



**cycle  
BOOM**

DESIGN FOR LIFELONG  
HEALTH & WELLBEING

# Fourth Stakeholder Advisory Group Meeting

25 April 2016 | Arnolfini | Bristol

# Meeting Objectives



- 1. Report our emerging findings**
- 2. Provide you with an opportunity to scrutinize our approach and findings: suggest possible avenues of further analysis | provide ideas for making an impact in terms of ways of supporting & encouraging older cycling.**
- 3. Hear about a project already supporting older cycling.**

# Agenda

Item	Time	
	09.45	Arrival   Coffee
1.	10.00	Welcome & Introductions [Tim Jones, Oxford Brookes University (OBU)]
2.		<b>'cycle BOOM' preliminary headline findings</b>
3.		The Participant Sample   Data Organisation   Process of Analysis
4.		<b>Unpacking the preliminary headline findings</b> <ul style="list-style-type: none"><li>• Cycling Life History Interviews [Kiron Chatterjee and Heather Jones]</li><li>• Cycling Mobility Observation Interviews [Justin Spinney, Ben Spencer &amp; Heather Jones]</li><li>• Cycling and Wellbeing Trials [Carien van Reekum, Louise Leyland &amp; Tim Jones]</li></ul> BREAK
5.	12.30	<b>Roundtable Discussion</b>
	13.00	LUNCH   Cycling and Wellbeing Trial 'video vignettes'
6.	14.00	Inclusive Cycling Project for the 'Over 55s'   Poppy Brett, Chief Executive, Life Cycle UK
7.	15.00	<b>Workshop Discussions</b> <ul style="list-style-type: none"><li>a) Data gaps and ideas for further analysis</li><li>b) Opportunities for impact</li><li>c) Reflections in light of Government's Draft Cycling and Walking Investment Strategy*</li></ul>
	16.00	CLOSE

# Study objectives

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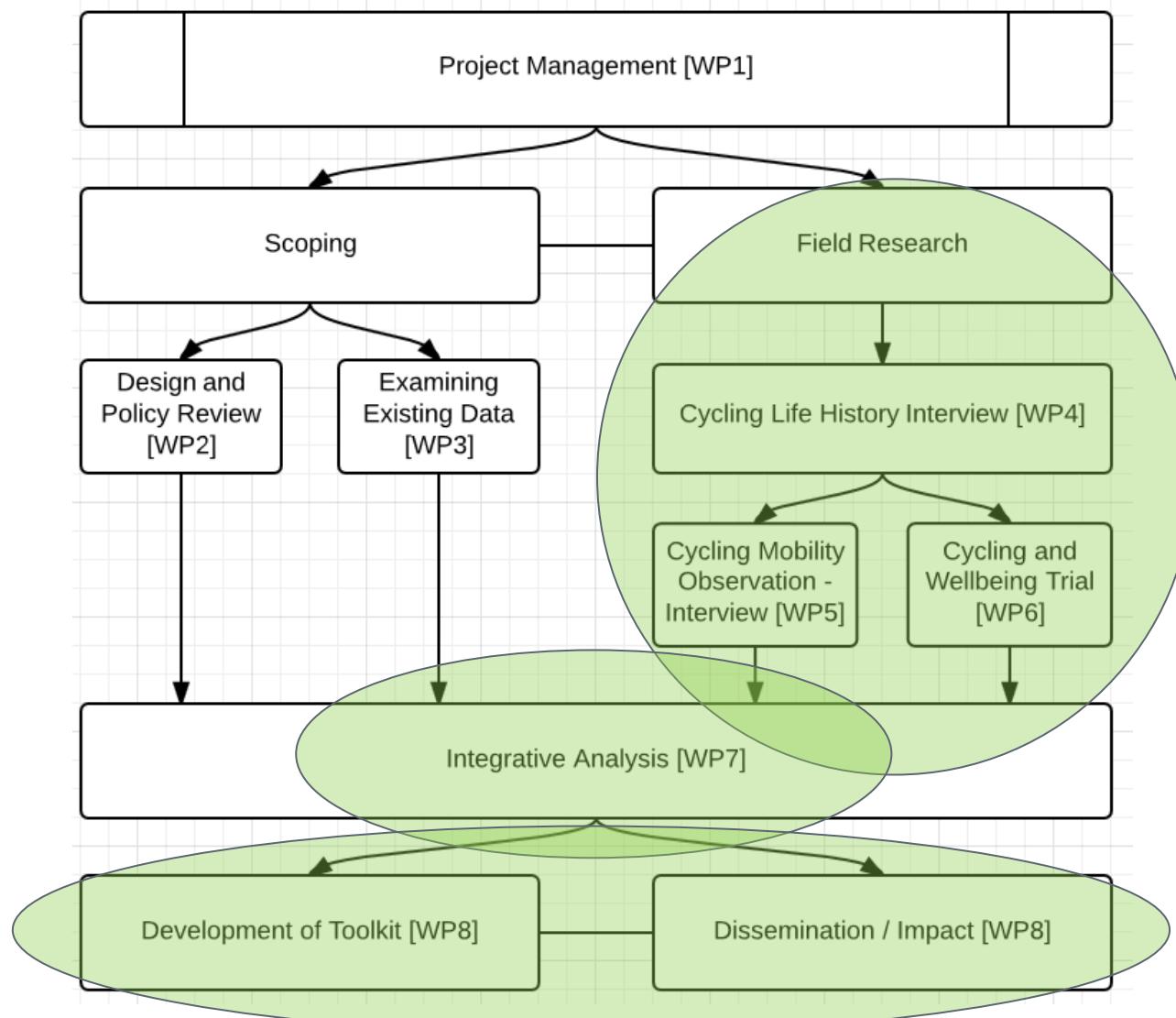


# Study approach

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# Study structure



# Case sites



# Participation



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

# Participant Profile



	Age 50s		Age 60s		Age 70+		Total	
	M	F	M	F	M	F	M	F
<b>Reluctant Riders</b> [Biog interview only]	6	7	6	14	4	9	16	30
<b>Resilient Riders</b> [Mobile observations]	20	14	25	20	13	12	58	46
<b>Re-engaged Riders</b> [Pedal trial]	5	7	10	12	2	1	17	20
<b>Re-engaged Riders</b> [E-bike trial]	7	8	10	12	3	-	20	20
<b>Total age/gender</b>	38	36	51	58	22	22	111	116
<b>Total</b>	74		109		44		227	

# Integrative analysis of multiple data sources

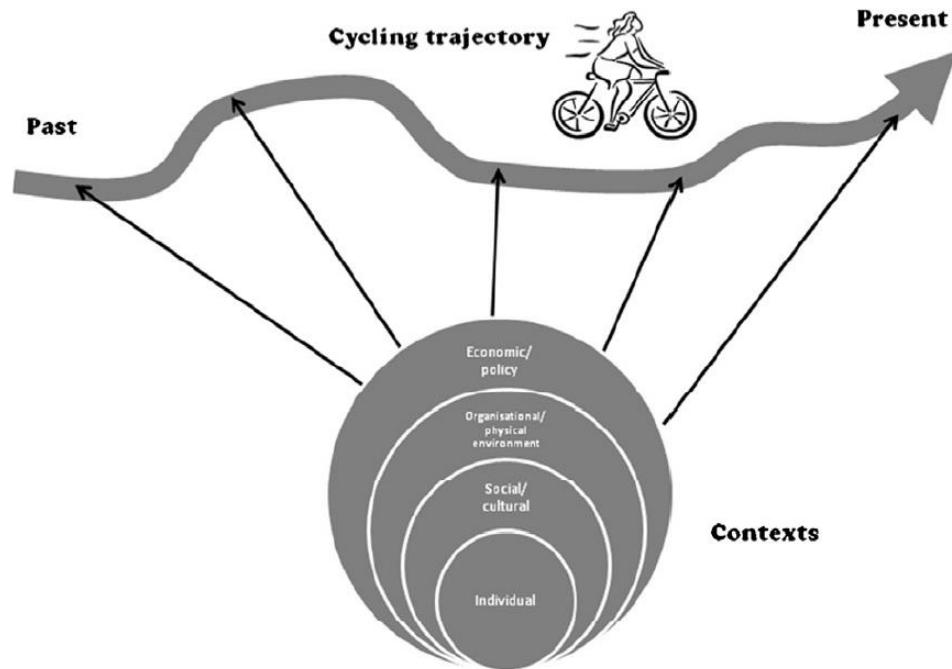


	Biographical interview [Audio]	Mobile Observation [Video]	Video Elicitation Interviews [Video]	Hours of data
Oxford	83	11	23	117
Reading	35	4	7	46
Bristol	26	14	18	58
Cardiff	30	18	18	66
Hours of data	174	47	66	287

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

# Conceptual approach driving analysis

## Cycling Trajectories | Staging (Velo) Mobilities



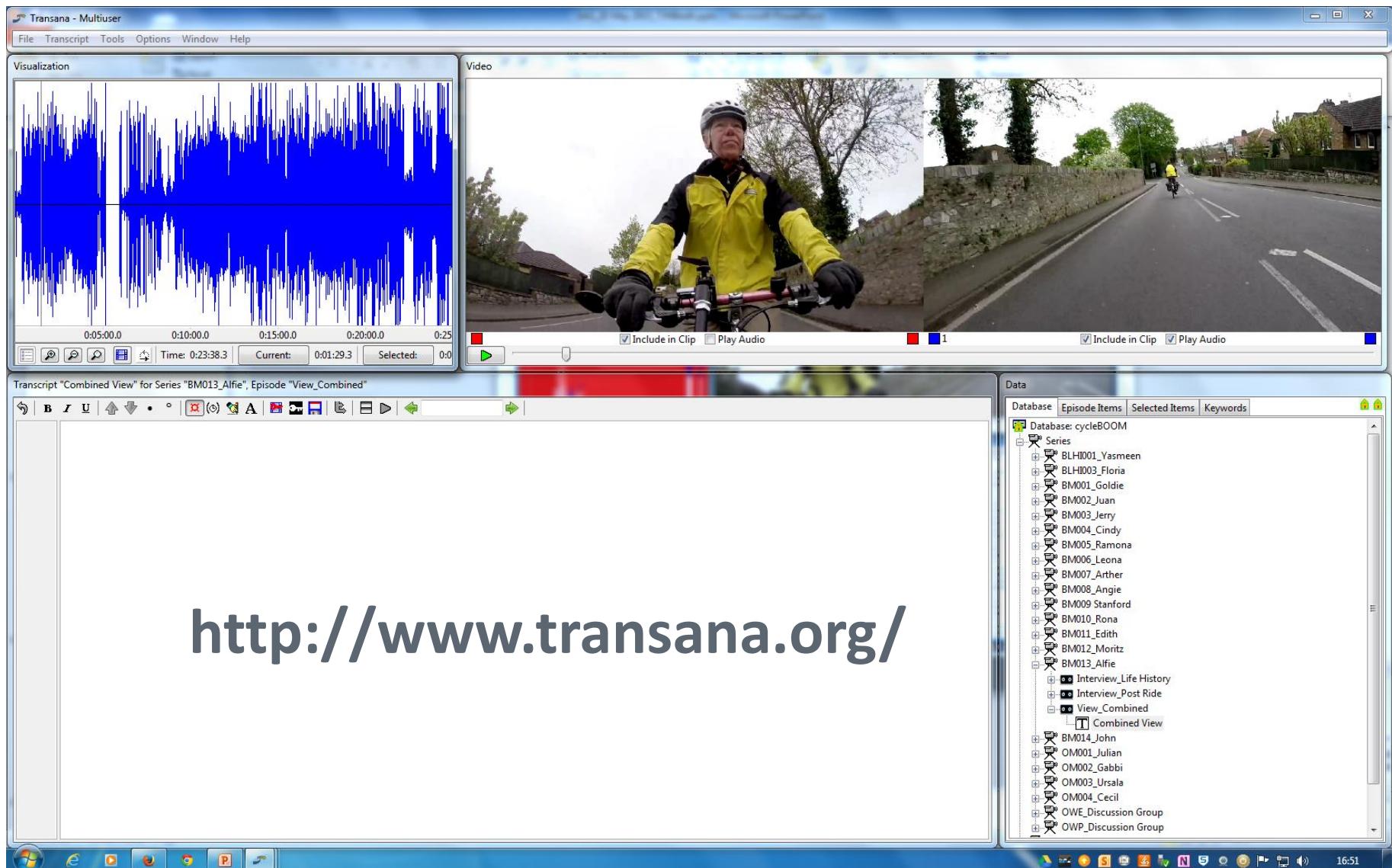
Chatterjee, K., Sherwin, H., & Jain, J. (2013). Triggers for changes in cycling: the role of life events and modifications to the external environment. *Journal of Transport Geography*, (30).  
<http://doi.org/10.1016/j.jtrangeo.2013.02.007>

The *Staging Mobilities* model (Jensen 2013:6)

**Temporal and Situational:** **Person** (body; relationships) | **Place** (home/neighbourhood/city; social/cultural setting) | **Policy** (national & local policy on planning & transport/trends) | **Technology** (materials & things).

# Tool for analysis | Transana CAQDAS

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<http://www.transana.org/>

# Approach to coding

	Themes	Primary Data source
P	Participant profile: gender, age, class, ethnicity - cycling trajectory-past practices-current routines-competences-materials	Screening questionnaire Timeline/life history grid Life History Interview Photos Memos
R	Ride characteristics: purpose-route choice/rationale-timing/temporality-rhythm-competence	
I	Interactions (encounters & negotiations ) with 'things': people, place, infrastructure, technology.	Ride gist (context) STRAVA trace Observation/memos Researcher Video (RRV) Participant Video (PRV) Video Elicitation Interview (VEI) Diary of Cycling Experience (DoCE)
M	Meanings bestowed on practices: making sense of actions-personal lifeworld-lifeworld of others; places of significance.	
E	Embodied experiences: feelings-sensations	
S	Social context: politics of mobility-reflections on ways of moving and co-habiting space and on built design/infrastructure.	Life History Interview Video Elicitation Interview (VEI) Researcher Memos

## Abductive

'Top down'/deductive approach - application of loose theoretical framework - while applying 'bottom-up/inductive' approach through dialogical coding\*

*\*Allowing researchers to collaboratively develop coding themes within and outside of PRIMES umbrella.*

# Overarching questions

		<b>Output</b>
1. How is older people's mobility constructed and understood in relation to UK policy and guidelines and what policies are in place in the UK and across the EU to support older people cycling?	Policy Review. cB study visit to Munich and Seville.	Report Video
2. What are the trends and characteristics of older people cycling in the UK and what has been the effect of recent investment in cycling infrastructure projects, promotional programmes and technological developments?	Secondary Analysis of data.	Info-graphic
3. 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?	AM: Kiron and Heather	
4. How do specific features of the built environment and assistive technology affect cycling experience amongst older people and what is the impact on wellbeing?	AM: Justin, Ben and Heather	
5. To what extent does cycling improve older people's cognitive function, eudaimonic wellbeing (human flourishing), hedonic wellbeing (life satisfaction) and physical health?	AM: Carien, Louise, Nick and Tim	
6. What are the implications for cycling stakeholders, policy makers and practitioners?	PM: Over to you!	



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# Emerging Findings

**No single ‘older cycling’ narrative**

**Complex life-worlds**

**Different experiences**

**Different personalities**

**Different capabilities**

**Different cycling trajectories**

# Biographical Interviews

Reluctant Riders	Resilient Riders	Re-engaged Riders
<p><i>Cycling curtailed in last five years or largely absent through adulthood</i></p> <p>Combination of definitive stops and 'fizzling out' – cycling less relevant or irrelevant.</p>	<p><i>Ongoing engagement /constant activity through adulthood</i></p> <p>Fortunate to have periods of stability/activity space.</p>	<p><i>Cycling diminished in last five years or absent</i></p> <p>Desire to maintain or reconnect with cycling.</p>
<p>Reservations about cycling's ability to (continue to) meet mobility needs.</p>	<p>Adapted cycling through their life: riding style /technology.</p>	<p>See opportunity for rehabilitation, ageing well, physical activity.</p>
<p>Lessening ability and concerns about safety.</p>	<p>Self-sufficient/confident/not uncritical</p>	<p>Lacking confidence; concerns over safety ; challenge of re-learning.</p>

## Resilient Riders

Adapted cycling through their life and are self-sufficient and confident.

They try to perform ‘civilised cycling’ and are highly critical of transgressive cycling of ‘others’ – the ‘new breed’.

They employ a range of 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.

## Re-engaged Riders

Pedal cyclists and e-bike users reported increased wellbeing compared to controls.

Effects on cognition not quite as clear cut but cycle trialists tend to outperform controls.

Effects are not just due to physical exercise, but engagement with (selected) outdoor settings also plays an important role in improved wellbeing

Narrative analysis of qualitative accounts of participation in the trial supports quantitative indicators and elaborate possible mechanisms.



