cycle BOOM
DESIGN FOR LIFELONG HEALTH & WELLBEING

Final Conference Summary of Key Findings & Recommendations

26 September 2016 | London
28 September 2016 | Manchester

AGE FRIENDLY MANCHESTER

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DESIGN FOR LIFELONG HEALTH & WELLBEING

Tim Jones
Oxford Brookes University
Principal Investigator

Introduction and Overview

Origins

EPSRC Pioneering research and skills
ESRC Economic and Social Research Council
Arts & Humanities Research Council
Lifelong Health & Wellbeing

Design for Wellbeing: Ageing and Mobility in the Built Environment

The Lifelong Health and Wellbeing (LLHW) cross-council ageing programme aims to:

- Target factors over the life course that may be major determinants of health and wellbeing in older age
- Identify and develop effective interventions that lead to improved health and quality of life in later life
- Inform policy and practice including the development of services and technologies to support independent living
- Increase capacity and capability in ageing-relevant research

Commenced October 2013

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Project Team

PROJECT TEAM

OXFORD BROOKES UNIVERSITY	UNIVERSITY OF READING	UNIVERSITY OF THE WEST OF ENGLAND	CARDIFF UNIVERSITY
School of the Built Environment	*School of Real Estate and Planning*	*Centre for Transport & Society*	*School of Geography and Planning*
Tim Jones	Emma Street	Kiron Chatterjee	Justin Spinney
Ben Spencer	*School of Psychology and Clinical Language Sciences*	Heather Jones	Carl Hora
Nick Beale	Caren Van Reekum		Shaun Williams
	Louise-Ann Leyland		

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Schedule

10:00-10:20 | Paul McGarry (Age-friendly Manchester): Welcome
Tim Jones (OBU): Objectives | Approach | Key findings

10:20-10:40 | Kiron Chatterjee (UWE): Cycling Biographies

10:40-11:00 | Justin Spinney (Cardiff): (Velo)mobile observations and video elicitation interviews

11:00-11:20 | Q&A session

11:20-11:40 | Break for Refreshments

11:40-12:10 | Ben Spencer (OBU) & Louise Leyland (Reading): Cycling and Wellbeing Trial

12:10-12:30 | Q&A session

Lunch 12:30 – 13:30

13:30-14:00 | Tim Jones (OBU): Summary of Recommendations

14:00-15:00 | Q&As
Close: Patrick Hanfling (Age-friendly Manchester)

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Background

Population across most of Europe is ageing.

People living longer and birth rate falling.

Push to encourage people to stay active for longer – reduce end of life morbidity.

Mobility & independence important constituents of wellbeing in later life.

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The Problem and Potential

LOW LEVEL OF CYCLING AMONG OLDER PEOPLE IN THE UK

The share of journeys made by bicycle is low for all age groups, but particularly low in older age.

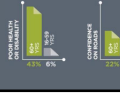
DIFFERENT STORY ELSEWHERE

Cycling is an important method of transport in older age in other parts of Northern Europe.

Share of journeys by people aged 65+

LACK OF CONFIDENCE OR CAPABILITY TO CYCLE ON UK ROADS

Nearly half of older people feel it is physically difficult for them to cycle and only **one in five** are confident cycling on roads.



MORE CYCLING WILL BENEFIT HEALTH IN LATER LIFE

Cycling could make a valuable contribution in promoting active ageing and prolonged independence and good health.

Physical activity declines with age to the extent that by 75 years only 1 in 10 men and 1 in 20 women **are sufficiently active for good health.**

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Study Objectives

To develop a better understanding of how the design of the built environment and technology shapes engagement with, and experience of cycling as people get older and how this affects their independent mobility, health and wellbeing.

To provide advice to policy makers and practitioners on how the built environment and technology could better support and promote cycling among current and future older generations in order to improve independent living, health and wellbeing.

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Questions

Four specific questions were used to drive the research:

1. How is ability and willingness to cycle shaped by individual life events such as family and social relationships, employment and wider social, economic and technological change?
2. How do specific features of the built environment and assistive technology affect cycling experience among older people and what is the impact on wellbeing?
3. To what extent does cycling improve older people's cognitive function, eudaimonic wellbeing (human flourishing), hedonic wellbeing (life satisfaction) and physical health?
4. What are the implications for cycling stakeholders, policy makers and practitioners?

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Case Areas

	OXFORD	READING	BRISTOL	CARDIFF
POPULATION				
All usual residents	151,906	155,698	428,234	346,090
Area (ha)	4,560	4,040	10,961	14,038
Density (People per ha)	33.3	38.5	39.1	24.7
AGE				
50-59	8.7%	9.7%	10.2%	10.9%
60-69	6.9%	7.2%	8.2%	8.3%
70+	7.9%	8.3%	9.5%	9.6%
All age 50+	23.5%	25.3%	27.9%	28.8%
TRAVEL AND CARS				
Journeys to work by cycle	17.6%	4.2%	7.7%	3.7%
Households without car or van	33.5%	28.3%	28.6%	29.0%
Vehicle density (cars & vans per ha)	11.3	16.5	17.4	10.9
STRATEGY FOR CYCLING				

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Approach and Methods

Policy Review | Analysis of Trends | Study Visits

Biographical Interviews | Shadowing Riders | Cycling & Wellbeing Trial

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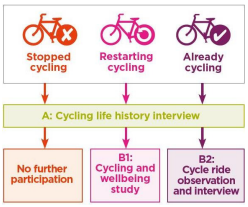
Pathways



