'Instead of "closing down" at our ages… we're thinking of exciting and challenging things to do': older people's microadventures outdoors on (e-)bikes

Article

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‘Instead of “closing down” at our ages… we’re thinking of exciting and challenging things to do’: Older people’s microadventures outdoors on (e-)bikes

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Biographical notes

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an interest in mobile methods applied to walking and cycling. Following his PhD on Playful Public Places for Later Life Ben worked on the RCUK cross-council funded cycle BOOM project on older people's cycling (www.cycleboom.org) before moving on to the ESRC Newton Funded Healthy Urban Mobility project (www.hum-mus.org).

Tim Jones is Reader in Urban Mobility at the Faculty of Technology Design and Environment at Oxford Brookes University. His work focuses on urban mobility, particularly walking and cycling, and its connection with environmental sustainability, health and wellbeing and social inclusion. He was Principal Investigator of the EPSRC cycle BOOM study Grant No. EP/K037242/1 (2013-2016).

Louise-Ann Leyland completed her PhD on Visuocognitive Processing in Hemispatial Neglect after Stroke and was a Postdoctoral Research Associate on the cycle BOOM project and Teaching Fellow in the School of Psychology at Reading University. She is now a Postdoctoral Research Associate at the Dementia Research Centre, Institute of Neurology, Faculty of Brain Sciences at University College London.

Carien van Reekum is Professor of Psychology and Neuroscience at the School of Psychology and Clinical Language Sciences at the University of Reading. Her research examines psychological and brain mechanisms supporting emotion and well-being, with a focus on ageing. As a Co-Investigator of the cycle BOOM study, she was able to pursue her interest in the development of interventions to promote well-being in older age.

Nick Beale has worked as a research project manager at Oxford Brookes since 2013. Prior to that he had over 15 years' experience working in the private sector, focusing on environmental research and consultancy in the low carbon energy sector.

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‘Instead of “closing down” at our ages… we’re thinking of exciting and challenging things to do’: Older people’s microadventures outdoors on (e-)bikes

This paper explores how people aged 50 and over, who were returning to cycling as part of an eight-week health and wellbeing trial, created their own cycling microadventures. Applying a stage model of the process of adventure to qualitative data generated from personal diaries and focus groups, we examine how older people anticipated and prepared for their microadventures, the challenges and discoveries they experienced, the benefits they gained and how electrically assisted ‘e-bikes’ can provide further opportunities for adventure. We conclude that cycles are a mode uniquely placed to facilitate microadventures and that e-bikes, in particular, offer further potential to enable older people to (re-) connect with place and other people. But, while this type of activity can provide benefits in terms of health and wellbeing, we argue that more supportive physical and social infrastructure is required to provide opportunities for more people to undertake microadventures close to their homes.

Keywords: cycling, ageing, microadventure, e-bikes, health and wellbeing

Introduction: Cycling Mobility and Micro-adventures

The UK population is ageing (Office for National Statistics, 2017) prompting concern over the impact on national health and care services. UK Policy makers are seeking ways of encouraging individuals to stay active for longer to enhance quality of later life and reduce end of life morbidity. On the international stage, the World Health Organisation (2015) promotes a ‘healthy ageing’ agenda. This recognises the importance of the interaction between an individual’s physical and mental capacities, their changing functional abilities ‘that enable people to be and to do what they have reason to value’ and their external social and physical environment. This policy suggests ways in which ‘healthy ageing’ can be facilitated across different contexts and policy domains.

Mobility is important for older people's physical and mental health and wellbeing as it can provide autonomy and enjoyment (Harper et al., 2016; Musselwhite, 2017; Nordbakke & Schwanen, 2014; Ormerod et al., 2015; Ziegler & Schwanen, 2011). Furthermore, exercise and social connections from activities in the outdoors have been identified as having wellbeing benefits for older people including reduction in isolation and depression (Abraham, Sommerhalder, & Abel, 2010; Boyes, 2016; Cutler-Riddick, 2016; Spinney, Scott, & Newbold, 2009; Sugiyama & Thompson, 2007). Cycling is one form of mobility that promotes exercise and access to the outdoors and could support improved health and wellbeing among the older population (Østergaard, Jensen, Overvad, Tjønneland, & Grøntved, 2018; Saelens, Sallis, & Frank, 2003; World Health Organization, 2002). Despite the potential of cycling to improve older people's mobility less than 1 per cent of people aged 65 and over report cycling in the UK compared to, for example, 9 per cent in Germany (Pucher & Buehler, 2012). Cycling in the UK typically requires sharing the public highway with motor traffic and a demanding sensory information ~~over~~ load that requires, at times, intense concentration. The majority of older people therefore do not contemplate cycling in any form because of fear of traffic danger and an unwillingness to expose themselves to the risk of cycling in traffic (LifeCycle, 2010; World Health Organization, 2002). This means that cycling remains the preserve of a minority of 'hardened', typically male, younger and middle-aged cyclists, who have established 'coping strategies' to tackle cycling in this environment (Pooley, 2013) or who relish the visceral feelings and risks of riding in these conditions (Fincham, 2007; Larsen, 2014). Other cyclists will vary their route to include different types of spaces which are less complex and demanding, and hence better suited to their capabilities. These often offer greater opportunity to interact with

landscape and other people, in contrast to the controlled and 'anodyne' experience of travelling by private motorised transport (Jones, 2012).

The concept of adventure is contested and difficult to define (Hickman, Stokes, Beard, & Inkster, 2017; Pike & Beames, 2013; Swarbrooke, Beard, Leckie, & Pomfret, 2012). Core characteristics of adventure expand from novelty, excitement, daring and risk to include the interdependent and overlapping aspects of uncertainty of outcome, danger, challenge, anticipated rewards, stimulation, escapism and separation, exploration and discovery, absorption and focus and contrasting emotions (Swarbrooke et al., 2012, p. 9). Adventure is subjective and unique to each individual who engages with activities in a physical, intellectual, spiritual and/or emotional way (Swarbrooke et al., 2012, p. 14). Hopkins and Putnam emphasise that 'adventure can be of the mind and spirit as much as a physical challenge' (1994, p. 6). Humphreys also advocates a mind-set towards adventure rather than formulaic rules governing what constitutes a legitimate adventure (2014) and advocates 'microadventures' (2018) that are 'short, simple, local, cheap' as offering the potential to be 'fun, exciting, challenging, refreshing and rewarding' (ibid.).

