

The Psychology of Cycle Commuting

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Abstract

The daily commute is a significant part of the working day in terms of its potential impact on people's health, well-being, and performance. Commuting by motorised transport associated with adverse effects on congestion, air-pollution, poor public health, and environmental harm. Encouraging more people to switch to modes of commuting that minimise harm and promote benefits should be the goal of employers, communities, and governments wanting to tackle the problems associated with commuting by car, bus, or train. This research focuses on cycle commuting as both a solution for contemporary problems caused by prevailing commuting habits and a source of significant benefits for people at work, employers, and communities. A systematic literature review was conducted to establish the scope of previous research investigating the determinants of cycle commuting. The review identified studies across a range of disciplines including transport planning, facilities management, and environmental science. The studies explored physical/objective determinants of cycle commuting rates such as infrastructure, terrain, trip qualities, facilities, and incentives. Psychological determinants of people's decision to ride to work were only included in a small minority of the studies identified by the review. The conclusions of the systematic review informed the subsequent stage of research, which specifically examined the psychological determinants of cycle commuting. The focus of the study was to understand why people adopt this mode choice while many do not, even in the context of access to the same infrastructure, facilities, terrain, and incentives. The research adopted an exploratory approach in order to establish a model of psychological determinants and their interaction with physical/objective determinants. A thematic analysis of data from research interviews with regular cycle commuters articulated three themes, which were used as a basis of a psychological model using the Theory of Planned Behaviour to describe the process by which people adopt cycle commuting as a sustained behaviour. The research contributes to our understanding of the psychological factors within commuting behaviours and provides a model which can be tested empirically as a means for encouraging behaviour change within interventions at the personal, organisational, and policy level.

Contents

Systematic Literature Review	8
The psychological determinants of cycling to work: A systematic review.	8
Abstract	8
Introduction.....	9
Benefits of cycle commuting	10
Encouraging change in mode-choice.....	11
Determinants of cycling to work	12
This study.....	14
Method.....	15
Search strategy.....	15
Selection of papers for inclusion	15
Data synthesis.....	16
Results	17
Study characteristics.....	17
Research themes: Determinants	18
Research themes: Psychological models.....	29
Relationship between physical/objective and psychological determinants	39
Conclusion	41
Strengths and limitations of this review.....	42
References.....	43
Empirical Paper.....	48
The Psychology of Cycle Commuting.....	48
Abstract	48
Introduction.....	49
The current study	55
Method.....	56
Design	56
Participants.....	57
Procedure	60
Results	63
1. I feel fantastic	65
2. I can do this.....	71
3. I belong here.....	74
The role of infrastructure	76
Discussion	79

Towards a psychological model	81
Conclusions	92
References	93
Process Review document.....	100
1. Scoping out your research idea.....	100
2. The systematic review: Conducting searches	102
3. The systematic review: Assimilation and write up	103
4. Research Study: Design.....	104
5. Research Study: Writing up.....	108
6. Overall Doctoral Process	109
Appendices.....	111
Appendix A: Interview schedule and consent form.....	111
Appendix B: Analysis iterations and results.....	116
Appendix C: Initial codebook	118
Appendix D: Coded transcript extracts	120

Professional practice

As a Chartered Occupational Psychologist, I am exempt from the first module (Professional Practice Portfolio) of the Professional Doctorate. This thesis therefore satisfies the requirements for Part 2 of the doctorate (Research Thesis). I provide a summary of my professional practice as context to this thesis.

Post MSc, in 1996, I embarked on my career in practice as a consultant occupational psychologist with Criterion, a test publisher and business psychology consultancy. Through my practice with clients and work as a psychometrician I developed critical professional practice skills within the consultancy cycle. These included skills and techniques in the areas of job analysis, the design and delivery of assessment and development interventions, and research skills relating to the construction and validation of psychometrics and other interventions. In more recent years, I have integrated techniques from evidence-based practice into my consultancy work.

My professional practice formed the basis of the focus and research techniques adopted for my professional doctorate. My practice as a psychologist had included assessments and interventions for resilience, well-being, and performance at work. This linked with my long-term experience of cycle commuting and led to the basis of my research, to understand the psychological components of commuting mode choice and its benefits for the people and the organisations for whom work. The methods deployed in my research drew on skills developed in my practice such as job analysis, interviewing, and analysing verbatim extracts.

Publications arising from this thesis

Papers based on this research have been presented at these conferences:

- 2018 British Psychological Society Division of Occupational Psychology conference
- 2018 Association for Business Psychology conference
- 2019 British Psychological Society Division of Occupational Psychology conference

The systematic literature review paper is currently in review with the Journal of Transport Reviews. The research paper is in preparation for submission to the Journal of Environmental Psychology. Both papers are substantially my own work; my contributions were the formulation of the research questions, data collection and analysis and writing of the draft. Both papers benefitted tremendously from support, supervision, and review from my supervisors, who also provided assistance with stages of analysis that required validation from third-party reviewers.

Systematic Literature Review

The psychological determinants of cycling to work: A systematic review.

Abstract

The benefits of cycle commuting appear self-evident, with evidence of positive contributions to congestion reduction, public health, and decreases in emissions and carbon. Key areas of focus for research into the determinants of cycling to work are infrastructure, employer facilities, employer incentives, traffic volumes, and local geography. This paper presents the outcomes of a systematic review exploring what research has been conducted into the subjective and objective/physical antecedents of commuting by bike. The systematic review followed an evidence-based practice model by first identifying papers meeting search criteria relating to cycle commuting. These were sifted against a priori criteria into a short-list of 17 papers, which were then aggregated and synthesised to identify research themes. The review process included an analysis of the papers against models of planned behaviour and identity theory to understand any psychological determinants described by research to date. The systematic review revealed that the majority of research into cycle-commuting to work has largely overlooked psychological processes and individual differences to account for commuting-mode choice. Where papers have included a consideration of individual factors, they rarely explicitly linked to established models for explaining individual decision-making and attitudes, such as the theory of planned behaviour and identity theory. The systematic review concludes with recommendations for further research to focus on the psychological processes underling individual's decisions to cycle to work that can be used by employers and policy makers to encourage more people to ride to their workplace.

Introduction

The benefits of travelling to work by bike seem self-evident and numerous, especially when compared to other commuting modes. Many societies are grappling with the challenges of rising levels of obesity, congestion on roads and public transport, and air pollution, plus the need to reduce carbon emissions. Helping people out of their cars and into more active forms of travel has the potential to contribute to efforts being made to tackle these issues. The commuting journey, given the volume of annual trips for which it accounts and its impact on congestion, the environment and health, is a primary focus for measures designed to encourage a change in commuting mode. Cycling is a particularly promising choice of active travel for a mode-switch since it is suited to the relatively short distances that make up a significant proportion of commuting trips and offers the flexibility to be used for part or the whole of the commute. Much contemporary transport policy is therefore concerned with encouraging a mode switch from motorised travel towards cycling. Cycling rates vary a great deal between different countries. In the UK, cycling accounted for just 2% of all trips and 1% of the distance travelled in 2016, compared with 62% of trips and 78% of distance travelled by car (National Travel Survey, 2017). This disguises regional variations; the highest cycling rates in UK are in the cities of Cambridge (33%), Oxford (22%), and York (15%) (Sport England Active People Survey, 2015), while the lowest is Aberdeen (0.3%) (Cycle Scotland travel survey, 2015).

The 2011 UK census found that 2.8% of the workforce (741,000 people aged 16-74) commute by bicycle. The census identified hotspots where cycle commuting has increased significantly between 2001-2011, such as London (101% increase), Brighton (109% increase), and Manchester (83% increase). This contrasts with 25% of commuting trips in the Netherlands (National Institute for Public Health and the Environment (RIVM), 2015). The census also reported that in the majority of local authorities in England and Wales, the number of people cycling to work decreased between 2001-2011 (in 202 out of 348 authorities). Similarly, the 2016 National Travel Survey identified a decline in the average number of bike trips per person per year to 15, from an average of 16 over the last 5 years. This compares to 591 trips per year by car in 2016 (with an average of 595 over the preceding five years).

There is evidence that increasing the numbers of trips to work by bicycle benefits congestion reduction, the environment, and health.

Benefits of cycle commuting

Switching to cycle commuting reduces crowding on public transport and congestion. A single car-parking space can hold 10 bicycles or 42 folding bicycles, a benefit which may not be lost on facilities managers struggling to accommodate the space needs of a growing workforce. Cycling UK describes how a typical road lane can carry an average of 2,000 cars per hour or 14,000 bicycles (2017 report to UK Government Travel Select Committee). In countries where bicycle use has been prioritised through transport policy, car use decreases. Copenhagen saw bike journeys exceed car journeys through the city for the first time in 2016. London saw a decrease in car use from 46% to 32% of the modal share of journeys between 1994-2014, with increases in both public transport and cycling through changes to transport policy, such as congestion charging and infrastructure development (Transport for London Travel Report 2015). A switch from driving to cycling at rush hour contributes to a reduction in emissions and air pollution. The European Cycling Federation calculates that the quantity of carbon produced by car travel is 10 times greater than that of bicycle per kilometre, taking into account the production of the vehicle and its ongoing use. (Blondel et al, 2011).

Commuting journeys by bike are more predictable in terms of travel time and may be quicker as average speeds in cities for motorised transport fall lower than those for cycles. In 2016, the average speed of traffic in London fell to 7.7mph, lower than reported averages of cycling in urban environment which can increase to 9.3mph during rush hour. (Transport for London, 2017). (Jensen et al, 2010).

The switch from motorised modes of transport to cycling brings benefits for air quality and carbon reduction, which when combined with savings through improved public health, create significant economic benefits. The economic benefit per year of increased cycling would be £2 billion per year by 2015 if the UK's Cycling Delivery Plan's targets for increasing trips by cycle are met. (Crawford & Lovelace, 2015). Savings produced by improved health and congestion reductions are the largest drivers of the projected economic benefits.

The health benefits of cycling to work apply to both the individual's well-being and public health. A systematic review of 16 cycling-specific studies identified a wide range of health benefits associated with commuter cycling; the benefits included reductions in mortality, increases in cardiovascular health and fitness, and contributions to improvements to population health.

Studies included in the review identified a positive-dose effect; health benefits increased with the quantity and frequency of cycling. (Oja et al, 2011). A Netherlands study identified further evidence for the dose effect in terms of reduction in absence rates from work. The study demonstrated that days off from work due to sickness were lower for cyclists than non-cyclists and that this reduction increased with the distance and frequency of cycling. (Hendriksen et al, 2010).

A 2017 prospective-population based study of over 260,000 people across the UK concluded that commuting on a bicycle was associated with a lower risk of cardiovascular disease, cancer and death from any cause (Celis-Morales, L. et al. 2017)

The promotion of cycling by employers has been linked to improvements in health among the workforce (Brockman & Fox, 2011). Active travel (cycling or walking) has been linked to lower obesity rates, lower levels of diabetes, and higher rates of physical activity (Pucher et al, 2010).