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# Understanding pathways of development in cycling in later life

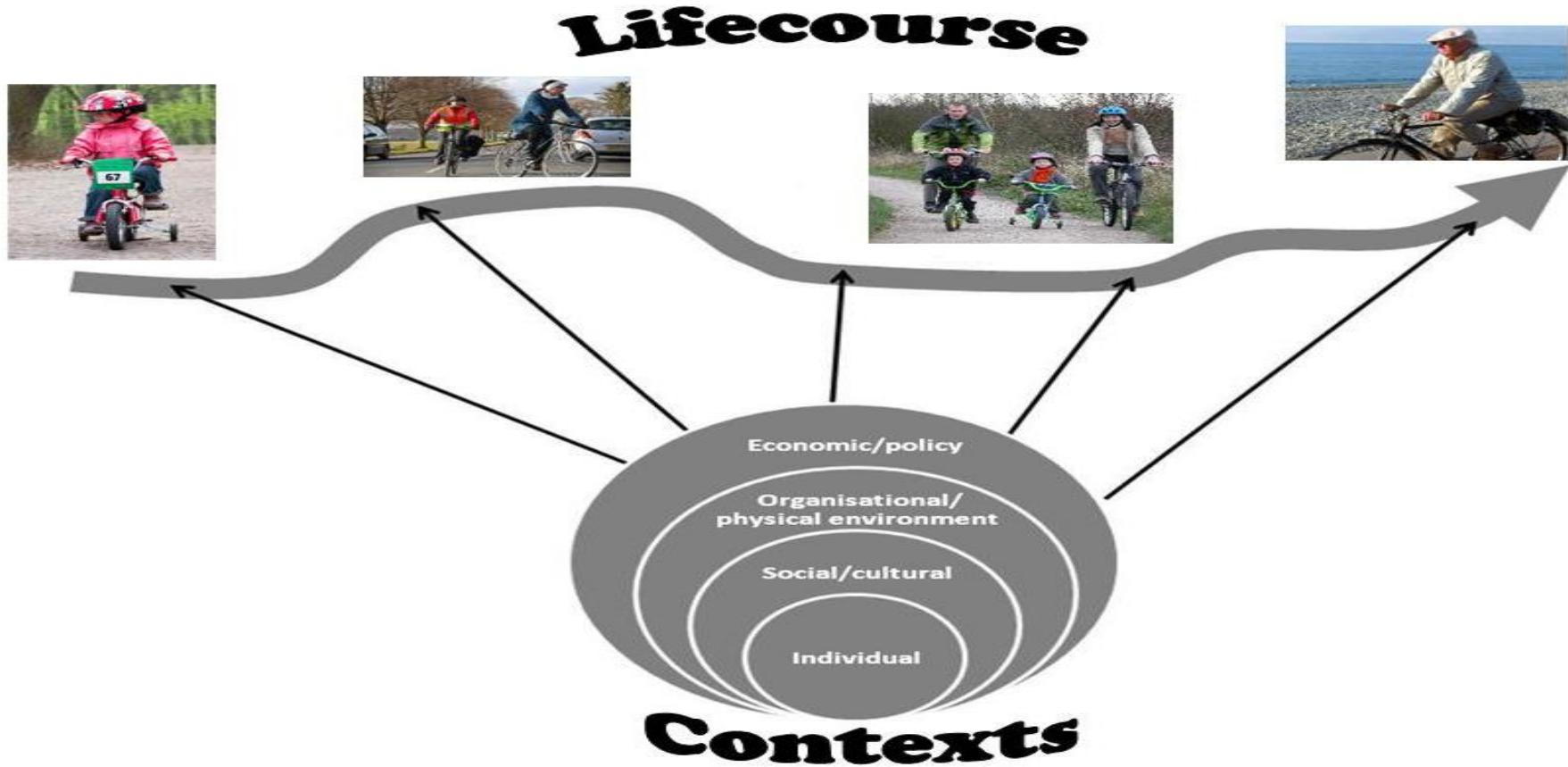
Kiron Chatterjee (UWE) | Heather Jones (UWE)

# Biographical Interviews

<b>Reluctant Riders</b>	<b>Resilient Riders</b>	<b>Re-engaged Riders</b>	<b>Re-engaging Riders</b>
<i>Cycling curtailed in last five years or largely absent through adulthood</i>	<i>Ongoing engagement /constant activity through adulthood</i>	<i>Reengaged in the last five years following a hiatus of varying length</i>	<i>Cycling diminished in last five years or absent</i>
Combination of definitive stops and 'fizzling out' – cycling less relevant or irrelevant.	Fortunate to have periods of stability/ activity space.	Lessening constraints and new opportunities e.g. downshifting, released from caring	Desire to maintain or reconnect with cycling.
Reservations about cycling's ability to (continue to) meet mobility needs.	Adapted cycling through their life: riding style /technology.	Rehabilitation, ageing well, physical activity deficit "need to do something"	See opportunity for rehabilitation, ageing well, physical activity.
Lessening ability and concerns about safety.	Self-sufficient/confident/not uncritical	Found a spatial/ temporal niche they feel capable cycling within	Lacking confidence; concerns over safety ; challenge of re-learning.

# Outline

- Approach
  - Resilient riders
  - Reluctant riders
  - Reengaged riders
  - Reflections and next steps
- 
- With exemplar cases



“dynamically as the consequence of past experience and future expectation as well as the integration of internal motive and external constraint”

(Giele and Elder, 1998)

# Interviews

- Narrative interviews
- Visual elicitation

	Year of birth: 1963	1950s	1960s	1970s	1980s	1990s	2000s	2010s
Residence		HARLOW, ESSEX	→ 1977 ADDITION MENINGEON TO 1980	COTTHAM BOST 82-83 BRIXTOL 1983	WESTBURY TRIM	WESTBURY TRIM	WESTBURY ON TRIM	WESTBURY ON TRIM
Household		MUM, DAD, OLDER SISTER	M, D, SISTER	M, D 2 WORK COLLEAGUES IN HOUSE STREET	PROFESSIONAL WITH FREIGHTWIFE DAUGHTER 1992 SANDALS	M, WIFE, SON & DAUGHTER	DARLINGTON UNIVERSITY 2010 SON TOWN 2011	
Education / work (paid / unpaid)		PRIMRY SCHOOL 1968	SECONDARY SCHOOL HARLOW THEN WILSHIRE, HEREFORD 1977	SIXTH FORM LEEDS 1980-82 PAID WORK 82-83 UNIVERSITY 83-86	PART JOB 1986 PAID WORK NANCA 82-83 UNIVERSITY 83-86	JOB FILTON 1988	2005 JOB CATERER OF OBSTOL 2005-2010	JOB CHAMPION WILTS 2010-NOW
Activities / hobbies / leisure				FOOTBALL SPORT ADVENTURES WITH FRIENDS	FOOTBALL BASKETBALL (SCHOOL + UNIV.)	ACTIVE HOLIDAYS	WALKING WITH KIDS, FRIENDS 5-A-SIDE	
Transport		KIDS BIKES IMMEDIATE AREA	TOY BIKES ETC	1975 FIRST "REAL" BIKE → 5-SPEED ANGEL	USE OF CAR BRAUNET GOOD BIKE 1980 BIKE SOLD IT IN 1990	NO BIKE		
Cycling - owned or had access to a bike				↓	↓	↓		
Cycling - activity				WENT EVERYWHERE ON BIKE FROM 1975 →	1986 THEN GOT A CAR	CYCLED AT CENTRE PARKS ONCE	NO OTHER BIKE USE	



# Data analysis

Interview materials  
examined, case by case  
  
Interpretive accounts

Btw case  
Commonalities  
and difference

Corroboration  
and  
contradiction

Case summaries and  
reflective memos

Preliminary  
Categorisation

Refine  
categories  
Identify  
exemplar cases

Individual  
biography &  
contextual  
change

Bristol cases

Oxford cases

Cardiff + Reading cases

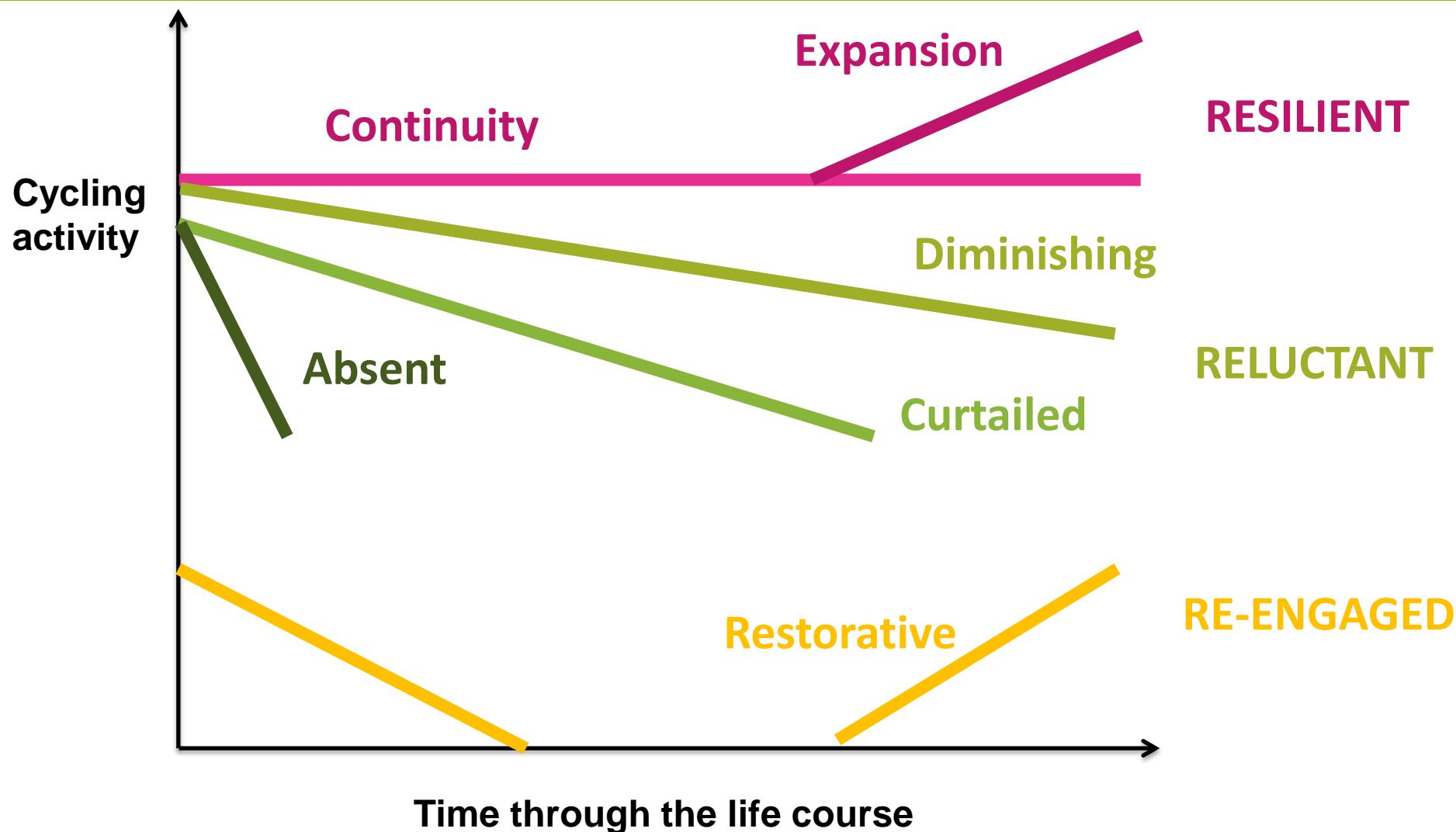
Individual reasoning of  
continuity and change  
through life events

Longer term processes of  
resilience, reengagement  
and curtailment

How physical, social, cultural  
change plays out in individual  
cycling development ?

How might resilience and  
reengagement be supported  
by policy?

# Pathways of development in mid and later life



- Had periods of stable functional bike use which often coincided with consistent activity space
- Had been some gaps
- Re-purposing/adapting cycling through life transitions and events
- Self-sufficient: confident and content to cycle alone

# Alfie M70s, retired engineer, suburbs

Continuous commuting  
after short hiatus

Volunteering and  
other functional  
replace commute

Ad hoc leisure  
experiences

Cycling on  
holiday with wife

R  
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I  
R  
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S



*did retirement affect your cycling?* Not really because I started doing other activities right away I started volunteering so that was 2.5 miles to get to that

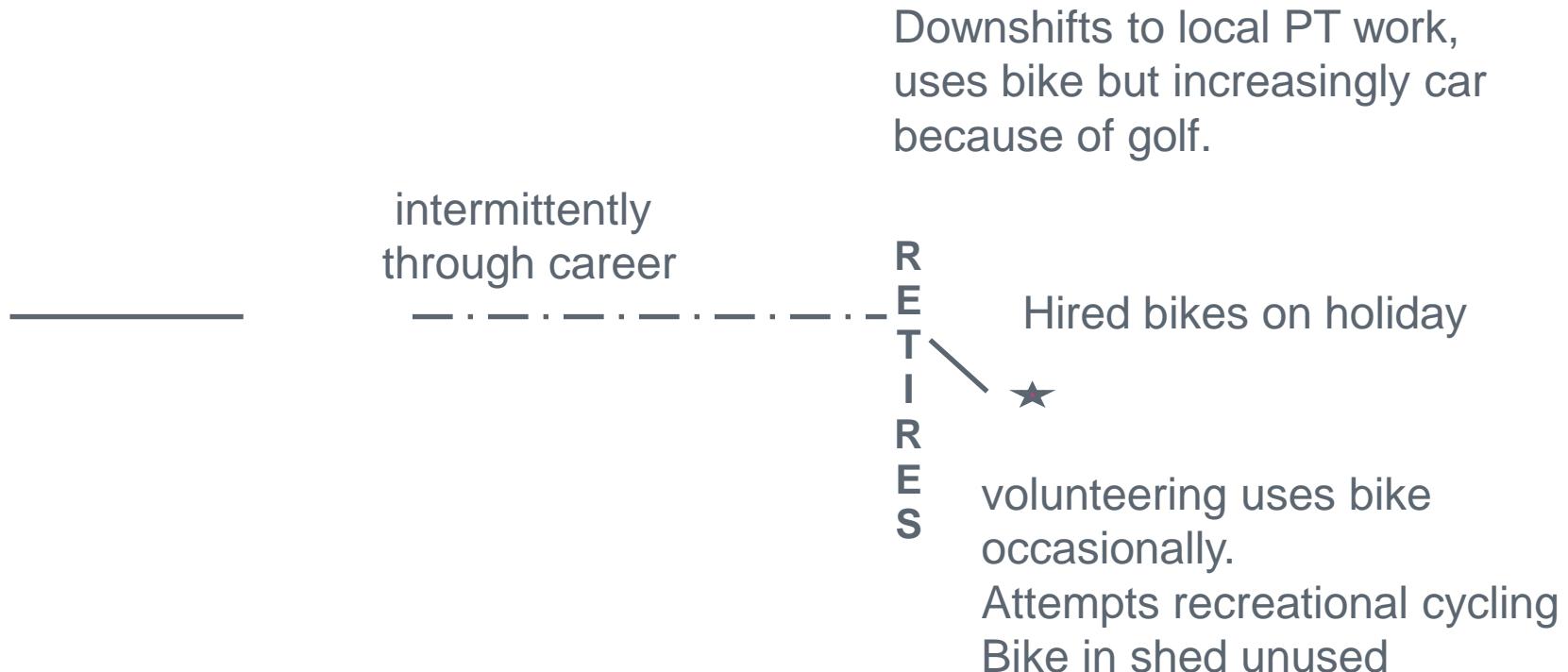
*So the journeys you made..?* they just changed a bit, I stopped doing that journey into [work] and did other journeys instead but they were similar, within the bounds of Bristol, just different journeys

...Now I can do it any day of the week... whereas before I might have done a detour on my way home or gone on a Saturday...it's no trouble to cycle down there but then you've got cycle up [hill] ...I used to look upon it as a sort of fitness challenge to cycle up, now I tend to push up or avoid it by taking a slightly different route, more of a gentle climb ...

# Reluctant Riders

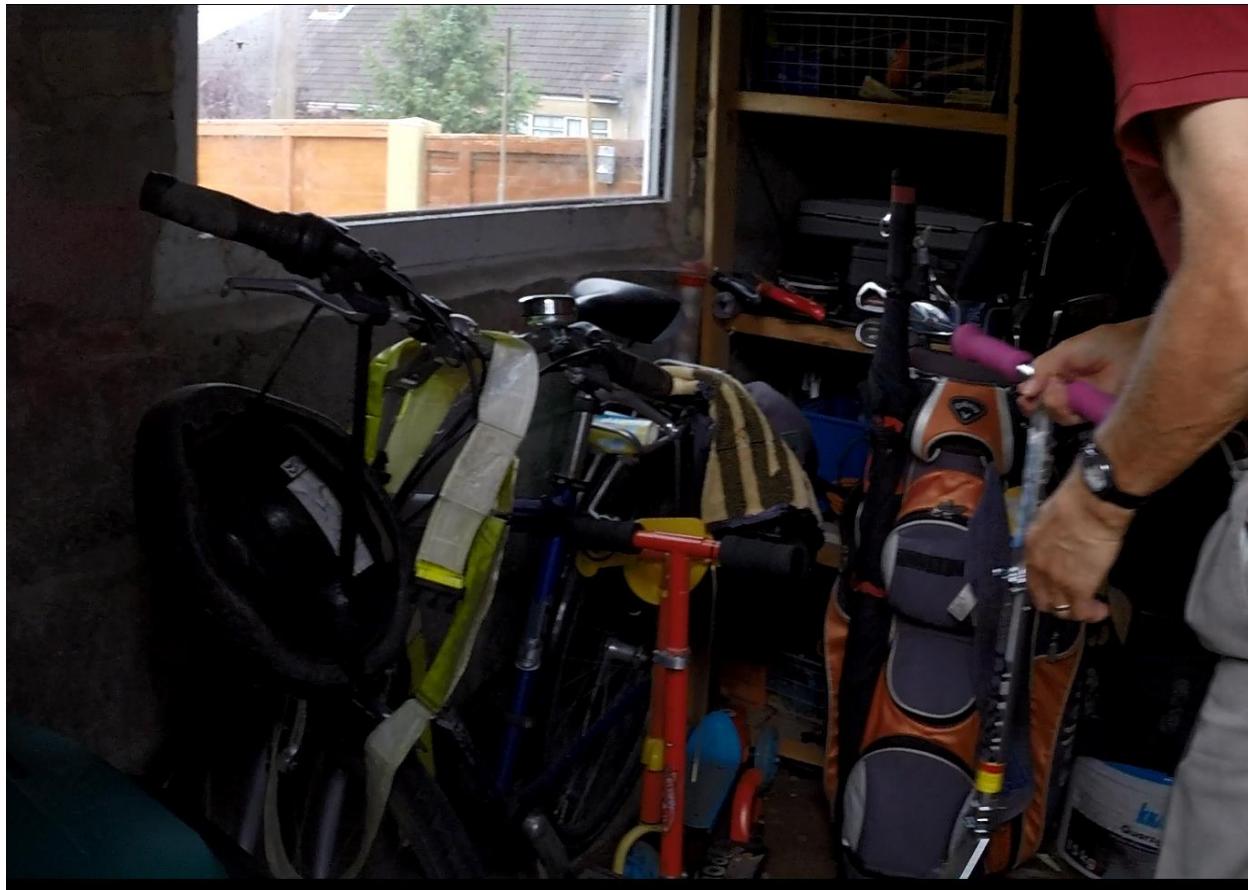


- Combination of definitive stops and ‘fizzling out’
- Travel needs shift related to changes in role and location
  - Attractiveness of cycling diminishes relative to other forms of mobility
- Failure to re-purpose or adapt cycling following event
- Array of acute and chronic health issues which undermine capability, comfort and confidence
- Process of mounting dis-ease and doing it less
- Reservations about their bike/ musings about needing a different bike
- Safety concerns: balance of personal competencies/external threats

