

Design for Wellbeing: Ageing & Mobility in the Built Environment

cycle
BOOM

EPSRC
Pioneering research
and skills

Lifelong Health
& Wellbeing
Research for Healthy Ageing

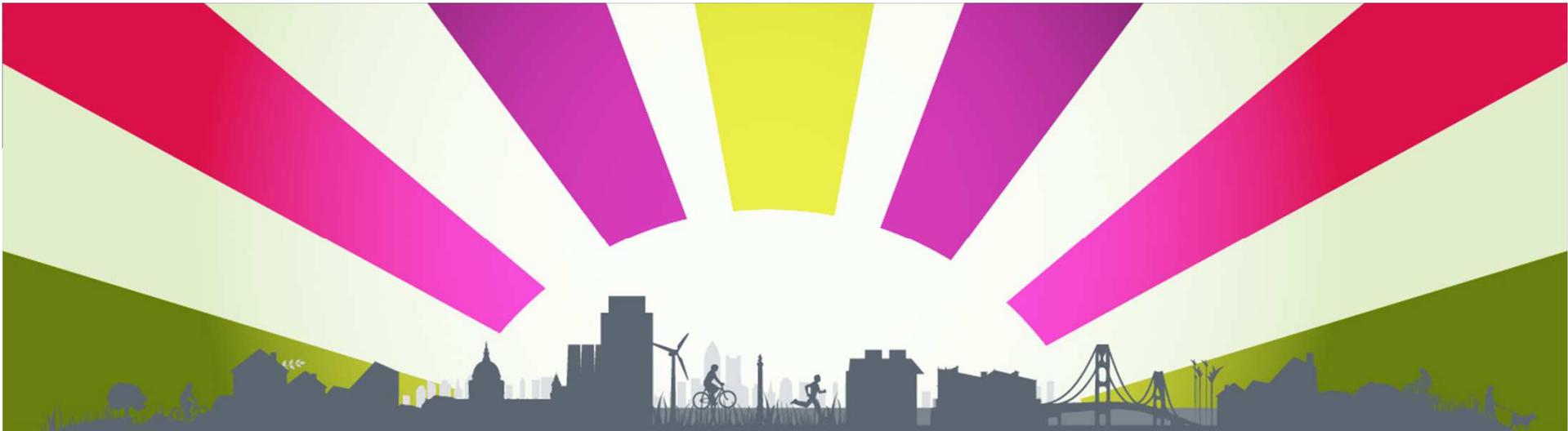
Call 2012

Announced March 2013

Commenced October 2013

Complete September 2016

- **Understanding the relationship between the built environment, mobility and activity in older populations**
- **[Providing] Evidence based and user-centred design and engineering approaches, in the context of the whole system, that are driven by a desire to increase and enable mobility and activity, decrease isolation and enable greater independence**
- **Understanding what environmental designs encourage activity/inactivity and how these can be engineered to facilitate older users to increase their physical activity**



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DESIGN FOR LIFELONG
HEALTH & WELLBEING

Maintaining momentum - ageing and cycling in Oxford (and Abingdon)

BSG Conference | Stirling | 7 July 2016
Dr Ben Spencer | Oxford Brookes University
on behalf of the cycle BOOM team



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DESIGN FOR LIFELONG
HEALTH & WELLBEING

Objectives

1. To understand cycling among the older population and how this affects independence, health and wellbeing.
2. To advise policy makers and practitioners how our environment and technologies can be designed to help people to continue to cycle in older age or to reconnect with cycling. [Read more...](#)

Focus



Participation

Total number of applicants	=	544
Total number of participants	=	247
Total number 'dropped out'	=	20
Final participant set	=	227
		[95%]

Integrative analysis of multiple data sources

	Biographical interview [Audio]	Mobile Observation [Video]	Video Elicitation Interviews [Video]	Hours of data
Oxford	83	11	23	117
Reading	35	4	7	46
Bristol	26	14	18	58
Cardiff	30	18	18	66
Hours of data	174	47	66	287

Plus photos; STRAVA traces; Cycling & Wellbeing Trial 'Diary of Cycling Experience' (DoCE); associated cognitive tests/PA & wellbeing measures; and, 'exit survey'. (n=91)