Encouraging change in mode-choice

Given the potential benefits of cycling to work, government and employers have developed policy to increase the numbers of people changing their commuting mode to cycling. The terms of the UK's Infrastructure Act (2015) requires the publication by government of a strategy, updated every five years, for increasing cycling and walking in England. The overall objective of the Act is to make walking and cycling the natural choice for shorter journeys by 2040, with commuting by active travel modes a key focus. The current strategy, published in 2017, includes cycling-specific measures such as improved cycling infrastructure, new routes between local communities, retail, and employment sites, increased cycle-parking facilities, and cycling-safety awareness programmes.

Scotland and Wales have similar initiatives (Cycling Action Plan for Scotland: 2017-2020, Active Travel Action Plan for Wales, 2013), which contain measures for improvements to infrastructure, education, and promotion to encourage a behavioural change in mode-choice. Measures in these UK plans reflect the decades-old policies of countries with much higher contemporary levels of cycle commuting, such as the Netherlands; they also reflect the outcomes of research into the determinants of cycle commuting.

Determinants of cycling to work

Both government and organisational policy is supported and guided by a substantial body of research into the determinants of a mode switch from car and public transport to bicycle. This research features an overlap across many disciplines and policy areas, including public health, the environment, transport planning, employer incentives, and facilities management. Research has often drawn on existing data sets such as census data, travel surveys, and geolocation data to identify determinants and reported benefits of cycling, identifying factors such as infrastructure provision, traffic density, trip-distance, elevation, cost and time savings (e.g. Wardman, M., Tight, M. and Page, M. 2007)

Such outcomes are reflected in the focus of subsequent policy and plans for encouraging active travel and cycling specifically. Perhaps drawing on the experience of countries with high-rates of cycle commuting, the focus of policy and travel plans tend to follow a pattern of investment in infrastructure, facilities, and promotion/education.

Fewer studies include a focus on the psychological components of cycling to work. Understanding the individual determinants and benefits may contribute to an understanding of why some people cycle and many do not under identical conditions in terms of determinants like trip distance, infrastructure, and employer incentives. Studies have identified personal determinants such as attitude and benefits like stress reduction, (Scheiner, J. and Holz-Rau, C. 2007; Appleton, K. and Gatersleben, B. 2006), without drawing on more complex psychological models to explain what makes people choose to cycle to work. Previous research straddles active travel, where cycling and walking are lumped together, and often does not distinguish between travel for leisure, utility, school/college, or work.

Cycling to work requires the individual to take the decision to opt for this mode of commuting rather than alternatives (such as car, public transport, walking). This decision-making process may be best understood through the lens of the Theory of Planned Behaviour (TPB), which describes a model of the psychological elements required for a decision driving behaviour change. (Ajzen, 1985).

The TPB model comprises three components:

1. Perceptions of benefits - a subjective judgement about the likely rewards and outcomes of making a behaviour change is required for a decision is made
2. Perceptions of social norms - the individual must form a judgement about the likely social evaluations of the planned behaviour; will friends, family, colleagues and other social group regard the behaviour positively?
3. Perceptions of personal control - the individual needs to feel capable and confident to perform the new behaviour. This element is closely related to self-efficacy.

When an individual regards the benefits, norms, and personal capabilities positively, the conditions for a decision to make a planned change in behaviour are in place. This psychological model offers an additional explanatory perspective on the processes underlying a commuting-mode choice of cycling.

Whilst the theory of planned behaviour offers an explanation of the initial choice to cycle to work, an alternative psychological lens may offer a more effective view of daily commuting choices. Mode choice may vary day-to-day based on short-term factors such as weather, trip complexity, or intrapersonal states. Within groups of cycle commuters, there is individual variation in the frequency and regularity of riding to work. Social Identity Theory offers possible insights regarding the maintenance and longer-term commitment to sustained cycle commuting. (Tajfel & Turner 1986). In social identity theory (SIT) terms, the individual is likely to sustain regular levels of cycle commuting when their sense of personal self is closely linked with that of the social identity of a cyclist. This process of social identification comprises of three components:

1. Social categorisation - does the individual perceive cycle-commuters as a discrete, unified social group?
2. Self-identity - does the individual feel a sense of belongingness to the social category of cyclists; are they motivated to conform to the perceived group norms for behaviours?
3. Social comparison - does the individual favourably compare the social category that forms this element of their personal identity to other categories (such as driver)? The comparisons should feel positive and enhance the sense of belongingness and cohesion with the in-group

An individual who significantly invests their sense of personal self with the social group of cycling commuter may be more likely to base daily commuting choices on their relationship with the group and its norms. The motivation to demonstrated ideal behaviours in terms of the in-group may overcome short-term, day-to-day obstacles to riding to work.

Adopting the lens of psychological models (such as TPB and SIT), therefore offers the potential for developing a more effective model for explaining individual differences in choices relating to cycling to work.

This study

No previous systematic review of research investigating the determinants of cycling to work exists; given the scope of the potential benefits of increasing the numbers of people choosing to cycle to work, there is value in understanding more about the factors that encourage greater levels of riding to work. In particular, a greater understanding of what is known about the individual, psychological factors determining regular cycle commuting will offer valuable insights into the individual differences in decision-making and choice.

The purpose of this study is to conduct a systematic review of research into the determinants of cycling to work. The review will identify research outcomes that contribute to a psychological explanation; to establish what is known about the relationship between the physical, environmental and psychological determinants driving individual choice for cycling to work. By establishing this picture, this systematic review aims to identify subsequent research questions and inform cycle commuting policy and organisational planning.

The focus of this systematic review is to:

1. Understand what is known about the determinants and benefits of cycling to work
2. Establish the extent to which a psychological lens has been applied when investigating these factors

Method

Search strategy

Data extraction was conducted in February 2017 from these data sources:

- EBSCO (Business Source Premier)
- PsycArticles (Ovid)
- PsycINFO (Ovid)
- Web of Science
- Science Direct (Business, Management and Accounting + Psychology + Social Sciences)

Search terms used in the data extraction were *cycle commute*, *cycle commuting*, *bicycle commute*, *bicycle commuting*, *bicycle*, *ride to work*, *work*, *organisation*. The search included English language papers only; no time limit was applied. The search terms were applied to titles, abstracts, and keywords. The references of subsequently shortlisted papers were also reviewed against the selection criteria for further results.

Selection of papers for inclusion

Titles and abstracts were extracted from the search and any duplicates removed.

Three reviewers screened the results of the data extraction by reviewing titles and abstracts against inclusion/exclusion criteria; Quality criteria were also included in the screening process (Briner & Denyer, 2012). Figure 1 describes the criteria used for the screening process.

Screening disagreements were explored through reference back to the research objectives and question, discussion, and agreement. Where resolution was not possible then the majority verdict applied.

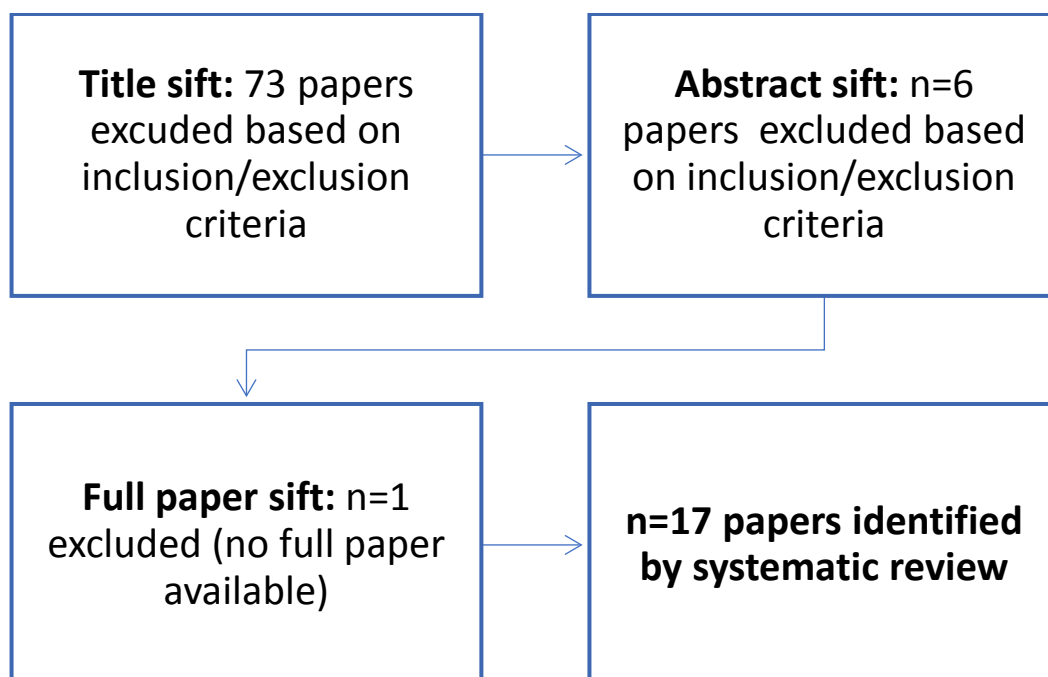
Figure 1: Screening criteria

Inclusion criteria	Exclusion criteria	Quality criteria
<i>Adult, working population</i> <i>Empirical studies</i> <i>English language</i>	<i>Health promotion</i> <i>Public health programmes</i> <i>Sport and leisure cycling</i> <i>Children, adolescents</i> <i>Students</i> <i>Non-commuting cycling</i> <i>Transport</i> <i>Infrastructure design</i>	<i>Clarity and basis of research question or hypotheses</i> <i>Appropriateness of sample selection</i> <i>Appropriateness of design to research question</i> <i>Appropriateness of data analysis and inferences made</i>

Data synthesis

Aggregation of the data from the shortlisted papers was conducted using the narrative method to identify the key themes from the research. The systematic review process deployed in this study is illustrated in figure 2.

Figure 2: Systematic review process



Results

The databases search identified 109 results; 12 duplicates were removed and the remaining 97 papers assessed by the panel of three reviewers against the inclusion and exclusion criteria. 73 papers were excluded on the basis of the title sift against these criteria and a further 6 excluded by the subsequent abstract sift. The full paper sift excluded 1 paper (full text could not be sourced). The result of the data sift was a total of 17 papers for data synthesis: Braun et al. (2016), Buehler (2012), Cole-Hunter et al. (2015), Dickinson et al. (2003), Flynn et al. (2012), Guell et al. (2012), Heinen (2016), Heinen, Matt and Wee (2010), Heinen, Maat, and Wee (2011), Muñoz, Monzon and López (2016), Nkurunziza et al. (2012), Piatkowski and Marshall (2015), Pope (2013), St-Louis et al. (2014), Unknown (2014), van Bekkum, Williams and Morris (2011), Vandenbulcke et al. (2009), Wooliscroft and-Wooliscroft (2014)

The paper by Pope (2013) was included despite not meeting one of the inclusion criteria (empirical studies). While the paper was not published in an academic journal, the content of the abstract and full text was judged to be of sufficient value by the reviewers for inclusion in the data synthesis.

Study characteristics

The characteristics of the studies identified in this review are summarised in figure 3.

Country of origin

The studies were conducted in the UK (n=4), the Netherlands (n=3), Spain (n=3), USA (n=3) and 1 study each from Belgian, Canada, New Zealand, and Tanzania.