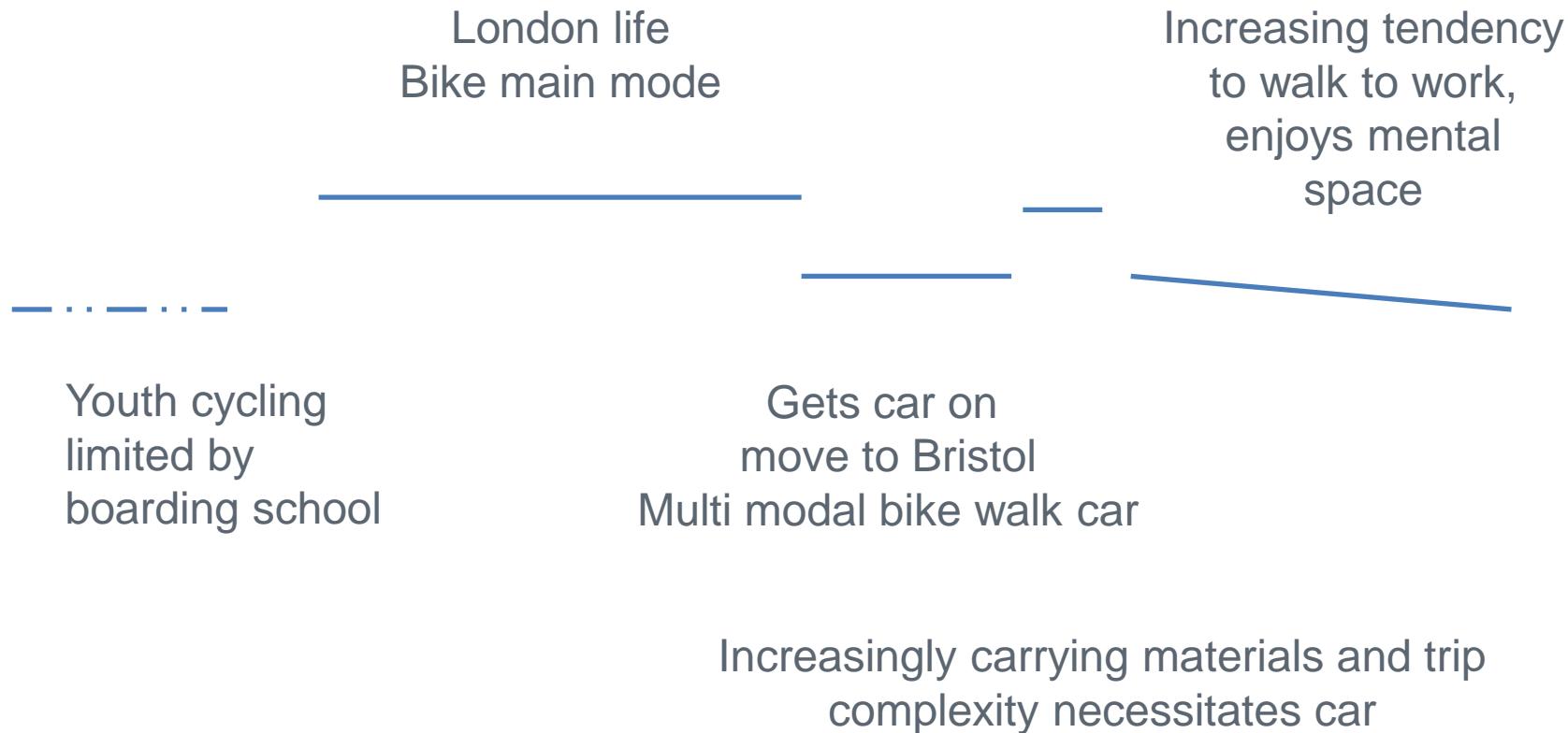


**"there has always been a purpose, to get somewhere to do something else...having got the bike to go to school, a bike was then a mode of transport, an efficient and cheap mode of transport which I was happy to go on doing but it wasn't something that took my interest in its own right."**

**"...then it went in the garage, I used it occasionally, I used to go up to [volunteering], having retired and got time so I did that but anything else local, Tesco's or to the shops just walk. just once or twice I went out for a cycle ride for exercise, to keep fit because not being on my feet every day, I consciously wanted to keep fit .....but me bum hurt...it was so, it was uncomfortable and it was more stressful than walking and trying to find different routes for interest because I didn't like going there and back again for fun, it's ok for commuting but if I'm doing something I like to do it in a circle....then I stopped doing that and it's stopped now for the last couple of years....About a year ago was the last time I used my bicycle...on holiday last year when we hired bikes..."**



**“Golf and grandchildren”**



“My cycling life has really shrunk actually, not because I can’t or don’t want to, for some reason, particularly at the moment, because I’m doing a lot of things to do with work I have needed to the car to go and buy stuff”

“I used to go on the roads more, I think that I am less confident and I think that’s partly to do with I don’t do it so much, and also an age thing ..... you feel more vulnerable, you know turning your head to see what’s coming and you use a lot of peripheral vision when you’re cycling and hearing, those things tend to become a little bit less acute....also to do with moving your head, balance and move, checking to see, and all those things combined they are not quite as good as they were.”

“I have been thinking it would be nice to have a decent bike, a sort light weight, with lots of gears .... more user friendly thing in terms of hills to do leisure cycling,.... it would be nice to have one with a motor {laughs}....it seems to be creeping up, that sort of thing”



# Re-engaged riders



- Lessening constraints and new opportunities to cycle e.g. downshifting, released from caring responsibilities
- Rehabilitation, ageing well, physical activity deficit “need to do something”
- Found a spatial/ temporal niche they feel capable cycling within
- Others, either as companions or supporters/facilitators, important but not necessary

Youth  
cycling,  
stops at  
university

Cycles to  
work

Urbanising move  
Initially works city centre  
wouldn't cycle

Rural, commutes by car  
Occasional leisure with partner

Job move  
urban fringe  
positive culture  
sedentary job  
2/3 times a week

Relationship ends  
Occasional short functional/recreational  
trips

“as a child fairly level, then a big stop while I was at uni, then started again and then there was another stop and then, since I’ve had this new bike, it’s probably grown and as I say I probably cycle more now than I ever have done in my life.”

“very much a fitness thing, cos at work I’m sitting down all day ...it’s only been the last 15 months....I started work there then, it’s a 6/7 mile cycle ride which is actually no further to when I worked in the city centre previously...there is absolutely no way I would have cycled from here into the city..... it’s quieter, traffic’s quieter,

..... and it’s also the attitude of work, if I’m not at my desk until 9.15 it doesn’t matter whereas before I was in financial services and it did .....they have this sustainable travel policy...there are changing facilities, showers...

...I am a fair-weather cyclist, I must admit, October comes and the bike goes in the shed for winter.....some of the ring road path is unlit”



# Wilfred, M60s - retired business owner, urban fringe



Youth cycling,  
first job

Self-employed  
Business necessitates van

Approaching retirement,  
family got him bike  
“I had to do something”

Knee ops



knee issues end sport

Didn't enjoy at first

Wife gets in to cycling

Focused on business - no time



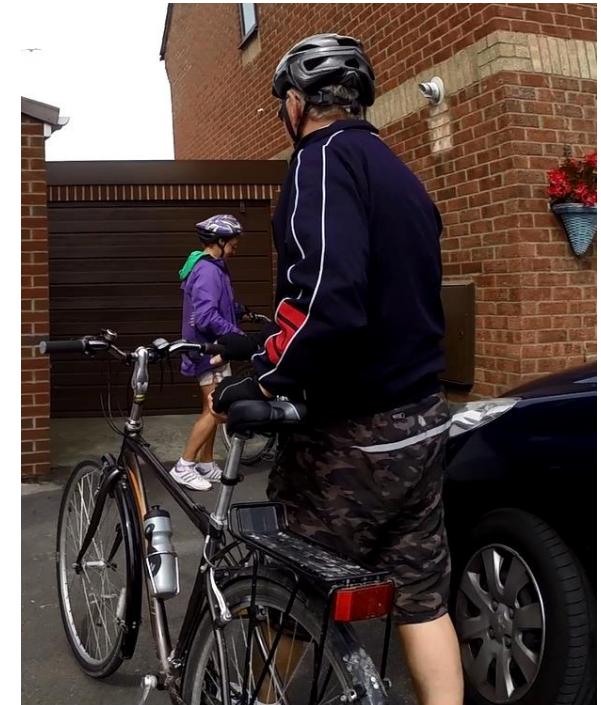
# Wilfred M60s

"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"

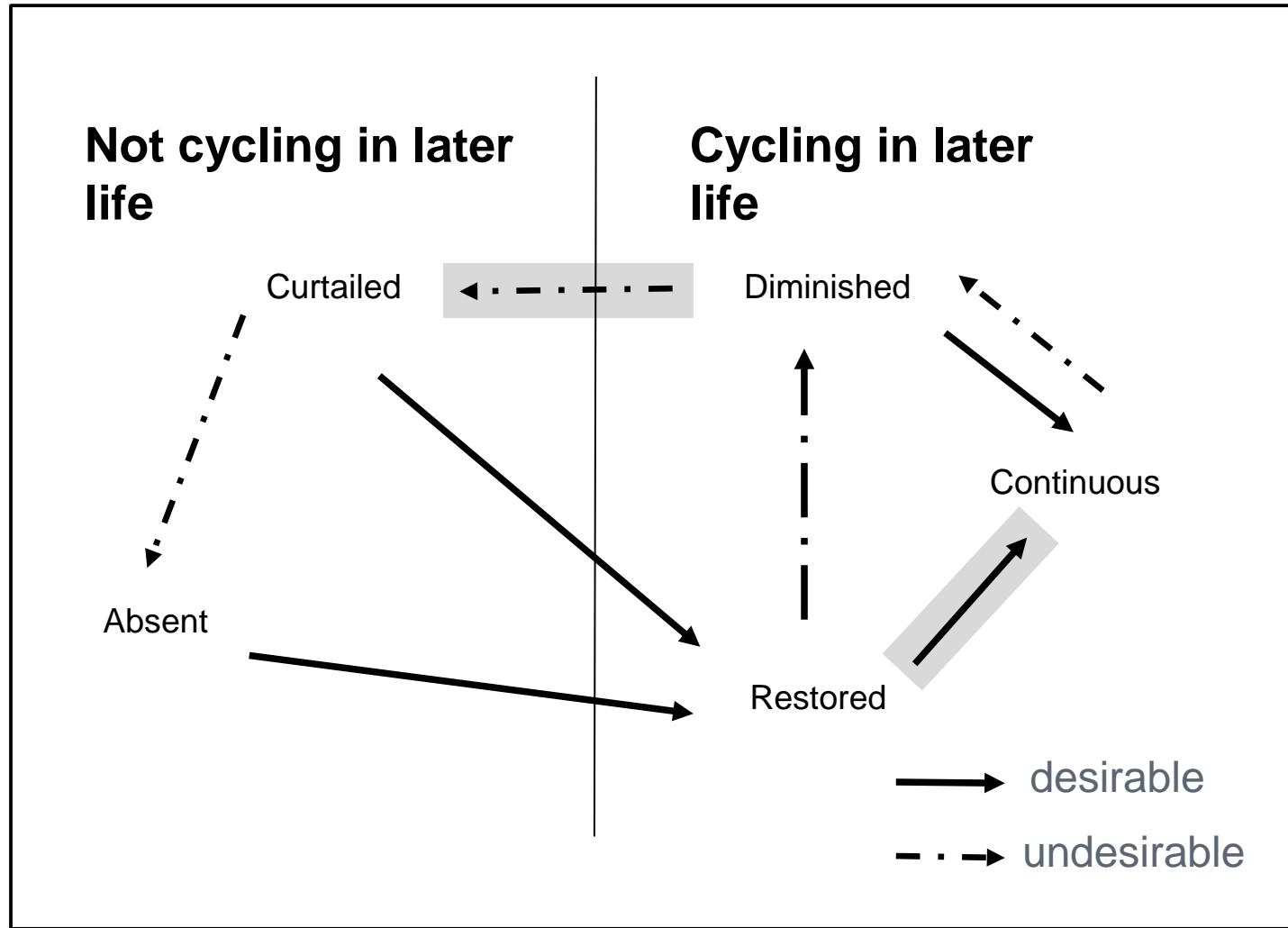
"Um probably since I retired, 3 years been doing it all the time, cos I've been sporty all my life and competitive, you know if I do something I want to win kind of thing, and of course I couldn't do nothing, so I started cycling"

"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"



Life changes	Examples	Implications for cycling
Relocation	Down-size home down-shift in work	Physical domain: Distances, topography, infrastructure, safety, aesthetics, cycling culture
Roles	Retirement/ down-shift Interests/Volunteering/Caring	Schedule Potential purposes
Relationships	New/dissolution/evolution Intergenerational Networks	Social support/influence
Health & Wellbeing	Fitness, flexibility, sensory and motor abilities Rehabilitation, management of conditions/ ageing process	Capacity and comfort  Motivation

# Movement between pathways



Trauma

Cycling companion stops

Onset of health condition prompts reappraisal of capabilities

Dissatisfaction with and deterioration of bike

Compatibility with travel needs

need to travel with and transport others and things

trip chaining

option of concessionary bus travel

Perceived cycle of diminishing confidence and performing it less

Rehabilitation/ Weight management/ Addressing sedentariness

Making car available to partner

Beating congestion

Holiday experiences

Reduce travel expenditure/ limited other travel options

Establishing a post-retirement routine

Shared activity with family members/friends

Sustained promotion of sustainable travel in workplace

Rediscovering earlier cycling achievements



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# Mobile Observations – Video Elicitation Interviews

Justin Spinney & Carl Mann (Cardiff)  
Ben Spencer (Oxford Brookes) & Heather Jones (UWE)

## Naturalistic Route

- Oxford – 20 Participants
- Bristol – 23 Participants
- Investigate where, when, how and why older people ride.
- Explore the strategies and tactics older cyclists use to minimise negative affects

## Waymarked Route

- Cardiff – 35 Participants
- Reading – 17 Participants
- Explore the tactics older cyclists use to minimise negative affects
- Gather quantitative data on subjective wellbeing
- Investigate patterns in data on wellbeing in relation to specific locations

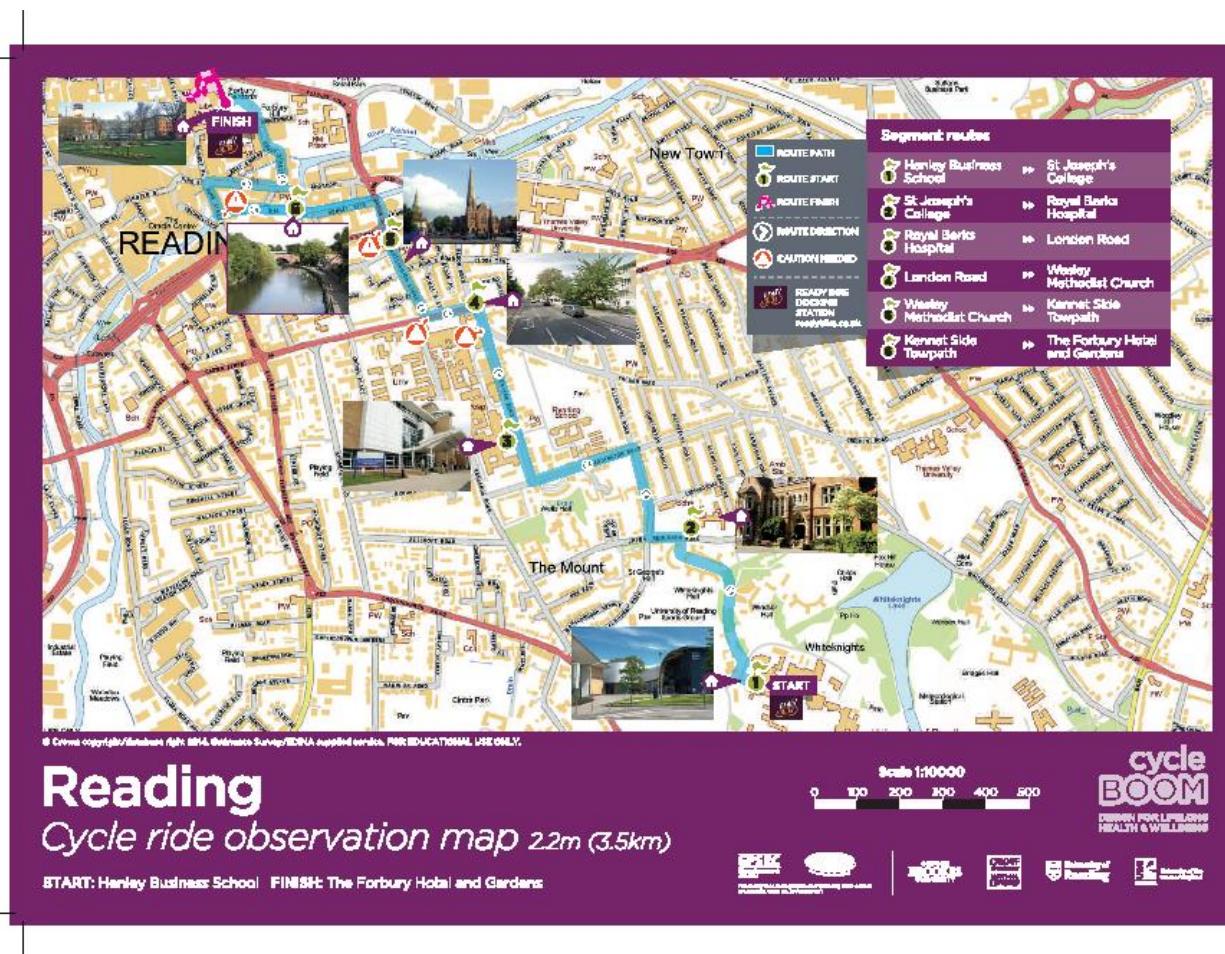
### Common to both:

- Focus on how the journey and particular locations enhance or detract from wellbeing
- Focus on what cyclists do to minimise or maximise wellbeing

## Map of Cardiff Waymarked Route



## Map of Reading Waymarked Route





1. Hedonic – An assessment of satisfaction ‘in the moment’.
2. Eudaimonic – An assessment of satisfaction with life goals.