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Sample and Data

	Oxford	Reading	Bristol	Cardiff	Total (% Female)	Ave. age (SD*)
Biographical interview only	16	19 ✪	13	16 ✪	64 (60)	65 (9.3)
Mobile Observation-Video Elicitation Interview (VEI)	20	16	24	35	95 (45)	63 (7.8)
Cycling & Wellbeing Trial (E-bike & Pedal)	38 ✧ (19 & 19)	39 ✧ (20 & 19)			**77 (53)**	62 (7.0)
Total (% Female)	74 (66)	74 (46)	37 (49)	51 (41)	**236✧ (52)**	
Ave. age (SD)*	65 (8.9)	63 (7.7)	64 (7.9)	60 (6.7)	**63 (8.1)**	

Table 4. Participant set for each case site

✪ A further 9 participants who were recruited for Mobile Observation & VEI at the Cardiff (7) and Reading sites (2) were unable to take part and only completed a biographical interview

✧ A further 12 participants who were recruited for the Cycling and Wellbeing Trial at Oxford (10) and Reading (2) were unable to take part and only completed a biographical interview.

♦ A further 20 participants were recruited but were subsequently unable to take part in any aspect of the study.

* SD (Standard Deviation). A small SD indicates that data points are clustered close to the mean (average). A large SD indicates they are spread from the mean.

Cycling Biographies: **180 hours of audio-recorded material**
Mobile Observations: **100 hours of video footage for analysis**

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Key Findings

3 Groups of Riders

Reluctant | Resilient | Re-engaged

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Reluctant Riders

Majority of older population.

Cycling at best away from traffic, in fine weather for recreation.

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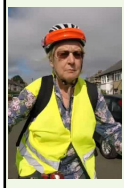
Resilient Riders



Small minority (A 'Cycling Precariat')

1. Positive antecedent state towards cycling.
2. Tend to be physically active in other areas of their lives.
3. Majority also car drivers.
4. Acclimatised to changes over time and adapted their style of riding to deal with changing conditions and capabilities: timing, route choice, equipment.
5. Critical of infrastructure and current conditions for cycling which impacts moment-by-moment wellbeing.
6. Question whether they would have been able to re-engage with cycling nowadays if they hadn't acclimatised over time.

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Re-engaged Riders

Potential significant market

1. Place importance on staying active.
2. Cycling fits with pursuit of active ageing project.
3. Only cycle in specific spatial domains.
4. Positive experience when they have control of their cycling activity (when, where & how).
5. Evidence of benefits to wellbeing when part of a structured plan offering support.
6. But cycling only partial and precarious.

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Key Messages

1. Recognise heterogeneity of older cycling market
Tackle age stereotypes.

2. Older cycling is partial and resigned to specific times and spaces.
Adapt infrastructure to cater for wider range of capabilities.

3. Cycling offers older people potential to gain positive health benefits.
Recognise broader health benefits not just physical activity.

4. Cycling does pose greater challenges to aging body
Capitalise on new assistive technology including e-bikes.

5. Older cycling is precarious
Policies and programmes required across sectors to develop infrastructure and programmes to support cycling among an ageing society

6. Also relevant to younger population
Interventions targeted at older population would also benefit younger cycling and address many of pressing social health issues.

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Kiron Chatterjee
UWE Bristol

Cycling Biographies

Research Questions

The key question and sub-questions driving this part of the investigation were:

How is ability and willingness to cycle shaped by individual life events such as family and social relationships, employment and wider social, economic and technological change?

What are the different cycling trajectories?

What are the reasons for cycling cessation, continuity and re-engagement?

What are the recurring themes about cycling (including its role in people's lives and how changes are made to cycling as people age)?

Life Course View on Cycling

Ageing is considered as a combination of life-long biological (personal capabilities), psychological (personal perceptions of capabilities) and social processes (perceived opportunities and support) that individuals encounter in specific cultural contexts

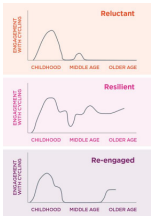
Life History Interviews

- Participants completed life history calendar in advance of interviews
- Semi-structured interviews
  - Present life situation and cycling
  - Future outlook for cycling
  - Change and continuity in cycling through lifetime
  - Experiences of ageing and cycling
  - Summary reflection on lifetime cycling
- Viewing of cycle(s) and storage
- Mobile observations and video elicitation interviews

Findings Overview

1. Cycling trajectories
2. Ageing and changing life circumstances
3. Contrasting settings
4. Cycling practices, benefits and meanings

Three Cycling Trajectories



Reluctant Riders not cycled in the last five years or had either stopped or substantially decreased their cycling

Resilient Riders cycling consistently in the last five years or who had increased their level of cycling over this period

Re-engaged Riders who had started cycling in the last five years after a hiatus in adult life or who had not cycled since childhood

Reluctant Riders - Characteristics

- Accustomed to using car or other methods of transport
- Only cycled on holiday on traffic-free routes
- Tried cycling but sporadic and did not lead to confidence to cycle in range of environments
- Cycling had 'fizzled-out' due to vulnerability cycling or health conditions
- Bicycles disposed of for taking up space
- Some cycled during working life but not after retiring
- Cycling considered good form of exercise nevertheless

Dexter, 70s, North Fringe of Bristol

Dexter's sole cycling experience was confined to his youth when he lived in a town situated in a valley in south Wales. He got a car soon after becoming eligible and his travel had remained largely car-based ever since. He saw driving as integral to his routine of activities, clubs and hobbies as well as family relations and responsibilities. He had no expectations of cycling again and imagined he would be "really quite frightened" cycling in Bristol.

