction, thereby permitting theoretical links within and
2 between cases to be established.

3 Following the listing of initial themes, a process of clustering took place which
4 consolidated themes of similar meaning. From this clustering emerged central concepts – or
5 superordinate and subordinate themes (Shaw 2010). To demonstrate how all the interpretive
6 themes were represented in the data, relevant excerpts from the transcript were highlighted.
7 Whilst each further transcript was analysed independently as described above, reflecting the
8 number of participants involved, the themes developed in earlier cases were used to appraise
9 each subsequent analysis (Smith and Osborn 2008). This meant identifying repeating patterns,
10 convergences, as well as divergences, where new issues came to light. At the end of the
11 interpretation process, a list of superordinate and associated subordinate themes drawn from
12 all the participants were tabulated for final selection. This involved merging certain themes
13 that were conceptually similar and removing those felt to be comparatively weaker.
14 Illustrative quotes from the participants' accounts were linked to all the remaining themes.
15 The final stage of analysis required shepherding the substantive themes into a narrative
16 account that articulated the findings. It was evident that some analysis of the themes
17 continued as they were formed in the writing process.

18 Throughout the analysis, the principal author kept a reflective diary (Shaw 2010). In
19 addition to capturing thinking about developing interpretations, it also provided a record of
20 acknowledged biases which were subsequently suspended in relation to the data (Lemon and
21 Taylor 1997). For instance, this process revealed the assumption that competition would
22 represent a significant feature of the participants' experiences and that the use of technology
23 would fuel this further. Complementing this, the co-author acted as a critical friend surveying
24 theme development within and between cases to ensure credibility against the data. This
25 consisted of challenging and clarifying how the links between the data, abstract theorising
26 and, finally, extant psychological literature were justified. This process resulted in the further
27 development and refinement of final themes.

28

29 **Results and Discussion**

30

31 The analysis identified three recurrent superordinate themes and the subordinate themes they
32 incorporate. They relate to the participants' experience of green-cycling and the meanings it
33 had for them. The participants spoke of: mastery and uncomplicated joys; my place to escape
34 and rejuvenate; and alone but connected. Elaboration on these themes is presented below.

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Mastery and uncomplicated joys

This theme is split into two subordinate themes. My place to marvel, which addresses the occasions the participants described the values and meanings associated with the extended distances that cycling in the countryside encourages. Second, simple joys which concerns the feelings aroused by the physically challenging and thrilling terrains that are negotiated.

My place to marvel

The theme my place to marvel relates to how for the participants the countryside formed a backdrop for articulating the personal pride they felt about their accomplishments on the bicycle and how it acted as a gauge of and motivation for mastery. The special meanings this place had in contrast to less rural environments was captured by Sean, ‘It’s all about the countryside! I mean I kind of ride in and around [urban] Park, I do that out of necessity because I feel that that's the place to go, kind of do, like a quick fix’. There was a sense of urban riding being perfunctory, as Richard put it, ‘a chore’ – merely a way of sustaining fitness. Elaborating further on the elements that ensure the countryside enhances the physical experience of bicycling, Francis said, ‘I think the workout you get from your ride in the countryside is a lot better. There's more hills obviously, they're country lanes so different gradients – a more varied workout’.

Unlike Francis, when considering the virtues of the countryside, several of the participants initially focused on the distances it encourages to be ridden, which were all documented. Logging of mileage acted as a tangible record of performance and improvement. As Andy put it, ‘I got how many miles I'd done for the year it was like wow! A sort of sense of achievement and frankly using the time usefully’. Uniquely, Andy prioritised the experience of road-riding and its association with physical mastery over other factors explaining, ‘which direction... I’m going in doesn’t matter... I don’t care, I just want to ride my bike’. Perhaps significantly, Andy was the only participant who lived in a rural village meaning all his riding was green-cycling. This potentially altered the meanings that seeking out nature represented compared to the others. However, when contrasting green-cycling with doing it indoors, he identified how, ‘you miss that undulation and the variety of exercise...[it] just, doesn’t motivate in the same way’. In acknowledging the difference, it is possible to deduce that the countryside offered more to the participants than endless tarmac to ride miles

1 on. Philip shed further light on what function distances might serve amidst goal progression
2 and its relationship with being in the countryside:

3
4 ...as that kind of having goals are concerned... I guess it's exploring bigger more
5 beautiful places... riding big routes, and up big hills and just seeing all that
6 beautiful countryside... Having big days out on the bike. You cover big distances,
7 going to the Alps, you know, it's bigger, it's harder, it's more beautiful.

8
9 Philip's description of how distance formed just one element of a broader and interwoven
10 challenge concept was typical of nearly all the cyclists including Alex who agreed:

11
12 Even a decent but not great road cyclist can do 100 miles. Which in the mountains
13 is a significant chunk you could see loads of different valleys, you can go over lots
14 of different passes and that idea that there's always something to see around the
15 next corner, over the crest of the next hill, climb one mountain down the other side
16 and you're in somewhere you've not seen before. That's a very resonant idea for me.

17
18 Reflecting the surroundings, cycling is perhaps unique in providing a mix of dynamic
19 challenges. These can become progressively more difficult over time and mastery is
20 dependent on developing certain competencies and skills – some obvious – such as greater
21 stamina and bicycle maintenance knowledge – and others subtler – including mental fortitude
22 and bicycle handling. Supporting this notion, David shared:

23
24 I've conquered routes and climbs that I wouldn't of done or would have struggled
25 with before and found those getting easier, as I've accepted my abject fear of going
26 downhill and kind of learnt to bottle that and keep that under control. I've become
27 as a person a lot more self-confident.

28
29 A virtuous circle seemed to have established for the participants whereby the capability to
30 cover and enjoy more terrain is dependent on greater stamina and strength which contributes
31 to growing physical competence that gives confidence to further explore the natural
32 environment. This finding appears to support the Ecological Dynamics Approach (Brymer *et*
33 *al.* 2014), with the countryside here playing an active role in affording the participants the
34 opportunity and freedom to constantly challenge themselves not simply physically but also
35 emotionally resulting in positive psychological experiences.