## Defining wellbeing

- Subjective wellbeing: Focusing on individual experiences, calculates wellbeing based on judgements about life satisfaction and/or emotional responses to particular situations (Diener 2009)
- Ecological approach: Emphasis on how human-environment interactions affect wellbeing (Nordbakke & Schwanen 2014:115-116)



“to promote greater quality of life for all citizens, with the desired outcome of reducing negative impacts on well-being and to promote a healthy natural environment”

(Department for Transport, 2015)

## Mobility and wellbeing

- Increasing emphasis on journey quality to enhance wellbeing
- Commute stress caused by longer distances, waiting times, congestion, crowding, lack of predictability (Roberts 2009)

- Who/what is encountered during and/or following trips
- The nature of the inter-personal interactions
- The means of transport and infrastructures used
- Influence of person's past experiences, embodied skills and capacities, goals, needs and values
- Cultural and social norms

(Nordbakke & Schwanen 2014:118)

# When & Where?



**What was the purpose of the journeys made by participants?**

## **Work/ volunteering:**

Oxford – 25%  
Bristol – 50%

## **Leisure/ exercise:**

Oxford – 10%  
Bristol – 40%

## **Social/ practical:**

Oxford - 65%  
Bristol – 10%



“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”

(BM20 – George, 70s)

## When did participants cycle?

- Work/ volunteering – largely peak times but some control over when
- Leisure/ exercise – Overwhelmingly outside of peak time
- Social/ practical – Overwhelmingly outside of peak time



## 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.
- Data suggests tensions between potential freedom and constraints on when and where that freedom can be enjoyed.



## Physical wellbeing

- ‘One of the good things about the bike is that it’s an exercise’ (Timothy, CM001)
- ‘I was just absolutely hooked in it as a great fitness thing’ (Neville, CM009)



## Mental wellbeing

- 'I had a period where I was being treated for depression... and that was before the cancer... I found myself becoming much more open with people, and a combination of that and much more exercise I am no longer depressed. I feel a whole lot better' (Vinnie, CM003)
- 'still get a lot of fun from cycling, out in the country... the metaphorical wind in your hair... being out on your own, certainly on longer rides, it's a bit about adventure, being independent, being responsible for oneself, making one's own decisions' (Lindsey OM014)



## Social Networks

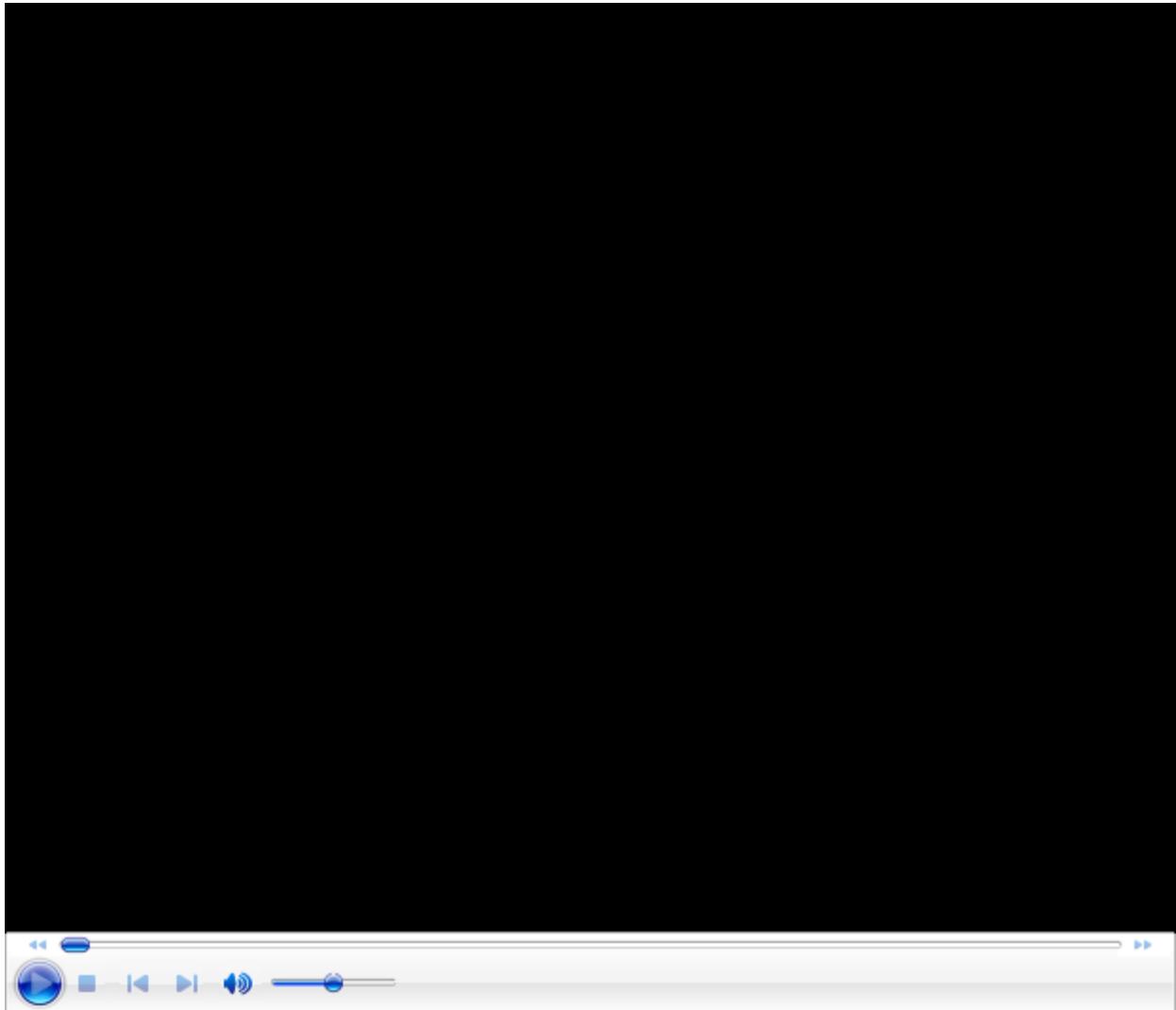
- '[Cycling has] certainly improved my quality of life, but I'm not a naturally sociable person. I have friends from work but I have never really sort of been a mixer, generally, but actually the cycling is good because it gets me out with a group of people' (Bernie, CM010)

# Causes of stress



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

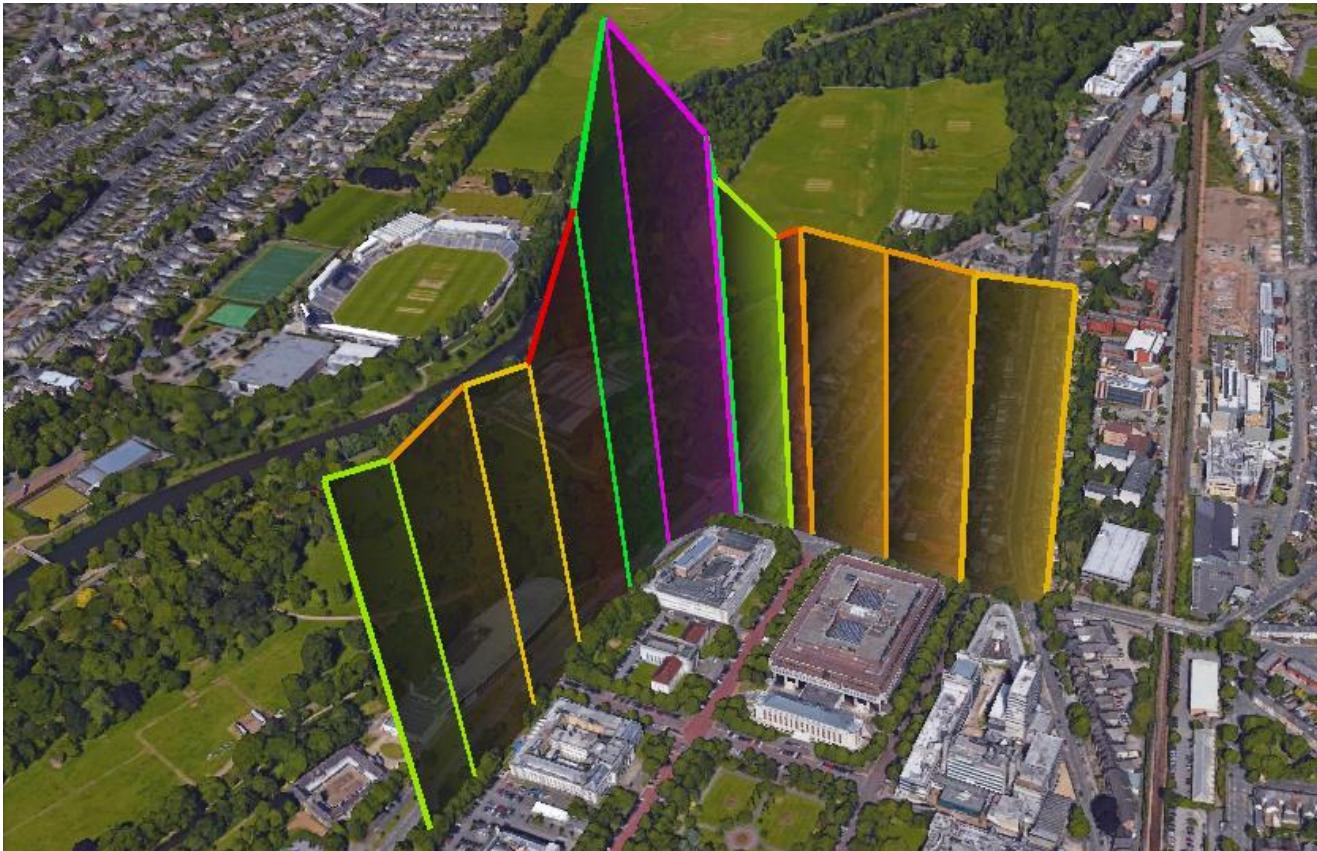
*'I didn't want to be  
standing in the  
middle of a busy  
junction like that'  
(Sibylle CM011)*



# Causes of stress



Visualisation of participant GSR data North Road – Corbett Road, Cardiff  
(CM007)

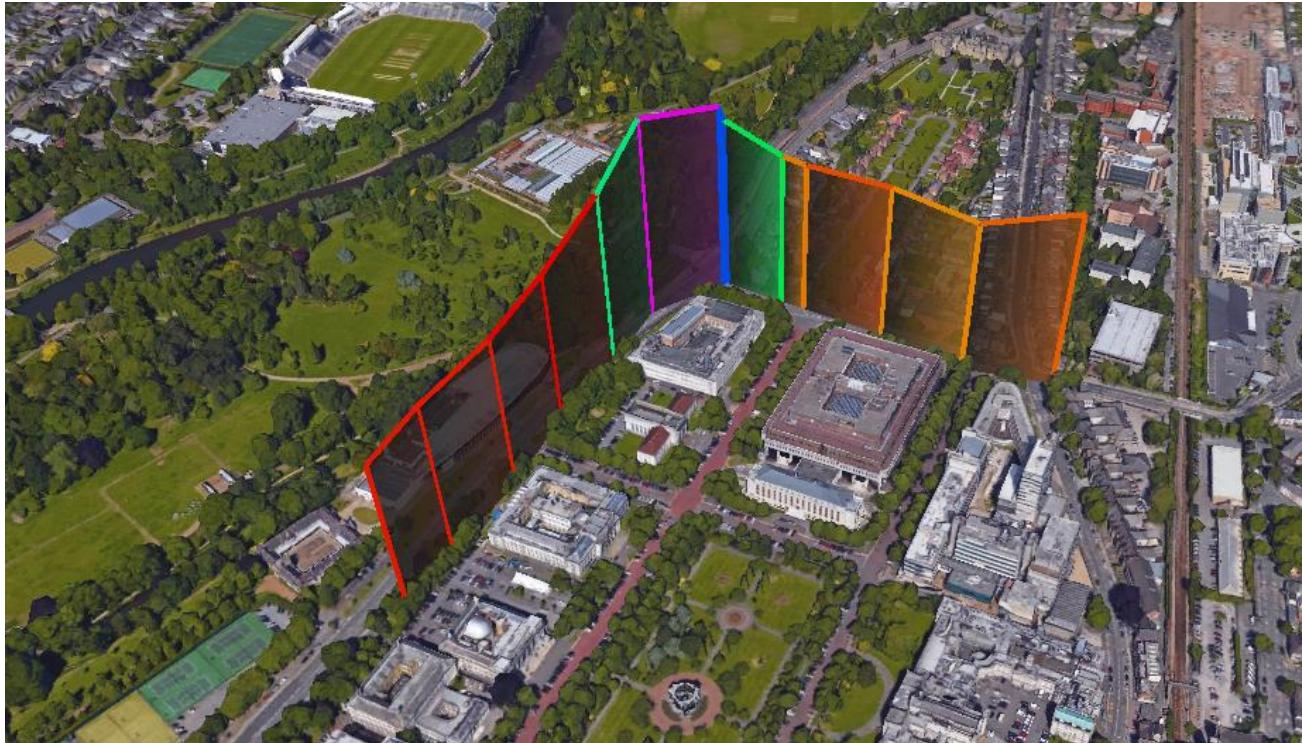


# Causes of stress



Visualisation of participant GSR data North Road – Corbett Road, Cardiff

(CM008)



# Causes of stress



Visualisation of  
participant GSR  
data Bute Park –  
Castle Street  
(CM003)



# Causes of stress

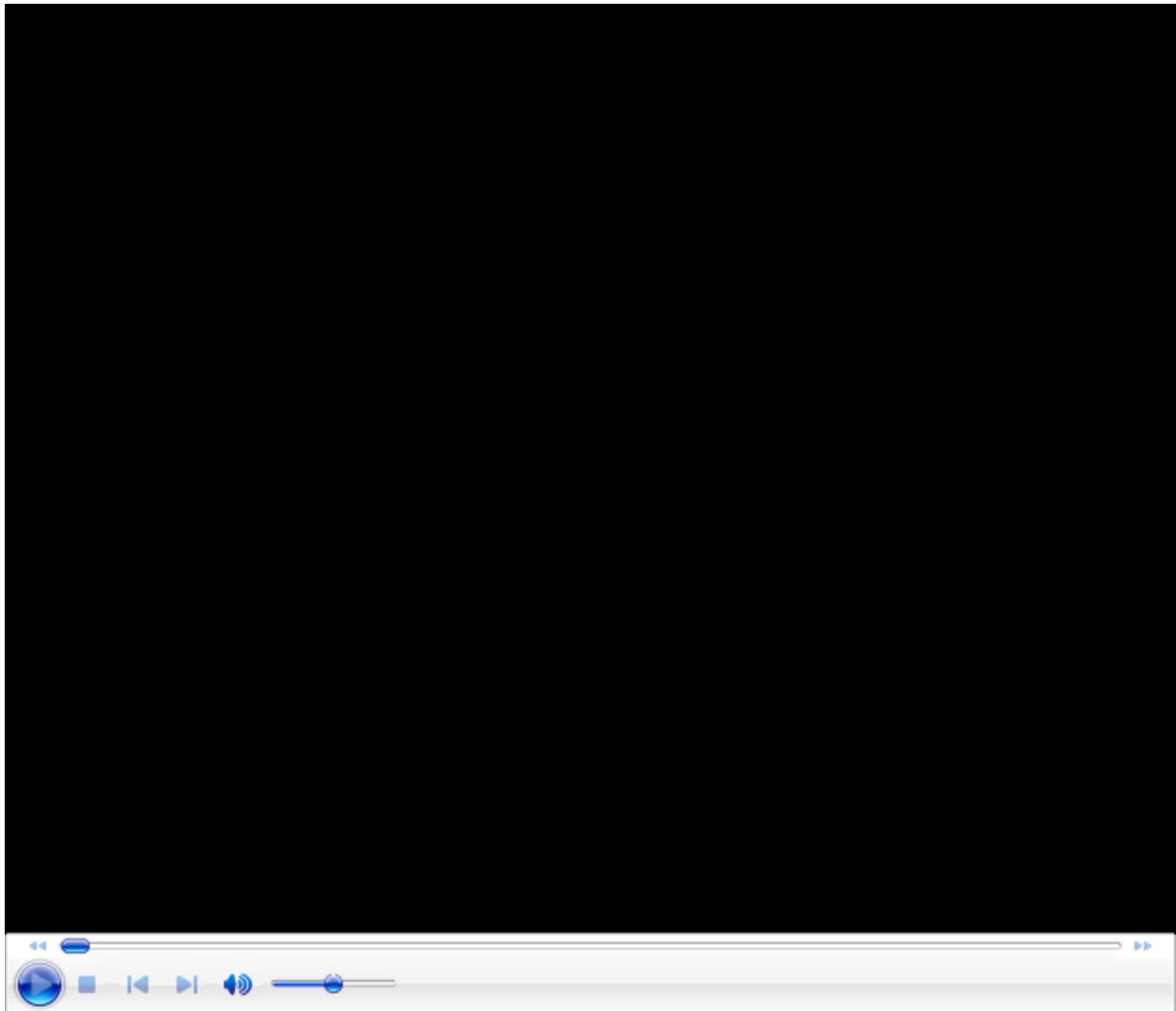


'It's not like driving, is it? When you know you've always got a lane. On the bike you've got loads of different things, haven't you? Sometimes you have got to cross a pavement, sometimes you've got a cycle lane, and sometimes you're amongst the traffic, sometimes you're in a dangerous spot in the middle of the road. It's nothing like being in the car, is it? (Sybille, CM011)

# Ageing and tactics



'I feel that when I do that, I've got sort of a bad neck really – a bit arthritisy so I can't turn as I should so I feel I'm going to wobble so I'd rather stop'. (Chloe, BM015)





## Turning

*'I find looking over my right shoulder more problematic. It's about flexibility actually, I suppose you get on and you get less. I use my peripheral vision and also using your hearing... These days you aren't hearing quite as much cars and much less 'rattley' noises' (Vinnie CM010)*

*'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 BM015)*



## 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, CM010)*

*'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, OM002)*



## 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'

(Sybille CM014)



## 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:** I got knocked off last year. Which is one of the reasons I don't ride a full size bike anymore. I find it awkward to swing my leg over the cross bar... (Eduardo, CM010)
- **E-Bikes:** 'After attending the CB e-bike demo day in June 2014 participant had bought herself an e-bike as she was impressed with the ease of getting up Headington Hill `sold! A complete convert!' She chose one that she could cycle easily with the motor switched off so the power would be a `backup' as she wanted the exercise'
- **Trikes:** Ridden by a minority of participants, mentioned as a possibility by more as a comprehensive solution to balance and dismounting issues.