Jodi, 60s, Abingdon (small town south of Oxford)

Jodi stopped cycling when a student in London and then started driving to commute for her first job. She had continued to cycle locally on an occasional basis for leisure with her husband. This despite not feeling at all confident cycling on roads with traffic and classifying herself as 'not a very good cyclist'. Having put on a lot of weight, Jodi was aware of the need to get more exercise but did not use her static exercise bike due to 'laziness' and was prevented from cycling by the condition of her bike and reduced confidence. She was positive about the potential of e-bikes but was concerned it might be a waste of a considerable amount of money if she did not end up using it.

Resilient Riders - Characteristics

- Accumulated cycling experience over long periods and exhibited a high level of autonomy and capability
- Many brought up in cycling families
- Small number of participants who had not learnt to drive a car, or did not wish to drive a car
- Cycling to work prominent, particularly for men with stable employment
- Cycling for women had 'yo-yoed' and often restarted when children had grown-up or left home
- Adapted cycling after retirement with new purposes, routes and times to cycle
- Mix of purely recreational cyclists and those who cycled for variety of reasons

Jerry, 50s, North Fringe of Bristol

Jerry had cycled to work throughout his career. When he wasn't travelling with other family members he often used his bike for other journeys around Bristol. He had joined a group of retired colleagues on a monthly recreational ride when he could fit it in. Jerry described cycling as 'a drug', something he had to replace with a walk if he was ever away without his bike. He recalled a difficult time when cycling had been a time to relax, think things through, and this he felt, kept him going.

Fiona, 70s, suburban Oxford

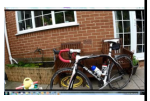
Fiona had done more cycling as she got older. She had cycled increasingly as a child and teenager before dropping to nothing when she had her first child. Her cycling had then built up once more as the whole family had bikes and cycled, she then had more time to cycle as the children became more independent. She then had a period of 7-8 years of doing almost no cycling as she worked very locally and didn't have a bike. Her cycling picked up again when she starting work in the centre of the city and was given a bike. Her cycling increased further when she retired as she had more time to cycle appreciating it as a reason to get out of the house and to experience freedom.

Re-engaged Riders - Characteristics

- Predominantly motivated by getting fit and maintaining health
- Retired males for whom the transition to retirement led to a desire to become more active in older age
- For women, newfound freedom and a desire to become active had also prompted a return to cycling
- Restarting cycling was often encouraged by a partner who cycled
- Changing housing situations also opened up opportunities to cycle
- Cycling almost exclusively took place along off-road paths and quiet roads
- Key question is whether cycling will be sustained and confidence develop to expand cycling domains

Lance, 60s, Yate (town north-east of Bristol)

After cycling competitively and also using a bike as a principal means of getting around in his youth and early adulthood, **Lance** took a break from cycling as he entered his thirties because of a move from outer London to Yate and change of job where cycling to work was less feasible. With the exception of two 6-month periods when he trained for two cycle challenges his cycling was absent until retirement which he used as an opportunity to get back on his bike. Lance had four bikes and a routine of cycling three times a week with the University of the Third Age and another older persons cycling group.



Patricia, 70s, Yate (town north-east of Bristol)

Patricia returned to cycling in her forties. She bought a bike to get some exercise and to get outdoors, having found she didn't enjoy classes at the gym: "I wanted to be doing something that was outside so decided give cycling a go". She initially rode circuits around the town mainly on the pavement and cycle paths alone three or four times a week. Subsequently her husband had joined her on these rides. Over the last few years Patricia had been riding once a week with a friend who didn't feel capable or inclined to cycle long distances with her husband.

Ageing and Life Circumstances

Turning points in cycling histories usually associated with:

- Health
- Family
- Employment/retirement
- Home moves

Wilfred, 60s, North Fringe of Bristol

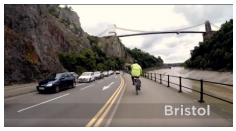
"about 2008 the kids bought me a bike cos [wife] was biking ….I'd already had a half [knee] replacement ….They bought me a bike and I started just doing a little bit of biking cos I was working still, just out with the kids and that…*the bike was bought for you?*: Yeah just to do something {laughs},encouragement to do something ….as I say I was so embedded in work, my focus was work, building up the business and early retirement"

"Um probably since I retired, 3 years been doing it all the time, cos I've been sporty all my life and competitive, you know if I do something I want to win kind of thing, and of course I couldn't do nothing, so I started cycling"

"I didn't enjoy it greatly to begin with if honest, I'd go out with my wife and thought - aww gawd - 12 miles cycle ride yeah I'll do it if it keeps her happy, keep her, you know… it's just cycling's boring…but then gradually you appreciate what's around you, the scenery and that and going out and stopping in a café"

Contrasting Settings - Bristol

- Parking difficulties and congestion discouraged driving
- In Inner Bristol routes were 'manufactured' to avoid busy transport corridors
- Hilly topography presented challenge
- Workplace cycling promotion, annual city bike rides and National Cycling Network routes were influential