Scoping
secondary
data
sources

International
study visits

**Mixed
methods
approach**

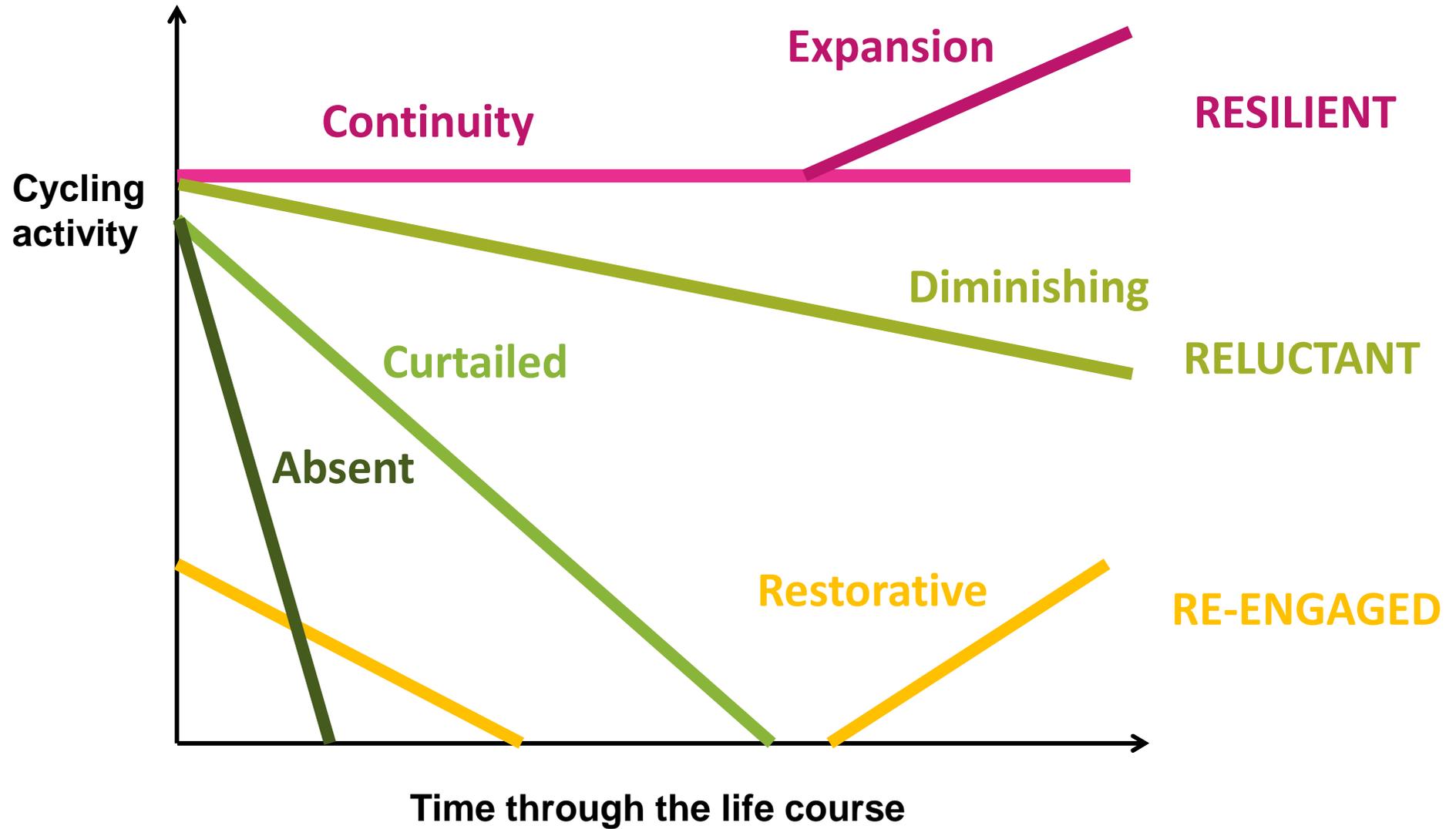
(E)Cycling &
Wellbeing
Trial

Urban
Design Audit

Life history /
Biographical
interviews

Mobile
methods |
Micro-
ethnography

Pathways of development in mid and later life





Scoping secondary data sources

International study visits

Urban Design Audit

Mixed methods approach

(E)Cycling & Wellbeing Trial

Life history / Biographical interviews

Mobile methods | Micro-ethnography

Unspecified rides : background



- ‘New mobilities paradigm’ exploring mobile bodies in mobile contexts
- Approaches that diverge from traditional methods – research ‘on the move’. (Sheller and Urry, 2006)
- Mobility not just movement between point A and B (Cresswell, 2006)
- Interest in affect, place, meaning, culture and representation
- Video elicitation interviews : in-depth review of rides to preserve details
- Participant chooses route: familiar journey, similar timing, everyday experience

Post-ride Video Elicitation Interview

Strategies and tactics:

- route choice
- road position
- manoeuvres
- transgressions
- infrastructure
- environment

Experience of route:

- sensory
- affective
- social

Wider experience



Participant Profile: Oxford

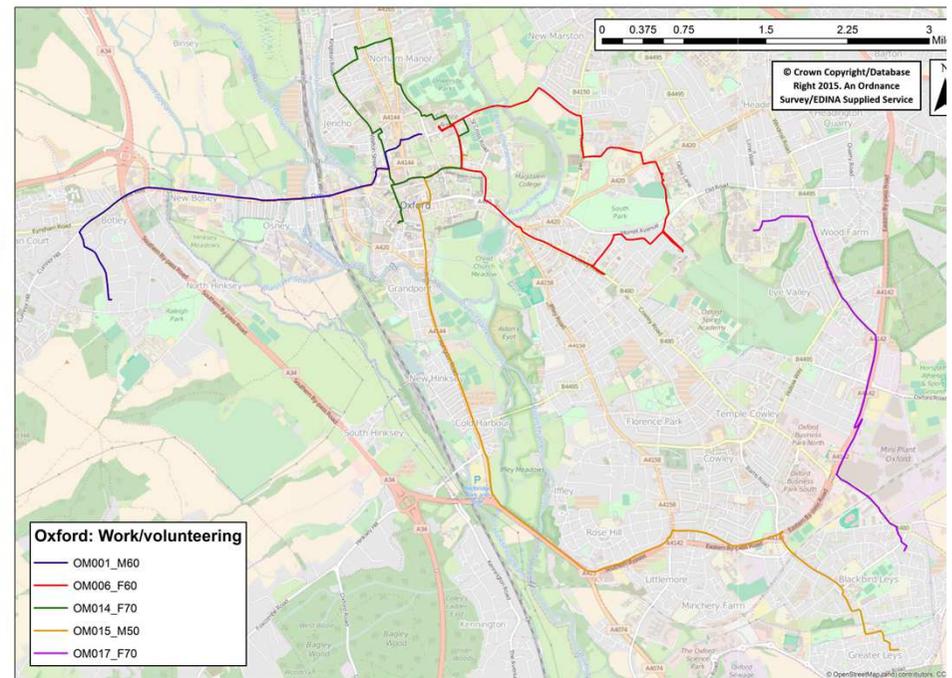
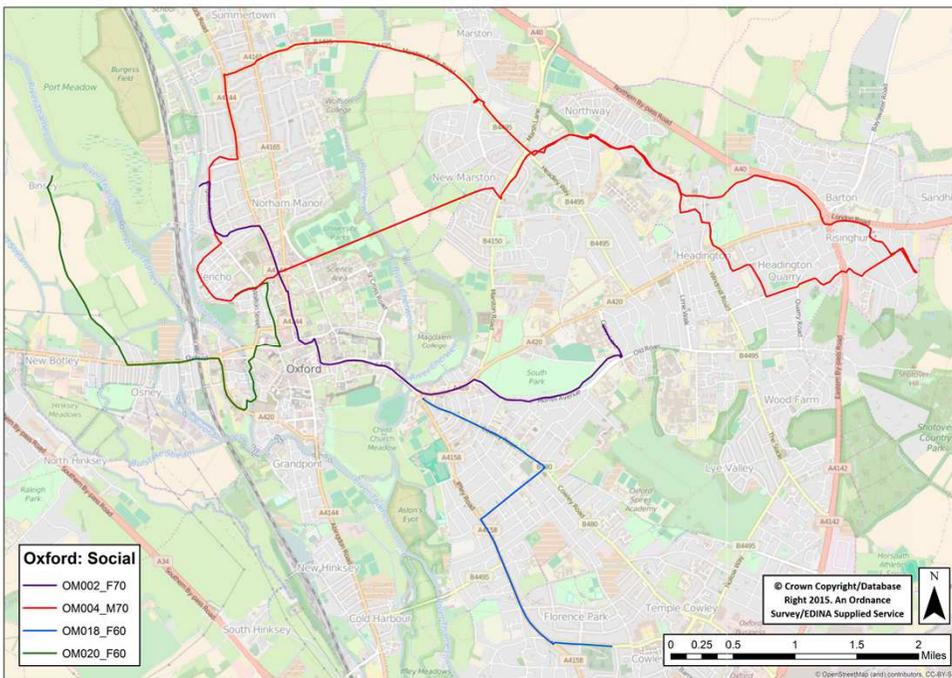
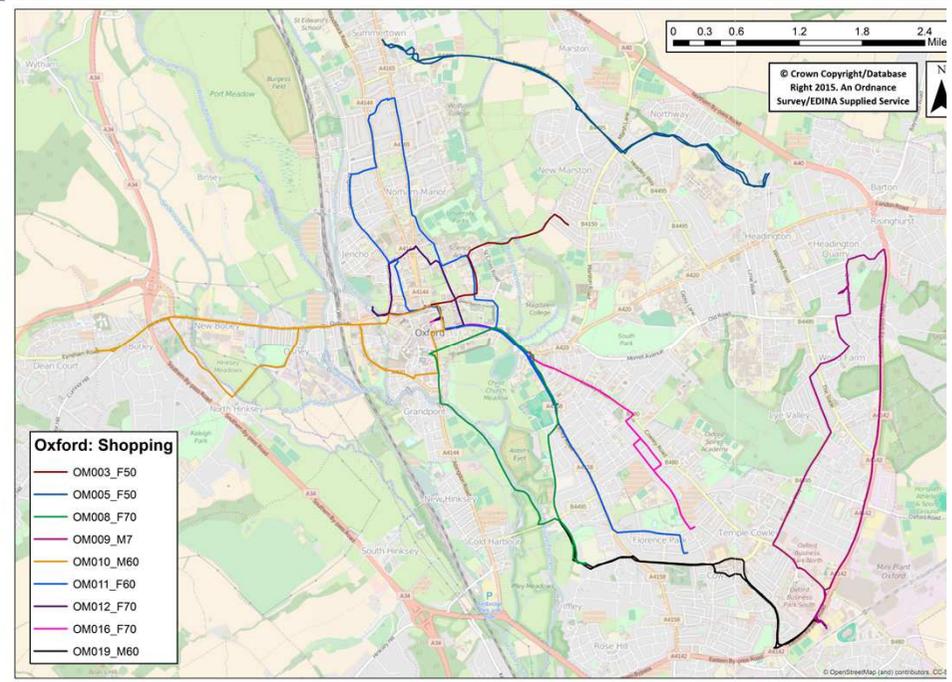
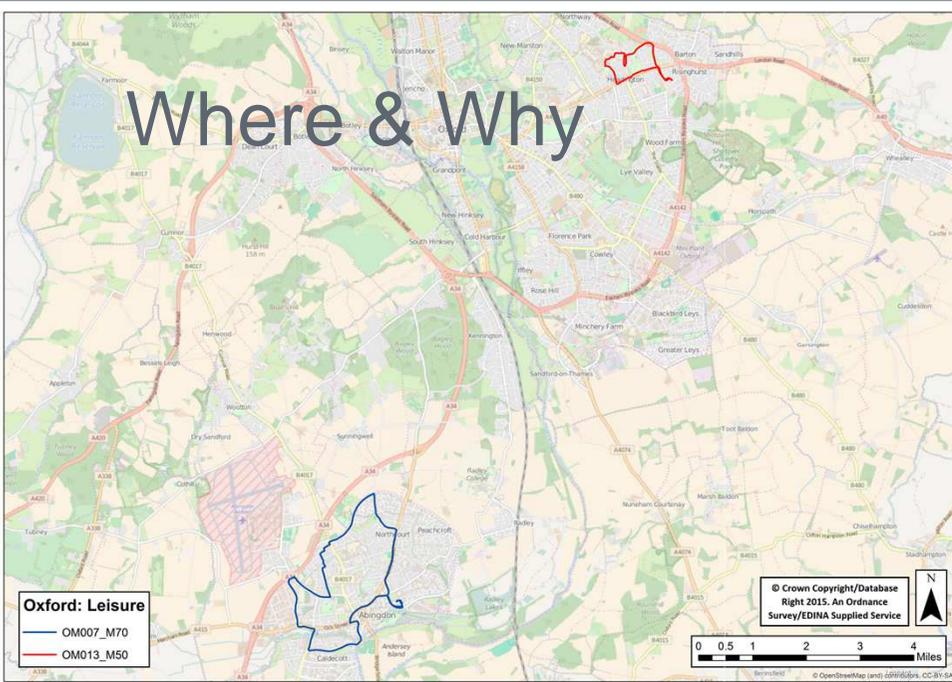