Study design

The 17 studies included in the data synthesis comprised 1 literature review (non-systematic) (Heinen, Matt and Wee, 2010); 2 meta-analytic studies (Heinen, Maat, and Wee, 2011), (Muñoz, Monzon and López, 2016); 1 longitudinal study (Flynn et al. 2012); 2 qualitative studies (van Bekkum, Williams and Morris 2011), (Guell et al. 2012). A cross sectional design was employed by 4 of the studies (Dickinson et al. 2003), (Heinen, 2016), (St-Louis et al. 2014), (Wooliscroft and-Wooliscroft 2014). 5 studies analysed pre-existing data sets;

Buehler, (2012) (Household Travel Survey data); Nkurunziz, (2012), (Travel survey data with questionnaire-based face-to-face follow-up); Vandenbulcke et al. (2009), (Analysis of census data and road accident statistics); Piatkowski and Marshall (2015) (Bike to Work survey data and built environment measures). Both Cole-Hunter et al. (2015) and Braun et al. (2016) adopted a mixed-method design. Pope (2013) was based on an API design process.

Participant characteristics

Figure 3 includes a summary of the participants included in the papers identified by this review.

Research themes: Determinants

The narrative synthesis identified six broad determinants described across the 17 papers included in the systematic review:

1. Infrastructure – existence of physical facilities encouraging cycling to work
2. Environment – built or natural features of the environment experience by cycling commuters
3. Trip qualities (distance, slope, climate, weather) – characteristics of the journey to work
4. Facilities/incentives – provision of benefits and amenities for cyclists by organisations
5. Group membership – status in terms of categories such as gender, ethnicity, socio-economic group
6. Attitude – beliefs and values of the individual, groups, culture, society

These determinant categories are described in turn. A summary of the determinants identified in each study is shown in Figure 4.

Figure 3: Summary of study characteristics

Paper	Location	Design	Sample
(Braun et al. 2016)	Barcelona, Spain	Mixed-method	765 recruited while commuting
(Buehler, 2012)	Washington, US	Mixed-method	5,091 commuters sampled randomly by residential postal address
(Cole-Hunter et al. 2015)	Barcelona, Spain	Mixed-method	769 recruited while commuting. Female = 51.8%. Mean age 36.6 years.
(Dickinson et al. 2003)	Hertfordshire, UK	Cross sectional	2,065 employees from 3 UK organisations, Respondents were 46.5% male and 53.5% female. 78% full time employees. full-time (78%). 5% stated they had a disability or a long-term medical problem that affected how they travelled to work
(Flynn et al. 2012)	Vermont, USA	Longitudinal study	185 participants (male= 102, female = 61).
(Guell et al. 2012)	Cambridge (Qualitative study	1164 participants in initial baseline survey. 53 participants in follow-up interviews male=22, female = 31.
(Heinen, 2016)	Utrecht, Netherlands	Cross sectional	1,062 randomly sampled householders. 34.7% Female. 65.3% Male.
(Heinen, Maat, and Wee, 2011)	Netherlands	Meta analytic	3,900 Employees from large companies (incentivised) + random mail survey respondents
(Heinen, Matt and Wee, 2010)	Netherlands	Literature review (non-systematic)	N/A
(Muñoz, Monzon and López, 2016)	Vitoria-Gastiez (Spain)	Meta analytic	654 telephone surveys, 15 interviews. Male = 50%.
(Nkurunziz, 2012)	Dares-Salaam, Tanzania	Cross sectional	598 commuters. 75.1% male

Paper	Location	Design	Sample
(Piatkowski and Marshall, 2015)	Denver, USA	Survey data analysis (Bike to Work Day events participants) and built environment measures	2,030 randomly sampled from Bike to Work events in 2012 & 2013. Male = 61%. Mean age 43.4 years.
(Pope, 2013)	London, UK	Grey	None
(St-Louis et al. 2014)	Montreal, Canada	Cross sectional	3,377 single-mode commuters. 54% students, 24% staff, 22% faculty.
(van Bekkum, Williams, and Morris, 2011)	Edinburgh, UK	Qualitative study	15 (8 cycle commuters, 7 potential cycle commuters) from cycle-friendly employer. Male = 14, female = 1.
(Vandenbulcke et al. 2009)	Belgian	Analysis of census data and road accident statistics	2001 Belgium census data. 6.2% of all commuters used the bicycle as their only means of transport between home and workplace. 68.6% of commuters used a car
(Wooliscroft and-Wooliscroft, 2014)	New Zealand	Cross sectional	573 randomly sampled householders. 45% male and 55% female respondents with an average age of 42 years. 67% of respondents married or live with a partner, 18% single and 15% separated, divorced or widowed.

Figure 4: Summary of determinants

Study	Infrastructure	Environment	Trip qualities	Facilities/ incentives	Group membership	Attitude
Heinen, Matt and Wee, 2010	Y	Y	Y	Y	Y	Y
Buehler, 2012	Y	Y	Y	Y	Y	
van Bekkum, Williams, and Morris, 2011		Y	Y	Y		Y
Dickinson et al. 2003	Y		Y	Y		Y
Nkurunziz, 2012	Y	Y	Y	Y		Y
Heinen, 2016					Y	
Wooliscroft and-Wooliscroft, 2014	Y			Y		Y
Vandenbulcke et al. 2009	Y	Y	Y	Y		Y
Piatkowski and Marshall, 2015		Y			Y	Y
Cole-Hunter et al. 2015	Y	Y	Y		Y	
Braun et al. 2016	Y	Y	Y	Y		
Pope, 2013			Y			
St-Louis et al. 2014			Y		Y	
Heinen, Maat, and Wee, 2011			Y			Y
Guell et al. 2012						
Muñoz, Monzon and López, 2016					Y	Y
Flynn et al. 2012			Y			

1. Infrastructure

The role of infrastructure, such as bike lanes, advanced stop lines ('bike box' or 'cycle reservoir') at traffic lights, and other physical features for cyclists were identified by 8 of the studies. The literature review conducted by Heinen, Matt and Wee (2010) identified 12 studies focusing on different types of bicycle infrastructure and its effectiveness in encouraging cycling; measures that improved real and perceived safety, such as segregated bike lanes, traffic-speed reduction, and continuity of cycle routes being most strongly associated with higher rates of cycling. Characteristics of infrastructure such as road-surface quality were also identified by the review as related to cycling rates.

Papers identified by this systematic review provide elaborating evidence concerning the relationship between infrastructure and cycle commuting rates. Buehler, (2012) and Nkurunziz, (2012) identified a link between cycle commuting mode choice and availability of bike paths through an analysis of Household Travel survey data, whilst Vandenbulcke et al. (2009), identified a similar relationship from an analysis of census data and road accident statistics. Dickinson et al. (2003) found evidence of the relationship between bike-path provision and cycle commuting in the results of a self-report survey exploring commuting-mode choice.

Cole-Hunter et al. (2015) and Braun et al. (2016) examined the relationship between cycling to work and a specific form of cycling infrastructure that is becoming increasingly widespread in cities; Public bicycle-hire schemes (e.g. London, Paris, Brighton) provide bicycles for short-term use and are often used by commuters for either the whole or part of the commute (such as to or from a public transport hub). These studies identified that the number and proximity of bike stations (from where bikes are hired) to home was associated with an increase in cycle-commuting rates. The Braun et al study compared self-reported and objective measures (geo-locational data) of access to bike-commuting infrastructure and found a positive correlation between proximity to home address and cycle commuting rates. Self-reported perceptions of proximity were more strongly related to cycle-commuting rates, suggesting that subjective beliefs regarding how close an individual lives to a bike-hire stations are a more powerful determinant of cycle-commuting than the physical existence and proximity of the infrastructure.

This study gathered data through telephone survey combined with existing geo-locational data of the neighbourhoods included in the study and also found that the existence of bike-hire stations (Barcelona's *Bicing* stations) encouraged greater incidence of regular cycle commuters through encouraging perceptions of the environment being conducive to cycling. This again suggests that there is a psychological component to the role of infrastructure as a determinant of cycle-commuting.

The study also found evidence for the role of infrastructure as a negative determinant of cycle commuting. Objective and perceived proximity to public-transport stops reduced was associated with lower levels of cycle commuting, suggesting modal competition between cycling and public transport. A conjoint analysis of self-report data collected by Wooliscroft and-Wooliscroft, (2014), found that cycle lane provision was the weakest determinant of cycle-commuting (with perceived attitude of drivers to cyclists identified as the major factor by the nationwide New Zealand survey conducted for this study).

While infrastructure was identified as an important determinant of cycle commuting, the evidence across the papers identified by this systematic review suggests a more complex relationship, whereby the provision and availability of cycling infrastructure interacts with individual perceptions to influence commuting-mode choice.

2. Environment

The local, physical environment acts as a determinant, distinct from infrastructure, on cycle commuting rates. Vandenbulcke et al. (2009) found that differences in cycle commuting rates were strongly related to 'urban hierarchy'; cycling to work was most prevalent in medium-sized towns, with lower cycle commuting rates observed in larger cities. The study also identified positive effects of lower cycling accident rates, and urban density on cycling to work. More cycling commuting occurred in medium-sized towns, with higher urban densities and lower cycling accident rates.

Mixture of urban functions and the degree of urban density was also identified by Heinen, Matt and Wee (2010) as positively related to cycle-commuting rates. Increases in cycling to work were observed in environments that featured a mix of urban functions (such as shops, businesses, workplaces, cafes etc.) and higher urban densities. For example, a town with a mix of building types and functions would see higher rates of

cycling to work than environments with more rural features and fewer functions present.

Buehler, (2012) found that urban density (measured by volume of persons per acre) and residence in an urban hub were positively correlated with rates of cycle commuting; again suggesting that denser, urban built environments are a determinant. However, Heinen et al, and Cole-Hunter et al. (2015) also identified the role of natural physical environment as a determinant. Attractive landscapes, experience of nature, amount of greenness around home and work locations were found to be positively linked with rates of cycling to work.

The evidence suggests that the nature of the environment in which commuting takes place does have a determining effect, but that different types of environment operate in different ways on mode choice. Higher density, function-mixed urban centres perhaps encouraging cycling to work through convenience and a possible interaction with prevalence of cycling infrastructure, while natural, rural, and attractive environments encourage cycling to work via a positive, experiential effect.

3. Trip qualities (distance, slope, climate, weather)

The characteristics of the commuting journey itself is a significant determinant reported across twelve of the studies in this review. Elements of trip quality overlapped with the theme of the environment; the physical nature of the journey or route impacts on the decision to commute by cycle. Heinen, Matt and Wee, (2010), van Bekkum, Williams, and Morris, (2011), Cole-Hunter et al. (2015) and Nkurunziz, (2012) report the effects of topography, the frequency and severity of hills, and the elevation of the home or work address on rates of cycle-commuting; Braun et al. (2016) analysed survey data and geo-locational data and identified that cycle commuting rates were inversely related to slope and elevation, and also trip distance.