36 What was also striking was how Philip, reflecting other participants, characterised the
37 challenges with which they set themselves as, 'sensible' and as Francis put it being, 'naturally
38 drawn to keep doing it'. Two participants did refer to more external drives, in this instance
39 health promotion. David and Andy disclosed that physical activity formed part of a regime to
40 manage chronic medical conditions with the former – a Type-1 Diabetic – explaining how
41 green-cycling helps because it, 'feels, well it just feels, better – it's easier to do'. Joe,

1 however, rejected the notion of doing it because of external pressures drawing a clear
2 distinction saying, ‘I will... do a cycle because I’ve learnt to enjoy the cycle itself’.

3 The order with which external pressures spurred the participants’ activities typically
4 appeared to be secondary to their own internal desires to bicycle surrounded by nature. It may
5 be possible, therefore, to broadly characterise the type of motivation present amongst the
6 group as self-determined. This experience that the participants spoke of in the present study
7 appears to align with Deci and Ryan’s Self-Determination Theory (SDT) (2008).

8 Incorporating SDT into the Green Exercise paradigm marks a significant departure
9 from extant literature, nonetheless in the context of physical activity its relevance has been
10 established (e.g. Lindwall *et al.* 2016). As a result, this macro-theory might provide a useful
11 framework when considering the interplay between exercise and the natural surroundings
12 which brings about its recognised additive benefits, a gap identified by Ewert *et al.* (2014), in
13 addition to potentially helping inform the interactive processes component identified by
14 Rogerson *et al.* (2016). SDT focuses on types of motivation, paying particular attention to
15 autonomous motivation, controlled motivation, and amotivation the first being the best
16 predictor of elevated performance, relational, and wellbeing outcomes (see Teixeira *et al.*
17 2012 for a review). It also addresses the social conditions that enhance these types of
18 motivation, emphasising autonomy, competence, and relatedness (Deci and Ryan 2008).

19 For the participants in this study, the countryside might be interpreted as a rare space
20 containing the nutrients where a series of predominantly self-determined repertoires could
21 be played out, such as independently defined achievement, personal growth, physical
22 empowerment and health, volition to explore and enjoyment. This finding contributes to
23 existing literature focused on exercise motivation (Sebire *et al.* 2009, Gunnell *et al.* 2014),
24 suggesting more self-determined exercise regulation results in enhanced exercise persistence
25 and greater psychological wellbeing. Consequently, there might be merit in further research
26 examining whether incorporating natural landscape features into physical activity regimes
27 contributes to more inherently satisfying experiences.

28

29 *Simple joys*

30 All the men described the fun, thrill and the physically embodied feelings of joy they felt when
31 riding in the countryside. As Stephen put it:

32

33 It feels natural. You feel like you’re expressing yourself when you’re doing it on a
34 physical level and I do feel that about being on a bike and definitely get that thing.
35 Yeah, there’s the exhilaration of going fast. Yeah, it’s fantastic because it’s not like

1 a rollercoaster but there's enough thrill to make you feel like a kid again. Like
2 there's a part of you that's going: weeeee! As you go down you know it's really
3 uncomplicated and really simple.
4

5 Alex also highlighted the draw that certain roads and hills had as well as the part that the
6 natural aesthetic played in accentuating the sensation, saying, 'There's some roads which are
7 really fun... You're going downhill forever and it's very beautiful and you're just on the edge'.
8 There is a sense of getting pleasure from gratifying an inherently human urge (Coveney and
9 Bunton 2003). Like Stephen, references to childhood were typical amongst the participants
10 when describing the pleasures they experienced. For instance, Andy opened his interview
11 articulating how, 'I used to cycle a lot I think as a kid and used to enjoy getting out'. One of
12 the features that characterised that enjoyment was the freedom to reach high speeds, which
13 continued to fascinate into adulthood. As Joe said:

14
15 I like descending hills because it's exciting, because you go fast. There's sort of a
16 bit of risk... It is fun, descending at speed. I suppose I used to ride a bike when I
17 was a kid... because I used to enjoy riding.
18

19 Sean, who was a former Royal Marine, also emphasised how this pleasure was in part
20 predicated on the ability to simultaneously invite and then tame the hazard, 'If I'm going
21 downhill, it feels like you're competing against yourself. if you're doing a downhill descent
22 you know you're roughly hitting – 50, 60,70 km's an hour it's like, ooh, that feels quite
23 dangerous'.

24 Indulging in frissons and harking back to earlier times appears to give credence to the
25 conception that cycling in the countryside was a simple joy for the participants – echoing the
26 findings of Minello and Dixon's (2017) study of older male cyclists. Indeed, even wretched
27 weather conditions could not dampen these emotions, as David put it: 'It was absolutely
28 brilliant. It wasn't relaxing, it was freezing cold 20 mph winds, lashing rain. When you came
29 back it was like that old analogy about banging your head against the wall. It was lovely when
30 you stopped'. The impression that justification for the fun was not necessary and the apparent
31 irrationality at some moments to its potential consequences including censor was summed up
32 by Stephen, 'I just absolutely love it. You know, it's worth risking marital discord to make it
33 happen... As a person, I'm happy with life, if I can do rides like that'.

34 There is evidence here to support Biddle and Mutrie (2007) who contend that
35 enjoyment, intrinsic motivation and the concept of Flow coexist in relation to physical activity.
36 Many of the accounts also support the Flow concept (Nakamura and Csikszentmihalyi 2009)
37 where high-speeds precipitate an autotelic experience and the pleasurable sensations

1 associated with being absorbed in the present moment by challenges that stretch but do not
2 exceed existing skills and where clear goals and immediate feedback are available.

3 As we have seen, drawing attention to the sensations they experienced as part of a ride
4 and the way it made them feel was commonplace in the participants' talk. For instance, Alex
5 said:

6
7 You get to the top and it's pretty windy up there. you'd get this real sense of being
8 hit by nature, and hit by the natural world and that was definitely a, something I'd
9 look forward to... [it] was a big motivation, a lot of the time. You spend the day at
10 the desk and just have it all blown away by the time you get to the top of the hill.