	Age 50s		Age 60s		Age 70+		Total	
	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>
Resilient Riders [Mobile observations]	2	2	3	4	3	6	8	12
Re-engaged Riders [Pedal trial]	1	7	5	5	1	1	7	13
Re-engaged Riders [E-bike trial]	1	6	4	5	3	1	8	12
Total	4	15	12	14	7	8	23	37

“some students are dreadful cyclists, not all of them... whizzing around unpredictably”
Lindsey

- Experienced, committed and confident riders
- Try to perform ‘civilised cycling’ and are critical of transgressive cycling of ‘others’
- Strategies to minimise journey stress (time and space)
- Ageing bodies and reduced range of movement, coupled with poor design, means that riders employ different tactics including making their own (rationalised) transgressions

Where & Why



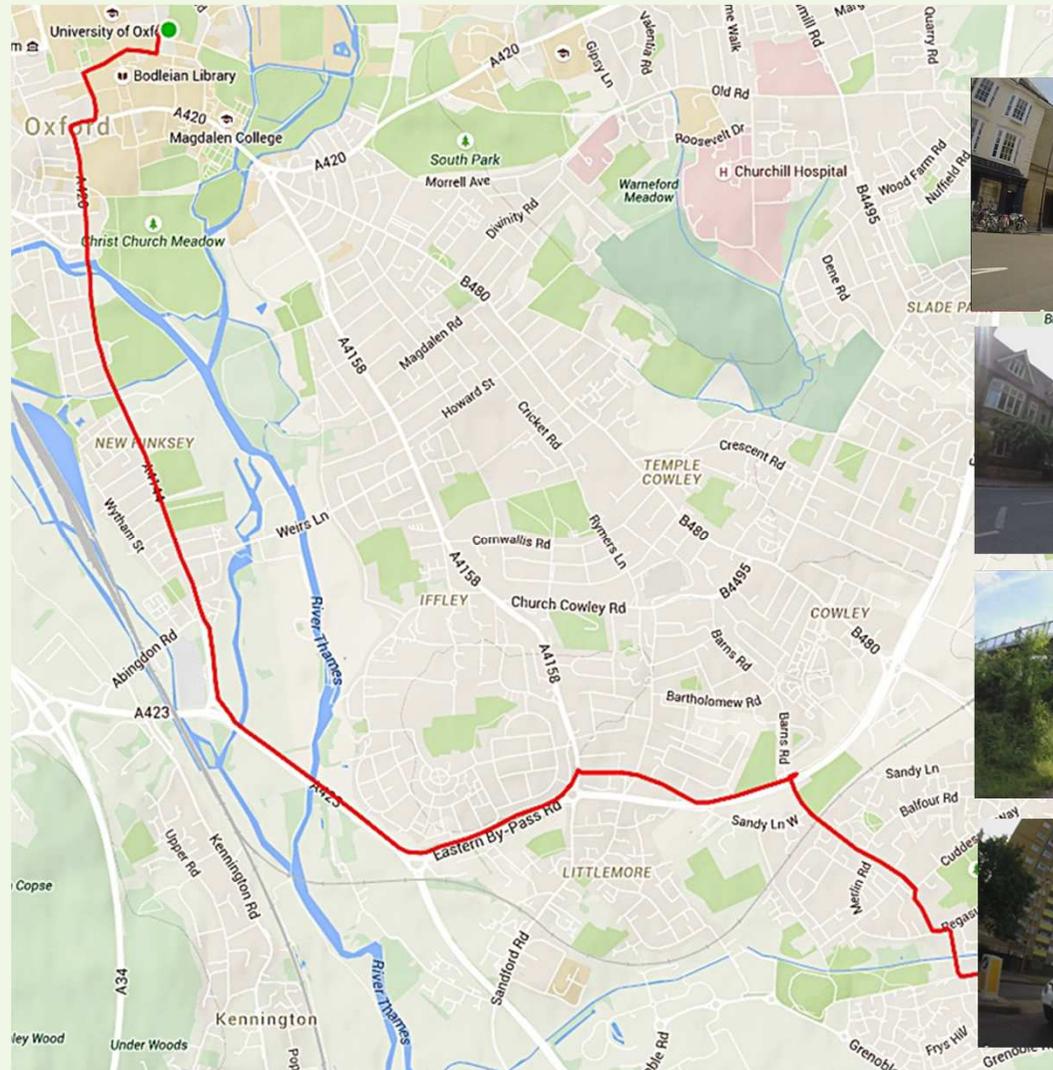
Sean | 8.5 km | 5 pm | 30 mins | 18 kmh



Journey home from work:

City to suburbs
City centre
Arterial road
Ring-road cycle track
Residential neighbourhood

50s
Ride 15 years
'Steady & skilled'