The relationship between trip distance and the decision to cycle to work was explored in depth by a number of the studies. Dickinson et al. (2003) describe the effect of distance as part of a broader trip quality of 'perception of reasonableness'. Rather than view distance as an objective, physical determinant, this study found evidence of an interaction with psychological components of decision making. The study found that commutes of 8km or less were most likely to be perceived as reasonable and therefore lead to the mode-choice of cycle-commuting.

Vandenbulcke et al. (2009) identified a maximum trip distance of 10km before cycle commuting rates started to decrease, a distance of 3-4km as being optimal to that mode-choice, and very low trip distances (<1km) operating as a barrier to cycling to work. (Heinen, Maat, and Wee, 2011) also reported a non-linear relationship with distance and cycle commuting mode choice, with both long and short distances discouraging the decision to cycle to work.

Authors described distance as interacting with other trip qualities to determine rates of cycle commuting. Dickinson et al's perceptions of trip reasonableness concept extends to include distance and complexity of trip-dynamics. These are characterised by features such as multiple stops, a school-run, further travel requirements during the working day, strong dress-code rules in the workplace. In this way, the cycle-commuting decision is determined by the individual's perceptions of a range of trip qualities.

Other studies noted this interplay of various trip qualities; van Bekkum, Williams, and Morris, (2011) found that travel for business during the working day, transporting work-related materials, and clothing issues acted as barriers to the cycle-commute mode choice; Nkurunziz, (2012) described the quality of trip complexity (such as commitments/errands before/after work) as interacting with trip distance, and perceived car-driver attitudes and behaviours associated with the journey. Wooliscroft and Wooliscroft, (2014) also reported the effect of perceptions of negative attitudes and behaviours of drivers during the trip as having a negative effect.

Slope, elevation, distance, trip complexity and perceptions of driver behaviours are qualities of the journey that are somewhat fixed and therefore may determine the initial decision to cycle to work. The day-to-day decision to ride to work may also be determined by short-term factors such as the weather. While seasons and the local climate are less variable, the conditions on a particular day may affect daily choices within an individual's general propensity to ride to work. Buehler, (2012), Nkurunziz, (2012), Heinen, Matt and Wee, (2010), and van Bekkum, Williams, and Morris, (2011) describe the negative effect of seasonality and the local climate on mode-choice. St-Louis et al. (2014) found a negative correlation between satisfaction with the cycle commute and days with snowy conditions in Canada.

Flynn et al. (2012) explored daily choices in more detail by trying to quantify the effect of weather conditions on daily choices to ride to work. Using travel diaries and weather data, the study calculated odds ratios, finding that respondents were nearly twice as likely to cycle when there was no rain in morning. A temperature increase of 1 degree increased the cycling likelihood by 3%. The study found negative effects of temperature, rain, snow and wind, with correlations with daily cycle commuting decisions in the expected directions. For example, a wind-speed increase of 1mph decreased cycling likelihood by 5%, while an inch of snow decreased incidence of cycling by 10%.

Work by Pope (2013) put these determinants into action through the development of an API-based device designed to inform a daily mode-choice between cycling and public transport options. The device scraped data concerning commuting mode-choice determinant data (UK weather and public transport information about congestion and service levels) to indicate best daily mode-choice. While this paper was not published in a peer reviewed academic journal, it arguably serves to illustrate the day-to-day decision making that underlies the effects of broader determinants of riding to work.

4. Facilities/incentives

Incentives for riding to work are designed to actively encourage a mode-switch from driving or public transport and can include measures such as tax-breaks for cycle purchases, rewards for meeting cycling to work targets, or through disincentives like charging for car-parking. Facilities can facilitate the mode choice by ensuring that amenities exist to overcome barriers to cycling to work, such as lack of secure parking or storage.

Trip-end facilities were included as determinants in the papers by Heinen, Matt and Wee, (2010), Buehler, (2012), Wooliscroft and-Wooliscroft, (2014), and Vandenbulcke et al. (2009). Examples included secure bike parking, cycling equipment/clothing storage, showers and changing facilities. Cycling facilities may also be the result of public policy interventions (Nkurunziz, 2012), either through policy (tax exemption on bikes, car congestion charges), direct provision, (secure/guarded bike parking), or through measures designed to encourage employers and organisations to include cycling facilities and incentives in their travel plans (Dickinson et al. 2003).

Buehler, (2012) highlights how trip-end facilities can act as negative determinants; free car parking provided by the employer was associated with a decrease in cycle commuting rates. Braun et al. (2016) describe how public-transport employer-incentives have a similar negative effect. Nkurunziz, (2012) describes how facilities can become negative determinants by their absence or poor quality. The study identified a decrease in mode-choice change to cycling when there was an absence of safe bike parking, lack of bike paths, or shortage of workplace facilities. This study also described how such negative determinants varied in terms of the magnitude of their effect with the stage of change and social-ecological context that an individual occupied.

5. Group membership

A range of demographic factors are described as being related to cycle commuting. Cole-Hunter et al. (2015) used data from a telephone survey to group respondents into four categories: frequent bicyclists, infrequent bicyclists, willing non-bicyclists, and unwilling non-bicyclists. The determinants of frequency and willingness (propensity) to ride to work were significantly affected by demographic indicators of age, education level, gender, and nationality. Similarly, Muñoz, Monzon and López, (2016) reported relationships between propensity to cycle to work and gender, age, family status, professional situation, and car license; Heinen, Matt and Wee, (2010) and Buehler, (2012) identified socio-economic determinants for cycling to work, including gender, ethnicity, income, age, vehicle ownership, employment status, and household status. Both Dickinson et al. (2003) and van Bekkum, Williams, and Morris, (2011) found correlates between cycling to work and cycling more generally; owning a bike or being a leisure cyclist. Both increase the likelihood of a change in mode to cycle commuting. St-Louis et al. (2014) found that age and overall level of life-satisfaction were positive determinants of satisfaction with the cycling commute; people were happier (and perhaps more likely) to ride to work as they got older and more satisfied with life in general.

The size and direction of these effects varied between different studies. For example, socio-economic group membership was related to higher levels of cycle commuting for higher incomes groups in the Buehler study of cycle commuting determinants (with 35.1% of cycle commuters in highest income quartile; a significant association with propensity to ride to work). In other studies, cycle commuting rates were higher in lower income groups, perhaps reflecting differences in cultural attitudes to cycling.

Nkurunziza et al (2012) found lower rates of modal change to cycling in commuters in Tanzania, reflecting a cultural view of cycling as being low in social status. The authors found that personal barriers like perceptions of the social status of cycling and social (in)security were the most negative determinants of bicycle commuting (along with physical barriers including weather, lack of bike paths, and absence of trip-end facilities).

The most consistent group membership determinant across studies in this review was gender, where the effect was for the significant majority of cycle commuters being male. (Buehler, 2012; Heinen, Matt and Wee, 2010; Piatkowski and Marshall, 2015). Authors accounted for this difference through the interactions between gender and different trip qualities (with women more frequently dealing with more complex, multi-stop commutes) and personal safety perceptions.

Dickinson et al (2003) went deeper, exploring a previously reported effect where the average women's commuting journey is shorter than the average distance for men, yet women cycle less and make equal use of cars for commuting. (Turner and Niemeier, 1997; Office of Population Censuses and Surveys, 1991; Pooley and Turnbull, 1999). Dickinson et al argue that differences in trip characteristics cannot fully account for the observed differences in cycle-commuting rates between genders. Their analysis of UK commuter habits identified an effect where employer travel plans fostered more positive perceptions with men than women and recommended the development of plans aimed to address this perception gap and other cultural and societal barriers to cycle commuting affecting women (the perceived maleness of cycling culture; safety perceptions; trip complexity).

Piatkowski and Marshall, (2015) formulated a model of different cyclist types (the 'Portland Typology'), which sought to account for differences in propensity to cycle commute and the different effects of common determinants. The typology described two models; those who can cycle commute but choose not to (model 1) vs. those that do cycle commute at least occasionally (model 2). The authors argue that barriers vary depending on individual, attitudinal, and built environment characteristics between the two types; barriers to increasing commute cycling may be different than for model 1 individuals than those who are model 2 and already commuting by bike at least occasionally.

Data from a bike-to-work survey was aggregated with geo-locational data for the analysis, revealing that the socio-demographic characteristics of gender, household size were significant for model 1 only, while race, education, car ownership affected model 2 decisions. Some determinants affected both models (security and comfort, relative convenience, trip distance). This analysis suggests that socio-demographic factors (and other determinants) may vary in the size of their effect across individuals.

6. Attitude

A partial account of how such individual differences operate in relation to cycle commuting may be present in the theme of attitude reported as a determinant in some of the papers identified in this review. Heinen, Matt and Wee, (2010) described the effect of differences in subjective safety perceptions on propensity to ride to work. Their literature review cited studies that found differences between objective measure of safety and subjective perceptions. Subjective perceptions varied between different groups, with 10%-15.9% of men describing their cycle commute as safe, compared to women, where 3.9%-4.6% described it as safe (percentage ranges represent perceptions in different cities).

Cycle commuters as a group demonstrate a different attitude to safety than commuters more generally; cyclists rate riding to work as the safest mode compared to driving, public transport or walking, while other commuters rate the cycling the least safe.

A more substantial explanation of differences in propensity to cycle to work and the manner in which determinants vary between individuals is provided by research themes relating to psychological determinants.

Research themes: Psychological models

The evidence from across studies identified in this review suggest that physical, objective, concrete determinants (i.e. infrastructure, environment, trip qualities, facilities/incentives, group membership) may account for a proportion of the variance in individual's propensity to cycle to work. Subjective determinants may be more critical in the general and day-to-day decisions to choose cycling as the preferred commuting mode.

Heinen, Maat, and Wee, (2010) include attitude in their analysis of determinants, with cycle commuters characterised as sharing altruistic and environmental motives as well as being motivated by their expectations of the benefits of riding to work (e.g. health, exercise/fitness, convenience, utility/cost). Dickinson et al. (2003) found that individuals were more likely to choose to cycle to work when they perceived that cycling was perceived positively; with a gender difference in terms of the importance of this perception to women's decision to ride to work.

Guell et al. (2012) adopted a 'social practice' approach to understanding determinants of cycling to work. Using qualitative social research methods within a social practice framework. They explored the interaction of physical, psychological, environmental and social factors, describing cycling as an identity-forming practice. The focus of the study was to understand how the individual's complex social worlds embedded, shaped, and moderated their commuting decisions. Their analysis of the qualitative data gathered thorough structured interviews with 49 cycle commuters identified three facets of the social practice framework that were central to determining propensity to cycle to work. The constantly changing social contexts experienced by individuals affected choices and decisions in response to the fluid demands of the physical, psychological, environmental and social factors. Participants in the study provided paradoxical and ambiguous accounts of the reasoning and decision-making processes determining commuting choices, suggesting that commuting-mode choices are not based on a simple utility-based algorithm.

Instead cycle commuters described a complex pattern of motives, ambitions, and personal identities in relation to their choices. The authors describe how the positive physical and emotional experiences of cycling to work can help embed it as a practice, or habit. Life events (e.g. parenting) and everyday changes (e.g. smaller, variable factors) may moderate choice and habit, as can shifts in perceptions (e.g. a heightened perception of danger). Guell et al argue that the lens on commuting choice provided by the social practice approach is a more effective means of predicting commuting behaviour in relation to cycling than the more quantitative, static, structural determinants. Guell et al also describe how habit established by social-practice processes moderate the automated and unconscious decision-making processes described by the Theory of Planned Behaviour (TPB). The Theory of Planned Behaviour framework was adopted by a number of studies, either explicitly or implicitly, to account for differences between individuals in commuting mode-choice.