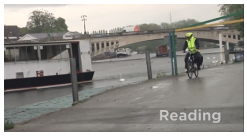


Contrasting Settings - Oxford

- Lack of parking and permeable streets discouraged driving
- Traffic-free routes through natural spaces (riverside and meadow paths) particularly valued
- Barrier of Oxford ring-road and criticism of fragmented facilities on arterial routes
- Shared use paths and connection to National Cycling Network appreciated in Abingdon

Contrasting Settings - Reading

- Wide and fast 'urban motorways' discouraged cycling
- Riverside and canal paths appreciated
- New cycling initiatives welcomed (A4 Bath Road cycle track)
- Most participants avoided cycling in city centre



Contrasting Settings - Cardiff

- Compact city centre, flat topography and numerous green spaces provide rich potential for cycling
- Mix of pedestrianised streets and large car-centric roads discourage cycling
- Green corridors (Taff Trail) are well used by cyclists

Cycling Practices

- **'All-purpose' cyclists**
  - Confident to cycle in different environments
  - Prefer cycling as it is quicker, more reliable, flexible
  - Happy that frees up car for others
- **Cycling 'reliant'**
  - Do not drive or have access to a car
  - Cycling enables them to get to essential activities and increases freedom of movement
  - Limits to how far they cycle outside local area
- **New commuter cyclists**
  - Taken up cycling to work with help from workplace and colleagues
  - Typically cycle on sheltered routes and alternate cycling to wark with other modes
- **'Recreation only' cyclists**
  - Tend to use traffic-free routes accessible from their home
  - Cycle as part of regular exercise or social routine
  - Some lack others to cycle with
  - Some returning to cycling of youth

Cycling Benefits and Meanings

- Positivity about contribution to staying active/healthy
- An enjoyable exercise/sport
- Sense of achievement
- Relaxation and enjoyment of place
- Time for reflection
- Connection to place and to others
- Pride in encouraging others to cycle

" so I suppose it's a picture of I've always cycled when I could from early age right through, I've used cycling for commuting when it was practical to do so and now cycling is essentially for keeping fit, get the heart rate up and you know feeling fit" (Simon, 70s, Inner Bristol)

(Velo)Mobile Observations and Video Elicitation Interviews

Justin Spinney, Cardiff University

Research Questions

The key question and sub-questions driving this part of the investigation were:

How do specific features of the built environment and cycling technology affect cycling experience among older people and what is the impact on wellbeing?

How does' moment-by-moment' wellbeing unfold when moving around by cycle?

What factors/design elements support or detract from wellbeing when moving around by cycle?

What strategies and tactics are employed by participants when moving around by cycle in order to maximize wellbeing?

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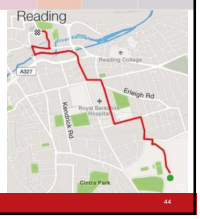
Research Design

	Oxford	Reading	Bristol	Cardiff	Total (% Female)	Ave. age (SD+)
Mobile Observation-Video Elicitation Interview (VEI)	20	16	24	35	95 (45)	63 (7.8)



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Galvanic Skin Response

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1. When & Where

BOX 1

"This is a school along here...but usually my time is not clashing with that. That's one lucky thing about being retired; you can pick your times!" (George, 70s, Bristol).

"Coming up to the junction which is a tricky one...a lot of problems...it is used as a rat run...staff going to the hospitals... because I am retired I can set out in the middle of the morning or afternoon [and avoid it]." (Abraham, 70s, Oxford).

Implications of when and where?

- Retirement or semi-retirement cited as a time of increased freedom.
- Many older cyclists self-limiting in where and when they ride in order to minimise journey stress.
- Limiting behaviour due to perceived stresses and dangers of certain places/times.

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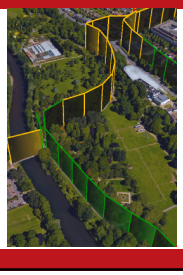
2. Sharing Space

"It's in fact one of the reasons I prefer cycling to walking, you see much more, and you can think 'oh that looks interesting, I'll stop and have a little look'" (CM036 Harrison, Cardiff)



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2. Sharing Space

Reasons for positive affect:

- Slower traffic
- Separated
- Green spaces
- Descending hills
- Good surfaces
- Good visibility
- Few traffic lights
- Few parked cars
- Good continuity
- Absence of clutter
- Social encounter

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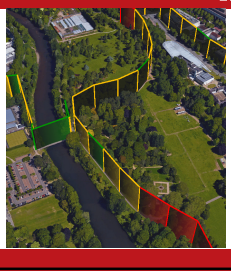
2. Sharing Space

"On anything with shared use, even if it's got a line on it, you're not sure of your place, you don't know if they're suddenly going to take off this way or that way" (Sean, RM015, Reading)

"Yeah, so they were well on the left. The next lot were straggled right across the full width [of the path]." (Matthew, Cardiff)



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4. Traversing Surfaces

"This road surface is awful. Bumps everywhere as you can see... I have front suspension but it doesn't make any difference. It's the back...if it's a bad bump you get a real thump anyway. You need both hands on the handlebars!" (Stanford, 60s, Bristol).

"I just really hate bumpy things shaking me up and down, so I'm just irritated at this point. I often prefer to be on the road if the cycle path is in poor condition. I get shaken up by it so my body feels really uncomfortable on it." (Rebecca, 60s, Cardiff).

"There's nothing worse than going over those bumps. Howard Street is a nightmare. They're much higher…it jars your whole body really." (Ursala, 50s, Oxford).