11
12 Like the sensual type of pleasure identified by Phoenix and Orr (2014), there appeared to be a
13 coming together of the body and the world in many of the participants' accounts which leaves
14 them at the influence of their present exercise environment. Furthermore, based on
15 anthropological observations of older-age Italian road bicyclists, Whitaker (2005) has posited
16 that the experience of riding in the countryside uniquely merges body and soul which
17 culminates in an intense joy that is not limited to the present but also reaches into time off the
18 bike, corresponding with heightened wellbeing. Echoing this, Joe, reflected on his green-
19 cycling experience, saying, 'After a long ride [in the countryside], you'd come back.... You
20 feel good about it. You feel very optimistic, and it sets you up for the days ahead'. The present
21 study's findings, albeit amongst a younger cohort, further reinforces the earlier works'
22 recommendations that emphasising the pleasurable elements of exercise may help promote
23 behaviour change towards increased physical activity (Whitaker 2005, Phoenix and Orr 2014).
24 As Patrick put it, 'I do it because I enjoy it and I do it because it makes me feel better, both
25 physically and mentally'. Accordingly, policy makers and practitioners should consider the
26 potential opportunities that features of the natural environment might provide to allow for the
27 effective integration of pleasure experiences into physical exercise activities.

28

29 *My place to escape and rejuvenate*

30

31 A number of the participants reported how they viewed the countryside as somewhere to
32 escape to and recuperate in. Accordingly, two subordinate themes: unhindered exploration
33 and the rhythm of restoration were arrived at.

34

35 *Unhindered exploration*

1 Reflections on how green-cycling offered a potential fillip to mental wellbeing featured
2 prominently across all the participants' accounts, for example Sean, 'I've kind of always felt
3 like getting on a bike feels like escaping', and Francis, 'getting out there [the countryside],
4 and nothing to worry about'. Some identified what precisely they wanted to leave behind.
5 Like Alex, 'there's often that sense of a big long ride as a release after a stint of work', and
6 Leon, 'there's a definite correlation between the time that my partner and I had our daughter
7 and when I started cycling longer and further'. Elaborating on his desire to get away Leon
8 highlighted his quest for solitude, 'it's just me on my bike, doing something positive and life
9 affirming'. The absence of other people, also implied safety from motorists. This feeling of
10 safety served to enable the surroundings to be attended to in an incautious way, as David
11 explained:

12

13 I feel much more relaxed in a rural setting, on the bike... when you're out on a
14 quiet road, rolling hills, all that kind of thing you focus, you're able to focus to a far
15 greater degree on your riding and your surroundings.

16

17 This finding corresponds with Ulrich (1979, 1983, 1984) and Ulrich *et al.* (1991) Psycho-
18 Evolutionary Theory (PET) that suggests the salutogenic benefits of the aesthetic are only
19 activated when distractions and dangers are minimised (Hartig *et al.* 2011).

20 Most of the participants also maintained how getting away into the countryside
21 satisfied a need to explore pleasant scenery. As Joe put it:

22

23 It's sort of a better experience. But then I think it's just sort of nice to be out in the
24 countryside, you sort of know the sun coming up or a bit of mist or the smell of
25 wood smoke or something from a fire. It all just adds to the sense of freedom and
26 being out on the road and kind of exploring.

27

28 It is noteworthy that Joe was the only participant who was also a serious runner – frequently
29 inferring that it was a more efficient means of getting the physical health-related benefits of
30 exercise. However, it was clear in his account, and exemplified above, that running did not
31 necessarily permit the psychological engagement with the surroundings that was so valued.
32 Joe's experience reflects Rogerson and colleagues (2016a) speculation that in instances where
33 internally focussed exercise cues predominate, receptiveness to the environment might be
34 limited. Comparisons were also drawn with mountain biking by two of the participants.
35 Richard, who had previously been a keen mountain biker in his youth but had switched to road
36 cycling later, explained:

37

1 Road cycling, well you just go wherever you want and I think that's a really
2 incredible thing. You can start a ride with a general direction and just get lost you
3 know and find your way back and I really like that. It's slightly easier to do that on
4 a road bike than on a mountain bike.
5

6 And Alex, who said, 'With mountain bikes, you simply can't cover enough terrain', drawing
7 attention again to the allure of, as he put it, 'increasing your knowledge of the landscape and
8 of the geography and the sights and smells'.

9 The participants' experiences appear to accord with Attention Restoration Theory
10 (ART) (Kaplan and Kaplan 1989, Kaplan 1995). Hitherto, literature has prioritised the
11 influence of soft fascination – where attention is effortlessly captured principally by exploring
12 and making sense of the environment – and its influence on psychological restoration.
13 However, ART identifies three additional features that an environment should have to afford
14 soft fascination. These concern the notions of: being away or a need to feel escape from the
15 stressful demands of daily life; extent, that is the environment has sufficient scope to facilitate
16 a sense of mental unfolding; and compatibility – which stresses how the surroundings must
17 accommodate a person's inclinations, needs and purposes in that moment (e.g. Duvall and
18 Sullivan 2016). The current study has revealed both the presence and significance of these
19 phenomena in the experiences of many of the participants.