Other studies also noted the interaction between TPB components and commuting habits. This review analysed studies against this framework to establish what psychological evidence relating to determinants of cycling to work exists in research.

This analysis focused on the three components of the theory of planned behaviour (Ajzen, 1985, 1991):

1. Attitude – the individual's belief that the behaviour will produce the desired outcome
2. Social norms – the individual's beliefs about whether they are expected to demonstrate the behaviour or whether it will be socially desirable or valued by others
3. Perceived control – a similar construct to self-efficacy; the extent to which the individual believes they possess the capability to successfully demonstrate the behaviour

The behaviour in this case is cycling to work; the decision to do so being governed by the degree to which the individual perceives that they can do it, that it is socially acceptable or valued, and that it will lead to the desired outcomes or benefits.

1. TPB Attitude

Heinen, Maat, and Wee, (2011) identified four factors through a factor analytic study, which mapped onto the theory of planned behaviour; direct benefits factor (TPB attitude), awareness factor (TPB attitude), safety factor (TPB attitude) and perceptions of others factor (TPB subjective norm). The strongest influencing factor on frequency of riding to work was the attitude factor of 'direct benefits'. This effect became stronger as distance increased. Over short distances (<5km) the attitude factor of 'awareness of environmental, health, and psychological well-being benefits' was most strongly related to the decision to cycle on a daily basis.

They also found that the perceptions of these benefits were moderated by trip-distance; Direct trip-based benefits influences mode choice at all distances, while Safety and Awareness are only important for short commutes. For journeys of less than 5km and/or more than 10km Heinen et al found that their attitude factor of 'safety' became the most predictive of everyday cycle commuting, indicating that those who did not perceive the trip as dangerous were most likely to cycle short and/or long commutes every day.

The authors were unable to account for why this effect was not observed for journeys between 5-10km. van Bekkum, Williams, and Morris, (2011) also found that holding socially responsible values as well as an awareness of direct benefits (such as health, well-being, enjoyment, stress reduction, reflective time, weight management) were positively related to cycle commuting choice. These values accord with the attitude component of TPB in terms of perceptions of benefits and desired outcomes.

Muñoz, Monzon and López, (2016) conducted a survey of commuting choices structured around the theory of planned behaviour. An exploratory factor analysis identified attitudes relating to desired outcomes (lifestyle, safety, comfort, and awareness) being positively correlated with cycling commuting mode choice. Perceptions of direct disadvantages (distance and time) were negatively correlated with cycle commuting mode-choice, indicating that in TPB terms, a negative attitude to outcomes of the behaviour was associated with the behaviour not being adopted.

Many studies identified determinants that relate to the TPB attitude component in terms of perceptions of the benefit of engaging in cycle commuting. A widely-held perception among cycle commuters was that riding to work saved money. Cost savings as a perceived direct-benefit were reported by Heinen, Matt and Wee, (2010), (van Bekkum, Williams, and Morris, 2011), (Wooliscroft and-Wooliscroft, 2014), and (Heinen, Maat, and Wee, 2011). While some individuals may base decisions on mode choice on purely economic grounds, there was evidence that other aspects of utility are also important.

Other studies reported evidence that other forms of utility relating to direct, trip-based benefits were important to cycle commuters. van Bekkum, Williams, and Morris, (2011), (convenience, time savings); and Muñoz, Monzon and López, (2016) (Speed and time reliability). Wooliscroft and-Wooliscroft, (2014), found that convenience benefits such as biking as door-to-door service, and quicker journey times than cars over short distances (<5km) were important to cycle commuters.

Perceptions of the physical elements of health and well-being were widely reported across the studies. Cyclists perceiving benefits for health, fitness, weight management, and exercise were described in the studies by Heinen, Matt and Wee, (2010), van Bekkum, Williams, and Morris, (2011), Wooliscroft and-Wooliscroft, (2014), and Heinen, Maat, and Wee, (2011).

Perceptions of benefits for psychological health and well-being were also reported. In the qualitative study conducted by van Bekkum, Williams, and Morris, regular cycle-commuters described the benefits for stress reduction, opportunities for reflection/planning, (bookending the day), and the experience of nature/outdoor environment. Cycle commuters in the Guell et al (2012) study described psychological benefits of awareness/enjoyment of surroundings, the challenges of dynamic routing, 'time-out' and the emotional, spirituality of experiences, such as happiness and joy. They also found that cycle commuters described paradoxical benefits, for example commuting trips being either quicker or slower depending on mood. Cyclists in this study believed that these benefits would contribute to greater resilience and well-being. St-Louis et al (2014) reported that cyclists have higher satisfaction levels (81.85%) compared with drivers (77.42%), but lower than train commuters (84.98%) and walking (84.10%)

The TPB component of attitude therefore aligns with many of the determinants identified across the studies, where cycle commuters perceive direct benefits of the mode-choice.

2. TPB Social norms

The importance of social norms as a determinant was identified in over half of the studies in this review. The influence of social/cultural norms, social support (cycle champions, senior leadership), and family beliefs as determinants was described by Heinen, Matt and Wee, (2010), van Bekkum, Williams, and Morris, (2011), Heinen, (2016), (van Bekkum, Williams, and Morris, 2011), and Vandenbulcke et al. (2009). Heinen, Maat, and Wee, (2011) found evidence that subjective social norms only affect cycle commuting frequency over short distances. Perceptions of the attitudes and behaviours of drivers, a specific form of social acceptance, was described in studies by Wooliscroft and-Wooliscroft, (2014) and Vandenbulcke et al. (2009).

These findings chime with the subjective social norm TPB component and contribute to an understanding of how individuals make different choices in terms of cycle commuting in similar contexts of physical/objective determinants. The Nkurunziz, (2012) study found that the influence of physical/objective determinants varies with the individual's position in the stages-of-change model (Prochaska and DiClemente, 1983; Prochaska and Velicer, 1997). This effect includes variables relating to the TPB social norms component.

As individuals moved through the early stages of change (pre-contemplation, contemplation, prepared for action), personal values concerning social-environmental factors (e.g. culture, social norms) relating to the TPB social norm perceptions become important in the decision-making process. Equally, personal barriers (attitudes, perceptions, preferences, social status, social insecurity) may act negatively on the decision to change commuting mode to cycling.

A conjoint analysis performed by Wooliscroft and-Wooliscroft (2014), found that the most important factor determining cycling rates was the perceived attitudes of drivers, which relates most closely with the TPB component of social norms. This factor had a stronger effect than perceptions of direct benefits, such as petrol price. In terms of the TPB social norms component, this suggests that the perception of negative driver attitudes reduces the perceived social acceptability of cycling to work, discouraging its uptake.

The perceptions of wider benefits of cycling to work for society, the environment, and communities were also identified as determinants relating to the TPB social norms component. The finding by Heinen, Maat, and Wee (2011) that awareness of the benefits for the environment is a component of one of three factors influencing cycle commuting reflects evidence from other studies in this review.

Vandenbulcke et al (2009) report perceptions of benefits for emission-reductions, air quality, and space savings; similarly, Wooliscroft and-Wooliscroft (2014) report benefit perceptions of road congestion reduction, pollution reduction, carbon reduction, and space savings (parking). van Bekkum, Williams, and Morris (2011) report a slightly different perceived benefit of environmental role-modelling, where cycle commuters feel that a benefit of riding to work is the demonstration of environmentally-friendly, sustainable behaviours that may influence others to adopt the same choices. In TPB terms, if a behaviour is perceived as being beneficial for others, it is more likely to be perceived as a socially desirable behaviour to adopt.

3. TPB Perceived control

The degree to which the individual perceives personal control over desired outcomes relating to cycle commuting was explored in a number of studies. The issue of subjective safety perceptions and confidence of abilities to maintain personal safety was discussed as a perceived control factor by Heinen, Matt and Wee (2010). van Bekkum, Williams, and Morris (2011) also identified personal safety perceptions as an element of perceived control along with cycling confidence/experience, self-efficacy, self-motivation (overcoming perceived challenges/barriers), and effective planning/strategies/coping skills. Nkurunziz (2012) found a positive link between propensity to commute by bike and confidence in ability to engage in new behaviours.

Muñoz, Monzon and López (2016) found that all subjective belief factors had much larger effect sizes than objective/physical determinants, which had only minor associations with cycle commuting frequency. Perception of individual capabilities was the second strongest determinant of cycle-commuting frequency. The strongest determinant identified by their exploratory factor analysis was non-commuting cycling frequency. In other words, the more the individual chooses to cycle for non-commuting purposes, the greater the frequency of cycle-commuting. In terms of the theory of planned behaviour, this suggests a relationship with self-efficacy and perceived control, where greater levels of cycling experience lead to increased perceptions of capability. This effect also chimes with a potentially complimentary psychological model for explaining the variance between individual choices to cycle to work, Social Identity Theory, where identifying with a cyclist in-group increases the likelihood of riding to work through a need to conform to group norms (social identification), define the world by social categories (cyclists and drivers), and compare the self favourably with again other groups (social comparison).

The emotional significance from identifying with a group and striving to demonstrate ideal in-group behaviours to maximise positive comparisons with others inside and outside the group for self-esteem maintenance provides an additional psychological lens on the individual, subjective determinants of cycling to work.

This systematic review also analysed the studies identified from the data extraction against the three components of Social Identity Theory (Tajfel, H., & Turner, J. C. 1986):

1. Social categorisation – assigning social categories to the world and people to help define self according to membership of categories
2. Social identification – adopting the identity and behavioural norms of groups to which we are assigned.
3. Social comparison – comparing self and in-group with other groups

Some studies identified determinants relating to Social Identity Theory, suggesting that when an individual identifies as belonging to an in-group of cyclists, they are more likely to cycle to work.

1. SIT Social categorisation

Only Nkurunziz (2012) explicitly described determinant effects that relate to the process of social categorisation. This study identified a negative relationship between a prevailing social categorisation in the cultural context of where the study was conducted (Tanzania). Here the social category of cyclists was a negative one, with category characteristics associated with low income and low status stereotypes. The study found that the social category of cyclists had a negative effect on cycle-commuting rates as a result of the negative perceptions of this group.

2. SIT Social identification

Heinen (2016) found that self-identifying as a cyclist correlated with cycle commuting mode choice. This self-identity was informed by the cyclist social category characteristics of being environmentally friendly, healthy, sporty, career-minded. The study also found that identity types correlated with both mode choice and the intention to change mode choice; (transport-related, place-related, and social/family related self-identities).

Further to this, identifying with users of a transport mode (a social category) corresponds with its use. In the other direction, some transport self-identities (sporty, car driver), correlated with non-cycling mode choices, while certain identities (car driver, career-orientated, pedestrians, family-orientated, being healthy) also negatively correlated with intention to change.