# Ageing and Tactics: implications?



'So if you know what is expected of you and it's clear to you then it's easy to fit in with it' (Zachary R015)

- Ageing user finds it increasingly hard to improvise in the built environment
- Design guidance assumes a standard user based upon normative assumptions of the young and flexible body
- Discontinuity and illegibility of cycle infrastructure a bigger barrier to cycling for older people

# Design Discussions



“Coloured surfaces are not prescribed by TSRGD and they have no legal meaning. ***There is no obligation to use them***” (LTN 2008:19)

“[Cardiff] Council will generally seek to avoid the use of colour surfacing, except in specific circumstances where it is advisable to highlight the presence of a particular infrastructure design feature” (CCDG, 2014:22)

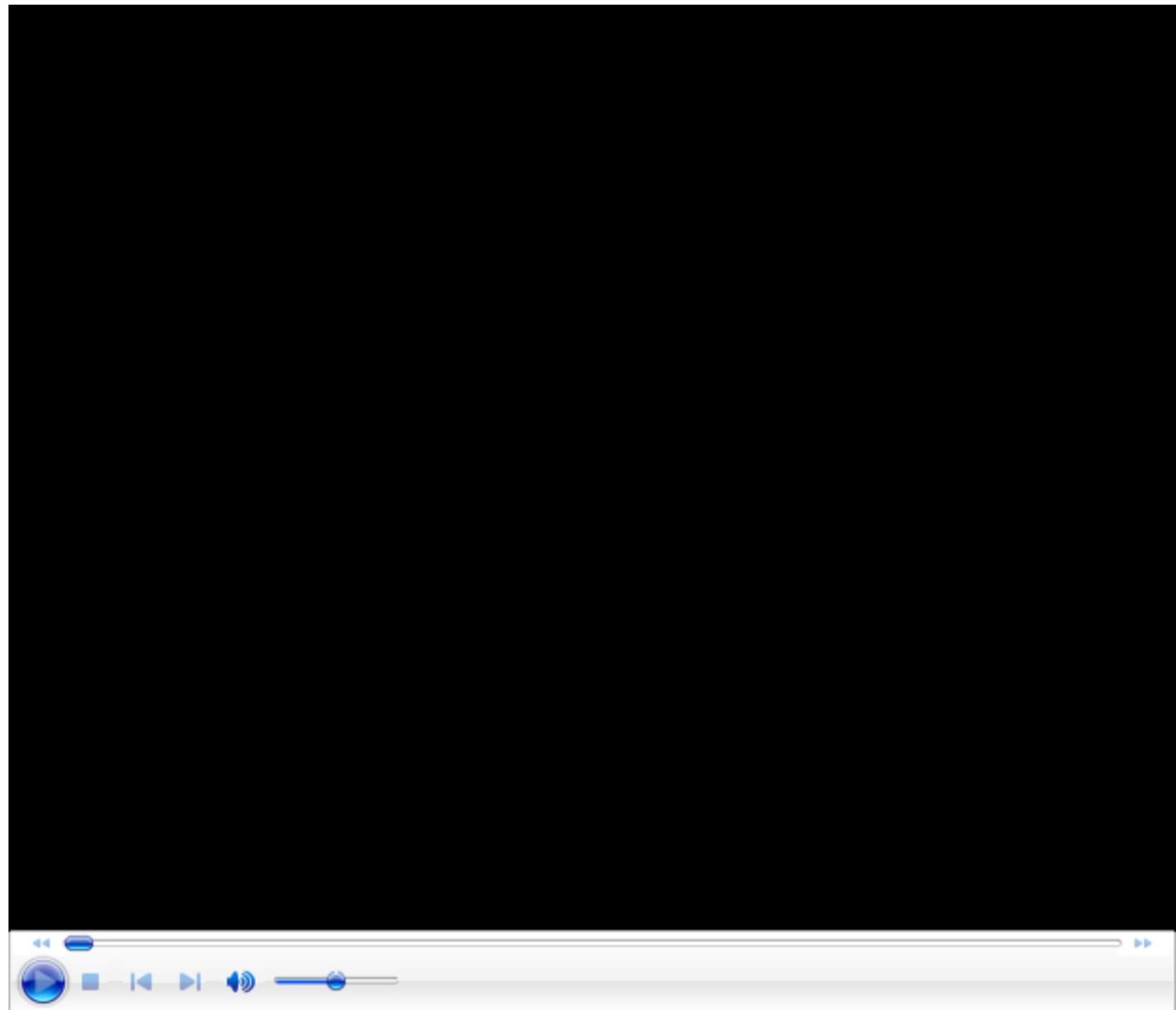
*‘if that had a nice distinctive colour all the way across it would be much easier to read, it would really help...when you’re here it’s quite hard to read the far side of it so you can see there’s maybe a traffic light you’ve got to read and you see that kerb and wonder what that does and I’m not at all sure because that’s the pedestrian one right? So what’s that cut through? It’s probably for pedestrians going across there to be fair, but you’d probably be safer if that was all on the one level and it was distinguished by paint or sets. If that was a distinctive colour it would lead you through. It has the potential to be really good’*  
(Zachary R015).

# Positive wellbeing



## Examples in Oxford:

- River-side path
- Meadows cycle track
- Descending steep hills
- Ring Road cycle track
- Marston Ferry Road
- Iffley Road



# Positive wellbeing



“As with a number of other cities and towns promoting cycling (Cycling City and Town) Cardiff Council will implement unsegregated shared use cycle and pedestrian routes” (CCDG, 2014:4).

- *‘Enjoyable, just a pleasant feeling. I felt with the lack of definition that I could be cycling there I thought people might not be aware...but you have to go very slowly and zig-zag and you don’t know if other people are going to walk in the way and sort of step sideways, that’s the thing that worries me the most.’ (Timothy CM001)*
- *‘This is perfect for me now, nobody around. That little dog is a potential hazard...it’s absolutely ideal cycling, I love it, I feel like I’m flying. The fresh air, the beauty of it...then I get slightly distracted by pedestrians and stuff (Margaret CM004)*
- *‘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’ (Zachary, RM015)*

# Conclusions?

“For cycling to be attractive, cycle routes and infrastructure need to be continuous and legible. Cyclists must be able to easily and comfortably follow the route, and should not be, or feel to have been, abandoned by infrastructure at difficult locations...” (CCDG 2014:24)



- Older users employ a range of strategies like taking alternative routes and travelling at different times to minimise journey stress
- Uncertainty caused by poor/ absent design is a key source of journey stress – negatively impacts wellbeing
- Some older users find it harder to employ tactics due to reduced range of movement – poor design therefore a bigger barrier
- Design guidance that is based on a minimum range of movement rather than assuming a ‘normative’ flexible and fit body
- Possibilities of alternative bike designs to mitigate ageing issues virtually absent from policy and design discussions



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# Cycling and Wellbeing Trials

Carien Van Reekum & Louise Leyland (Reading)  
Nick Beale & Tim Jones (Oxford Brookes)



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# Cycling, cognition and well-being

Carien Van Reekum  
Louise-Ann Leyland

 University of  
**Reading**

 **CINN**  
Centre for Integrative  
Neuroscience and  
Neurodynamics

**EPSRC**  
Pioneering research  
and skills

Lifelong Health  
& Wellbeing  
Research for Healthy Ageing

**OXFORD  
BROOKES  
UNIVERSITY**

**CARDIFF  
UNIVERSITY**  
**PRIFFSGOL  
CAERDYN**

 **University of  
Reading**

 **UWE  
BRISTOL**  
University of the  
West of England

# Age and cognitive function

- Age, also in the absence of pathological conditions, is associated with cognitive decline (e.g., Sandberg, 2014; Park, 2000; Salthouse, Atkinson, & Berish, 2003; Salthouse, 2004)

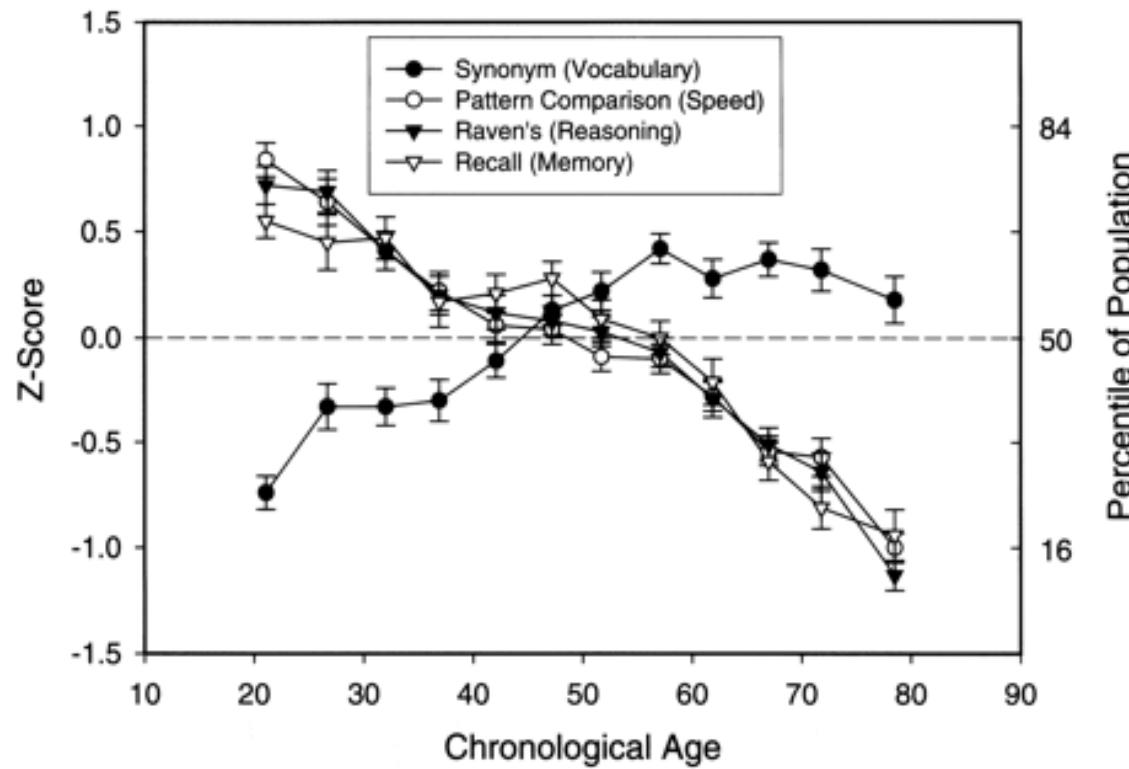
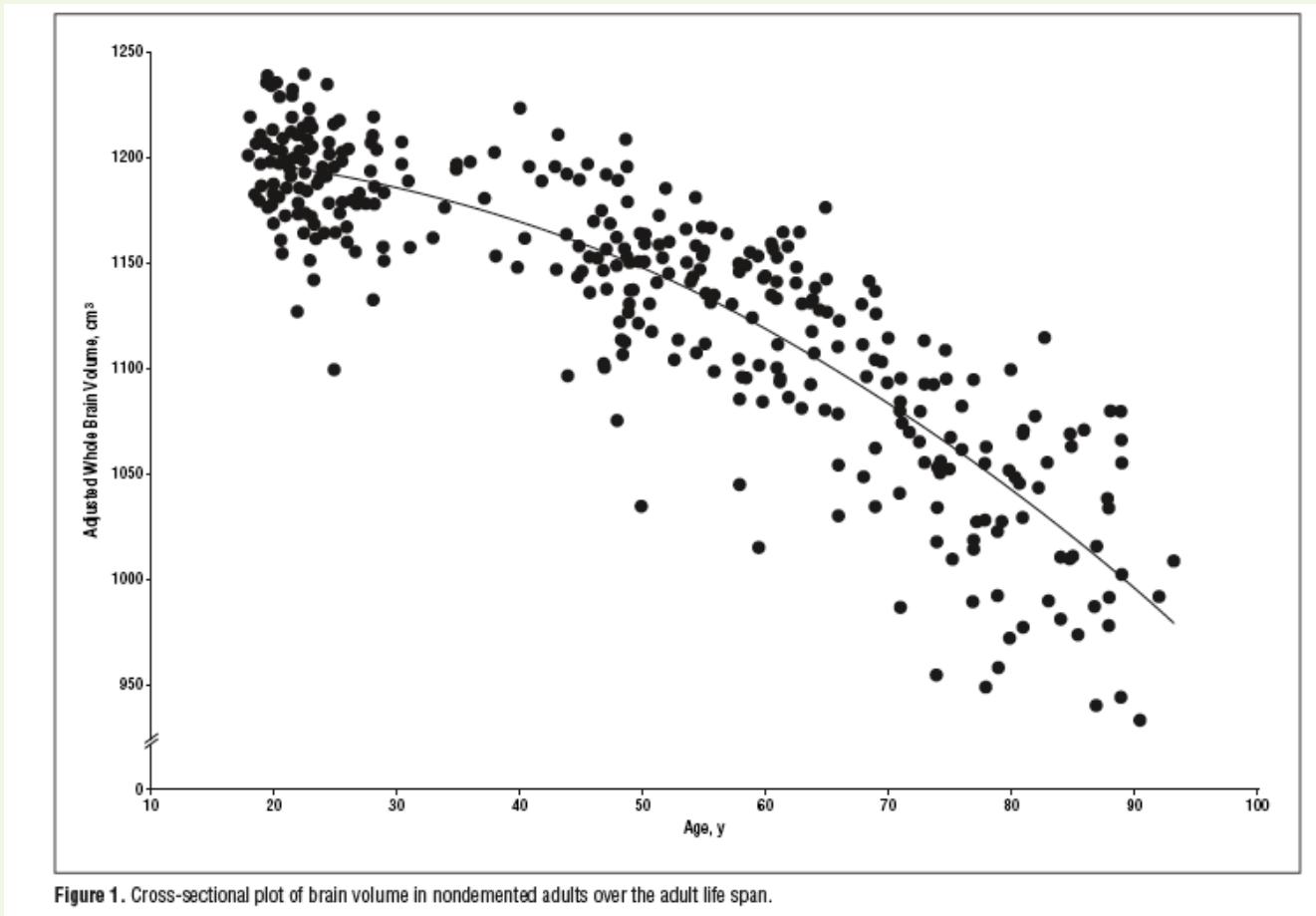


Fig. 1. Means (and standard errors) of performance in four cognitive tests as a function of age. Each data point is based on between 52 and 156 adults.

- Executive functions start to decline from the age of 20 onwards
  - vocabulary continues to increase with age

# Brain volume declines from late 20s

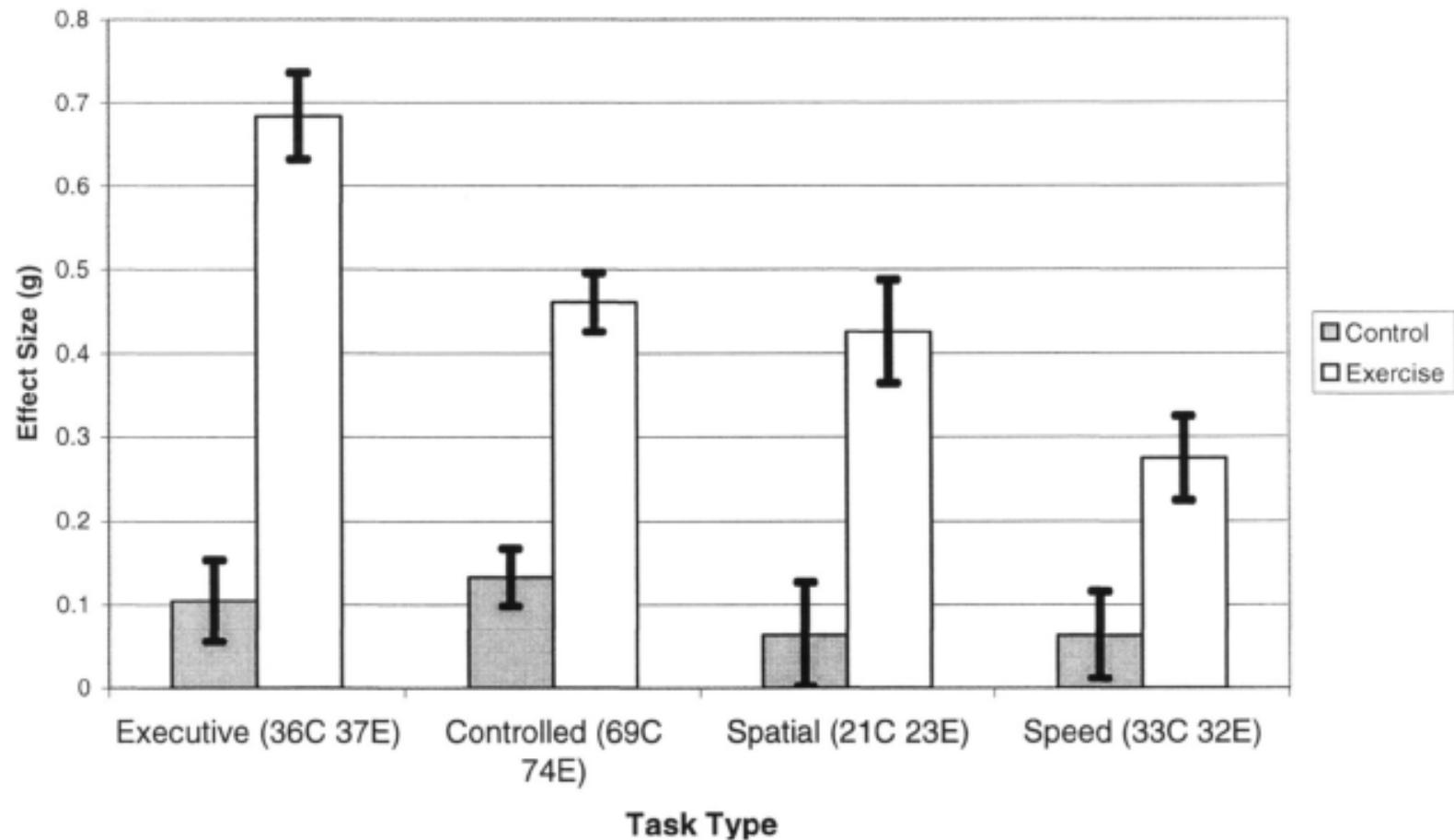
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Fotenos et al. (2008)

- Both %GM and %WM in the intracranial space were significantly less in older subjects ( $\geq 50$  years) than in younger subjects ( $< 50$  years; Ge et al., 2002)

# 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.

# Psychological well-being

- It is well known and has been demonstrated previously that cycling has a positive effect on physical health, including for older adults (Pollock et al., 2014)
- Physical function in older adults is related to feelings of well-being. It has been demonstrated that those who are physically active report higher levels of well-being





- Is exercise and better cognitive performance in older age causal?
- Would cycling improve cognition and well-being due to physical exercise?
  - Role for interaction with environment, the “outdoors”
- Would improved well-being underlie any changes in cognition?