Cycling adventures are often considered in the context of extreme challenges, such as endurance events or testing expeditions, often abroad in mountainous regions and typically involving young or middle-aged men. Less consideration is given to the potential for less time and resource intensive cycling microadventures in the local vicinity of the home. Rawles (2013) reflects on her own experiences of cycling and the concept of the microadventure to analyse how local cycling can provide experiences of challenge, exploration, achievement and engagement with people and place locally without the need for the financial resources and physical fitness required for more traditional and carbon-intensive 'expedition' type adventures. In the field of outdoor

education Roberts argues that microadventures, focussed on the everyday rather than expeditions, can provide more inclusive and sustainable experiences (2018). However, no attention has been given to the potential of cycling microadventures in enhancing older people's mobility, physical and mental health and wellbeing.

This article examines how cycling can facilitate microadventures among the older population using data from a large-scale study investigating cycling and wellbeing.

Approach and methods - The cycle BOOM study

The UK Research Council funded cycle BOOM study (2013-2016) sought to understand the mobility, health and wellbeing benefits of cycling among the older population and those approaching older age (Jones, Chatterjee, et al., 2016). Part of the study involved a cycling and wellbeing trial (CWT) to investigate the impact of cycling outdoors on health and wellbeing. This involved 74 participants aged 50 and over[2], who reported that they had not cycled for at least five years or whose cycling had significantly declined during this period. They cycled at least three times a week for thirty minutes over an 8-week period. This intervention length was chosen as having been successful in improving cognitive and brain function in a meta-analysis of previous studies (Colcombe & Kramer, 2003). Participants also took part in cognitive tests and well-being measures before and after the trial and recorded their experiences throughout the trial in a diary – see Leyland et al. (2018, under review) for more details of well-being measures and the results of cognitive tests. Potential participants

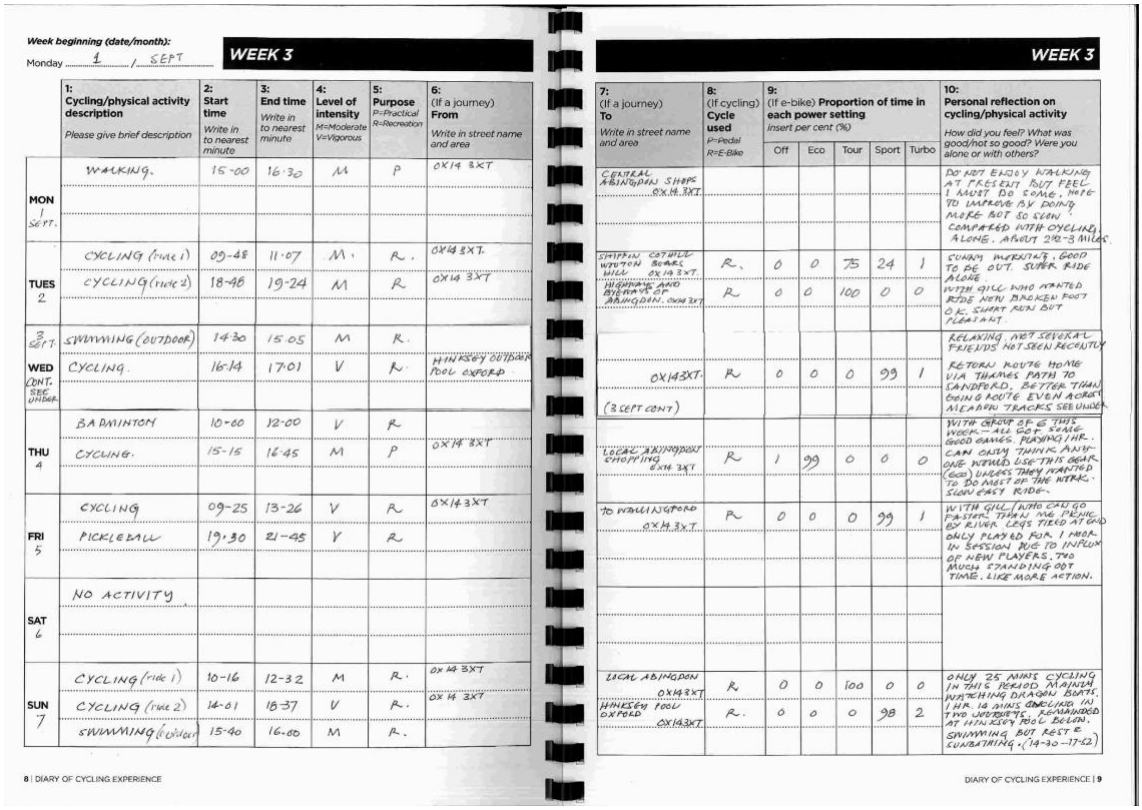
[2] Conceptions of old age vary between different societies and disciplines. The uniqueness of individual experience over the life course, the effect on ageing and the resulting heterogeneity of older people is widely recognised, see for example (World Health Organization, 2015), however, those in older age are often identified chronologically, starting at 50 or 65 years. A starting point of 50 years was used to enable understanding of how our participants approached and planned for older age.

responded to advertisements in the local press and flyers posted at shopping and community centres in the Oxford and Reading areas. Prospective participants were asked to complete a short screening questionnaire that was used to ensure that the final selection of participants represented a balance of sexes, broadly equal age categories (50-59, 60-69 and 70+), represented different socio-economic backgrounds and that they resided in a mix of urban and rural locations. The 74 participants who were selected and agreed to take part were between 50 and 83 years of age (mean age of pedal cyclists 63 years, e-bike cyclists 62 years) and from a range of backgrounds and locations.

All prospective participants first had to undertake a cycle training assessment and skill development programme with an accredited cycle trainer to ensure that they were capable of cycling safely on the public highway. Upon satisfactory completion, participants were then loaned an electrically assisted 'e-bike' (n=38) or were supported in the purchase a conventional pedal cycle or the maintenance of their own (n=36). Raleigh e-bikes were used that were powered by a battery linked to an electric motor in the bicycle transmission system. This type of e-bike requires the rider to pedal to receive assistance and the level of power assistance is regulated by using a handlebar mounted computer display panel and controller (Jones, Harms, & Heinen, 2016).

Prior to starting the trial, participants took part in a semi-structured biographical interview (Chatterjee, Sherwin, & Jain, 2013; Lanzendorf, 2010) of approximately one hour to understand their engagement with cycling throughout their life. Participants prepared for the interview by completing a life history grid which identified key themes across their life course (Harrison, Veeck, & Gentry, 2011). This included residential locations, family structure, transport modes and leisure activities. This approach was used to help participants 'anchor' cycling activity against key life course episodes. The

participants were then issued with a Diary of Cycling Experience (DoCE) and asked to complete it after every cycling activity. This recorded basic journey characteristics including type, frequency and duration (see Figure 1) and they were also asked to write briefly about their experience. At the end of each week they were invited to provide further reflections in written format (or even photographs and sketches) to enable more extensive, emotional and embodied qualitative data to be generated (Jacelon & Imperio, 2005; Milligan, Bingley, & Gatrell, 2005).