3. SIT Social comparison

The Nkurunziz (2012) finding that the low status of the social category of cyclists is a negative determinant suggests a link to the social comparison effect, where the real or perceived outcome of any comparison with non-cyclists would likely be negative and potentially negatively moderate cycle commuting mode-choice. Heinen, Matt and Wee (2010) noted that cyclist perceptions of the benefits of cycle commuting were different and more positive than the perceptions of non-cyclists, suggesting a social comparison process emphasising the positives of belonging to the social category of cycle-commuters. Cyclist perceived the benefits of riding to work as being greater in terms of health, utility, environment, and enjoyment. Potentially this relates to a motive of defining the in-group favourably through comparison with other groups such as non-cyclists who by implication do not experience these benefits to the same degree.

There is some evidence then that Social Identity Theory offers some insights into psychological processes behind individual differences in the propensity to cycle to work that are not fully accounted for by the more objective/physical determinants.

Figure 5 summarises the evidence relating to psychological models across the studies.

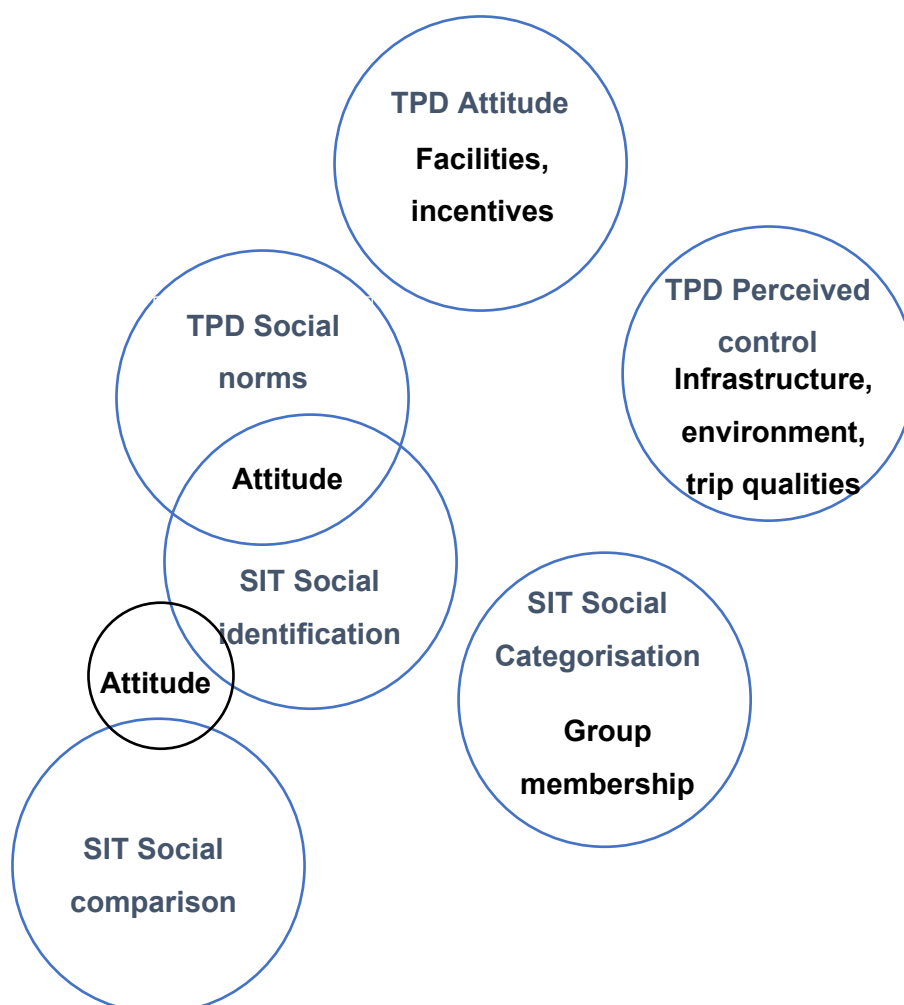
Figure 5: Summary of psychological models

Study	TPB Attitude	TPB Social norms	TPB Perceived control	SIT Social categorisation	SIT Social identification	SIT Social comparison
Heinen, Matt and Wee, 2010	Y	Y	Y			Y
Buehler, 2012						
van Bekkum, Williams, and Morris, 2011	Y	Y	Y			
Dickinson et al. 2003						
Nkurunziz, 2012	Y	Y	Y	Y		Y
Heinen, 2016		Y			Y	Y
Wooliscroft and-Wooliscroft, 2014		Y				Y
Vandenbulcke et al. 2009						
Piatkowski and Marshall, 2015						
Cole-Hunter et al. 2015						
Braun et al. 2016						
Pope, 2013						
St-Louis et al. 2014						
Heinen, Maat, and Wee, 2011	Y	Y	Y			
Guell et al. 2012	Y	Y	Y			
Muñoz, Monzon and López, 2016	Y	Y	Y			
Flynn et al. 2012						

Relationship between physical/objective and psychological determinants

This systematic literature review has described the determinants of cycle commuting identified by the studies included in the synthesis, which were physical/objective in nature. The evidence in these studies were also reviewed through the lens of two psychological models; the Theory of Planned Behaviour (TPB) and Social Identity Theory (SIT). The combination of these two perspectives offers a further level of synthesis, which offers an account of the relationship between physical/objective determinants and the psychological factors behind cycle commuting mode-choice. Figure 6 describes the suggested relationships between the determinants and psychological models.

Figure 6: Physical/objective determinants and psychological models



In this model, perceived control (TPB) is related to physical determinants that encourage the individual to feel that the behavioural change (to cycle to work) is possible for them to achieve. The existence of appropriate infrastructure (physical facilities encouraging cycling to work), the right environment (built or natural features of the environment experienced by cycling commuters), and trip qualities (distance, slope, climate, weather) may help to encourage a perception of control.

However, the existence of appropriate journey characteristics is not sufficient to account for the differences in mode choice between individuals, hence the contribution of attitude (TPB), and social norms (TPB), where physical determinants such as facilities and incentives can facilitate the decision to cycle through encouraging a perception of the likely benefits of this commuting mode choice.

The attitude determinant can influence the social norms (TPB), the social identification (SIT), and social comparison (SIT) processes underlying mode choice through perceptions and beliefs of individuals, groups, culture, and society. Objective determinants relating to group membership, such as the individual's status in terms of status in terms of categories such as gender, ethnicity, socio-economic group, may influence the effect of social comparison (SIT) on decisions to ride to work.

The relationships between physical/objective determinants and psychological models suggested by the evidence from this review indicate that a future research direction should be to explore the interaction between the provision of measures to encourage cycling to work (infrastructure, facilities etc.) and psychological differences in decision-making. For policy makers, the model suggests that the 'build it and they will come' approach may be better framed in terms of a 'build it and enable behaviour change' in those individuals who are psychological pre-disposed to commute under the right set of conditions.

A clearer understanding of this relationship will also help us to understand how variances in determinants that are beyond the control of policy, such as trip qualities and environment, can also be accounted for in travel plans by including a focus on their effect on psychological decision making.

A psychological account of differences in the propensity to cycle to work could therefore be informed by an understanding of the influence of physical determinants. Increases in rates of cycling to work could be achieved through an understanding of how to cultivate the right blend of physical and psychological conditions to influence behaviour change.

Conclusion

The focus of this systematic review was to:

1. Understand what is known about the determinants and benefits of cycling to work
2. Establish the extent to which a psychological lens has been applied when investigating these factors.

The results of the review describe a range of themes, many of which focus on the physical and objective determinants of cycle commuting. The main focus for determinants is infrastructure, facilities, physical environment and trip qualities. The psychological component is considered in terms of the subjective perceptions that individuals form of the availability or appropriateness of these determinants in relation to their personal decision about commuting mode choice.

Similarly, the main focus for the benefits of riding to work are objective, measurable outcomes relating to factors such as health, the environment and utility. Again, the psychological lens is the subjective perceptions of the direct benefits formed by individuals, with potential and regular cycle commuters forming more positive perceptions of direct benefit than commuters opting for other modes.

The evidence demonstrates less focus on the psychological factors relating to cycling to work than this focus on an economic, utility-based philosophy behind decision making and behaviour change. Where psychological processes were considered, the evidence maps on to the theory of planned behaviour and social identity models. This suggests that the variance between individuals and their decision to ride to work are influenced by perceptions of direct benefits, appropriate social norms and feelings of control as well as a sense of self-identification with a social category of cyclists.

The balance of evidence potentially suggests a complex interaction between individuals and the physical/objective determinants, with psychological processes underlying the differences we observe in commuting decisions. A clearer understanding of the psychological components of riding to work may help to explain why individuals with the same access to infrastructure, facilities and trip quality can make different commuting choices; some driving and some riding.

Where evidence of the benefits of riding to work exists, the balance is more towards utilitarian and physical outcomes. Health and fitness feature in the research more than psychological outcomes such as well-being. Benefits are reported in terms of the individual (health, exercise, weight-management) and society (obesity reduction, public health, environment, congestion). No research was found that explored benefits for organisations (beyond the reduction in space for car-parking) or performance at work. Without an understanding of direct benefits for employers, there is less incentive for organisations to encourage uptake.

The results of this systematic review therefore suggest that future research should explore the psychological components of decisions to switch commuting mode to cycling; of regular and frequent cycle commuting, and the benefits of riding to work for individuals and the organisations that employ them.

Strengths and limitations of this review

A possible weakness of the search strategy used in this review were the narrow and specific terms employed. The search criteria were refined to minimise the volume of irrelevant results that would be produced using widely used words such as 'cycle', which is often used outside of the context of bicycling.

This review focused solely on commuting cyclists. Recreational, leisure, and utility cycling were excluded. While the different modes of cycling may share common determinants, both physical/objective and psychological, the purpose of this review was specifically commuting mode-choice. Future research should explore the overlap between different modes of cycling and how this may determine choice. A significant proportion of the studies included in this review came from the same journal (Transportation Research). Psychology journals were poorly represented. However, this is likely to reflect the relative paucity of psychological research into the area of commuting mode-choice.

A strength of this review is the description from the evidence across the papers of a potential framework that integrates physical/objective determinants with psychological ones. This framework would benefit from further exploration with samples of cycle commuters and future quantitative testing. Finally, this review had some success in striving to bridge the gap between the extensive research conducted into cycle commuting in the domain of transport planning with psychological research.

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Empirical Paper

The Psychology of Cycle Commuting

Abstract

The benefits of cycle commuting appear self-evident, with evidence of positive contributions to congestion reduction, public health, and decreases in emissions and carbon. However, a recent systematic review (Redman et al., 2018) identified that research examining the benefits of cycle commuting overlooked the psychological processes and individual differences that determine commuting mode choice. This qualitative study explored the determinants of cycle commuting using a sample of 22 cycle commuters living/working and riding to work around the Brighton area. The participants were recruited against criteria for identifying regular cycle commuters (riding to work at least 3 times a week over a single trip distance of 3 miles or more) and took part in structured research interviews that explored habits, decision-making and experiences relating to their commute. An inductive thematic analysis was conducted using all interview transcripts as the data set. Themes were identified using an iterative process to articulate the determinants that influence choices, decisions, habits, and perceived benefits associated with cycle commuting. Three over-arching themes were expressed that described the psychological determinants of cycle commuting in relation to the physical/objective ones (infrastructure and facilities). The discussion explores how the Theory of Planned Behaviour can overlay this model to provide further insights into the mechanisms that link these themes to cycle-commuting decisions and habits. The study formulates an initial explanatory model for processes underlying initial mode switch and sustained cycle commuting. The model describes the interaction between psychological determinants and physical/objective factors such as infrastructure that drives the behaviour change process. This model identifies directions for future quantitative study and initial recommendations for organisations and policy-makers.