# Cycling and older adults

- Physical exercise
- Stimulation
- Navigation
- Social
- Independence
- Increasing mobility



# Wellbeing and cognition trial

- Investigate the impact of cycling for an 8-week period on older adults' cognition and well-being
- Participants, over 50, cycle for an 8 week period
  - At least 1 ½ hours/week
    - Pedal bike
    - E-bike
    - Control – no cycling
- Complete a diary of rides
  - Including other physical activity undertaken
- Cognition and wellbeing are measured before the trial (pre-intervention) and after (post-intervention)



# Domains measured

- Wellbeing/affect
- Physical and mental health
- Physical activity
- Cognitive function
  - “Executive function”
    - management (regulation, control) of cognitive processes, including working memory, reasoning, task flexibility, and problem solving as well as planning and execution
- During cycling trial: GPS, diary

**Compare pre-trial  
to post-trial score**



- Participants:
  - 77 Middle to older aged (range 51-83 years, Mean age = 62) – not currently cycling
  - Pedal bike: N=33 (out of 40)
  - E-bike: N=32 (out of 40)
  - Control: N=12 (out of 20)

- Scales of Psychological Well-Being (PWB, Ryff, 1989)
- Autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance
- Items include:
  - *“I feel good when I think of what I've done in the past and what I hope to do in the future”*
  - *“People would describe me as a giving person, willing to share my time with others”*
  - *“I think it is important to have new experiences that challenge how you think about yourself and the world”*
  - *“With time, I have gained a lot of insight about life that has made me a stronger, more capable person”*

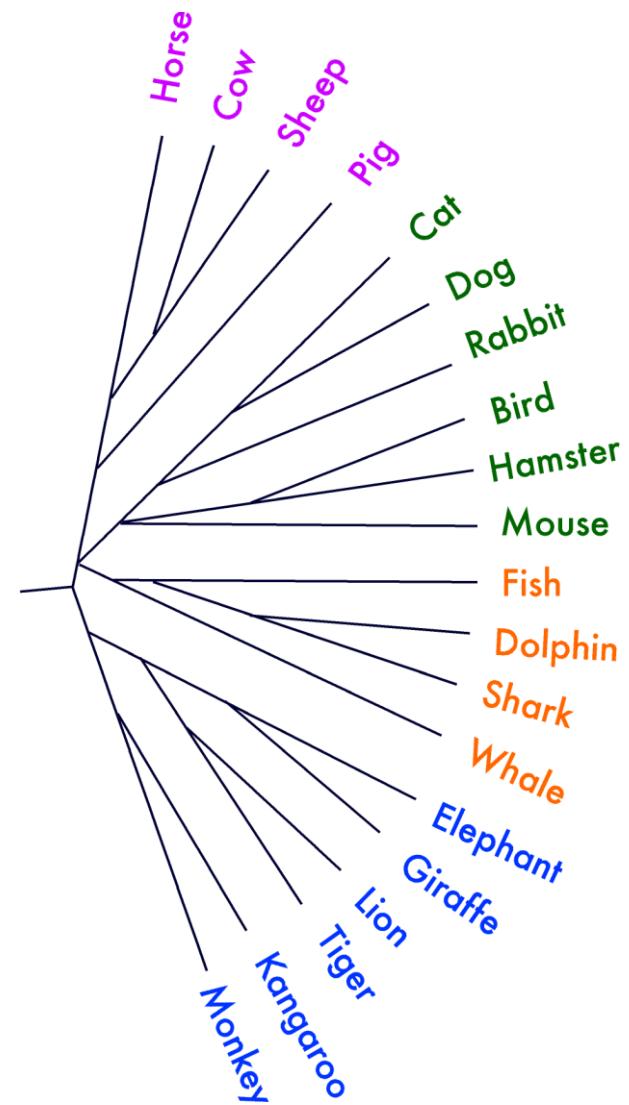
**Personal Growth** “Has a feeling of continued development; sees self as growing and expanding; is open to new experiences; has sense of realizing his or her potential; sees improvement in self and behavior over time; is changing in ways that reflect more self knowledge and effectiveness”

**Purpose in Life** “Has goals in life and a sense of directedness; feels there is meaning to present and past life; holds beliefs that give life purpose; has aims and objectives for living”

**Positive Relations with Others** “Has warm, satisfying, trusting relationships with others; is concerned about the welfare of others; capable of strong empathy, affection, and intimacy; understands give and take of human relationships”

# Other measures

- Composite executive function
- Verbal fluency scores
- Memory composite scores



# Summary and conclusions so far

- It is feasible to provide cycle training for older adults who have not cycled before (or recently)
- Suggestion that both pedal cycling and e-bike use can improve psychological well-being and some executive functions for older adults.
- As those on e-bikes improved as much as pedal cyclists, the increase is likely to be due to the enjoyment/reward and independence gained during the trial and is not necessarily only due to increased cardiovascular health/cerebral blood flow (e.g., Erickson, 2011).
- This has implications for re-engaging older adults with cycling through the use of e-bikes



# Thanks!

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Oxford Brookes



Tim Jones - PI



Nick Beale – Project Manager



Benedict Spencer –  
Mobile rides and interviews

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Pioneering research  
and skills

Lifelong Health  
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Research for Healthy Ageing

OXFORD  
**BROOKES**  
UNIVERSITY

CARDIFF  
UNIVERSITY  
PRIFYSGOL  
CAERDYN

University of  
**Reading**

UWE  
BRISTOL  
University of the  
West of England

**cycle BOOM team**

Reading



Emma Street – Urban  
design guide



Carien van Reekum –  
Cognition trials

Bristol



Kiron Chatterjee -  
Interviews



Heather Jones –  
Interviews

Cardiff



Justin Spinney – Mobile  
rides



Carl Mann –  
Mobile rides

<http://www.cycleboom.org/>



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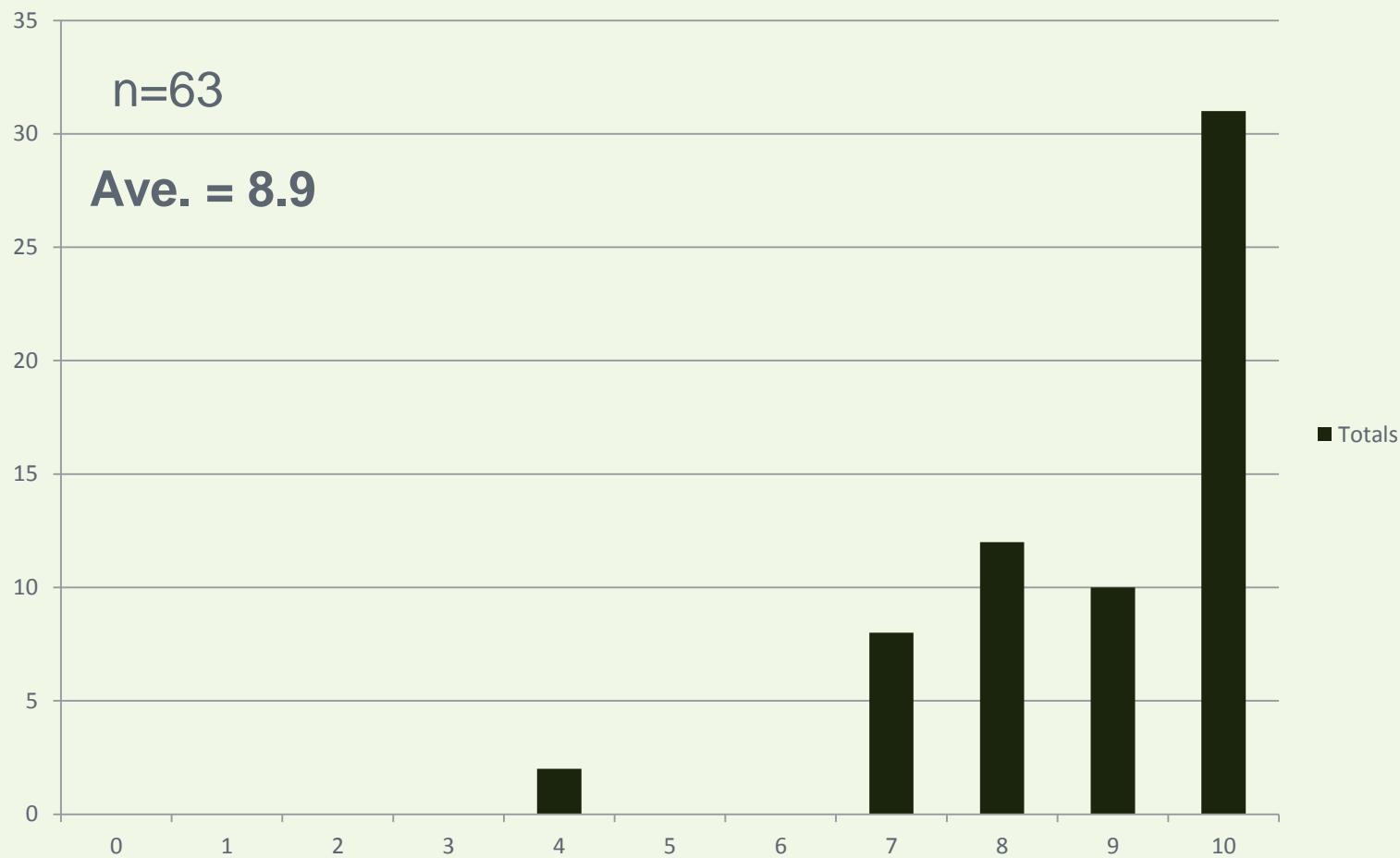
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# Wellbeing Trial Exit Survey | Results

Nick Beale (Oxford Brookes)

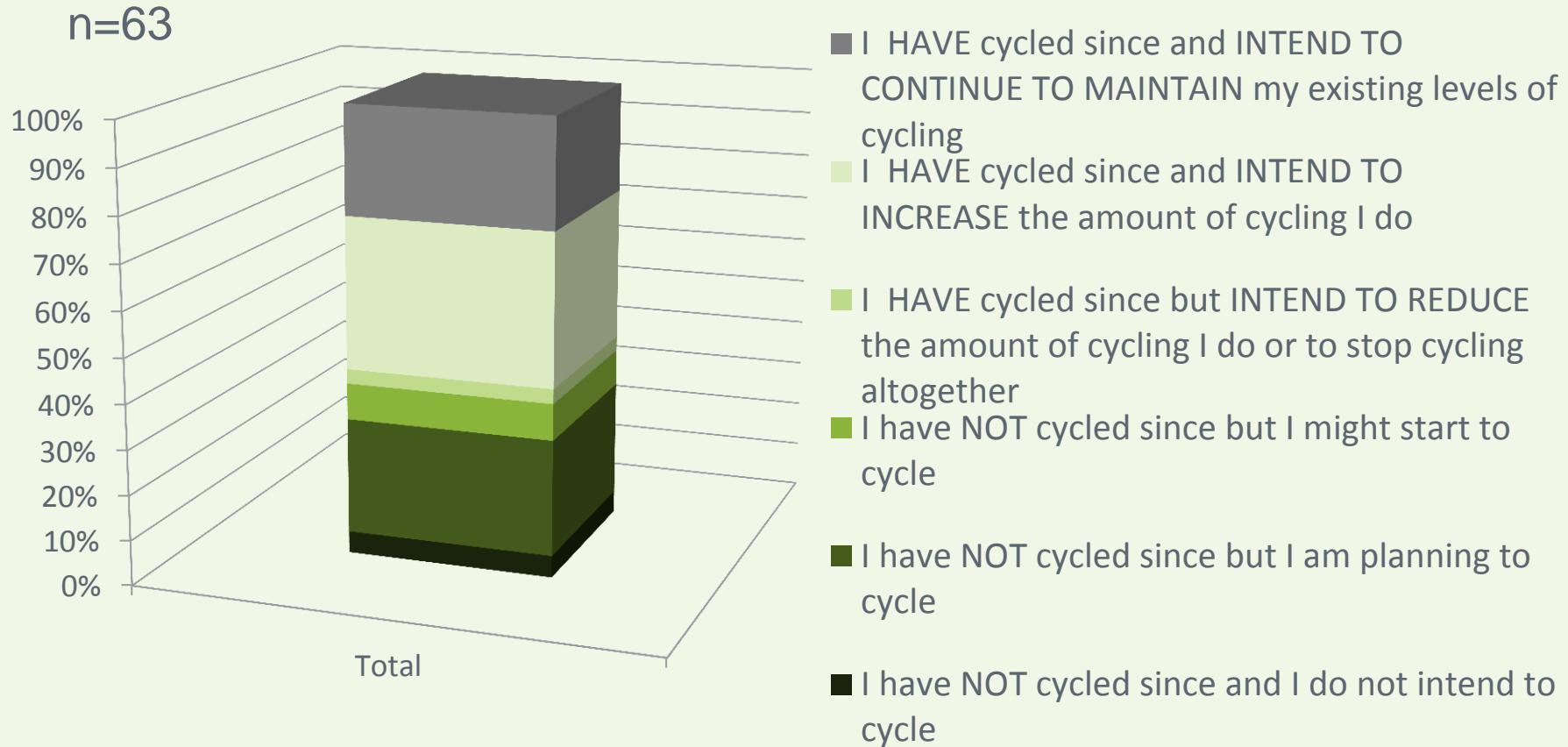
# Feeling on participation in the cycling trial

Q. Please indicate, on balance, how you feel about your participation in the cycling trial [on a scale of 0-10 where 10 is very positive]



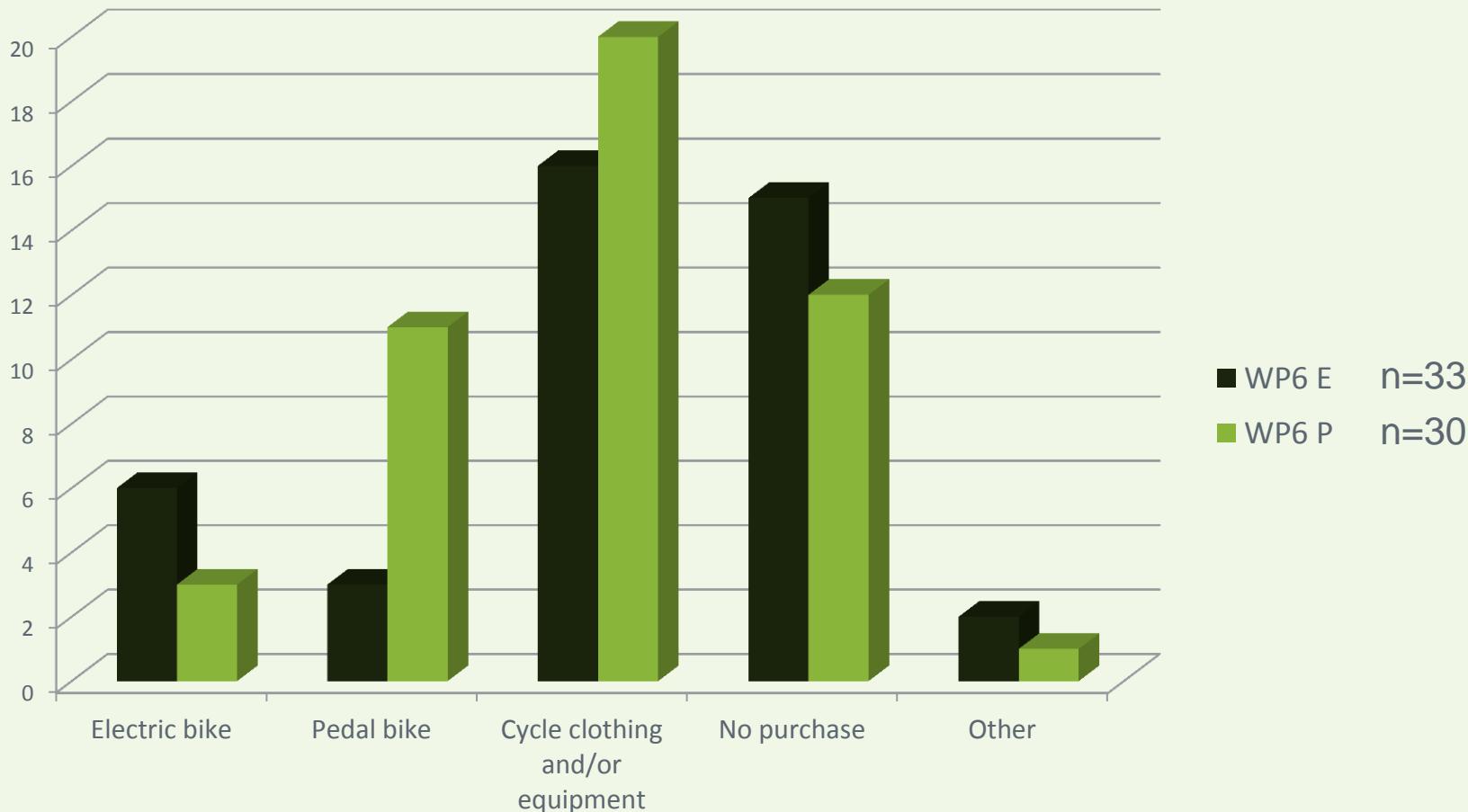
# Cycling since the trial, and future plans