Week beginning (date/month): Monday 1 / SEPT

WEEK 3

	1: Cycling/physical activity description (Please give brief description)	2: Start time (Write in to nearest minute)	3: End time (Write in to nearest minute)	4: Level of intensity (M=Moderate V=Vigorous)	5: Purpose (P=Practical R=Recreation)	6: (If a journey) From (Write in street name and area)
MON 1 SEPT.	WALKING.	15-00	16:30	M	P	OX14 3XT
TUES 2	CYCLING (ride 1)	09-48	11-07	M	R.	OX14 3XT.
	CYCLING (ride 2)	18-48	19-24	M	R	OX14 3XT
3 SEPT. WED CONT. SEE UNDER	SWIMMING (OUTDOOR)	14:30	15:05	M	R.	
	CYCLING.	16:14	17:01	V	R.	HANKSEY OUTDOOR POOL EXFORD
THU 4	BADMINTON	10-00	12-00	V	R	
	CYCLING.	15-15	16:45	M	P	OX14 3XT
FRI 5	CYCLING	09-25	13-26	V	R	OX14 3XT
	PICKLEBALL	19:30	21-45	V	R	
SAT 6	NO ACTIVITY					
SUN 7	CYCLING (ride 1)	10-16	12-32	M	R.	OX14 3XT
	CYCLING (ride 2)	14-01	18:37	V	R.	OX14 3XT
	SWIMMING (outdoor)	15-40	16-00	M	R.	

8 | DIARY OF CYCLING EXPERIENCE

WEEK 3

	7: (If a journey) To (Write in street name and area)	8: (If cycling) Cycle used (P=Pedal R=E-Bike)	9: (If e-bike) Proportion of time in each power setting (insert per cent (%)) Off	Eco	Tour	Sport	Turbo	10: Personal reflection on cycling/physical activity (How did you feel? What was good/not so good? Were you alone or with others?)
MON 1 SEPT.	CENTRAL ABINGDON SHOPS OX14 3XT							DO NOT ENJOY WALKING AT PRESENT BUT FEEL I MUST DO SOME. HAVE TO IMPROVE BY DOING MORE BUT SO SLOW COMPARED WITH CYCLING. ALONE. ABOUT 2½-3 MILES
TUES 2	SUTTON COURTENAY HILL OX14 3XT.	R.	0	0	75	24	1	SUNNY MORNING. GOOD TO BE OUT. SLOW RIDE ALONE
	HIGHWAYS AND BYWAYS OF ABINGDON. OX14 3XT	R	0	0	100	0	0	WITH GIRL WHO WANTED RIDE NEW BROKEN FOOT O.K. SHORT RIDE BUT PLEASANT
3 SEPT. WED CONT. SEE UNDER	OX14 3XT (3 SEPT CONT)	R	0	0	0	99	1	RELAXING. NOT SEEN FRIENDS NOT SEEN RECENTLY RETURN ROUTE HOME VIA THAMES PATH TO SANDFORD. BETTER THAN BEING ROUTE EVEN ACROSS MEADOW TRACKS SEE UNDER
THU 4	LOCAL ABINGDON SHOPPING OX14 3XT	R	1	99	0	0	0	WITH GROUP OF 6 THIS WEEK - ALL GOT STALE. GOOD GAMES. PLAYING THR. CAN ONLY THINK ANY-ONE WITHOUT USE THIS GEAR. (600) UNLESS THEY WANTED TO DO MOST OF THE WORK. SLOW EASY RIDE.
FRI 5	TO WALLINGFORD OX14 3XT	R	0	0	0	99	1	WITH GIRL WHO CAN GO FASTER THAN ME PEDAL BY RIVER. LEGS TIRED AT END ONLY PLAYED FOR 1 HOUR IN SESSION DUE TO INFLUX OF NEW PLAYERS. TOO MUCH STANDING OUT TIME. LIKE MORE ACTION.
SAT 6								
SUN 7	LOCAL ABINGDON OX14 3XT	R	0	0	100	0	0	ONLY 25 MINS CYCLING IN THIS PERIOD MAINLY WATCHING DRAGON BOATS. 1 HR. 10 MINS SWIMMING IN TWO WORKOUTS. REMAINDER AT HANKSEY POOL BELOW. SWIMMING, BUT REST = SUNBATHING. (14-30 – 17-52)
	HANKSEY POOL EXFORD OX14 3XT	R.	0	0	0	98	2	

DIARY OF CYCLING EXPERIENCE | 9

Figure 1: Example of completed cycling and wellbeing trial Diary of Cycling Experience (DoCE)

A total of 70 participants completed basic information about their journeys and 62 also wrote in more extensive accounts of their experience and several also included photographs and sketches. Shortly after completing the trial, 9 pedal cycle and 7 e-bike participants were invited to take part in two separate (audio-recorded) focus group

discussions to explore their experiences. All participants were also invited to complete an online exit survey following the CWT, this was completed by 73 of the group.

No. of Pedal cyclists (mean age | standard deviation |proportion female)	36 (63yrs | 7.47 | 55%)
No. of E-bike users (mean age | standard deviation | proportion female)	38 (62yrs | 7.00 | 53%)
Total pedal and e-bike participants (mean age | standard deviation | proportion female)	**74 (62yrs | 7.21 | 54%)**
No. of Diary of Cycling Experience basic data completed	70
No. of Diary of Cycling Experience detailed accounts	62
No. of Focus group participants (of which e-bike trial participants)	16 (7)
Total online 'exit survey' responses	73

Table 1: Summary of participation in the cycling and wellbeing trial

The research did not stipulate where, when or with whom this cycling should take place to provide participants with the opportunity to engage with whatever cycling they wished. The CWT took place on a rolling basis from August 2014 to December 2015 and therefore provided seasonal contrast. Ethical approval was obtained from the University of Reading Research Ethics Committee (Registration No: 14/31) and Oxford Brookes University (Registration No: 140813). Participant names have all been anonymised.

The following section provides results from a thematic analysis (Braun & Clarke, 2006) of participants' diaries, the focus group discussions and exit survey. Analysis was undertaken by immersion in the data by transcribing the text from the DoCEs, focus groups and exit survey into word documents. These were read repeatedly by two researchers on the team and coded against themes. The results of this coding were then summarised by theme and agreed by all authors.