Introduction

“When the spirits are low, when the day appears dark, when work becomes monotonous, when hope hardly seems worth having, just mount a bicycle and go out for a spin down the road, without thought on anything but the ride you are taking.” Arthur Conan Doyle

Motorised travel is the primary commuting mode-choice. In the UK, car, train, and bus travel make up 84% of the travel to work mode share (DoT Travel Statistics, 2015). Car use alone accounted for 62% of trips in 2016 and 78% of total distance travelled by all modes (National Travel Survey, 2017). These commuting modes are strongly associated with congestion, rising carbon levels, air pollution, poor health and obesity.

Road transport accounted for 93% of CO₂ emissions in 2017, most of this coming from passenger cars (62%) (Department for Business, Energy and Industrial Strategy, 2017). Motorised travel to work also increases levels of harmful vehicle emissions. A 2017 study used both road-side and in-car pollution sensors to measure levels of pollution during the daily commute. The study found that the pollution contained twice the amount of chemicals thought to be involved in the development of many diseases including respiratory and heart disease, cancer, and some types of neurodegenerative diseases (Vreeland et al., 2017). Twice as much particulate matter was detected inside vehicles compared to the roadside sensors.

Commuting by car is associated with negative psychological outcomes. Satisfaction with commuting by car is the lower than that of other modes (St-Louis et al., 2014), reflecting the stress and frustration most experience during their car journey to work. Motorised travel is associated with longer commutes in terms of time and distance; both absenteeism and mental health issues have been found to increase as commuting time and distance increase (van Ommeren and Gutiérrez-I-Puigarnau, 2011; Milner et al., 2017).

Commuting by motorised transport is a largely sedentary activity; the length of time spent commuting leaves less time for regular exercise and may be associated with poor diet. In a 2016 survey, the Royal Society for Public Health (RSPH) reported that UK commuters consume 800 extra calories per week while commuting and that 40% of commuters exercised less as a result of commuting by car, bus, or train.

Persuading people to switch their modes of commuting away from cars and the frequently over-crowded public transport networks has the potential to reduce carbon, air pollution, poor health, and low wellbeing while improving the quality and experience of the commute as part of the working day. A commuting mode-switch to alternative forms of travel such as walking and cycling offers the potential for reducing many of the problems and issues caused by the daily journey to work.

The benefits of cycle commuting

Active travel to work (walking or cycling) avoids the problems of congestion, the environmental damage, and poor health and wellbeing created by motorised travel as well as offering economic advantages. Cycle commuting is quicker than walking and more appropriate for longer journeys and therefore it has advantages as an effective and low-cost alternative mode choice to driving and public transport. In some cities cycling is faster than the average speed of traffic (Transport for London, 2017). In terms of the congestion relieving impact of cycle commuting, Cycling UK describes how a typical road lane can carry an average of 2,000 cars per hour or 14,000 bicycles (2015 report to UK Government Travel Select Committee). In countries where bicycle use has been prioritised through transport policy, car use decreases. Copenhagen saw bike journeys exceed car journeys through the city for the first time in 2016. London saw a decrease in car use from 46% to 32% of the modal share of journeys between 1994-2014, with increases in both public transport and cycling through changes to transport policy, such as congestion charging and infrastructure development (Transport for London Travel Report, 2015).

There is significant evidence for the benefits of cycle commuting in research. A 2018 report by Sustrans projected the benefits of achieving the UK government's policy goals for increasing cycle commuting rates. It reported that deaths from air pollution would be cut and public health improved, saving £9.3bn and 13,000 lives over the next 10 years (Sustrans, 2018). The European Cycling Federation calculates that the quantity of carbon produced by car travel is 10 times greater than that of bicycle per kilometre, taking into account the production of the vehicle and its ongoing use (Blondel et al., 2011). The economic benefit per year of increased cycling would be £2 billion per year by 2015 if the UK's Cycling Delivery Plan's targets for increasing trips by cycle are met. (Crawford and Lovelace, 2015). Savings produced by improved health and congestion reductions are the largest drivers of the projected economic benefits.

Evidence for the beneficial effect of cycle commuting on health and fitness was described by Mytton, Panter, and Ogilvie (2016), who conducted a longitudinal study into the body mass index (BMI) of active-travel commuters over a three-year period. Walkers and cyclists were separated out in the study; the positive impact of cycling to work on BMI maintenance was more powerful than walking to work. The study found that the lowest BMI was observed in cyclists and the highest BMI in car drivers. Further, an adult male who switches from car to daily bike use loses on average 0.75 kg. The study also found that giving up cycle commuting had a negative impact on BMI; frequent cyclists who stopped cycling increased their BMI. This is of importance given the strength of research linking high BMIs to a range of chronic and acute illnesses. Not surprisingly, cycling to work has been found to be associated with reductions in cardiovascular disease, cancer, and mortality. A 2017 BMJ study identified cycling to work as the most effective means of avoiding illness and premature death compared with other commuting modes. The study tracked health indicators of a cohort over a five-year period and found that cycling to work lowered the risk of dying early by 40%, and reduced the chance of developing cancer by 45% (Celis-Morales et al., 2017).

The low uptake of Active Travel

The significant potential of commuting by active travel, and cycling in particular, to address the challenges posed by poor health, environmental issues, congestion, and wellbeing is reflected in the focus on increasing active travel rates in contemporary travel policy from its current low levels (UK Infrastructure Act, 2015; Welsh and Scottish Government active travel plans, 2013, 2017).

However, uptake is poor and decreasing (Census, 2011). In the UK, cycling accounted for just 2% of all trips and 1% of the distance travelled in 2016 (National Travel Survey, 2017), with 2.8% of the workforce (741,000 people aged 16-74) commuting by bicycle (Census, 2011). Similarly, the 2016 National Travel Survey identified a decline in the average number of bike trips per person per year to 15 compared to 591 trips per year by car. This contrasts with 25% of commuting trips in the Netherlands (National Institute for Public Health and the Environment (RIVM), 2015).

The strategy of the UK's Infrastructure Act (2015) is to make walking and cycling the natural choice for shorter journeys by 2040, with commuting a key focus. The current strategy includes cycling-specific measures such as improved cycling infrastructure, new routes between local communities, retail, and employment sites, and increased cycle-parking facilities. Cycling-safety awareness programmes, cycling-skills education, and trip end facilities are left to local authorities, charities, pressure groups and employers.

In terms of investment alone, the UK transport investment budget includes £316m, or £1.38 per head of population, of spending on cycling between 2016-2021. The fractional nature of this investment is clear when compared with £3.86bn or £84 per person allocated to road and rail in the UK and an annual investment of €30 per head of population to maintain and develop cycling trip rates of 30% in The Netherlands. Much of this limited investment is directed towards cycling infrastructure, such as London's cycling superhighways, trip-end facilities, and incentives such as the Cycle to Work scheme of tax breaks for cycle commuting bike purchases. And yet, despite this investment and development of cycling infrastructure, rates of cycle commuting remain low and resistant to change.

If cycle commuting offers significant advantages compared to other modes of commuting, and uptake remains low despite investment, then we need to understand more about why, and why not, people choose to do it. Actions to change levels of cycle commuting require greater knowledge of its determinants.

A systematic literature review of cycle commuting aimed to identify the determinants of cycling commuting (Redman, et al., 2018). Of the 18 studies identified the majority of the research (83% of the studies) focused primarily on physical/objective determinants of cycle commuting rates such as cycle paths, commuting environment and trip qualities (e.g. Braun et al., 2016; Buehler, 2012; Nkurunziz, 2012) and trip-end facilities and travel policy (e.g. Dickinson et al., 2003; Flynn et al., 2012; Pope, 2013). Despite the noted environmental and health benefits of cycling, fewer than half of the studies included in the review explored personal benefits such as utility and convenience, environmental (green) benefits, and health/fitness/wellbeing (e.g. Heinen, Matt and Wee, 2010; Piatkowski and Marshall, 2015).

Only a minority of studies included in the review investigated subjective/psychological determinants such as attitude and group membership. The studies that did investigate psychological determinants explored models such as psychological type (Piatkowski and Marshall, 2015), attitude and values (Heinen, Matt and Wee, 2010; Van Bekkum, Williams, and Morris, 2011), social norms (Dickinson et al., 2003), and social practice processes (Guell et al., 2012). A number of the studies identified the personal perceptions of the benefits of cycle commuting, such as lifestyle, safety, comfort, cost savings, utility, health, and wellbeing (Muñoz, Monzon and López, 2016; Wooliscroft and Ganglmair-Wooliscroft, 2014; van Bekkum, Williams, and Morris, 2011). Others explored social psychological factors such as social/cultural norms, social support (cycle champions, senior leadership), and family beliefs (Heinen, Matt and Wee, 2010; Nkurunziz, 2012; van Bekkum, Williams and Morris, 2011; Heinen, 2016; Vandenbulcke et al., 2009). The review identified three things: first, much of what is known has been extracted from secondary data sources e.g. census data; second, many of the issues are studied in isolation and therefore it is difficult to understand the true breadth of psychological determinants; and finally, there is an imbalance in the current literature in terms of what is known about the role of infrastructure in increasing cycle commuting and what is understood about the effect of psychological processes in the same change.

Theories of change

The process underlying people's choice of regular commuting mode may be best understood through the lens of behavioural change. Theories of behavioural change have been applied in many different contexts where the intention is to encourage take up of positive or less harmful behaviours. The National Institute for Health and Care Excellence reported evidence for the effectiveness of interventions when they are based on explicit models of behavioural change (Abraham, Kelly, West, & Michie, 2009). A systematic literature review of behaviour change interventions across social and behavioural sciences identified 83 discrete theories of behaviour change employed effectively across contexts including health eating, physical activity, sun-protection behaviours, internet use, financial behaviours and driving behaviours. (Davis et al., 2015).

Within health and well-being contexts, where the intention is to encourage people to start or stop doing something, a number of theories have been used as the basis for intervention. Trans-theoretical theory, which describes stages of change that individuals must successfully navigate to adopt a new behaviour or habit, was developed in the context of smoking cessation (Prochaska and Norcross, 2011). Describing the behaviour change through a journey from pre-contemplation to maintenance of behaviour, the trans-theoretical approach may offer a useful framework to inform the swap to a cycle commute and the maintenance of cycle commuting.

The theory of planned behaviour (Ajzen, 1985) is often applied to the context of exercise, where the intended change in behaviour is to adopt an exercise regime. Models describing the interaction between habits and goals and their mediating effects on behaviour change are also used in health contexts and well-being contexts. Habits can both inhibit and encourage the behaviour change required to achieve personal goals, such as adopting healthy eating or exercise (Wood and Neal, 2007). The same mechanisms could potentially help explain the role of commuting habits in changing and sustaining a new commuting mode.