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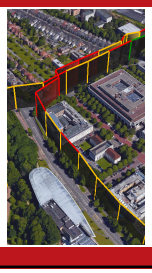
5. Navigation and Expected Manoeuvres

"There's nothing there... definitely something needs to be. That's the trouble, with these cycle paths, you go along and you think 'that's good it's got the bike [signage], and then all of a sudden bang it stops." (CM035 Abbie, Cardiff)

"How am I going to get across this junction?" (Eduardo, CM010)

"I didn't want to be standing in the middle of a busy junction like that" (Sibylle CM011)



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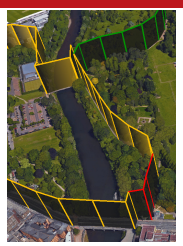
5. Navigation and Expected Manoeuvres

"It's just a question of picking your route, isn't it? And then it gets busy again [at Castle Street exit], it's blind as well. They come straight out, look. "Yeah, not really expecting to see a bike. It's a good job I stopped. If I hadn't they might have walked into me. "It is quite narrow… Although it was, there was nothing actually coming, but there was no point in me going because I would have been stranded in the middle." (CM038, Rodney, Cardiff)



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5. Navigation and Expected Manoeuvres

"It's not like driving, is it? When you know you've always got a lane. On the bike you've got loads of different things, haven't you? Sometimes you have got to cross a pavement, sometimes you've got a cycle lane, and sometimes you're amongst the traffic, sometimes you're in a dangerous spot in the middle of the road. It's nothing like being in the car, is it?"
(Sybille, Cardiff)

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6. Breaking the Rules

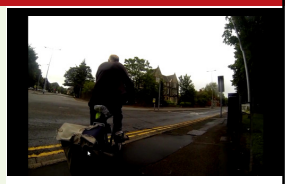
Heightened surveillance

Riding on pavements

Going down kerbs

Riding wrong way up streets

Dismounting and becoming a pedestrian



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7. Cycling Capability and Adaptation

Turning

"I don't like looking over my shoulder, partly as a result of the accident I had in the car, lost some mobility turning right, if I was turning right I tend to stop, look around and then cut across, particularly if I am tired and it is up hill…" (Gareth, 60s, Bristol).

"It is really hard as you get older to get 'when you've got the arthritis you can't turn your neck all the way back without wobbling and the mirror is actually not a lot of good because it is to…moves too much, alright for lipstick!" (Chloe, Bristol)

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7. Cycling Capability and Adaptation

Balance/ Dismounting

"Most of this year I have been recovering from a cycle accident which did the knees in, well, the knees were down in before that, but being knocked off the bike didn't make it any better. That's why I tend to use the pavement to help prop myself up and push myself off with" (Eduardo, 50s Cardiff)

"oh yes, well I try to do that [use the kerb]; I haven't got very long legs…more comfortable on the kerb and better for taking off afterwards [pushes off when lights change]" (Gabbi, Oxford)

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7. Cycling Capability and Adaptation

Momentum

"It is really hard as you get going again older to get going again. It really is, so I would always try and find a way of keeping going which is exactly what I did there. I was lucky with the light…I will always try and keep momentum…My fitness has gone down, it really has. I'm on these […], I'm not sure what it actually is, and my blood pressure is very low…Certainly, I do not want to stop. It's really quite physically hard"

(Regan, 70s, Cardiff)

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7. Cycling Capability and Adaptation

BOX 11

"…over the last couple of years my bike has been modified a lot, you know, it's…to cope with me as much as anything, I was getting pins and needles, I've got carpal tunnel syndrome, and so things like the handle bars come up by riding much more sat up position than I used to, I can't ride drop handle bars anymore." (Sadie, 60s, Reading).

"Because of my height I have a [longer] stem on the bike… allows me to sit more upright when cruising along, more comfortable, if I lean forward I get trouble with my back, always been a problem." (Gareth, 60s, Bristol).

"If that [wing mirror] got knocked off I'd replace it immediately…you won't see me looking over my shoulder very often, that's because I can just look down to see what is behind." (Alfie, 60s, Bristol).

"If I'm still working at 65…gonna get me one of them electric bikes… got to be at such a decrepit stage that I can't do the ride relatively comfortably but I don't want to lose the experience of cycling for the want of lack of hip, ankle joints or whatever…' (Sean, 50s, Oxford).

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Conclusions

- Great potential for cycling to enhance physical, mental and social wellbeing
- Older users employ a range of strategies like taking alternative routes and travelling at different times to minimise journey stress
- Uncertainty and vulnerability caused by poor/ absent design is a key source of journey stress – negatively impacts wellbeing
- Some older users find it harder to improvise tactics due to reduced range of movement – poor design is therefore a bigger barrier
- Design guidance should be based on a broader range of capabilities
- Promotion of alternative and non-standard bike designs to mitigate effects of ageing

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Cycling and Wellbeing Trial

Ben Spencer

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Structure

- Oxford & Reading locations
- Life history interview
- Assessment
- Pre-trial tests
- 8 weeks | 3 x 30min | Diary
- Post-trial tests
- Focus groups
- Exit survey

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Findings Drawn From

- Diary of Cycling Experience
- Focus group discussions
- Pre- and post-trial tests assessing wellbeing and executive function
- Exit survey

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Research Questions

The key question and sub-questions driving this part of the investigation were:

To what extent does cycling improve older people's cognitive function, eudaimonic wellbeing (human flourishing), hedonic wellbeing (life satisfaction) and physical health?; and, how do specific features of the built environment and assistive technology (pedal vs e-bike) affect cycling experience among older people and what is the impact on wellbeing?