- Bike choice – knees
- Route choices ‘throw the dice’
- Micro-detailed knowledge of route
- Manoeuvres
- Attentiveness versus ‘vegging out’
- ‘Stress busting’: reflect on the day
- Visual spectacle: ‘A bit of a tourist still’
- Sociality: ‘Cycle Socializing’
- Personal safety ‘bottles and bricks’

- Lindsey VEI 34:00 pavement cycling at traffic lights

Rationalised transgressions



“Very often do a quick escape round to the left, safer to get round that corner before this lot start especially if there is a bus... nasty junction... slow lights... not a very good thing to do, probably get me a black mark with the police but doesn't feel too bad to me...

Not a fixed decision... no idea, thought I'd gone behind her, that's what puzzles me...

I have to say a lot of people jump those lights...

[Cars drivers] would be glad to be rid of me... worried if going left or straight...

I feel a lot safer if I jump the lights...

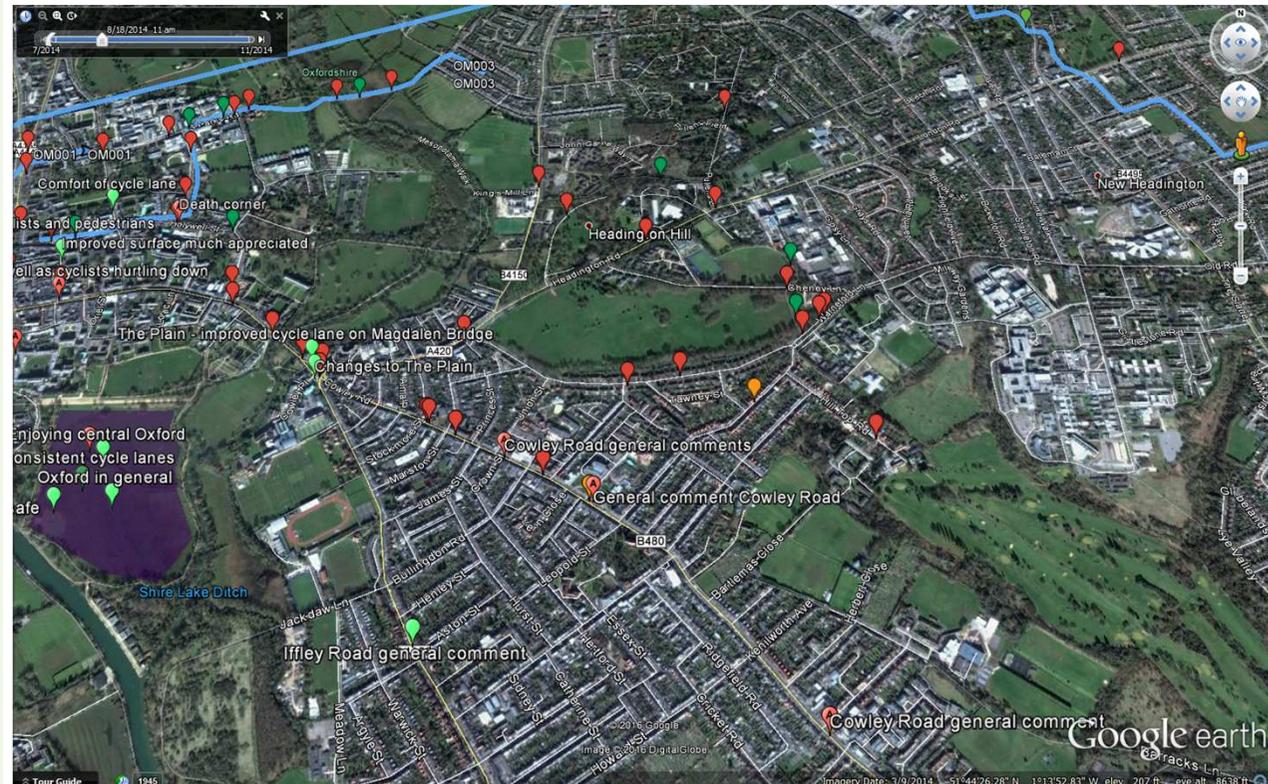
On green I'm not good at left signs...