20 As previously identified, the road bicycle was considered an essential facilitator of
21 exploration, immersion and a sense of interaction with the natural aesthetic. Participants gave
22 practical explanations for this including its cruising speed, vantage point allowing hedges to be
23 overlooked as well as its quietness. The culmination of these qualities meant the bicycle
24 permitted a full sensory experience. As Stephen elaborated, 'The world is best experienced at
25 18 mph because you see more stuff than if you're walking but you see it better than if you're
26 zooming past on a train... I completely get that... It's big!'. Stephen's comments appear to
27 touch on PET's conception of humans as being 'hard-wired' (Hartig 2007, p. 166) to perceive
28 the pleasantness of natural environments. This point was most pithily put by Leon when he
29 exclaimed, 'This [the countryside] is fucking lovely isn't it. I don't think anything more
30 profound than that... it makes you feel lucky'. Whilst Deci and Ryan (2000) have posited that
31 curiosity-based exploration and openness to sensory experiences of nature are activities that
32 require the satisfaction of basic psychological needs to operate optimally, there appeared to be
33 a more essential underpinning to the participants' accounts. Most of all that green-cycling was
34 a conduit to a richer and more meaningful interaction with nature and with it lived experience.
35 This finding corresponds with the biophilia hypothesis (Wilson 1984, Kellert and Wilson,

1 1993), which posits that humans feel an inherent connection to nature and that ‘the good life’
2 (Kellert 1993, p. 60) is in part derived from our evaluation of it. The essence of this was
3 perhaps best captured by Leon:

4
5 Maybe it's about majesty, or being reminded that it's, there's more. That earth is
6 about more than all the crap that we see every day from our houses to the train
7 station, to wander around town and supermarkets and all that crap, there's
8 something more essential about it.
9

10 *The rhythm of restoration*

11 The participants consistently spoke about how green-cycling encouraged a relaxed
12 psychological state. Stephen outlines what this meant:

13
14 I get quite quickly into a nice rhythm on the bike and when you're into a nice
15 physical rhythm you get into a different mental state... I don't think about very
16 much. I quite often think I'm going to think about stuff on a long ride and I end up
17 thinking fuck all, really... A song will go through my head... I'm not a spiritual
18 person... [cycling in the countryside] invites a sort of mindfulness where
19 particularly if you're not challenged by traffic... you're in quite an unbuttered
20 medical state, you're doing your thing, you're at one level absorbing it. You're
21 noting your physical state you're noticing the environmental, you know
22 surroundings, you're not at intellectual full pelt, or anywhere near it, but you are
23 on!
24

25 In this extract we find traces of pleasure from immersion. A concept whereby movement
26 serves to bring together the body and mind which precipitates a detachment from daily
27 concerns or a focus on one's self (Phoenix and Orr 2014). Further evidence of this was
28 offered by Richard, ‘I think it allows you to, the countryside allows me to focus on, prfff! I
29 don't know what, but to focus. You feel, even when you're with friends, like you are on your
30 own’. The presence of mindfulness is also referenced, however. Mindfulness is postulated to
31 be an enhanced awareness of present experience and functioning characterised by “clarity and
32 vividness” (Brown and Ryan 2003, p. 823). It is also correlated with greater nature
33 connectedness (Howell *et al.* 2011). Hence it may be possible to point to a sequence by which
34 green-cycling advances a state of mindful consciousness that in turn encourages greater
35 awareness and amplification of nature and its psychological influence.

36 Stephen and Richard's experiences also appears to give credence to the notion of
37 ‘clearing the head’ identified in ART (Kaplan and Kaplan 1989, p. 196). Permitted by the
38 untaxed environment, it is understood to be accompanied by the entering of random thoughts
39 into the mind. Like songs intruding upon Stephen's awareness above, other participants
40 reported similar experiences, including Patrick:

1
2 I often have tunes coming into my head that are quite bizarre... music that I
3 wouldn't listen to. Hymns, I'm an atheist... but I have hymns coming into my
4 head! Weird songs that I've never, you just suddenly stop yourself and think what
5 the hell, where's that come from?
6

7 Although Leon highlighted how this phenomenon could be subverted on occasions when, 'I
8 get a bad song stuck in my head that can be irritating'. The allusions to religion referred to in
9 the reflections of Stephen and Patrick, above, as well as in Francis' narrative, 'I feel really
10 blessed [when I am cycling in the countryside] - I don't believe in God or anything', also
11 draws attention to seeming transcendence for some. Indeed, parallels between the
12 characteristics of Flow and aspects of Zen philosophy, particularly meditation, amongst rock
13 climbers have been drawn (Csikszentmihalyi 1975, Watson and Nesti 2007). Notably
14 however, Philip, a seasoned rock climber, contrasted his experiences of the countryside when
15 climbing with cycling saying, 'it's very unlike climbing. At that moment climbing, it's so
16 intense, there's no room for anything, so it's a different type of thing for your brain'. This
17 draws attention to perhaps an important feature of green-cycling; that it benefits from
18 enabling the prospect of exhilarating thrills and quiet reverie to be juxtaposed efficiently and
19 effectively. Touching on this point, David said:

20
21 There's moments on the Sunday rides...you're not worried about whether you
22 filed those papers or whether you're going to make that deadline, all that kind of
23 stuff. You're right there and that includes being aware of the birds singing, the leaf
24 mold, all that kind of thing.
25

26 For David, like many of the other men, the process of mental unfurling when green-cycling
27 helped them to cope emotionally with their day-to-day challenges. Alex offered a further
28 account of this process:

29
30 I've hit a problem or something... I'll ride and I'll try and think about this block
31 that I've got. But often I don't think about anything at all. I just suddenly get into a
32 state where nothing really goes through my head. And that is as useful and as
33 therapeutic... I find that incredibly cleansing... I know that it's going to be a
34 positive mental experience.
35

36 Uniquely, Philip, spoke of how green-cycling did allow for conscious thinking saying, 'on
37 longer rides you can ride big stretches, I ... have, a really good opportunity to think things
38 through slowly and in a nice kind of considered, natural way.... it's just a great opportunity to
39 go over stuff'. This echoes the Kaplans (1989) who posit that the last and deepest restorative
40 stage in ART involves reflections on life goals. However, its absence from the other
41 participants' accounts casts some doubt over its relevance to feelings of restoration – and like

1 many of the facets of ART, notwithstanding fascination, there is merit in its further
2 investigation.