What was the impact of the cycling trial on wellbeing and cognition indicators?

What was participants' experience of cycling over the course of the trial and how did this affect wellbeing?

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Recruitment

- Re-engaging with cycling
- Cycling curtailed in adulthood / diminished in later life
  - Deterioration in health
  - Safety concerns
  - Lack of confidence riding

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Motivation to take part

- Structured programme / training
- Health and fitness
- Rehabilitation after illness
- Social cycling
- Everyday mobility
- Allure of the e-bike

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Recruitment

	Oxford	Reading	Total
E-bike	19	20	39
Pedal	19	19	38
Total	38	39	77

Age range 50-83
Average age 62 (SD 7)
% Female 53

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Engagement with the trial

- **Embraced**: > 3 x 30
- **Endured**: Time, family, weather, health, mechanical
- **Exited**:
  - Medical condition (n=5)
  - Time (n=6)
  - Confidence (n=1)

Average: 3 hours p/w | 30 journeys

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Experience – e-Bikes

"Riding an e-bike seems more fun than riding an ordinary bike." Aline, 60s, Oxford.

"I feel that the electric bike has enabled us to make journeys that we might not otherwise have done and get out enjoying the countryside." Alysia (& husband), 50s, Oxford.

- Enjoyment and thrill
- Cope with ailments
- Safer – junctions / hills
- Greater distances
- Discovery
- Ride with others
- Varied (and zero) assistance

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Experience – Pedal & E-bikes

"I ventured further afield this week and used the bike as an alternative to the car. I have been mostly staying in the local area on the bike and using it for errands where I would have possibly have used the car." Colline, 60s, Oxford.

- Mainly recreation
- Away from roads
- Social support
- Increased confidence
- More functional journeys

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Reported Benefits – Pedal & E-bikes

"I feel the rides are getting a bit easier and the average speed is creeping up, so maybe I'm getting a bit fitter which is one of the benefits of regular cycling…so that's really good. Lost 5kgs." Padraic, 50s, Reading.

- Weight loss
- Fitness
- Increased leg strength
- Endurance
- Better sleep
- Sense of achievement
- Improved self-esteem

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Challenges – Pedal & E-bikes

"Feeling increasingly confident on roads but still not wanting to use main/busy roads so tend to route [sic] out quieter roads." And later "Long route taken just because a nice day, traffic unpleasant on Cowley Road." Fran, 60s, Oxford

- Infrastructure design and maintenance
- Legibility
- Traffic
- Route planning
- Stop-start riding
- Paraphernalia
- Weather
- Storage and
- parking

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Challenges – E-bikes

"I found the e-bike good to ride but very cumbersome to get into my terraced house. It was very heavy to lift up the door step. I do like the 'palm rests' on the handlebar grips." Roanna, 60s, Reading.

"It took me longer to put all the locks on the bike but that's because I want it to be secure in the cycle rack." Kari, 50s, Oxford.

- Weight and manoeuvrability
- Operation – keys, charging
- Perception – cheating
- Cost and security

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Video Vignette

Jo Baldock, 60s, Reading, E-bike trial

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Cycling and Wellbeing Trial

Louise-Ann Leyland
University of Reading

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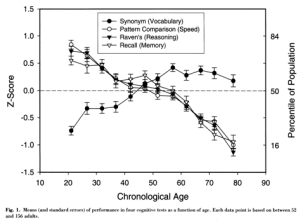
Age and Cognitive Performance



Salthouse et al, 2004, *Dev. Psy.*

Meta-analysis Exercise & Cognition

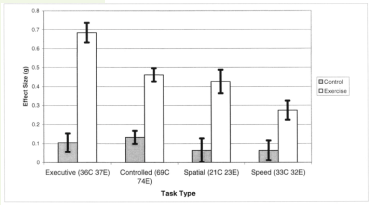


Fig. 1. Effect sizes for the different process-task types reflecting the four theoretical hypotheses concerning the process-based specificity of the benefits of fitness training. Parenthetical notations on the *x*-axis indicate the number of effect sizes contributing to the point estimates for each task type in the exercise (E) and nonexercise (C) groups. Error bars show standard errors.

Colcombe & Kramer (2003) *Psych. Sc.*

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Cycling, Ageing, Cognition and Wellbeing

- Older adults who are **physically active** report higher levels of well-being and physical function (Netz et al., 2005; Spirduso & Cronin, 2001)
- **Aerobic exercise** has been shown in laboratory conditions to improve cognitive function in older adults, particularly executive function (e.g., Erickson, 2011, Colcombe & Kramer, 2003)
- Benefits of **cycling** for regeneration in the brain (Erickson et al., 2011; Thomas et al., 2015)

Pedalling brain power!