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



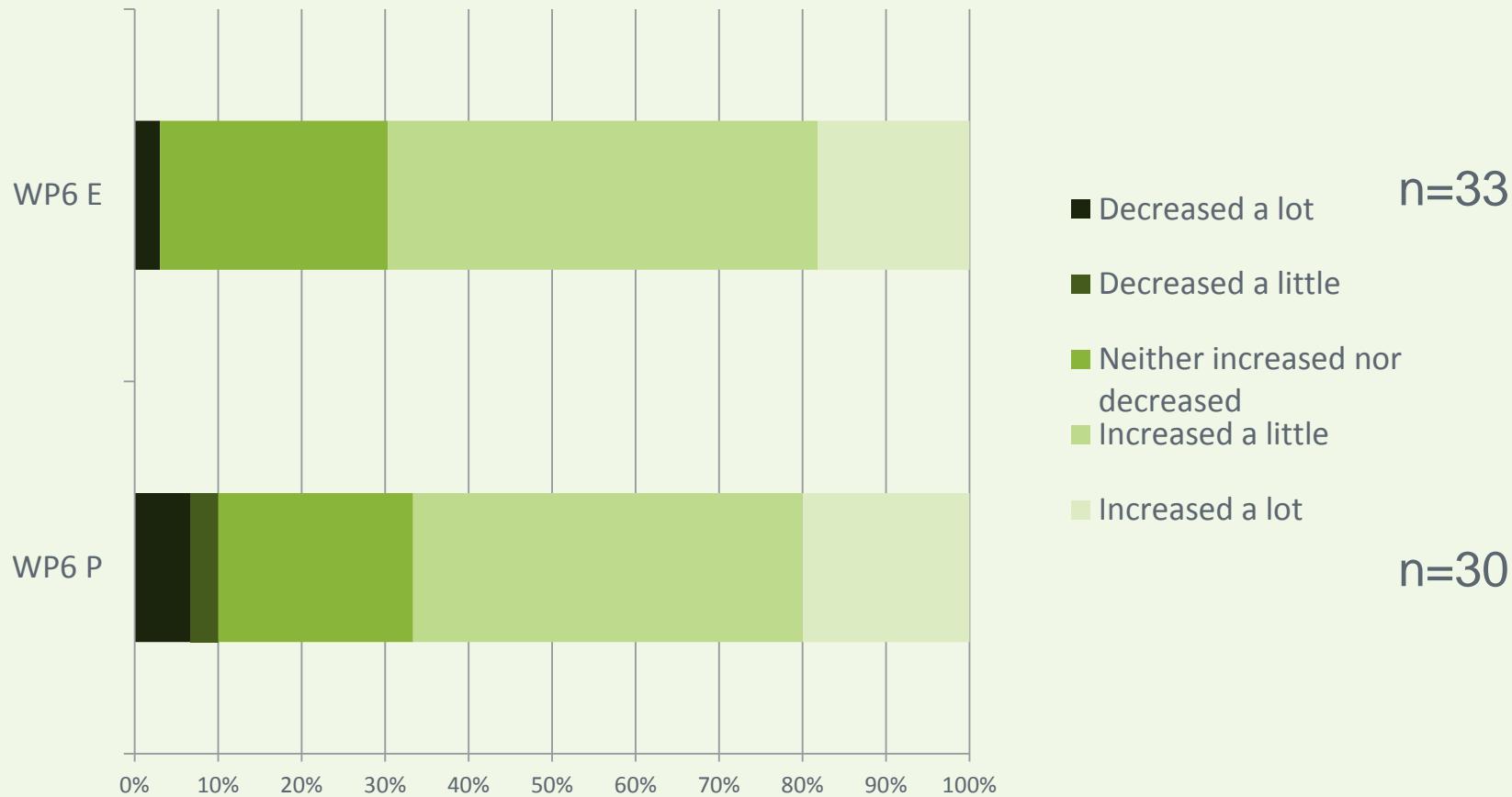
# Cycling purchases since completing the trial

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



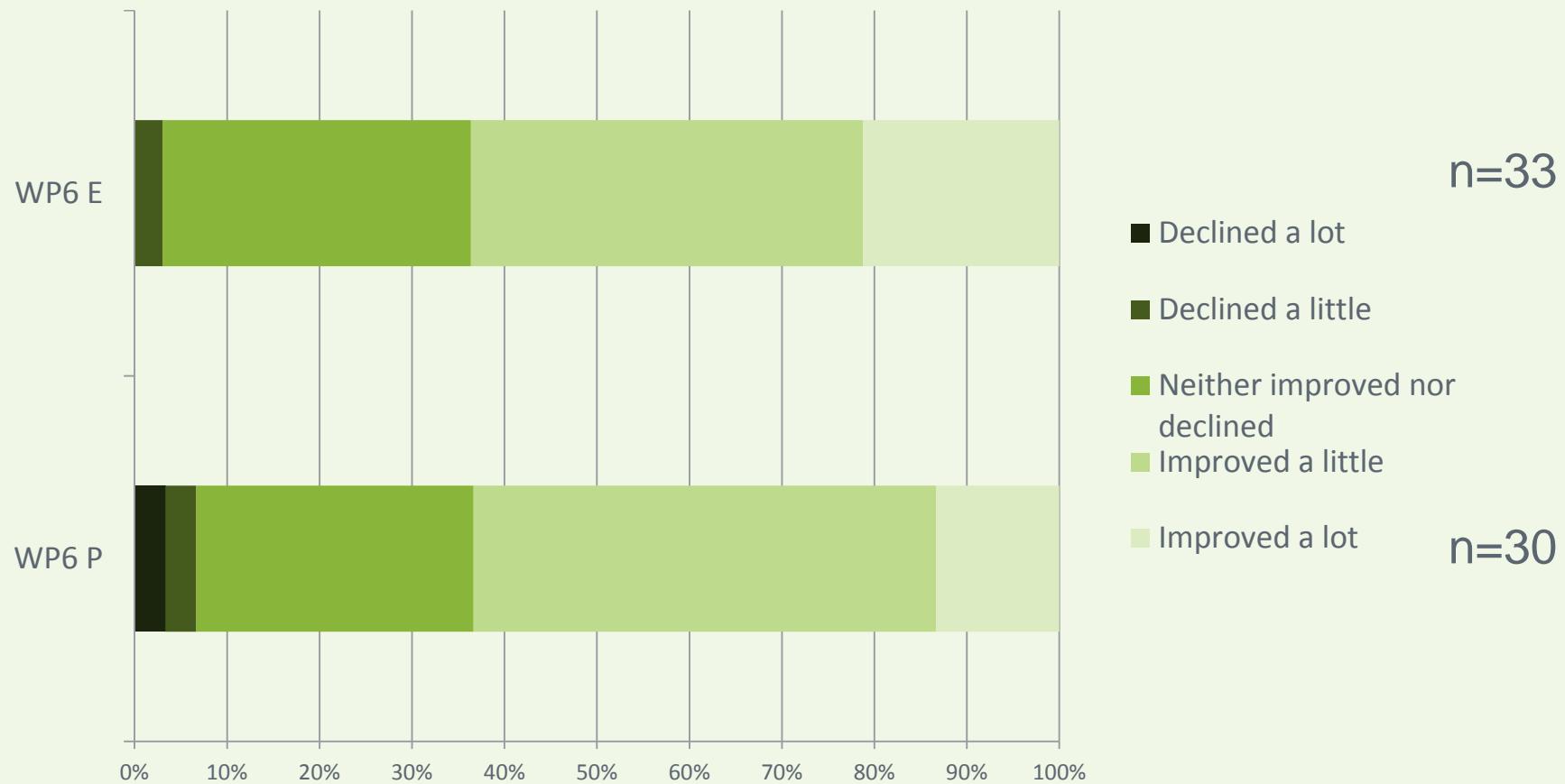
# Perceived change in physical activity

Q. Please indicate below how YOU perceive YOUR physical activity has changed compared to BEFORE taking part in the cycling trial



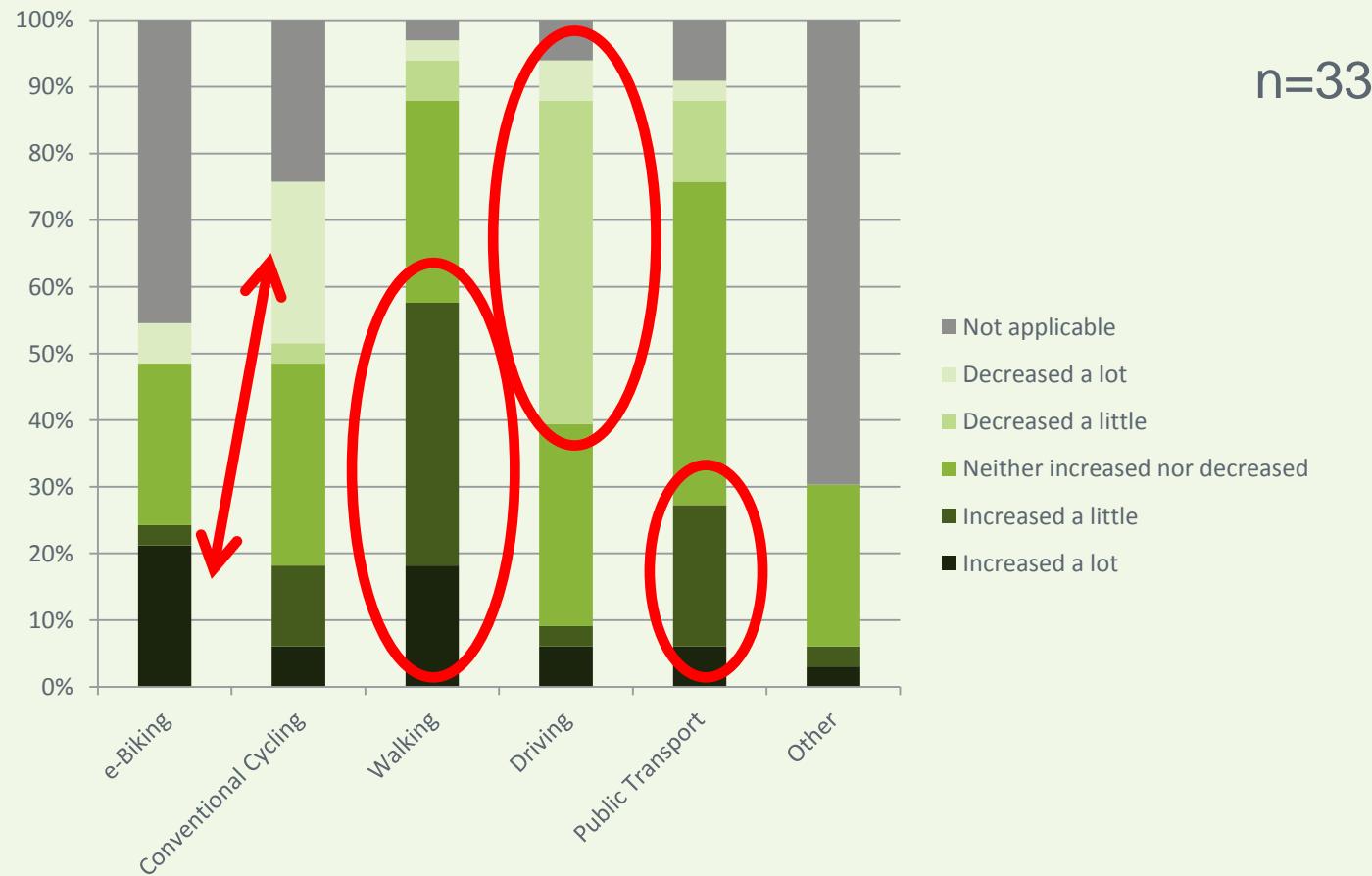
# Perceived change in wellbeing

Q. Please indicate below how YOU perceive YOUR wellbeing to has changed compared to BEFORE taking part in the cycling trial



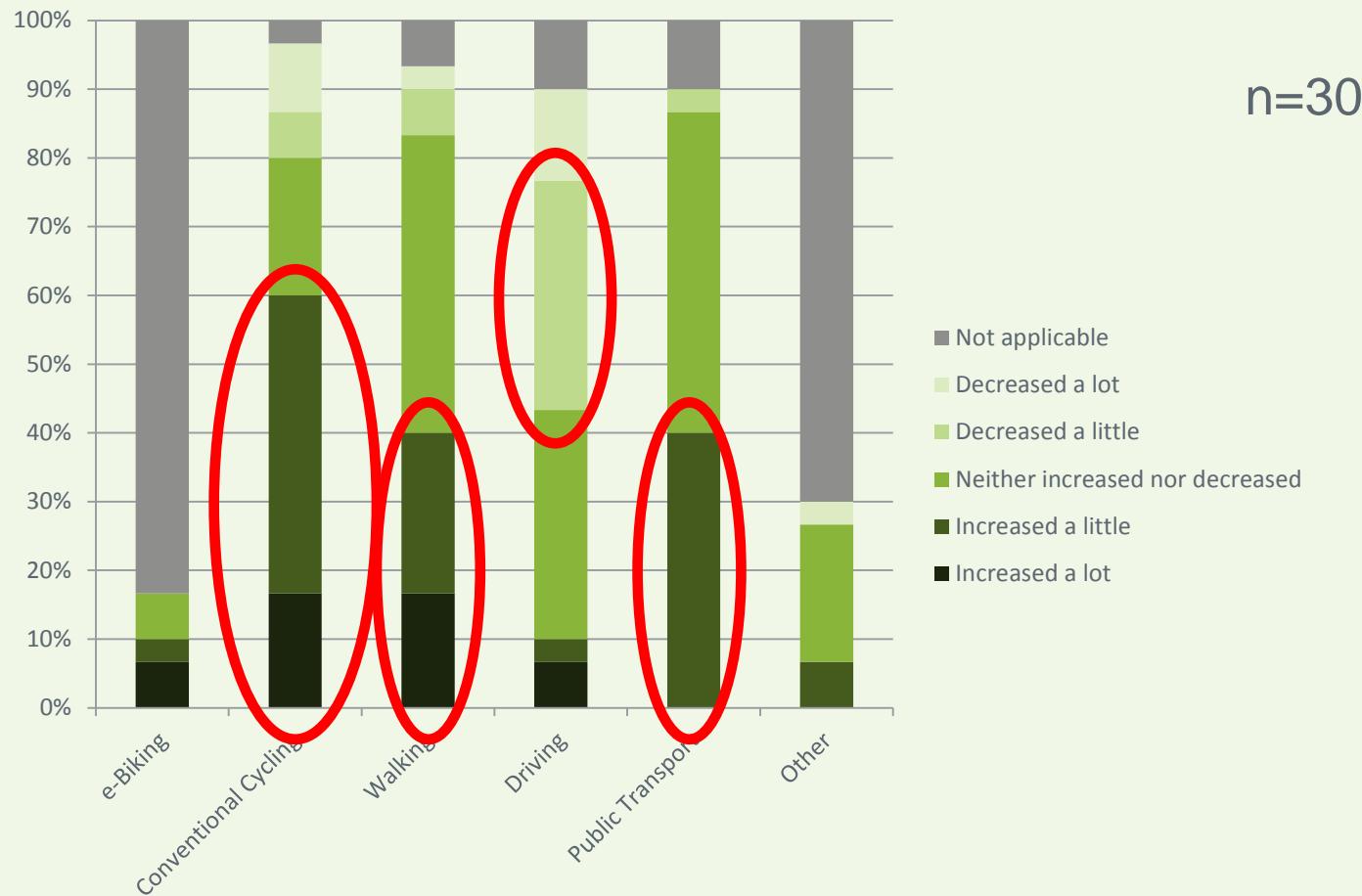
# Perceived change in travel behaviour after taking part – e-Bikers

Q. Please indicate below how YOU perceive YOUR travel behaviour has changed COMPARED TO BEFORE taking part in the 8-week cycling trial



# Perceived change in travel behaviour after taking part – Pedal cyclists

Q. Please indicate below how YOU perceive YOUR travel behaviour has changed COMPARED TO BEFORE taking part in the 8-week cycling trial





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DESIGN FOR LIFELONG  
HEALTH & WELLBEING

# Diary of Cycling Experience (DoCE)

Tim Jones (Oxford Brookes)

“Getting  
busy in  
middle  
age!”

## **Complexities of work-life**

Job | move to suburbs | household |  
caring obligations

## **Personality – antecedent state**

Mode preference | Road danger |  
Health issues-energy | social  
circles/lack of cycling culture

## **No reason! – not uppermost in sphere of consciousness**

# Rationale for participation



Acknowledge:

'Allure of the e-bike'

Positive antecedent state towards cycling or physical activity.