3 The excerpts above signal how the typical view amongst the participants was that
4 routine exposure to green-cycling was invaluable. As Francis put it, ‘If I didn’t do [green]
5 cycling [every weekend] then I wouldn’t perform as well at work or in my everyday life’.
6 And Patrick, ‘It makes me a better person... if I didn't have the cycling, and I didn't have that
7 vent, I wouldn't be as happy... my whole wellbeing feels better when I've been out on my
8 bike’. Exercise, the natural environment and wellbeing seemed to be perceived as three
9 inseparable entities. As Leon explained, ‘If I couldn't ride out into the [countryside], I'd feel
10 really sad. Like it would be a massive hole in my life’, and Alex corroborated, ‘I guess I'd
11 probably have to find an alternative way of doing, finding the same experience and doing the
12 same thing. I wouldn't ride a spinning bike, I wouldn't be happy going to the gym’. For all the
13 men, sustaining a regular green-cycling regime was essential – this meant green rides at least
14 once a week that were several hours in duration. The effects were considered cumulative and
15 were seemingly psychologically therapeutic. This notion was particularly pronounced for
16 Sean, who had recently recovered from a serious leg injury:

17
18 I've had two months of sitting around in the flat of just mental and physical pain
19 and suffering and whinging. The one thing I was desperate to do was just get on a
20 bike and go out towards the countryside... that's the one thing I kept wanting to do.
21

22 Barton and Pretty (2010) have advanced the efficacy of short exposure times – five minutes –
23 to achieve the benefits of GE. However, as acknowledged in literature and evidenced in this
24 study, some individual preference may exist that influences this response, specifically in
25 relation to intensity, duration and quality of nature experience (Barton *et al.* 2016).

26

27 ***Alone but connected***

28 A number of the participants expressed how they viewed bicycling in the countryside as an
29 activity that when done alone was routinely enhanced by the experience but never diminished.
30 As Alex said, ‘what I prefer doing is getting out, often on my own’, with Joe confirming, ‘I
31 mean I do enjoy riding with people, but equally I’ll get as much enjoyment from being on my
32 own’. What this does not account for were the occasions when participants did identify
33 associative qualities they appreciated when bicycling in nature – particularly in the virtual
34 sphere.

35 Significantly, the adoption of technology formed an important part of how participants
36 experienced their green-cycling relationships. Using bike-mounted computers, every

1 participant gathered a set of performance data about their ride as well as GPS-based route
2 mapping. Technology was synonymous with riding, as David put it, 'It's great and I can't
3 imagine getting on the bike without it'. Collected data was routinely shared publically
4 through online sites after a ride. These sites encourage comparisons with others, thus
5 theoretically inviting competition. Some resistance to this was apparent, as Patrick reflected,
6 'it was better before I used it [online site], but I wouldn't dream of not using it'. Explaining
7 his initial concerns, he added, 'Having [online site] made me push a bit more. It introduced a
8 bit of competition that I didn't like. I don't do it for the competition'. Providing more insight
9 into what the sites typically meant to the participants and how they had come to negotiate it,
10 Philip said 'It's [online data sharing] quite encouraging and quite inspiring, I think. I'm
11 always inspired more by my friends'. This finding extends research into amateur sports
12 cyclist's motivations (O'Connor and Brown 2007, Brown *et al.* 2009) by suggesting a more
13 nuanced relationship with competition amongst those prioritising green-cycling. Rather than
14 rivals, other cyclists were considered as equals, guides to achieving a better experience.

15 Also noteworthy is that whilst the technology encouraged real-time engagement by
16 virtually comparing one's pace over sections of road, most of the participants quickly
17 disregarded this. The reason, Leon explained was because, 'It's about having a nice bike ride
18 rather than thinking... I'm going to meaninglessly compete against people that I've never
19 met'. Instead, it was often viewed as a navigation aid as Stephen confirmed, 'I just use the
20 [bike computer] to make sure I don't get lost'. Attending to its implications for promoting the
21 green-cycling experience, Alex explained, 'What I like it [data sharing websites] for is
22 exploring by proxy, and seeing what other people are doing... I can take inspiration from their
23 routes, when I'm planning something I want to do myself'. This point was further emphasised
24 by Patrick when he said:

25
26 A lot of friends who ride are on [data sharing website]... you have that link up
27 with people. I wouldn't drop them a text and just say hello, but I get messages
28 from them about the ride that I've been on, asking me where I've been, saying it
29 was a good ride. You put pictures on there, I've got this thing going with a friend
30 where he started taking photographs of old red post boxes and posts them and
31 when I'm out riding I can't help it if I see one.
32

33 Technology appears to have given the bicyclists a means of identifying new areas of
34 countryside to explore and new ways of engaging with it. Doing this appeared to nourish
35 enthusiasm resulting in more riding and with it greater exposure to bicycling and the
36 environment. Simultaneously, however, online sites also enabled the cyclists to remain

1 connected with others and benefit positively from sharing the pleasures experienced when
2 exploring the countryside as Patrick's vignette explained.

3 This finding aligns with Rogerson *et al.* (2016b) who have identified how GE may
4 promote prosocial interactions. Limited attention has been given to how modern technology
5 could enhance this positive benefit further, however. There is also some evidence in the
6 present study that sharing information about cycle routes in nature and the data associated with
7 that enhanced the pleasures derived from the activity. This finding echoes Phoenix and Orr
8 (2014) who contend that documenting physical activities can boost feelings of pleasure,
9 particularly after the event, and sharing details of the experience may bolster affect further.
10 The present study also suggests that when using technology, participants generally eschewed
11 negative comparisons with others or to perceive it as an impetus for extraneous competition.
12 There are parallels here with Deci and Ryan (1985), most notably their assertion that activities
13 interpreted as informational rather than controlling promote feelings of autonomy and
14 competence and thus encourages self-determined motivation and with it positive affect.
15 Accordingly, practitioners seeking to implement strategies to drive up physical activity, should
16 consider exploring how they might use technology to encourage the sharing of individual
17 experiences of nature when exercising.

18 19 **Reflexive analysis**

20
21 The genesis of this research was the principal author's own interest in the topic. As a
22 longstanding road bicyclist they had observed its rise in popularity. Whilst not disclosing their
23 bicycling biography to participants before or during the interview process, it should be
24 acknowledged that the framing of questions and the familiarity with road-riding parlance
25 would have revealed that they were experienced in the subject matter, which could have
26 influenced participants. Also noteworthy was that whilst the co-author was conversant with the
27 major theoretical concepts underpinning sports and exercise psychology, the first was less so.
28 The implications of this are pertinent here considering that Self-Determination Theory appears
29 for the first time in the results section. This sequence reflects how its potential significance in
30 understanding GE only emerged following the interpretation of the participants' data. As with
31 all the principal author's interpretations, the co-author played a crucial role in challenging
32 these, particularly the emergence of Self-Determination Theory because of its novelty.
33 Checking it against the data they could satisfy themselves of its relevance and credibility.