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Wellbeing and Cognition Trial

- Investigate the impact of cycling for an **8-week** period on older adults' cognition and well-being
- Analysed:
  - 36 Pedal bike participants
  - 38 E-bike participants
    - Levels of assistance
  - 22 Control participants
- Standard battery: Cognition and wellbeing are measured before the trial (pre-intervention) and after (post-intervention) – Change score

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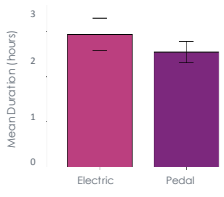
Cycling during the Intervention

Average weekly cycling duration
- Both e-bike and pedal cyclists spent approximately 3 hours cycling each week



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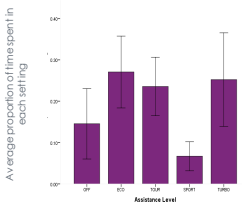
E-bike Participants: Assistance Level

E-bike participants spent on average 15% of the time cycling with the electrical assistance off



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Test Findings

- Physically activity levels before the trial did not correlate with the amount of time spent cycling during the trial
- Memory and attention scores did not benefit from cycling
  - Test sensitivity
  - Ceiling effects
  - Stable
- Spatial reasoning improved after the cycling trial for both e-bike and pedal cyclists

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Executive Function– Letter Updating Task

Pedal cyclists improved on the letter updating task, a measure of executive function, after the cycling trial

H HJ HJW JWB WBC

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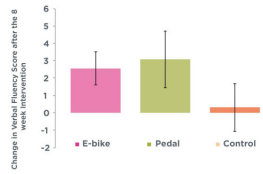
Executive Function – Verbal Fluency

Pedal and e-bike cyclists improved on the verbal fluency task, a measure of executive function, after the cycling trial



Say as many words beginning with the letter 'F'

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Wellbeing – Mental Health

Pedal and e-bike cyclists improved in their mental health score after the cycling trial

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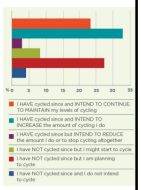
Exit Survey

- **Over two-thirds** of the participants thought that their wellbeing had improved **a little or a lot**
- 58 per cent reported that they had cycled and intended to increase or maintain their level of cycling
- A further 27 per cent reported that they had stopped but were actively planning to start cycling
- 19 went on to purchase an e-bike and a further 12 purchased a pedal cycle.



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Conclusions

- Our results suggest cycling has a positive effect on cognitive processes and wellbeing
- This may not be simply to do with increased physical exercise (and therefore increased cerebral blood flow) but also the opportunity cycling provides for older people to engage with the outdoor environment

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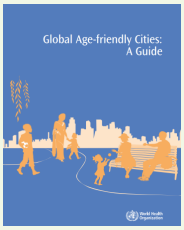
Age-friendly Cities Approach



Calls for attention to the needs of the most vulnerable people in society (i.e. older adults and children in order to increase the number of people who become or remain physically active.

Recognises the important role cycling (and walking) in achieving this ambition.

"Because active ageing is a lifelong process, an age-friendly city is not just "elderly friendly". Barrier-free buildings and streets enhance the mobility and independence of people with disabilities, young as well as old..."
WHO (2007) Global Age-friendly Cities: A Guide.

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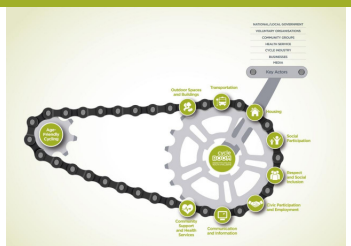
People Powered Age-Friendly Cycling



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Outdoor Space & Buildings

Outdoor space needs to offer a safe, comfortable and enjoyable experience for cycling.

Stimulate positive impact on wellbeing.

Towards infrastructure for intergenerational cycling, Hills Road, Cambridge (Photo: Ben Spencer)

This can be achieved by:

1. Providing dedicated cycling infrastructure separated from motor traffic and pedestrians on or close to all main roads and arterial routes into towns and cities and rural hinterlands and opportunities for side-by-side 'social cycling'.
2. Improving junctions and crossings by implementing measures now permitted in the Statutory Instrument, Traffic Signs Regulations and General Directions (2016)[1] including low level cycle signals, early start for cyclists and parallel pedestrian and cyclist crossings.
3. Implementing low speed zones in urban and rural areas to create conditions for safer, less harried, more civilised cycling for all.
4. Improving the quality of design so that it is clear where cyclists are 'meant to be'. This means ensuring routes are clearly signposted and consistent in surface texture and colour across the UK and that they provide a comfortable and positive sensorial experience.
5. Designing outdoor space and cycle parking to support a range of cycle types including trikes and electric-bikes.

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Transportation

Recognise the full potential of cycling as a mobility aid for older cycling.

Seamless integration with other modes.

Capitalise on the growing e-bike market.

Public bike hire scheme, Oxford, includes electric bikes (Photo: Tim Jones)

This can be achieved by:

1. Developing a strategy to reduce motorised traffic levels, particularly heavy goods vehicles, in the centre of towns and cities to allow cycling (and walking) to flourish.
2. Ensuring that public bike schemes provide cycles that are easy to use (e.g. step-through frames, electric bikes) and that they can be accessed with contactless travel cards.
3. Providing designated secure cycle parking at public transport hubs with charging points for e-bikes, step-free access and adequate width and space for non-standard bikes.
4. Working with public transport operators and motor vehicle manufacturers to find solutions for in/on vehicle carriage of cycles and charging of e-bikes.
5. Encouraging the cycle industry to design for and support lifetime cycling mobility through offering a broader range of cycles (including e-bikes) to suit older riders, improving customer service, and working with government to offer tax-free saving on the purchase of (e-)bikes.

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Housing

Secure and convenient cycle storage and street access are important to ensure cycles are easy to retain and use.