Shame they couldn't put a left turn bicycle path... round the pavement there”

Impact on wellbeing: positive experience

Preferred environments

- River and canal tow paths
- Meadows cycle track
- Descending steep hills
- Ring Road cycle track
- Marston Ferry Road cycle track
- Iffley Road



Impact on wellbeing: negative experience



Challenging environments

- Arterial roads:
 - Botley Rd
 - Cowley Rd
 - Abingdon Rd
- Junctions:
 - St Giles
 - The Plain
 - Large roundabouts
- Parked cars
 - Parallel parking
 - Car parks





Bike Design

- **Mirrors:** And I think particularly reflexes and also flexibility - you can't really twist as much as you would like to or to look back, that's one of the big things, and often I've thought 'well what about a mirror?'
- **Crossbars:** To help with (dis)mounting, balance and putting feet down – choosing bikes with lower cross bars / step through frames
- **Posture:** upright for seeing and being seen (Sean)
- **Gearing:** simple but sufficient
- **Saddles:** transformational experience (Janice)
- **Range of bikes:** Shopper, hybrid, racer
- **E-Bikes:** considered or bought: 'sold! A complete convert!' (Vivian)
- **Trikes:** Mentioned as a possibility as a comprehensive solution to balance, storage and dismounting issues.



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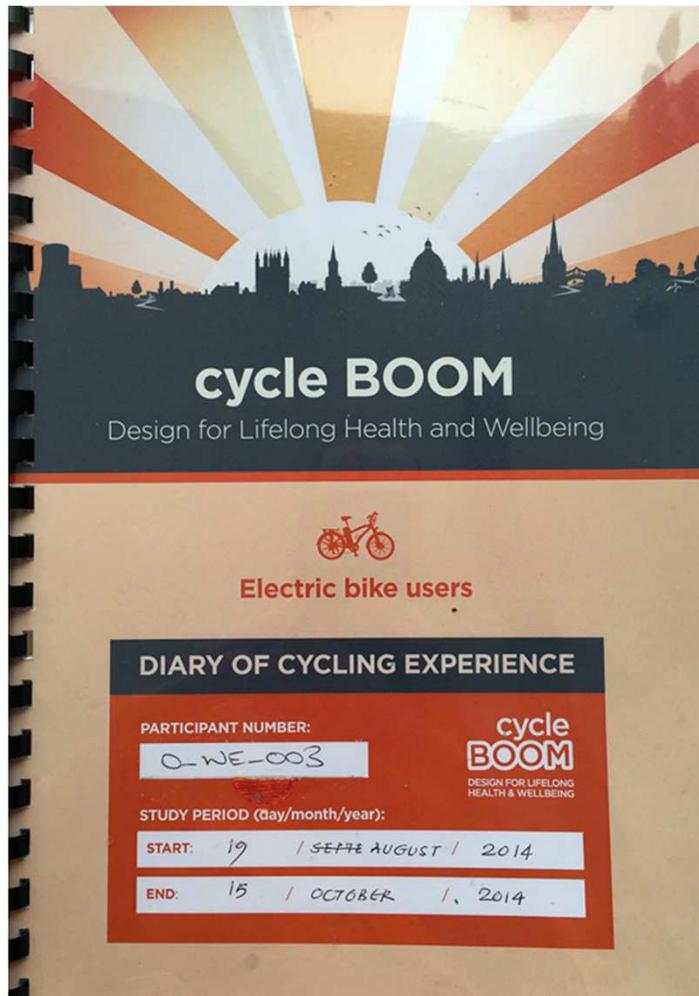
(E)cycling - eight week trial: background



Objective: to test the impact of (re)discovering cycling on physical activity, mental health and wellbeing in older adults.

“work on well-being and mobility should consider both the objective and the subjective and the hedonic and eudaimonic dimensions of well-being, and should pay detailed attention to the multiple ways in which well-being and its linkages to mobility are context-dependent and shaped by the particularities of time and place” (Nordbakke & Schwanen 2014)

(E)cycling - eight week trial



Life History Interview
Cycling assessment
Cognition and wellbeing tests
1.5 hours riding per week
Diary of physical exercise
Cognition and wellbeing tests
Focus group
Follow-up survey
Documentary films

Participant Profile: Oxford



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Acknowledge:

'Allure of the
e-bike'

Positive antecedent
state towards
cycling or physical
activity.