34

1 **Limitations and future directions**

2 The present study did not actively seek participant validation (Mays and Pope 2000). The
3 absence of follow-up interviews or an attempt to get them to review the investigators'
4 interpretation of their accounts may have detrimentally affected the overall credibility and
5 validity of the work.

6 The study's findings represent insights into a particular group. Demographic factors
7 such as age, gender, social-class and ethnicity, may also influence how GE is experienced,
8 however the evidence is limited (Wood *et al.* 2016). Therefore, to better appreciate its effects;
9 the barriers to accessing it; and how it might be more effectively harnessed, there is an
10 identified need to consider the experiences of other groups. This should result in other types
11 of GE being investigated. This study raises the possible association between nature and the
12 experiencing of enhanced levels of self-determined regulation amongst physically active
13 individuals. The strength of this link merits further investigation as it could augment the
14 current understanding of motivations for exercise and how surroundings can be fashioned to
15 increase enjoyment, wider affect and encourage perseverance.

16 17 **Conclusion**

18
19 This study of male, middle-aged, serious recreational bicyclists has revealed cycling in the
20 countryside to be a multifaceted experience. For the participants, it appeared to merge several
21 essential qualities – these were: volition in selecting one's physical challenges; opportunities
22 to feel pleasure; the chance to engage with natural aesthetics; to experience mindful
23 awareness; and to enjoy solitude yet also connect with others. Combined, these culminated to
24 boost the participants' perceived psychological wellbeing not only in the immediacy of green-
25 cycling but afterwards also. Identifying this interplay may go some way to help understand
26 the observed additive benefits that GE offers and to provide insights into how aspects may
27 potentially be incorporated to create more effective and enduring physical activity regimes.
28 The present study has opened new avenues that warrant further investigation including
29 nature's potential to engage more self-determined behaviours.

30 31 32 **References**

33 Aldred, R., Woodcock, J., and Goodman, A., 2016. Does More Cycling Mean More Diversity in
34 Cycling?. *Transport Reviews*, 36 (1), 28-44.

- 1 Barton, J., Griffin, M., and Pretty, J., 2012. Exercise, nature and socially interactive-based initiatives
2 improve mood and self-esteem in the clinical population. *Perspectives in public health*, 132 (2),
3 89-96.
- 4 Barton, J., and Pretty, J., 2010. What is the best dose of nature and green exercise for improving
5 mental health? A multi-study analysis. *Environmental science & technology*, 44 (10), 3947-3955.
- 6 Barton, J., Wood, C., Pretty, J., and Rogerson, M., 2016. Green Exercise for health: a dose of nature.
7 *In: J. Barton, R. Bragg, C. Wood, and J. Pretty, eds. Green Exercise: Linking Nature, Health and*
8 *Well-being*. London: Routledge, 26-36.
- 9 Berman, M.G., Jonides, J., and Kaplan, S., 2008. The cognitive benefits of interacting with
10 nature. *Psychological science*, 19 (12), 1207-1212.
- 11 Biddle, S.J., and Mutrie, N., 2008. *Psychology of physical activity: Determinants, well-being and*
12 *interventions*. London: Routledge.
- 13 Bodin, M., and Hartig, T., 2003. Does the outdoor environment matter for psychological restoration
14 gained through running?. *Psychology of Sport and Exercise*, 4 (2), 141-153.
- 15 Bratman, G.N., Daily, G.C., Levy, B.J., and Gross, J.J., 2015. The benefits of nature experience:
16 Improved affect and cognition. *Landscape and Urban Planning*, 138, 41-50.
- 17 British Cycling, 2015a. *British Cycling respond to Sport England activity survey* [online]. Available
18 from: [http://www.britishcycling.org.uk/about/article/20150129-about-bc-news-100-000-increase-](http://www.britishcycling.org.uk/about/article/20150129-about-bc-news-100-000-increase-in-regular-cyclists-since-October-2012---cycling-participation-targets-on-track-says-British-Cycling-0)
19 [in-regular-cyclists-since-October-2012---cycling-participation-targets-on-track-says-British-](http://www.britishcycling.org.uk/about/article/20150129-about-bc-news-100-000-increase-in-regular-cyclists-since-October-2012---cycling-participation-targets-on-track-says-British-Cycling-0)
20 [Cycling-0](http://www.britishcycling.org.uk/about/article/20150129-about-bc-news-100-000-increase-in-regular-cyclists-since-October-2012---cycling-participation-targets-on-track-says-British-Cycling-0) [Accessed 7 September 2016].
- 21 British Cycling, 2015b. *Facts about membership* [online]. Available from:
22 [https://www.britishcycling.org.uk/zuvvi/media/bc_files/factsheets/FACTS_ABOUT_MEMBERS](https://www.britishcycling.org.uk/zuvvi/media/bc_files/factsheets/FACTS_ABOUT_MEMBERSHIP.pdf)
23 [HIP.pdf](https://www.britishcycling.org.uk/zuvvi/media/bc_files/factsheets/FACTS_ABOUT_MEMBERSHIP.pdf) [Accessed 7 September 2016].
- 24 Brown, T.D., O'Connor, J.P., and Barkatsas, A.N., 2009. Instrumentation and motivations for
25 organised cycling: the development of the Cyclist Motivation Instrument (CMI). *Journal of sports*
26 *science & medicine*, 8 (2), 211-218.
- 27 Brown, K.W., and Ryan, R.M., 2003. The benefits of being present: Mindfulness and its role in
28 psychological well-being. *Journal of Personality and Social Psychology*, 84 (4), 822-848.
- 29 Brymer, E., Davids, K., and Mallabon, L., 2014. Understanding the psychological health and well-
30 being benefits of physical activity in nature: An ecological dynamics analysis. *Ecopsychology*, 6
31 (3), 189-197.
- 32 Calogiuri, G., Nordtug, H., and Weydahl, A., 2015. The potential of using exercise in nature as an
33 intervention to enhance exercise behaviour: Results from a pilot study. *Perceptual & Motor Skills*,
34 121 (2), 350-370.
- 35 Casciani, D., 2010. *Rise of the Mamils (middle-aged men in lycra)* [online]. BBC. Available from:
36 <http://www.bbc.co.uk/news/magazine-10965608> [Accessed 7 September 2016].
- 37 Coveney, J., and Bunton, R., 2003. In pursuit of the study of pleasure: Implications for health research
38 and practice. *Health: An interdisciplinary journal for the social study of health, illness and*
39 *medicine*, 7 (2), 161-179.
- 40 Csikszentmihalyi, M., 1975. *Beyond boredom and anxiety*. San Fransisco: Jossey-Bass.
- 41 Deci, E.L., and Ryan, R.M., 1985. *Intrinsic motivation and self-determination in human behavior*.
42 New York: Springer Science & Business Media.
- 43 Deci, E.L., and Ryan, R.M., 2000. The " what " and " why " of goal pursuits: Human needs and the self-
44 determination of behavior. *Psychological Inquiry*, 11 (4), 227-268.
- 45 Deci, E.L., and Ryan, R.M., 2008. Self-determination theory: A macrotheory of human motivation,
46 development, and health. *Canadian Psychology/Psychologie canadienne*, 49 (3), 182-185.
- 47 Department of Health, 2011. *Start Active, Stay Active: A Report on Physical Activity for Health from*
48 *the Four Home countries' Chief Medical Officers* [online]. Available from:
49 https://www.sportengland.org/media/2928/dh_128210.pdf [Accessed 7 September 2016].
- 50 Department of Health, 2013. *Get Active to get healthy* [online]. Available from:
51 <https://www.gov.uk/government/news/get-active-to-get-healthy> [Accessed 7 September 2016].
- 52 Duvall, J., and Sullivan, W.C., 2016. How to get more out of the green exercise experience. *In: J.*
53 *Barton, R. Bragg, C. Wood, and J. Pretty, eds. Green Exercise: Linking Nature, Health and Well-*
54 *being*. London: Routledge, 37-45.