The themes were based on the sequence of stages constituting the 'process of engagement in adventure' devised by Swarbrooke et al. (2012, p. 15). These four stages

220 are, firstly, *anticipation and preparation*, which includes consideration of dangers and
221 rewards and the development of appropriate skills; secondly, *challenge*, where skills are
222 applied; thirdly, *discovery*, including development and learning from the experience and
223 finally, *benefit*. These stages provide a simple framework which can be applied to a
224 wide variety of adventure experiences unlike, for example, Walsh and Golins' (1976)
225 more tightly focussed Outward Bound Process or subsequent derivatives (such as
226 McKenzie, 2003) which relate to educationally orientated organised activities.
227 In the case of the cycle BOOM CWT there was a good fit between the
228 Swarbrooke et al model and participant's consideration of whether to commit to taking
229 part in the trial, the training provided and other personal preparation, the flexible nature
230 of the experiences and the potential health and wellbeing benefits explicitly framed as
231 an aspect of the trial to be studied.
232 Swarbrooke et al differentiate their stages of the process of adventure from the
233 characteristics and qualities of adventure, such as novelty, risk and uncertainty which
234 can take place at different stages and can vary in importance depending on the particular
235 nature of the adventure. In the analysis presented below the stage of *challenge* has been
236 separated into *external challenges* provided by the physical and social environment and
237 *personal challenges* that participants had developed in relation to their cycling. This
238 differentiates two distinct types of challenge that were evident in the data.
239
240 **Findings**

241 ***The experience of the trial as microadventures***

242 Analysis of diaries revealed that participants mainly used pedal cycles and e-
243 bikes for recreation in green spaces away from traffic or on quiet roads. Most rides
244 started and ended at the participant's home and involved their immediate surroundings.

A few participants did take their bikes in the car or on the train to cycle in locations further afield, but this was exceptional.

Anticipation and preparation

Participants reported being motivated to take part in the CWT because it offered a structured programme that could support their transition back into cycling for personal fitness and to lose weight; for rehabilitation after an illness; to ride socially with friends, a partner or grandchildren; or a combination of reasons (Jones, Chatterjee, et al., 2016). These show similarities with older people's motivations for engaging with outdoor activities more generally (Sugerman, 2003) but anticipation of their cycling as a form of adventure was not made explicit at this stage.

The cycle training assessment and skill development programme was reported as helping participants to (re)gain confidence cycling. They were described as 'excellent in giving me confidence to safely get back on a bike again' (Anonymous response to the Exit Survey). Even those who had a long previous history of cycling and who regarded themselves as experienced cyclists found the sessions provided useful new information and skills. For example, Colline[3] stated that it 'completely changed the way I cycled, very different to cycling proficiency [undertaken when young], found it valuable, I was terrified of Oxford traffic and it did help to an extent' (Female, 65, e-bike user, Oxford).

Many participants performed some kind of 'desk-based' route planning in advance of starting to cycle. Some participants identified that this process started when as soon as they knew they had been selected for the trial. Henry (Male, 62, pedal cyclist, Reading) explained how 'I always know roughly where I'm going before I set off… I

[3] Pseudonyms have been used for all participants.

used opencyclemaps.com [sic] (sometimes) to see cycle routes and footpaths before riding; or deciding where to go. I combine this with Google maps.'

Participants often started by carrying out shorter rides in familiar areas close to home accompanied by a partner or friend and then used this to prepare to ride longer distances in different or more challenging environments. Aveline (Female, 64, e-bike user, Reading) reported how she 'Spent [first] week getting used to [e-]bike. Receiving instruction from my husband.'

Common among participants was the arrangement or purchase of equipment to facilitate cycling often at the start of the trial. Raymund described how the first week 'took quite a lot of preparation – with not only cycling clothes – but also the safety gear – (high vis waistcoat – reflective cross belt – helmet)' (Male, 83, pedal cyclist, Reading). Other participants added equipment as they gained experience of what was useful to them. In her fifth week of cycling, Nikki for example, explained how she had made a significant investment in a 'new jacket, mirror, puncture kit, inner tube – over £100!' (Female, 67, pedal cyclist, Oxford). Some participants were also inspired to purchase new bikes after discovering that their current cycles no longer suited their needs.

External challenges

The physical and social environment provided what might be termed 'external challenges' for participants in different measure. In meeting these challenges, the level of engagement in the trial followed one of three clear trajectories: first, there were those that *embraced* the trial and rode more than the requested three sessions of 30 minutes per week; second, there were those that *endured* the trial and struggled to complete the requisite amount of hours because of competing interests/time pressure, family commitments, poor weather, health issues (particularly colds and flu) and minor

interruptions such as mechanical issues and punctures; and third, there were those that *exited* the trial (n=12) before completion because of the onset of a medical condition (n=5); because they no longer had the time to take part (n=6); or in a single case, because the participant continued to lack confidence in cycling (Jones, Chatterjee, et al., 2016).

Participants that embraced the trial reported that the structured programme had motivated them to maintain their cycling in the face of poor weather, time pressures and technical difficulties. For example, Colline stated 'I used the bike this week for local errands and had to force myself out at the end of the week as the weather was very wet and windy. Not good cycling weather.' (Female, 65, e-bike user, Oxford). For some, the experience of getting into the outdoors was not as bad as they had anticipated. Mo explained that for him 'As the weather is turning colder now it is becoming increasingly difficult to go out on the bike. However, when I do I always feel the benefit.' (Male, 57, e-bike user, Reading) and Crystal 'Quite a heavy drizzle when I set off, but it was fine. Glad I did it.' (Female, 52, pedal cyclist, Oxford). However, most participants, even among those that embraced the trial, identified themselves as fair weather cyclists who were not keen to ride in cold, wet or windy weather and sought to organise their cycling to coincide with better weather whenever they could.

Apart from the unpredictable British weather, the key challenge for both pedal and e-bike users was poor quality 'cycle infrastructure' and lack of protection from motor traffic. Most participants found cycling near traffic a significant challenge, particularly along busy main roads and in urban centres. Purpose-built cycle infrastructure on such roads was generally regarded as insufficient, being narrow, inconsistent and poorly maintained. Even in Oxford, which has claimed the status of a 'Cycling City' since 2012 (Oxford City Council, 2017) and which boasts the UK's

second highest levels of cycling. Brandon (Male, 70, e-bike user, Oxford) summarised the problems for people returning to cycling, 'infrastructure, most obvious thing, if you haven't cycled for a while, how poor the conditions are for cyclists in terms of availability of cycle paths etc.' Drivers were also reported to be unsympathetic to cyclist's safety, for example, Mo stated that he was

> Feeling rather frustrated at the way that some car drivers treat cyclists. I was nearly knocked off twice on Wednesday. Both times at roundabouts where cars don't give cyclists priority to the right. Cycling in Reading I am afraid is rather dangerous. I need to find a quieter area with proper cycle paths. (Male, 57, e-bike user, Reading).