Health [maintain-improve-overcome]

Alternative mode [speed / reliability /
flexibility / environment / finance]

Access outdoors – exploration

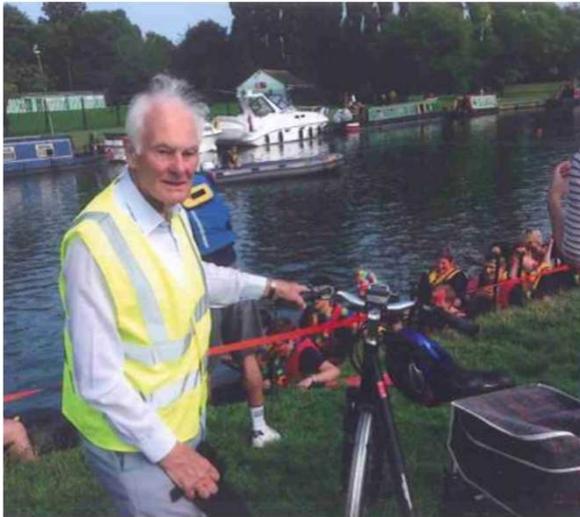
Regain confidence cycling

Structure and support

Social riding

Overcoming hilly terrain [e-bike]

Time /(in some cases) disposable income



- Abandoned
 - Ruby: technical
- Persevered
 - Livy: traffic, infrastructure
 - Colline: skills, weather
- Embraced
 - Ulrick: affect, social
 - Harvey: horizons, exercise

"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." Harvey DoCE

"same amount of exercise but more pleasure because going further than my usual boundaries" Sophey FG

- Geographies – rediscovered | extended | deepened | still partial
- Additional journeys
- Replacing car trips
- Increased use [Learning effect > novelty (Fyrhi & Fearnley 2015)]

Varying effort

“I haven't used e-bike power on this journey as it is flat and smooth so gives me a better exercise with the power off.” Mel DoCE

Feeling safer

“felt safe on the e-bike... setting off from a stop especially when on an up incline.” Colline DoCE

Overcoming topography

- “Excellent for me geographically as the return journey from town includes quite an incline, which I can now cope with effortlessly.” Aline DoCE
- “The Motus E-bikes' ability to maintain an improved hill-climbing speed is unpopular with traditional cyclists who dislike being overtaken especially by an ageing fat-man...[!]” Terry DoCE

E-bike challenges: technology



"I suppose most people who don't know think e-bikes are electric bikes, but they are completely different, this is what you've got to get over to people - still got to ride in the normal way not resting feet on the pedals" Brandon FG

"So many comments about 'laziness'." Aline DoCE

"You know, eee-bike?! Oh" Colline FG

Image / nature

Weight / balance

Manoeuvrability

Initial cost

Security

Stranding

Controls / battery

Technical support

E-bike challenges: environment



"have to say Oxford wasn't a very encouraging place to make me want to go out and cycle" Sophey FG

"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" Brandon FG

"Very nervous about cycling on roads so pushed bike until I got to traffic-free track" Livy DoCE

Researcher: Oxford... second cycle city in UK.... good city to cycle in?

Colline: Pah! Rubbish

Brandon: That is from someone who doesn't cycle that often, I probably use car more than bike, but no, completely bad

“Extremely bumpy sections of cycle track have convinced me that it is safer to ride with the cars than try to avoid being with them” Ulrick DoCE

“I fell off after my wheel hit a change in surface... no injuries other than a broken fingernail and dented ego!” Livy DoCE

Tracks

“Footpaths and cycle tracks are rough and very uncomfortable to use. Roads in general are smoother...cycle paths do not get nearby undergrowth cut back very often. This sometimes results in slippery algal growth. Rainfall and autumn leaf-fall is a dangerous combination as the cycle paths do not get cleaned.” Terry DoCE

E-bike experiences: Health & Wellbeing



"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." Harvey DoCE

"same amount of exercise but more pleasure because going further than my usual boundaries" Sophey FG

"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 DoCE

- Enjoyment, thrill, freedom and control
- Achievement
- Mental health
- Greater (cycling) confidence
- Spatial awareness and control
- Social contact
- Fitness and weight loss
- Pain / Aches / Tiredness / Cold / Colds / Crashes!

E-biking experience: Brian and Gill [4:30]