- 1 Eatough, V., & Smith, J.A., 2008, Interpretative phenomenological analysis. *In*: C. Willig and W.
2 Stainton-Rogers, eds. *The sage handbook of qualitative research in psychology*. London: Sage
3 Publications, 179-194.
- 4 Ewert, A.W., Mitten, D.S., and Overholt, J.R., 2014. *Natural Environments and Human Health*.
5 Wallingford, Oxfordshire, UK: CABI.
- 6 Gunnell, K.E., Crocker, P.R., Mack, D.E., Wilson, P.M., and Zumbo, B.D., 2014. Goal contents,
7 motivation, psychological need satisfaction, well-being and physical activity: A test of self-
8 determination theory over 6 months. *Psychology of Sport and Exercise*, 15 (1), 19-29.
- 9 Hansmann, R., Hug, S. M., and Seeland, K., 2007. Restoration and stress relief through physical
10 activities in forests and parks. *Urban forestry & urban greening*, 6(4), 213-225.
- 11 Harvey, S.B., Hotopf, M., Øverland, S., and Mykletun, A., 2010. Physical activity and common
12 mental disorders. *The British journal of psychiatry*, 197(5), 357-364.
- 13 Hartig, T., 2007. Three steps to understanding restorative environments as health resources. *In*: C.W.
14 Thompson, and P. Travlou, eds. *Open space: people space*. London: Taylor & Francis, 163-180
- 15 Hartig, T., *et al.*, 2011. Health benefits of nature experience: Psychological, social and cultural
16 processes. *In*: Nilsson *et al.*, eds. *Forests, trees and human health*. Netherlands: Springer, 127-
17 168.
- 18 Howell, A.J., Dopko, R.L., Passmore, H., and Buro, K., 2011. Nature connectedness: Associations and
19 well-being and mindfulness. *Personality and individual differences*, 51 (2), 166-171.
- 20 Kaplan, R., and Kaplan, S., 1989. *The experience of nature: A psychological perspective*. Cambridge:
21 Cambridge University Press.
- 22 Kaplan, S., 1995. The restorative benefits of nature: Toward an integrative framework. *Journal of*
23 *environmental psychology*, 15 (3), 169-182.
- 24 Kaplan, S., and Berman, M.G., 2010. Directed attention as a common resource for executive
25 functioning and self-regulation. *Perspectives on Psychological Science*, 5 (1), 43-57.
- 26 Kellert, S.R., 1993. The biological basis for human values of nature. *In*: S. R. Kellert, and E. Wilson,
27 eds. *The biophilia hypothesis*. Washington DC: Island Press, 42-72.
- 28 Kellert, S. R., and Wilson, E. O., 1993. *The biophilia hypothesis*. Washington, DC: Island Press.
- 29 Lemon, N., and Taylor, H., 1997. Caring in casualty: The phenomenology of nursing care. *In*: N.
30 Hayes, eds. *Doing qualitative analysis in psychology*. Hove and New York: Psychology Press,
31 227-243.
- 32 Lindwall, M., Weman-Josefsson, K., Sebire, S.J., and Standage, M., 2016. Viewing exercise goal
33 content through a person-oriented lens: A self-determination perspective. *Psychology of Sport and*
34 *Exercise*, 27, 85-92.
- 35 Mays, N., and Pope, C., 2000. Assessing quality in qualitative research. *British medical journal*, 320
36 (7226), 50-52.
- 37 Martyn, P., and Brymer, E., 2016. The relationship between nature relatedness and anxiety. *Journal of*
38 *health psychology*, 21, 1436-1445.
- 39 Minello, K., and Nixon, D., 2017. 'Hope I never stop': older men and their two-wheeled love affairs.
40 *Annals of leisure research*, 20 (1), 75-95.
- 41 Nakamura, J., and Csikszentmihalyi, M., 2009. Flow Theory and Research. *In*: S. J. Lopez and C. R.
42 Snyder, eds. *The Oxford handbook of positive psychology*. Oxford: Oxford University Press, 195-
43 206.
- 44 National Institute for Health and Care Excellence, 2012. *Physical activity: walking and cycling*
45 [online]. Available from: www.nice.org.uk/guidance/ph41 [Accessed on 7 September 2016].
- 46 National Institute for Health and Care Excellence, 2014. *Physical activity: exercise referral schemes*
47 [online]. Available from: <https://www.nice.org.uk/guidance/ph54> [Accessed on 7 September
48 2016].
- 49 O'Connor, J.P., and Brown, T.D., 2007. Real Cyclists Don't Race: Informal Affiliations of the
50 Weekend Warrior. *International Review for the Sociology of Sport*, 42 (1), 83-97.
- 51 Oxford English Dictionary. n.d. [online]. Available from:
52 <http://www.oed.com/view/Entry/35056053?redirectedFrom=MAMIL#eid> [accessed 7 September
53 2016].
- 54 Pearson, D.G., and Craig, T., 2014. The great outdoors? Exploring the mental health benefits of
55 natural environments. *Frontiers in psychology*, 5, 1178-1182.