Negative experience of interacting with vehicles led to some participants planning routes ahead to avoid traffic, using quiet residential streets and paths through green spaces and along waterways, Daphne summarised this approach as discovering 'towpath good, road bad!' (Female, 67, e-bike user, Reading).

As many of the participants grew in confidence they felt better able to ride in traffic, but many avoided it wherever possible due to it being too frightening. Reflecting on her experience at the end of the trial Livy said, 'I wouldn't say "never again" I'd still hire a bike in a traffic-free area… but on-road cycling isn't for me' (Female, 51, e-bike user, Oxford). Local cycling was therefore difficult for her due to the 'obstacle of getting out of Oxford [and the] convoluted way needed to get to places for pleasant cycling. [I] want to pick my bike up and throw it about 20 miles somewhere else, [I] feel imprisoned in Oxford on the bike'. To overcome this issue and to expand their potential cycling environments some participants had put their bikes in cars or on trains to reach other destinations, although this wasn't always easy to do.

Purpose-built shared pedestrian and cycle paths away from motor traffic were appreciated, such as parts of the National Cycle Network (Sustrans, 2017). However,

even here, participants recounted difficulties knowing where they should cycle and that this led to problems interacting with pedestrians in places because of poor legibility. Signage also made way-finding difficult leading to unexpected and unwanted microadventures, Darren reported 'Cycle Route 5 is not particularly well-sign-posted. Just after Iffley Lock I missed a turn and instead followed the riverside footpath to Sandford Lock. Given recent rain this proved an unfortunate choice' (Male, 66, pedal cyclist, Oxford).

Other issues included the quality of cycle track surfaces, difficulty negotiating barriers, junctions, steps, bridges and gates along paths separated from traffic that required participants to stop and dismount and therefore hindered smooth riding. This was both in rural and urban contexts, Venita described how in Oxford, 'Sustrans Route 5 good, goes past my door, bits of it in poor repair, not that old' (Female, 60, pedal cyclist, Oxford) and Theodora made the point that cycle tracks should be 'maintained, glass swept, overhanging branches removed' (Female, 73, pedal cyclist, Oxford). Some, such as Marti, went as far as to say that 'dedicated and shared cycle routes are worse than the roads, not maintained' (Female, 53, pedal cyclist, Oxford).

Several participants reported falling off their bikes and experiencing minor physical injuries as Aurelia's testified, 'Bruised and grazed elbow and knee. Bruised ego!' (Female, 58, e-bike user, Reading). However, a few injuries were more severe. One participant, Victoria, damaged her knee and required a check-up in hospital (Female, 68, e-bike user, Oxford) and Cary required stitches (Male, 66, pedal cyclist, Reading). All had the motivation to continue with the trial although it was not always clear whether this was a commitment to completing the research or a strong enough desire to keep cycling. Some did report varying levels of confidence afterwards. Crystal reported 'Really nervous after my fall on Sunday. Seat feels too low.' (Female, 52,

pedal cyclist, Oxford) and two weeks later she updated ‘Did the required 1.5 hours but did not feel like doing anymore. My confidence is very low after my fall’.

Those using e-bikes reported the sheer enjoyment and thrill of their cycling, for example, Padraic exclaimed ‘I’m enjoying the e-bike – it is really good fun’ (Male, 59, e-bike user, Reading). E-bike users also found that they could overcome some of the challenges of riding pedal cycles. Many explained how power assist allowed them to cope with physical ailments that made ordinary pedal cycling more challenging, Aline ‘Suffered last week from painful right knee … so using more power, which definitely seems to help.’ (Female, 67, e-bike user, Oxford). Some felt that they got more out of their cycling by being able to go further on an e-bike with the same effort, Sophey explained ‘I'm going a lot further already than would have done on bike so “same amount of exercise but more pleasure” because [I’m] going further than my usual boundaries’ (Female, 59, e-bike user, Oxford). However, in some cases the additional weight and high centre of gravity was reported as being a disadvantage of e-bikes due to its lack of manoeuvrability in relation to steps and other barriers, the additional challenge of lifting it into a car for transport, turning it upside down to undertake repairs and a danger of it toppling over when stationary.

Logistical challenges included the lack of time available for cycling, for example, work, volunteering and/or care responsibilities meant time was constrained, Sophey revealed: ‘Another week of working 7 days so not able to go exploring on the bike as I’d hope to when I started this trial.’ (Female, 59, e-bike user, Oxford). Other challenges included having to organise cycling related ‘paraphernalia’ typically locks and lights and additional gear during the winter such as gloves and extra layers (and even tissues for runny noses!)

Personal challenges

Participants described specific personal challenges that they had developed relating to their cycling. These were sometimes based on geography, for example, accessing places. Venita described how 'I fulfilled a long-held challenge and cycled from Church Hanborough into Oxford and back.' (Female, 60, pedal cyclist, Oxford) whereas for Fran it was topography 'When I am in Oxford I have started to give myself a few challenges such as including a few steep hills that for me are relatively steep certainly get me out of breath and heart racing' (Female, 61, pedal cyclist, Oxford). These were often qualified, recognising personal capabilities, Nikki reflected, 'A big achievement for me, not much for others! Found going there [Charney Bassett] good, coming back (against the wind) harder and legs ache now!' (Female, 67, pedal cyclist, Oxford). Some, such as Harvey, surprised themselves with their accomplishments

> I needed to go to Abingdon - normally a car journey. Instead, as the weather was nice, I decided to cycle. I used a route via Kennington to avoid traffic. On the return journey I used a lot of electric power as I was quite tired. It was good exercise and I felt that I'd really accomplished something. If you'd suggested this to me a year ago I'd have dismissed the possibility of cycling this distance out of hand. (Male, 62, e-bike user, Oxford).

Discovery

Both pedal cyclists and e-bikers reported enjoying the freedom to discover new routes and destinations in their local area and beyond. Sometimes exploration was part of a leisure activity, for example, Alysia related how 'I feel that the electric bike has enabled us [husband and I] to make journeys that we might not otherwise have done and get out enjoying the countryside.' (Female, 51, e-bike user, Oxford) going on to explain

> The ride I did on Sunday [from home] was perhaps the most enjoyable I've done so far – very few cars and glorious clear skies and beautiful fields, hedgerows and villages. I even found a previously unknown to me nature reserve!