Health [maintain-improve-overcome]

Alternative mode

Access outdoors – exploration

Regain confidence cycling

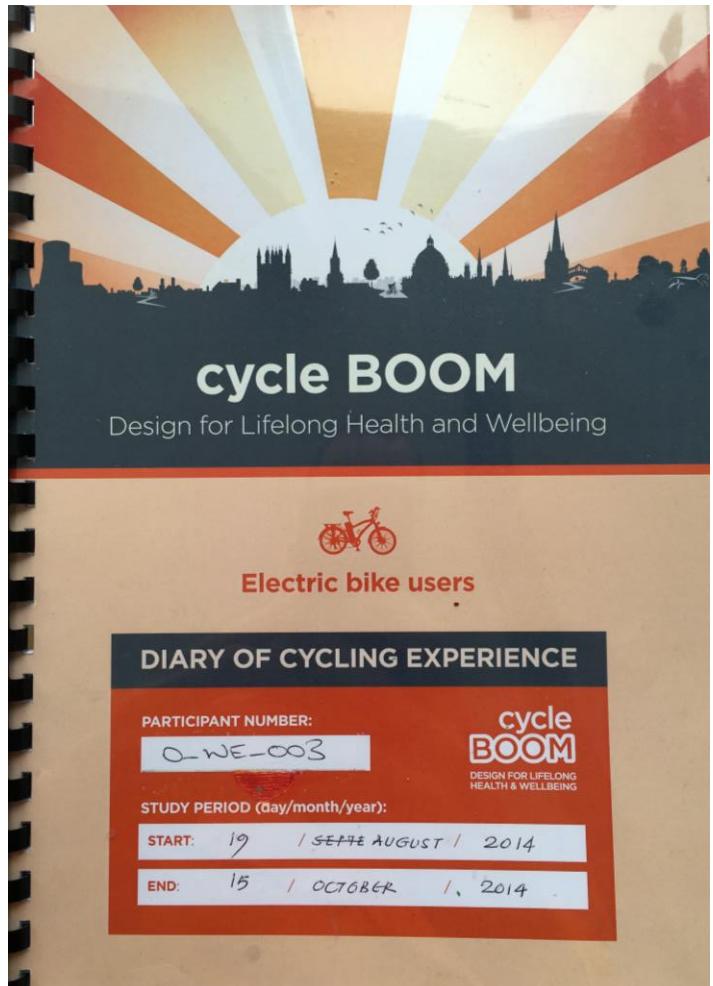
Social riding

Overcoming hilly terrain [e-bike]

Time /(in some cases) disposable income

# Diary of Cycling Experience (DoCE)

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## FACTS

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
<b>MON SEPT.</b>		WALKING.	15:00	16:30	M	P OX14 3XT
<b>TUES 2</b>		CYLING (ride 1)	09:48	11:07	M	R. OX14 3XT
		CYLING (ride 2)	18:48	19:24	M	R OX14 3XT
<b>WED 3 SEPT</b>		SWIMMING (OUTDOOR)	14:30	15:05	M	R.
		CYLING	16:14	17:01	V	R HANSEY POOL OXFORD
<b>THU 4</b>		BADMINTON	10:00	12:00	V	R
		CYLING	15:15	16:45	M	P OX14 3XT
<b>FRI 5</b>		CYLING	09:25	13:26	V	R OX14 3XT
		PICKLEBALL	19:30	21:45	V	R
<b>SAT 6</b>		NO ACTIVITY				
<b>SUN 7</b>		CYLING (ride 1)	10:16	12:32	M	R. OX14 3XT
		CYLING (ride 2)	14:01	18:37	V	R. OX14 3XT
		SWIMMING (outdoor)	15:40	16:00	M	R.

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 (%)				10: Personal reflection on cycling/physical activity
		Off	Eco	Tour	Sport	Turbo
CENTRAL OXFORD HIGHGATE SHOPS OX14 3XT						DO NOT ENJOY WALKING AT PRESENT BUT FEEL LIKE I COULD HAVE TO IMPROVE BY DOING MORE BUT SO SOON COMPARED WITH CYCLING ALONE. ABOUT 2-2.5 MILES
CENTRAL OXFORD WESTERN BOARD MILL OX14 3XT	R.	0	0	75	24	I ENJOY WALKING GOOD TO DO OUT SUPER RIDE AND ENJOY IT WITH GILL WHO WANTED RIDE WHEN BROKEN FOOT OK SHORT RUN BUT PAINFUL
HIGHGATE AND DOWNS IN ABINGDON, OXON 3XT	R.	0	0	100	0	RELAXING AND SEVERAL FRIENDS NOT SEEN RECENTLY
OX14 3XT	R.	0	0	0	99	ROUTE HOME FROM WORK TO SANDFORD BETTER THAN DRIVING A LOT EVEN AGAINST MEADOW TRACKS SEE UNCH
(3 SEPT CONT.)						WITH GROUP OF THIS WORK BETTER. GOOD GAMES PLAYING HR. CAN ONLY THINK ANYONE ONE WOULD USE THIS GREAT COULD BE RELATED TO MOST OF THE WORK. SOON EASY RIDE.
LOCAL ABINGDON SHOPPING OX14 3XT	R.	1	99	0	0	WITH GILL WHO CAN GO BY RIVER FEELS TIRED AFTER ONLY PLAYED FOR 1 HOUR IN SESSIONS HAD TO UNPLUG OVER 2 HOURS TOO MUCH STANDING OUT TIME LIKE MORE ACTION.
TO WILMINGTON OX14 3XT	R.	0	0	0	99	WITH GILL WHO CAN GO BY RIVER FEELS TIRED AFTER ONLY PLAYED FOR 1 HOUR IN SESSIONS HAD TO UNPLUG OVER 2 HOURS TOO MUCH STANDING OUT TIME LIKE MORE ACTION.
LOCAL ABINGDON OX14 3XT	R.	0	0	100	0	ONLY 25 MINS CYCLING IN THE RECREATIONAL PARK IN WILMINGTON. 1HR 10 MINS SPEND IN TWO JOURNEY. PROBABLY NOT AS MUCH SWIMMING BUT REST & SUNBATHING (14:30-17:52)
HANSEY POOL OXFORD OX14 3XT	R.	0	0	0	98	2

8 | DIARY OF CYCLING EXPERIENCE

# Diary of Cycling Experience

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## WEEKLY REFLECTION ON YOUR CYCLING/PHYSICAL ACTIVITY EXPERIENCE

Use this space to record reflections on your experience at the end of each week. Feel free to include text, photos, sketches etc. Please don't forget to include a date and caption.

### WEEK 3

A successful week of activities. With GM's broken knee declared minor we were able to use the e-bikes for journeys we would normally have undertaken or where we would have used a car.

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. One journey took us along the Thomas Pinta, including a field section, and this was in better condition than the road on which we had made the outward journey - and more scenic.

Still noisy constant power settings and using gears, except resting on steep hills. Have climbed hill we managed before. Strange phenomena is that it is sometimes better (repeat sometimes) to change up a gear going up a hill than the to change down, which is the logical way. This sometimes gives more power and it must be due to pedal pressure bringing more resisted power into play.

Due to the heftiness of the bike and high centre of gravity due to battery and saddlebag one must be careful not to leave the bike too far when stopping. I was caught unaware and the e-bike tipped over and took me with it. NO damage to either but I am now more aware now and being more careful.

The bell is in a very awkward position and prone to move to the opposite side than it will be more accessible.

Slight adjustments to the saddle position, about 12mm up and 12mm back have made my riding position better.

Am taking readings from the cardio unit after each ride which I will submit with the diary and may be useful in your review.

Hoping weather stays reasonable and look forward to upgrade rides in the next 5 weeks. The e-bike has certainly made cycling easier and although effort is required one finds a ride feeling fresh. Its also thrilling to go faster.

# FEELINGS



Wallingford Bridge. We enjoy camping at Wallingford. The site is a few metres away by the riverbank.

5 SEPTEMBER 2014



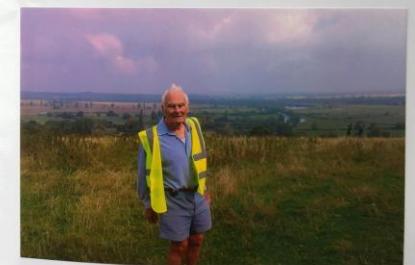
Time for a walk around Marlow Arboretum near Nuneham Courtenay, leaving e-bikes at the gate.

20 SEPTEMBER 2014

O-WE-003



Short stop at Clifton Hampden.



Wittenham Clumps, near Dorchester. Not even the e-bike could climb this hill.

5 OCTOBER 2014

O-WE-003

## TECH

## BODY

## PLACE

### Re-acquainting

*Comfort*

*Manoeuvrability*

*Operation*

*Knowledge-support*

### Adapting-learning

*Pleasure*

*Weight loss*

*Better sleep*

*Confidence/capability*

*Pain*

*Aches*

*Tiredness*

*Colds*

*Crashes!*

### Expanding-discovery

*Weather*

*Infrastructure*

*Social networks*

*Nature*

*Transgressions*

# REFLECTIONS on Cycling Experience

Overwhelmingly positive experience

Motivation: cycle training & structured plan

Intention: develop & maintain cycling

**But partial cycling [time/space]**

## POTENTIAL CATALYSTS

Awareness/knowledge of healthy ageing

Growth in more supportive/better quality infrastructure

Growth in availability/affordability of E-bikes

**Gillian Flynn**

**Barton, East Oxford**

**Age: 60s**

**Pedal cycle trial**

***Returning to cycling after several years***

It has been a great experience! I have met new people and made friends and it has made me more independent and outgoing.



My cycling with a conventional bike was getting slower, harder, and less enjoyable, and I have now regained the pleasure of cycling, easier but still giving a reasonable amount of exercise .

**Brian Hook**

**Abingdon**

**Age: 80s**

**Electric-bike trial**

***New to E- bikes after recently reduced pedal cycling***



# Video shorts



**Val Scatchard**

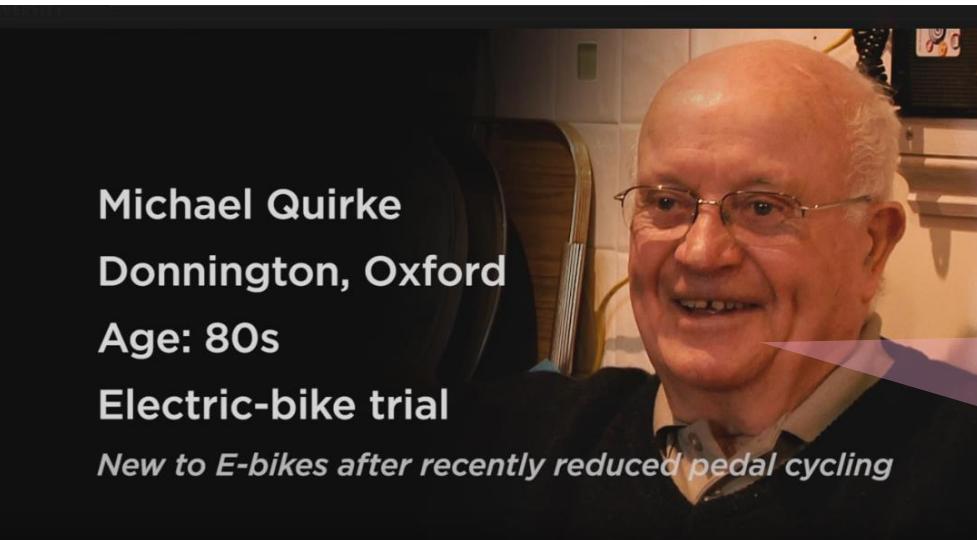
**Cumnor, Oxford**

**Age: 60s**

**Electric-bike trial**

*New to E-bikes after recently reduced pedal cycling*

“I would like an e-bike as I live at the top of a 1.5 mile hill...[taking part in the trial] proved the benefit of exile!”



**Michael Quirke**

**Donnington, Oxford**

**Age: 80s**

**Electric-bike trial**

*New to E-bikes after recently reduced pedal cycling*

“Appreciate value on wellbeing and ease at things...Great experience great team well organised easy to do and of benefit.”



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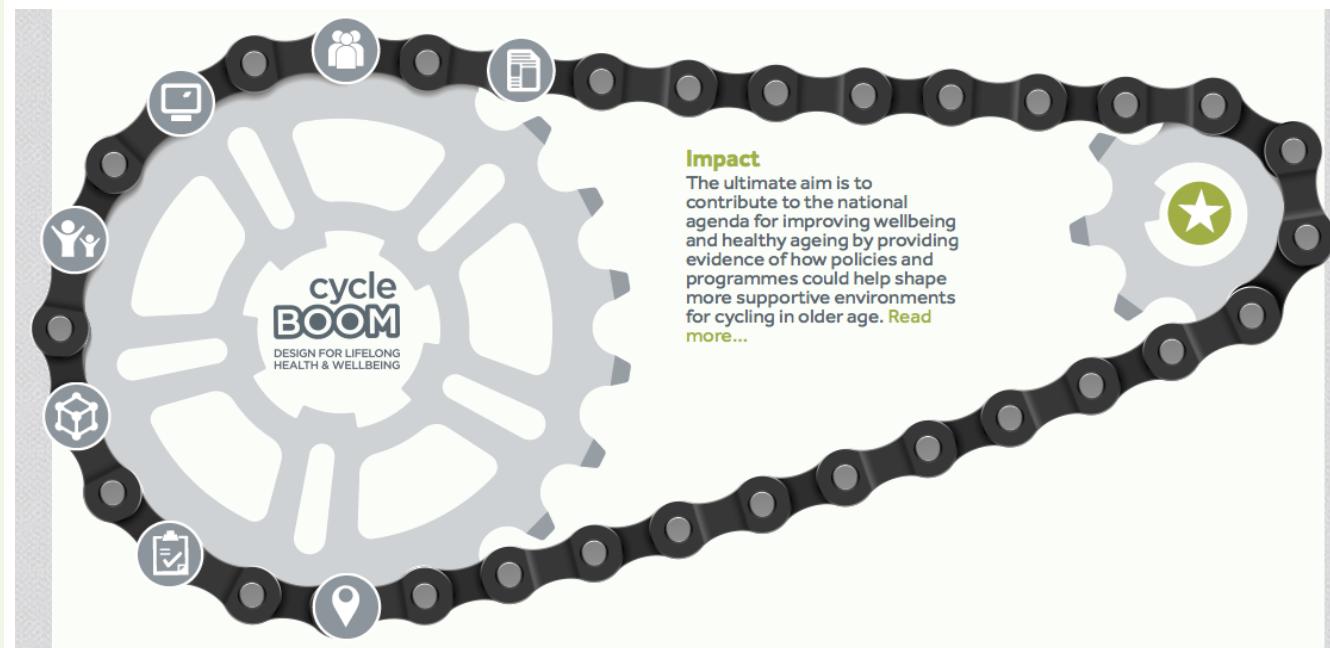
# Public Engagement | Outreach | Making an Impact

# Impact

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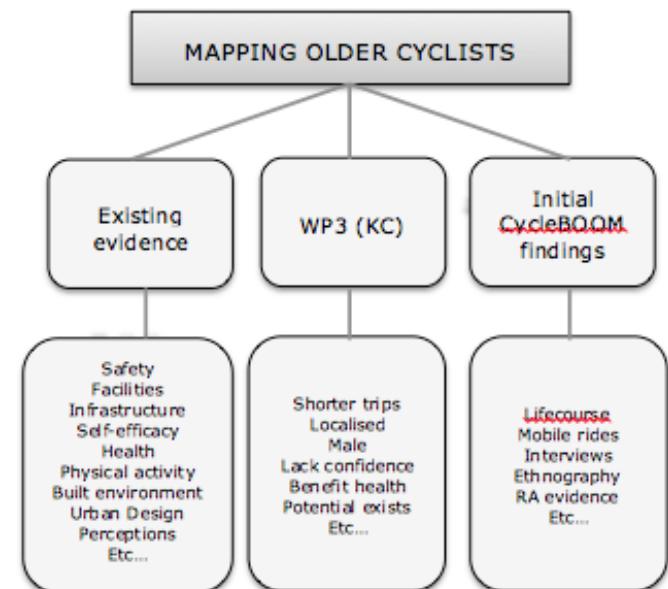
Developing more inclusive neighbourhoods, towns and cities

Designing products suited to the growing market of older people

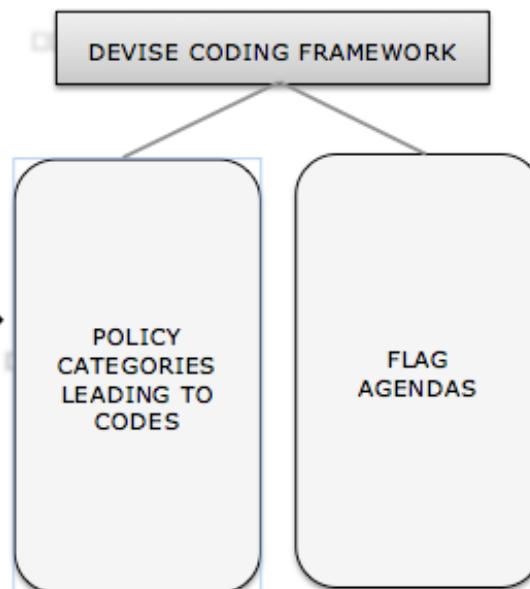


# Broader Integration & Outcome

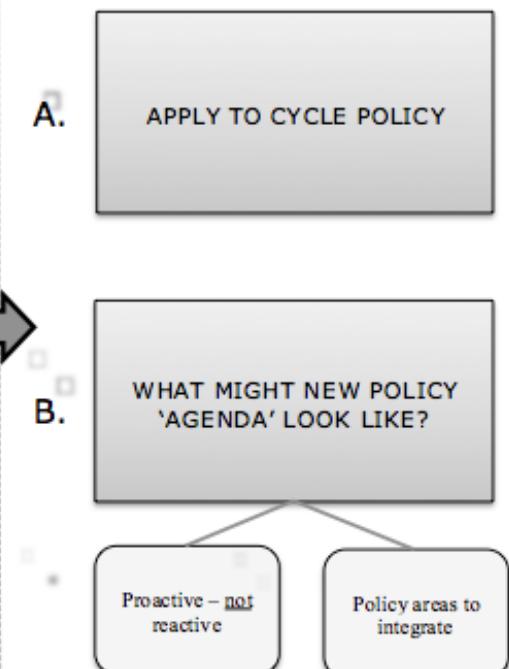
## PHASE 1



## PHASE 2



## PHASE 3



Devised by Emma Street