- 1 Phoenix, C., and Orr, N., 2014. Pleasure: A forgotten dimension of physical activity in older
2 age. *Social science & medicine*, 115, 94-102.
- 3 Pretty, J., Peacock, J., Sellens, M., and Griffin, M., 2005. The mental and physical health outcomes of
4 green exercise. *International journal of environmental health research*, 15 (5), 319-337.
- 5 Rogerson, M., and Barton, J., 2015. Effects of the visual exercise environments on cognitive directed
6 attention, energy expenditure and perceived exertion. *International journal of environmental
7 research and public health*, 12 (7), 7321-7336.
- 8 Rogerson, M., Brown, D.K., Sandercock, G., Wooller, J.J., and Barton, J., 2016a. A comparison of
9 four typical green exercise environments and prediction of psychological health
10 outcomes. *Perspectives in public health*, 136 (3), 171-180.
- 11 Rogerson, M., Gladwell, V.F., Gallagher, D.J., and Barton, J.L., 2016b. Influences of Green Outdoors
12 versus Indoors Environmental Settings on Psychological and Social Outcomes of Controlled
13 Exercise. *International Journal of Environmental Research and Public Health*, 13 (4), 363-378.
- 14 Sebire, S.J., Standage, M., and Vansteenkiste, M., 2009. Examining intrinsic versus extrinsic exercise
15 goals: Cognitive, affective, and behavioral outcomes. *Journal of Sport and exercise
16 Psychology*, 31 (2), 189-210.
- 17 Shaw, S., 2010. QM3: Interpretative Phenomenological Analysis. In: M. A. Forrester, eds. *Doing
18 Qualitative Research in Psychology: A practical guide*. London: Sage, 177-201.
- 19 Smith, J.A., Flowers, P., and Larkin, M., 2009. *Interpretative phenomenological analysis: Theory,
20 method and research*. London: Sage.
- 21 Smith, J.A., and Osborn, M., 2008. Interpretative phenomenological analysis. In: J. A. Smith, eds.
22 *Qualitative psychology: A practical guide to research methods*. London: Sage, 53-80.
- 23 Sport England Factsheet, 2016. *Once a week participation in sport* [online]. Available from
24 https://www.sportengland.org/media/11325/1x30_sport_16plus-factsheet_aps10.pdf [Accessed 13
25 March 2017].
- 26 Teixeira, P.J., Carraça, E.V., Markland, D., Silva, M.N., and Ryan, R. M., 2012. Exercise, physical
27 activity, and self-determination theory: a systematic review. *International Journal of Behavioral
28 Nutrition and Physical Activity*, 9 (1), 78-108.
- 29 Ulrich, R. S., 1979. Visual landscapes and psychological well-being. *Landscape Research*, 4, 17-23.
- 30 Ulrich, R.S., 1983. Aesthetic and affective response to natural environment. In: I. Altman and J. F.
31 Wohlwill, eds. *Behavior and the natural environment*. New York: Plenum Press, 85-125.
- 32 Ulrich, R. S., 1984. View through a window may influence recovery from surgery. *Science*, 224, 420-
33 421.
- 34 Ulrich, R.S., Simons, R.F., Losito, B.D., Fiorito, E., Miles, M.A., and Zelson, M., 1991. Stress
35 recovery during exposure to natural and urban environments. *Journal of environmental
36 psychology*, 11 (3), 201-230.
- 37 Valtchanov, D., and Ellard, C.G., 2015. Cognitive and affective responses to natural scenes: Effects of
38 low level visual properties on preference, cognitive load and eye-movements. *Journal of
39 Environmental Psychology*, 43, 184-195.
- 40 Watson, N.J., and Nesti, M., 2005. The role of spirituality in sport psychology consulting: An analysis
41 and integrative review of literature. *Journal of applied sport psychology*, 17 (3), 228-239.
- 42 Whitaker, E.D., 2005. The bicycle makes the eyes smile: exercise, aging, and psychophysical well-
43 being in older Italian cyclists. *Medical Anthropology*, 24, 1-43.
- 44 Wilson, E.O., 1984. *Biophilia*. Cambridge: Harvard University Press.
- 45 Wood, C., Bragg, R., and Pretty, J., 2016. The benefits of green exercise for children. In: J. Barton, R.
46 Bragg, C. Wood, and J. Pretty, eds. *Green Exercise: Linking Nature, Health and Well-being*.
47 London: Routledge, 46-52.
- 48 Zschucke, E., Gaudlitz, K., and Ströhle, A., 2013. Exercise and physical activity in mental disorders:
49 clinical and experimental evidence. *Journal of Preventive Medicine and Public Health*, 46 (Suppl
50 1), S12-S21.