Colline described how she ventured into her local area on her e-bike and 'Went exploring! Trying to discover ways around Oxford avoiding main roads. Some on tracks. Had to push for a short distance. Windy but enjoyable/exhilarating!' (Female, 65, e-bike user, Oxford). While Nikki (Female, 67, pedal cyclist, Oxford) went out on her pedal bike and 'Found new routes which was fun… Made an effort to go faster and enjoyed it and took long route back… with husband... energising... enjoyed exploring [but] got muddy.' Ulrick's attempts to explore were stymied on occasion but led to the discovery of other places: 'Seeking routes to Sunningwell and thr' Radley College but thwarted by stiles, steps and gates. Changed plan and explored Abingdon.' (Male, 83, e-bike user, Oxford). In his diary he noted surprising discoveries, including photographs such as Figure 2.

Figure 2: ‘Milton Manor: came across this house unexpectedly’ (Participant photograph, Ulrick (Male, 83, e-bike user, Oxford))

On other occasions Ulrick and his partner enjoyed more structured exploration, such as using their e-bikes to access properties taking part in the annual Oxford Open Doors event (see Figure 3).

Figure 3: ‘Oriel College: The Oxford Open Doors Weekend was very enjoyable. Our bikes were invaluable for seeing as many venues as we could fit in.’ (Participant photograph, Ulrick’s partner (Female, 78, e-bike user, Oxford))

Going further afield Fran took her pedal bike with her to the Midlands and found it was ‘Good to try new roads in a different area – cycling in country meant much less traffic.’ (Female, 61, pedal cyclist, Oxford). After a subsequent trip to the Brecon Beacons she reflected ‘When we are away [from home, with husband] – exploring new less crowded parts of the country is a joy (and escape from the family).’ Familiar, functional journeys could also involve an element of exploration, Stacee described how she ‘Went to post letters and extended to local exploration.’ (Female, 64, pedal cyclist, Oxford).

The experience of freedom and discovery provided some participants with a ‘Strong sense of nostalgia – makes me feel young again.’ (Henry, male, 62, pedal

cyclist, Reading). This chimed with the many recollections of a sense of freedom and adventure when cycling in their youth which were reported in the initial biographical interviews and have been reported elsewhere (Underwood, Handy, Paterniti, & Lee, 2014).

Cycling was specifically identified by some as a better mode than walking or car for exploring, Colline described how she

> went exploring locally, where [I] had driven past side roads and wondered where it went, don't do it in the car as ridiculous, don't on foot because if you can't get through [you] have to turn back, perfect on a bike, go exploring all over, really enjoyed that, got to know where side roads go (Female, 65, e-bike user, Oxford)

Many other participants also reported discovering footpaths, tow paths and other routes away from the road system that were new to them.

In some cases, exploration was less opportunistic and more systematic. During the e-bike focus group Ulricks' partner explained how she 'marked rides on a map and tried to fill in gaps where I hadn't been and it is amazing the little places you can find, all the tracks, minor roads, you can link through, take different routes' (Female, 78, e-bike user, Oxford, see Figure 4). In contrast when on his own Ulrick would also undertake an 'Abingdon mystery tour. Interesting, meandering ride seeing areas not visited before' (Male, 83, e-bike user, Oxford).

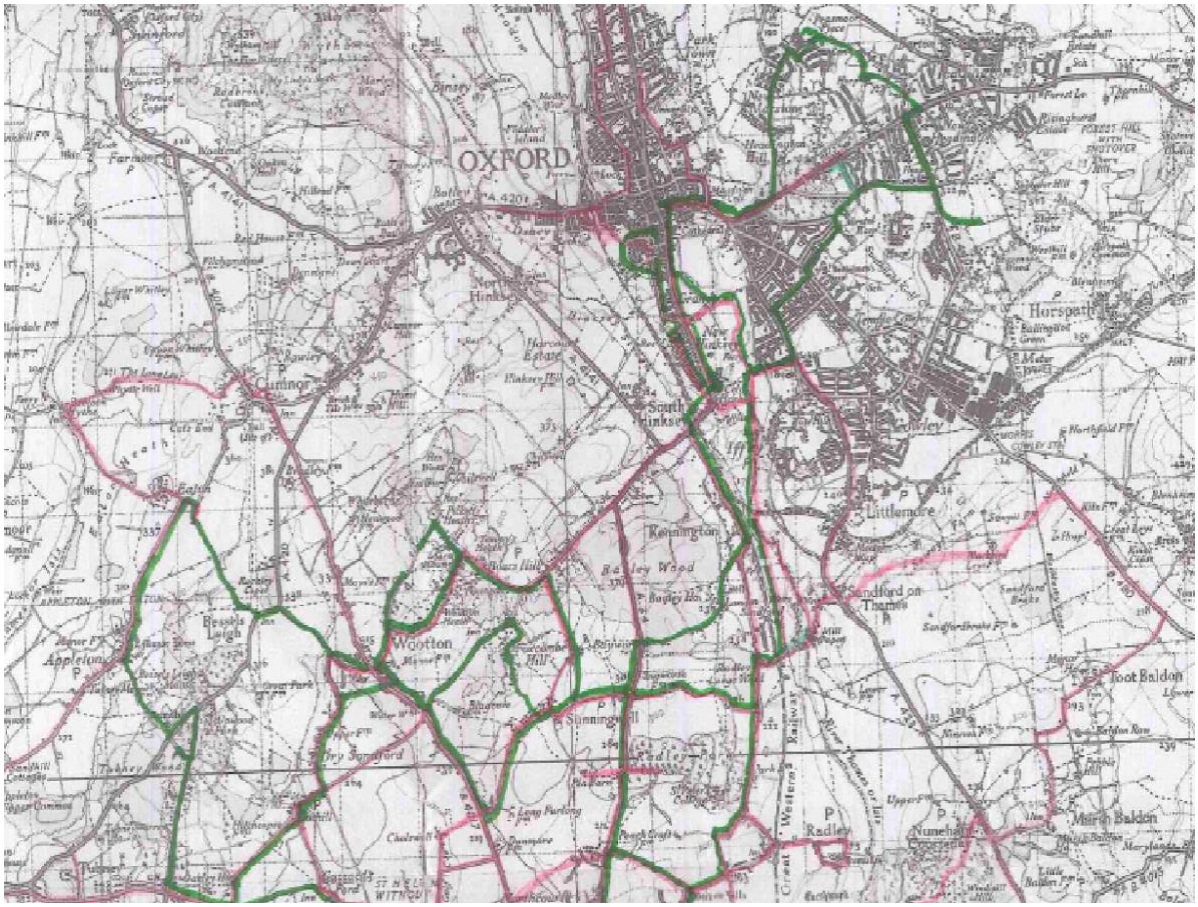


Figure 4: Cycling routes recorded by hand Ulrick (Male, 83, e-bike user, Oxford)

Participants also made reconnaissance journeys by bike in preparation for undertaking anticipated journeys. For example, in advance of an appointment Val reported 'Checking out easy route to Kidlington! First lane too muddy. Knee sore at end and started to rain but on return found the route without mud.' (Female, 59, pedal cyclist, Oxford).