Convenient "front-of-house" cycleStorage, Houten, NL. (Photo: Tim Jones)

This can be achieved by:

1. Siting new housing development for older people in flatter areas to facilitate cycling and ensuring that, where there are gradients, these are gentle and provide sufficient width for lateral movement.
2. Implementing recently revised Building Regulations' relating to accessible, adaptable dwellings based on the Lifetime Homes standard[2] which could support cycle users as well as those using other mobility aids such as wheelchairs and mobility scooters, for example, by enabling convenient movement between the street and the dwelling.
3. Developing private and communal cycle storage options close to property entrances (with the ability to charge e-bikes) in order to provide safe and convenient access to cycles for everyday use - see HAPPI design criteria[3].
4. Providing safe and convenient access to local services by implementing slow zones/cycle streets in residential areas and linking cycle tracks to key local amenities and green space and blue corridors into the countryside.

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Social Participation

Engaging and supporting potential and existing older cycling as a way of providing a sense of empowerment through social networks and independence.

Provide more inclusive cycling activities.

Over 55 cyclists enjoying a social ride in Bristol (Source: Life Cycle UK)[4]

This can be achieved by:

1. Developing and promoting national and local programmes and events to engage older people with cycling.
2. Promoting places in the local area and beyond where older people can cycle in safety and comfort and improve their confidence and skills, for example, the National Cycle Network[1].
3. Promoting cycle training for older people through Bikeability[5] and developing a specific e-bike training module as part of the national training scheme.
4. Providing cycle maintenance services specifically aimed at older people to ensure cycles are kept reliable and efficient.
5. Including information about cycling in literature preparing people emotionally for retirement and as part of planned driving cessation programmes. This should highlight the potential for cycling to improve wellbeing and information on organisations able to provide support and advice. For example, see Retirement Reinvented[6].

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Respect and Social Inclusion

Developing a culture of respectful behaviour.

Strengthen older people's place within community through participatory planning.

Residents engaged in street design, Torquay. (Photo: Sustrans)

This can be achieved by:

1. Promoting positive and inclusive cycling by including more images of older (and female) cyclists and intergenerational activity (e.g. cycling with grandchildren) in campaigns to promote cycling.
2. Encouraging law enforcement agencies to understand why older people occasionally ride on the pavement and to exercise their powers in dealing with pavement cycling with discretion.
3. Increasing driver awareness of the needs and vulnerabilities of older cyclists and extend driver training through the DVLA, Freight Transport Association and public service vehicle operators. See Fleet Operator Recognition Scheme[7].
4. Using participatory approaches to designing public space for cycling that includes older and less experienced cyclists and people with different cycling mobility needs.

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Civic Participation and Empowerment

Cycling related activity can be a conduit for engaging older people in meaningful activity and contribute to their community.

Sharing Knowledge and Skills. (Photo: Cycling UK).

This can be achieved by:

1. Enabling older workers flexibility to start and finish volunteer or paid employment so as to avoid peak traffic.
2. Providing access to secure cycle parking and showers and changing facilities at employment centres and locations of voluntary work.
3. Recognising the value of employing older people and promoting age diversity in the cycle retail industry.
4. Encouraging and training retirees to engage in voluntary work to support cycling[1].

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Community Support and Health Services

Recognise the broad health benefits of cycling and think beyond cycling as physical activity.

Positive Spin enables people with dementia and their cares to cycle. (Photo: Ben Spencer)

This can be achieved by:

1. Broadening the narrative on the benefits of cycling to include, not only physical activity, but cycling for therapeutic mobility through the opportunity it gives for social contact, stress reduction, time alone, sense of achievement, independence and control.
2. Promoting cycling on prescription and programmes that help people with different conditions and needs to get out cycling.
3. Providing local programmes to help older people maintain flexibility and balance required for cycling.
4. Supporting cycling as a mobility aid and part of care and wellbeing needs in Personal Health Plans and budgets[1].
5. Learn from the Marmot Cities in tackling health inequalities and encourage cycling as something other than exercise - getting older people more active 'without knowing it'. See Coventry Marmot City programme[8].

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Communication and Information

Communication strategies should challenge age stereotypes of decline and dependency and portray positive images of cycling and ageing.

Needs to be recognition that other types of cycling are as important as commuter cycling.

Cycling and e-biking can be fun and contribute to wellbeing. (Photo: Raleigh)

This can be achieved by:

1. Promoting the positive benefits of cycling including fun, freedom, sense of achievement and social participation - the ability to access the outdoors with other people - and the contribution this can make in promoting health and wellbeing.
2. Promoting the health and wellbeing benefits of e-biking and tackling the general misperception that e-biking is 'cheating' by holding public 'try-out' events with industry partners.
3. Providing information on cycling (benefits, programmes and events) for older people through a range of channels including the National Health Service, cycle industry and also national cycling organisations.
4. Monitoring use of e-bikes by distinguishing it from pedal cycling in the National Travel Survey and include the proportion of older people (age 60+) and women as 'indicator species' in national and local cycling targets.
5. Conducting further research to factor in the cost benefit of cycling (and walking) for those age 65 and over in Health Economic Impact (HIE) assessment (e.g. WHO HEAT tool[9]) of planned schemes.

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Summary

"It should be normal in an age-friendly city for the natural and built environment to anticipate uses with different capacities instead of designing for the mythical "average" (i.e. young) person. An age friendly city emphasises "enablement" rather than "disablement". It is friendly for all ages and not just "elder friendly"."

W HO (2007) Global Age Friendly Cities.

All of this will require a substantial shift in culture if cycling is to be embedded in the lives of an increasingly older population.

Different sectors will need to work in partnership to realise ambition.

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Thank You

cycle BOOM

DESIGN FOR LIFELONG HEALTH & WELLBEING

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