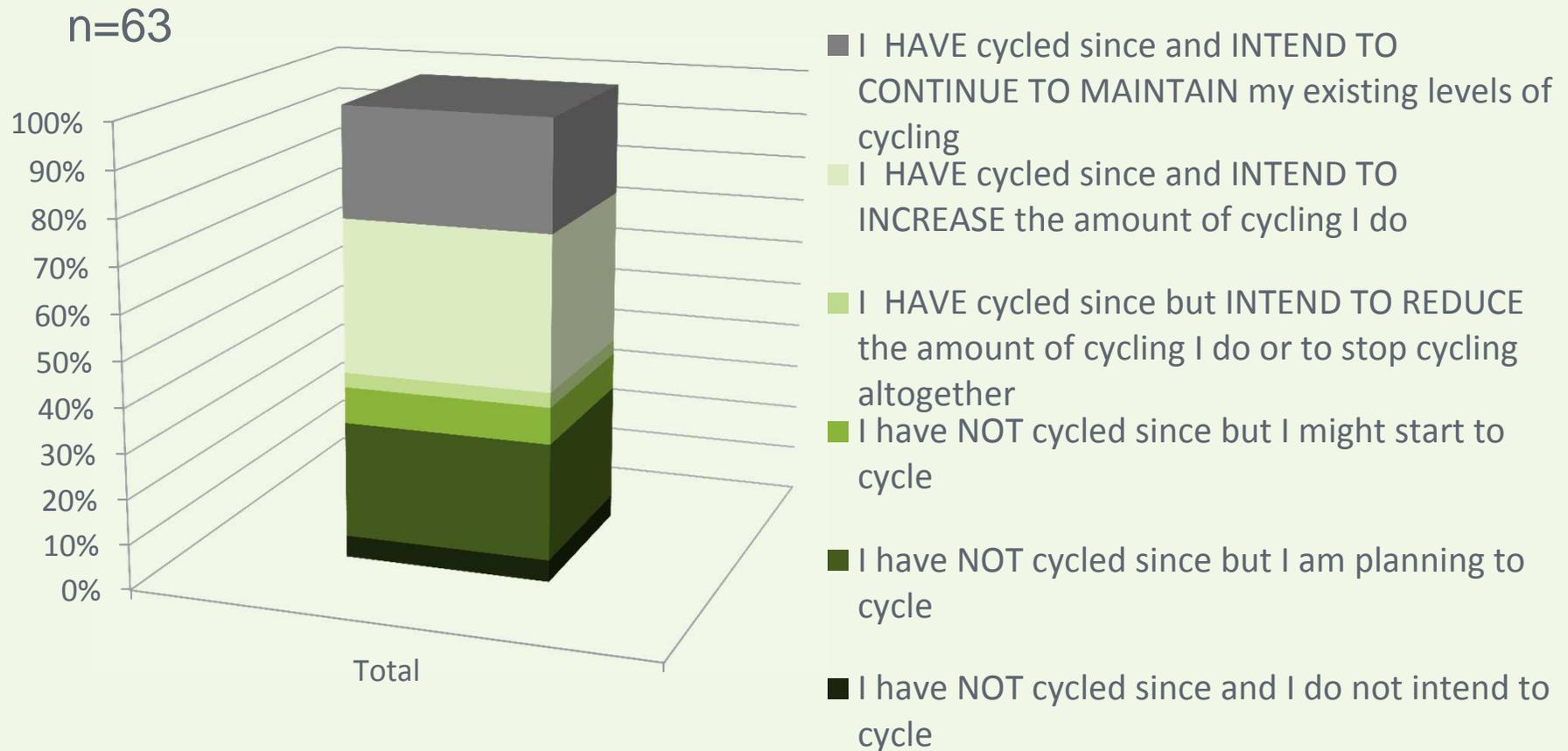


Excerpt from Brian Hook Wellbeing film
4:30 – effect of trial on his Wellbeing

- Both groups of participants - **enjoyed** the trial, feel physically fitter and better more generally
- **Improvement** on accuracy in the cognitive tests measuring executive function
 - **92%** E-bike; **72%** Pedal
- Reaction times reduced for most (responding quicker)
 - 67% E-bike; 57% Pedal
 - When reaction times increased, higher accuracy
- Practice effects? Very little change (positive or negative) in control group

Cycling since the trial, and future plans

Q. Please select the statement that best represents your cycling activity SINCE COMPLETING the cycling trial AND your plans over the next 12 months



Cycling purchases since completing the trial

Q. Since completing the trial have you or anyone in your household purchased any of the following



- Both pedal cycling and e-bike use can improve psychological well-being and some executive functions for older adults
- Cycling currently 'partial' in terms of timing and location due to poor infrastructure and 'precarious' due to lack of social support
- Resilient and re-engaged older cyclists employ a range of strategies to minimise journey stress: routes / times / manoeuvres / technology
- Ageing cyclists and infrastructure: some older cyclists find it harder to employ tactics due to reduced range of movement – poor design & maintenance therefore a bigger barrier

Cycle tracks:

- Separated from motor traffic and pedestrians
- Space for comfortable side-by-side cycling
- Surfaces flush and free of potholes, leaves, broken glass, ice... (and roads)
- Traffic-free routes along green and blue spaces
- High quality in new/re-development, enhance a fine-grained network of cycle routes

Infrastructure design

- 20mph zones in urban areas and smaller settlements
- Vehicle speed reduced without (uncomfortable) vertical deflections
- Momentum of cycling maintained - not start-stopping
- Clear where cyclists are “meant to be”, signposted and legible on the ground
- Design guidance based on a minimum range of movement

Storage and charging

- New build housing and residential homes should include generous and secure storage space at frontages with easy access to street
- On-street storage for cycles provided in areas where domestic storage is difficult
- Increased, generous cycle parking and E-bike charging points provided at shopping areas and other hubs

Supporting cycling: social interventions



[Schaeffler Bio-Hybrid](#)

[The Guardian 5 July 2016](#)

- Information about bike types and equipment (not focussed on wealthy, young, fit, male sports cyclists)
- Silver Cyclist programmes: social events, route advice, skills training
- Opportunities to try-out / borrow E-bikes & E-bike specific training
- Community transport and public bike hire schemes to include a wider variety of cycle types including E-bikes
- Cycling on prescription
- Funding for (E)bike purchase (via personal health plans?)

@cycle_BOOM

www.cycleboom.org

bspencer@brookes.ac.uk

Thank you

Questions, comments?

Final cycle BOOM conferences:

London

Monday 26th September 2016

Manchester

Wednesday 28th September 2016

References

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