As already highlighted, the e-bike also allowed riders to cover more distance in less time thereby extending their range. This enabled some riders to reconnect with cherished places, Ulrick explained that 'We had been places on pedal bikes in past, lovely to be able to go again, do the distances… [we] would have struggled on ordinary bikes' (Male, 83, e-bike user, Oxford).

E-bikes also gave participants confidence that they could return home from longer journeys without running out of energy. Ulrick went on to describe how the e-bikes used by him and his partner

> Enabled us to venture out further, much further and easier than, you know, we would have done otherwise [we] knew when went to Wallingford [we had] a bit of assistance to help coming back, don't think, 'oh I've got 12 miles of slog to get back home', always [provides a] back-up with us. (Male, 83, e-bike user, Oxford).

Participants also appreciated the ability to engage more directly with the landscape. 'I enjoy cycling and experiencing the sounds and smells of being outdoors. Luckily we have had a very mild autumn so far which has made being outside very pleasant.' (Alysia, female, 51, e-bike user, Oxford). Often participants would pick out particular aspects of nature that they discovered, 'Nice to be back on the bike again mostly away from traffic…pleasant to ride, rabbits and daffodils on way!' (Sophey, female, 59, e-bike user, Oxford). 'Nice ride to Northleigh. Lots of trees so lots of leaves blowing down as I passed, beginning to seem a bit more like autumn.' (Val, female, 59, pedal cyclist, Oxford), 'Saw a Muntjac deer!' (Veronica, female, 62, pedal cyclist, Oxford). For some their explorations involved a combination of social and natural encounters which they appreciated, Alisha described how she

> explore[d] part of the towpath I had not been on before. All the cyclists I saw said 'hello' or acknowledged me with a nod – made me feel good – as did dog walkers… Saw lots of wildlife, including swans landing on the river, which always makes me smile. Lots of blossom, lots of spring flowers at the lock garden. (Female, 53, pedal cyclist, Reading)

Benefits

The cycling experience reported by both pedal and e-bike participants during the trial

was positive overall[4]. The two groups of pedal and e-bike participants that completed the 8-week trial differed slightly in terms of the time spent cycling with e-bikers riding for an average of 2.4 hours a week and pedal cyclists 2.1 hours. Both e-bikers and pedal cyclists reported getting healthy exercise outdoors and a feeling that (e)cycling was contributing to personal health and wellbeing. This included weight loss, increased fitness, improved leg strength and endurance, better sleep and improved self-esteem. Some were explicit about the wellbeing benefits that this type of experience provided, 'On Sunday I took the bike out for the afternoon to cheer myself up. Gloomy day but the countryside around is lovely so felt better when I came back!' (Alysia, female, 51, e-bike user, Oxford).

Overall participants were very positive about the physical benefits of cycling, Marti (Female, 53, pedal cyclist, Oxford) was typical in commenting on the effects of cycling on her body, 'Could feel previous cycling in my legs and felt good for exercising… Feel definitely fitter for cycling - feels easier than at the start.' Participants also contrasted the experience of being outdoors with indoor exercise 'it's not difficult to find a pleasant 30-minute route and it certainly beats 30 minutes on the cross-trainer!' Darren (Male, 66, pedal cyclist, Oxford) and 'Think that cycling at the gym is helping with stamina a bit - but it's not so much fun.' (Venita, female, 60, pedal cyclist, Oxford).

Some were concerned about over-stressing their systems, Byran explains in week five that 'I am not particularly motivated to push my physical limit more than I already do – I take identification with me in case of heart attack or stroke – strangely I am unconcerned about any other accident.' (Male, 69, pedal cyclist, Reading).

[4] Twelve videos of participants, summarising and reflecting on their experience of using e-bikes and pedal cycles during the trial are available at https://www.cycleboom.org/video/.

Having engaged in the study, there was a sense of achievement and satisfaction in written narratives from both the pedal and e-bike groups. Participants reported that by maintaining their activity over the eight weeks they had gained confidence and skills. For example, Binky felt 'Brilliant & thrilled!' because she never imagined she could ride as far as she did. She explained 'When [the cycle trainer] initiated me on the bike he said, 'You could go to Henley and I fell about – 'dream on!' So today I decided to go and try it! Hooray, did it all no problem' (Female, 65, e-bike user, Reading). During the eight weeks Fran 'Extended the ride to almost 45 minutes – great sense of achievement.' (Female, 61, pedal cyclist, Oxford).

Many enjoyed the company of others but some preferred cycling alone. For example, Vassily explained that 'I always cycle alone. Depending on the conditions I try to travel at 14-15 mph.' (Male, 68, pedal cyclist, Oxford) and Fran, stated that 'All my rides were done on my own but for me that added to pleasure - time to ponder and reflect as I went along and no pressure to 'keep up' with anyone.' (Female, 61, pedal cyclist, Oxford). Whereas Venita enjoyed the social experience and motivation of cycling with her peers

> On Sunday I went on a lovely bike ride with friends from Church Hanborough, this is the third we have done in about the last 6 months. It's my second outing on my new bike which I am really enjoying... actually the hill was much shorter than in my memory and having companions made it much easier.' (Female, 60, pedal cyclist, Oxford).

Others enjoyed both, including intergenerational cycling, Nikki explained that she enjoyed the 'Variety of cycling both on my own and with family (grandson and

559 husband) … Beautiful and good fun … I like both but prefer company.' (Female, 67,
560 pedal cyclist, Oxford).

561 The e-bike was seen as particularly beneficial in providing opportunities to ride
562 with a more agile partner or friend. For example, Ulrick and his partner had been
563 struggling to enjoy shared walks due to variations in their relative speed whereas they
564 could cycle together at a similar pace.

565 Participants reflected on the different experiences they had of cycling in contrast
566 to walking. In addition to the earlier comments on the particular suitability of bikes for
567 exploring, triallists such as Stacee (Female, 64, pedal cyclist, Reading) emphasised the
568 'opportunity to cycle around and cover ground more quickly with breeze in hair!' and
569 Henry (Male, 62, pedal cyclist, Reading) found himself 'Surprised at how quickly I
570 arrived compared to walking.' Along with the benefit of being able to transport loads
571 easily 'Carried 10kg of ride in backpack on way back!' A couple of weeks into his e-
572 bike trial Ulrick, who had a knee problem, reported 'Didn't enjoy walk; longed for
573 bike.' The following week 'Do not enjoy walking at present. But feel I must do some.
574 Hope to improve by doing more but so slow compared to cycling' (Male, 83, e-bike
575 user, Oxford). Whereas Veronica found cycling less meditative

576 > I have always found walking a great aid to problem solving/creative thinking. It
577 > can be anything – what to cook and how to adapt a recipe; a problem with a
578 > painting e.g. composition, final touches; how to write a tricky email. Cycling on
579 > the other hand doesn't serve the same function – perhaps there's too much to
580 > concentrate on! (Female, 62, pedal cyclist, Oxford).

581

582 Bikes were seen as preferable to using vehicles in some circumstances 'One ride
583 I did to my piano lesson was particularly nice as it went through countryside and was in
584 fact quicker than driving (and much pleasanter)' (Alysia, female, 51, e-bike user,

585 Oxford). Alisha noted that ‘it's much easier to see the Victorian Architectural details on
586 the houses by bike. You miss so much by being enclosed in a box on wheels.’ (Female,
587 53, pedal cyclist, Reading).

588 **Discussion**

589 The CWT provided the opportunity for participants to engage in a series of
590 cycling experiences of their own choosing. While a small number exited the trial or
591 struggled to endure it despite problems with health, time availability and technical
592 issues the majority embraced the chance to cycle and to take part in shaping their own
593 microadventures. The previous section has provided an overview of the cycling
594 experiences of participants in the CWT structured using Swarbrooke et al.’s (2012)
595 stages of the process of adventure. This has proved to be a useful framework to
596 understand participants’ entire experience. Participants built up skills and confidence
597 throughout the eight weeks. They particularly appreciated the preparation provided by
598 the initial assessment and training but then continued to expand their cycling in terms of
599 distances travelled, environments encountered and physical challenges. In some cases,
600 preparation involved the use of advice and/or mapping to anticipate and negotiate
601 unwelcome challenges.

602 Cycling was reported by the participants to be a mode uniquely placed to
603 facilitate exploration – providing greater flexibility than motorised vehicles in terms of
604 size, manoeuvrability and access to narrow or restricted rights of way but less of a
605 physical and time commitment than walking. This supports and extends the
606 identification of freedom of interactions with the spatial and social environment when
607 cycling (Brömmelstroet, Nikolaeva, Glaser, Nicolaisen, & Chan, 2017) whereby
608 cyclists tend to build up an extensive and detailed image of their locality. This can be
609 enhanced by an ‘upright’ cycling style, such as required by the loaned e-bikes which

provide the ‘highest sensory potential’ for cycling (ibid. p. 8). Furthermore, cycles also provided a means of overcoming physical ailments such as knee and hip problems. In many cases e-bikes allow microadventures by bike to be extended and prolonged offering the advantages of reliability, range, comfort and carrying capacity.

Cycling was also a means of connecting and reconnecting with places through providing access to destinations but also experiencing them on a bike (Spinney, 2007). Participants delighted in their contact with nature in the form of landscape, plants and animals and the richness of sensory experience. The self-selection of green/blue environments for cycling by our trial participants follows the conclusion of Boyes that ‘Relatively benign natural places are ideal for exploration and exercise by older people where the individual can freely choose the activity, the duration, the intensity and the companions’ (Boyes, 2016, p. 374). In our study this was due to a combination of the positive attraction of nature and the avoidance of vehicles. However, even these more benign environments provided unwelcome challenges in terms of quality of surfaces, wayfinding and legibility. This made the cycling experience considerably less enjoyable and needs to be addressed. While good quality connections to green space/blue corridors are vital in urban settings improved infrastructure is also needed so that biking becomes an everyday cherished microadventure rather than a series of ‘micro-stresses’ that act as a deterrent to activity.

A social component was not necessary for all participants. While some appreciated the support and companionship of friends or family members many also relished the sense of independence (Hickman et al., 2017). Age was not a factor with participants throughout the range, from 50-83 years, reporting adventurous activities. Similarly, both men and women undertook microadventures, including personal challenges and enjoying exploration.

But we must also recognise the potential for more functional cycling to meet other needs of everyday life, such as, shopping, education, social and care visits etc. These are often in urban areas where the impact of fear of traffic is very significant and the risk of a potential journey goes beyond the thrill of adventuring. So, there is also the need to extend positive cycling environments by 'recreationalising' urban areas such that functional destinations can be accessed in a safe and enjoyable manner with the added potential of urban adventuring by cycle. More people should be encouraged and enabled to have journeys that move from 'post letters' to 'extended to local exploration' as in the case of Stacee (Female, 64, pedal cyclist, Oxford).

Levels of acceptable risk and tolerance varied between participants and at different moments during the trial. As one participant explained 'It was a mixture of exhilaration interspersed with brief periods of sheer terror!' (Anonymous response to the Exit Survey). The experience of terror went beyond the adventuring expectations of that individual.

Many of the participants had positive associations between their recent cycling microadventures and more extensive adventures on cycles in their youth. This positive association may be a generational effect that predisposes the current cohort of older people to cycling and to cycling microadventures and can therefore be capitalised on to encourage cycling outdoors.

Conclusion

The cycle BOOM wellbeing trial has demonstrated how cycle training, together with an 8-week structured programme of cycling can have a positive effect on wellbeing and perceived physical health for older people keen to re-engage with cycling. This may not be simply to do with increased physical exercise but also the opportunity that cycling provides for older people to engage directly with the outdoor physical and social

environment.

The experience of cycle BOOM participants in the CWT has shown that microadventures by (e-)bike offer the potential for local, outdoor, relatively accessible and environmentally sustainable adventures (Rawles, 2013; Roberts, 2018) for older people. They can provide 'the more classical elements of adventure (risk taking, uncertainty, discomfort etc.)' (Roberts, 2018, p. 28) and help people connect and re-connect to place and other people as they age, for example, through cycling with peers, sharing an activity with a partner who otherwise moves at a different speed and intergenerational cycling. In addition, cyclists can devise and undertake their own challenges and seize opportunities to explore and 'to go "off-script" *even among the everyday*' (Roberts, 2018, p. 28 Author's emphasis). While using cycles provides an inspiring and apt means of undertaking microadventures, these can be further extended by electrical assistance.

As Ulrick's partner summarised at the end of her eight-week diary 'There! Instead of "closing down" at our ages [83 and 78] we're thinking of exciting and challenging things to do… we have seen lots of lovely places on our e-bikes – some we have never seen before, others we have not seen for some years and also those we see often but always enjoy.' (Female, 78, e-bike user, Oxford)

[Word count 7384]

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Figures

Tables