Encouraging the adoption of pro-environmental behaviours (recycling, energy saving, switching of idling car-engines etc) has been investigated using a range of behavioural change models. The theory of self-interest cues (Schwartz, 1992) was deployed in a study that combined messages relating to self-interest and self-transcending reasons to influence uptake of a range of pro-environmental behaviours (Evans et al., 2012). Similarly, social norms have been used as a means of influencing pro-environmental decisions such as energy conservation (Emeakaroha et al., 2014) and to increase the numbers of driver switching off their engines when idle (Player et al., 2018). Alternatively, Meleady et al., (2017) used self-regulation theory (Carver & Scheier, 1982) as a basis for encouraging drivers to switch-off their engines at level-crossings using signage to engage private self-focus to process behavioural change choices.

A systematic review of cycle commuting literature (Redman et al., 2018) identified studies that included change models to account for commuting mode choices. The theory of planned behaviour was used as a model to explain mode switch to cycle commuting in studies (Guell et al., 2012 and Heinen, Maat, and Wee, 2011), while the transtheoretical model was used to articulate themes determined in an IPA study of cycle commuters and potential cycle commuters in an Edinburgh-based cycling-friendly employer (van Bekkum et al., 2011).

Self-efficacy as an engine of behaviour change was used to interpret results relating to cycle-commuting confidence, experience and risk tolerance (Heinen, Matt and Wee, (2010); Muñoz, Monzon and López, (2016); Nkurunziz, (2012). While these studies and others in the review deployed behavioural change theories to account for some of the themes and variance observed in cycle-commuting, they were generally considered within the broader context of investigating physical and objective determinants of behaviour, less is known about the psychological determinants of cycle commuting.

Increasing what we know about the psychological determinants of cycle commuting may provide us with deeper insights into change processes operating within mode choice and thereby, identify means to affect real change in behaviour. A more complete model of the psychological determinants of cycle commuting is required to ensure that we have the full means of creating behaviour change beyond simply relying on the partial effects of infrastructure. It will inform our understanding of why some people ride to work and many do not despite having access to the same infrastructure, facilities, and incentives and exposure to the same terrain, weather and other physical trip characteristics. Psychological research can identify what measures can be deployed to increase uptake in cycling to work.

The current study

This research is an exploratory study intended to identify a model of the psychological determinants of cycle commuting. The study will explore the experiences of regular cycle commuters to investigate the factors that influence their commuting mode choice. Moving beyond a focus on infrastructure, investment and physical/objective factors, this study will develop a psychological model of cycle commuting that answers the research question: “What are the psychological determinants of cycling to work – or why do people do it?”

Method

Design

The study used a semi-structured interview design to explore the experiences of regular cycle-commuters in the city of Brighton in the UK. Participation in the research was restricted to cycle-commuters who rode to work at least 3 times a week over a single trip distance of 3 miles or more. The frequency criterion was used to select cycle-commuters who were regular in terms of the UK Government Travel Survey, which defines people riding 3 or more times a week as 'Usual' cycle-commuters (UK Government Department of Health, 2016). The 3 miles criterion was based on a 'perception of reasonableness' trip quality (Dickinson et al., 2003), as an optimal distance for decision-making around mode-choice between cycling vs public transport and private car. Lower distances have also been found to operate as a barrier to cycling to work decisions (Vandenbulcke et al., 2009), where the main alternative form of active travel (walking) becomes more attractive.

Brighton was selected as the focus for the study since it possesses a range of characteristics that make it broadly representative of other towns and cities in terms of population (273,000); mix of employers, industries, and occupational types. Brighton also features a mix of both urban and natural environments through which cycle-commuting occurs. The city is not one of the UK's designated cycle-cities, which means it does not receive additional funding for cycling infrastructure and promotion. Brighton's cycle-commuting rates are higher than the national average at 5% (UK average = 2-3%) (Office for National Statistics, 2011). Restricting the focus to a single area also ensured a consistency of routes, terrain, elevation, weather, and access to cycling infrastructure.

Ethical approval for the study was granted by the University of Kingston Ethics Committee.

Participants

Recruitment, through opportunity sampling, attracted 27 expressions of interest, of which 3 people were excluded because they did not meet the inclusion criteria (either distance, frequency, or not in work). A further 2 participants removed themselves from the study due to personal reasons. The sample therefore consisted of 22 regular cycle commuters living/working in the Brighton area. Thematic saturation at this number meant no further recruitment was conducted.

The sample group was broadly representative of the local working population in terms of diversity of gender, age, and ethnicity. Previous survey and research data indicate that the significant majority of cycle commuters are male. (Buehler, 2012; Heinen, Matt and Wee, 2010; Piatkowski and Marshall, 2015). For this study however, the proportion of participants identifying as female (41%) in the sample was somewhat high compared with previous findings where men outnumber women by two or three to one. (Transport for London, 2014; (Office for National Statistics, 2011).

The age range of participants was 22-63 years (mean age = 40.04); 82% of participants were White-British and 14% were White-other (4% preferred not to say). Educational level ranged from diploma/technical qualification to Masters' degree. Occupational groups included administrative, managerial, and professional roles across private, public and 3rd sector organisations. See Figure 1 for a summary of the participants' demographics.

The average trip length commuted by bike by the group was 6.38 miles (one-way), with an average trip time of 33.27 minutes. The participants had been cycling to work from between 6 months to 15 years, with the average duration of 5.94 years. Over half of the group (54.55%) had access to a car for their commute. Figure 2 summarises the trip characteristics of the participant group.

Figure 1: Participant demographics

Pseudonym	Gender identity	Age	Ethnicity	Occupational level	Sector	Education level
Alfons De Wolf	M	32	Brit white	Retail manager	Private	A Level
Andrea Tafi	F	32	Brit white	White collar admin	3rd	Post-grad certificate
Fausto Coppi	M	38	Brit white	IT professional	3rd	Degree
Stephen Roche	M	42	Brit white	Manager	3rd	Post-grad certificate
Eric Maechler	M	43	Preferred not to say	IT professional	Private	Degree
Marcel Kittel	M	63	Brit white	Social worker	State	Degree
Eddy Merckx	M	54	Brit white	Director	Private	A Level
Fabian Cancellara	M	39	Brit white	Engineer	Private	Degree
Tom Boonen	M	35	Brit white	IT professional	Private	NVQ3
Giovanni Battaglin	M	65	Brit white	Teacher	State	Degree
Michele Bartoli	F	29	NI White	Nurse	State	Degree
Rochelle Gilmore	F	36	Brit white	White collar admin	3rd	Degree
Jacques Anquetil	M	52	Brit white	Sales professional	Private	Post-grad certificate
Malcolm Elliott	M	42	Brit white	Teacher	State	Post-grad certificate
Francisco Moser	F	22	Eastern European white	White collar admin	3rd	Degree
Roger De Vlaeminck	M	60	Brit white	Engineer	Private	MPhil
Dietrich Thurau	F	34	German white	Doctor	State	Degree
Rolf Sorensen	M	49	Brit white	Senior nurse	State	Diploma
Maurizio Fondriest	F	27	Brit white	White collar admin	3rd	Post-grad certificate
Lizzie Deignan	F	23	Brit white	White collar admin	3rd	Degree
Jan Janssen	F	35	Brit white	Installation engineer	State	A level
Lucien Van Impe	F	27	Brit white	White collar admin	3rd	Masters

Figure 2: Trip characteristics

Pseudonym	Commute distance (one way)	Weekly frequency	Trip time (minutes)	Time as a cycle commuter (months)	Access to car	Commuting bike type	Number of other bikes owned
Alfons De Wolf	13	5	50	144	Y	Road	1
Andrea Tafi	10	5	40	72	N	Folding	1
Fausto Coppi	5	5	25	96	Y	Tourer	1
Stephen Roche	3.5	5	15	168	Y	Hybrid	1
Eric Maechler	8	3	35	144	Y	MTB	0
Marcel Kittel	4	4	40	180	Y	Road	2
Eddy Merckx	10	3.5	45	42	Y	Road	0
Fabian Cancellara	3	5	20	36	Y	Racer	2
Tom Boonen	4	5	30	96	N	MTB	0
Giovanni Battaglin	8	5	45	0.5	Y	City	0
Michele Bartoli	3	5	17	30	N	Hybrid	1
Rochelle Gilmore	5	5	25	36	N	Hybrid	1
Jacques Anquetil	6	4.5	40	36	Y	Folding	2
Malcolm Elliott	5	5	20	84	N	Road	2
Francisco Moser	5	5	35	48	N	MTB	0
Roger De Vlaeminck	9	5	40	108	Y	Road	0
Dietrich Thurau	12	3	60	132	Y	MTB	2
Rolf Sorensen	9	4	45	36	Y	Road/cross	0
Maurizio Fondriest	5	5	30	36	N	Hybrid	0
Lizzie Deignan	5	5	30	36	N	MTB	0
Jan Janssen	4	3.5	20	0.5		Hybrid	0
Lucien Van Impe	4	3	25	6	N	Hybrid	0

Procedure

Participants took part in individual, face-to-face, semi-structured research interviews that explored the nature of their commuting habits; their initial decision to ride to work (commuting mode choice); daily decision-making and planning; experiences of the ride. The semi-structured approach encouraged a consistency of approach across interviews, while retaining flexibility for probing responses in greater depth when appropriate. This mixture of structured and exploratory approaches was adopted to ensure that the interviews gathered a diverse and rich data set.

The interview structure and questions were informed by the outcomes of the Redman et al., (2018) systematic literature review, which proposed the need for a framework of cycle commuting determinants that included physical, objective, and psychological factors. The interview structure was developed to offer further insights into the objective determinants that featured in the majority of studies included in the review (infrastructure, facilities, trip qualities, environmental features/terrain, weather/climate) and to explore in much greater depth the single psychological determinant (attitude), identified as an area receiving little research attention in the review. The questions in the interview schedule were therefore created to further explore the role of the five physical /objective determinants elicited from the systematic review and to explore the psychological factors in much greater depth than previous studies identified by the review.

To do this, the interview structure began with a question that focused primarily on the physical/objective determinants by asking participants to describe their daily commute in detail. Answers to this initial enquiry tended to yield detailed, surface level accounts of routes, times, and trip features. These questions were also designed warm-up the participant and sensitise them to the subject matter of the interview as well as identifying points for follow-up and probing during the subsequent discussion. The interview questions continued to explore the research question using by focusing on the participant's initial decision to cycle to work.

The next part of the interview structure extended the focus to psychological factors by exploring the behaviours, choices, routines and daily decision-making processes relating to their commute as well as the emotional and physical experiences of the ride. Critical incident questions were deployed to explore positive and negative experiences relating to their commute.

Critical incident technique (CIT) is an effective method of collecting data from respondents in their own words while avoiding forcing their responses on to an existing model of framework and offers a kind of “thick description” that is particularly useful in gathering rich data for theory building (Bott and Tourish, 2016). In the final stages of the interview, participants were invited to offer any further thoughts or reflections relating to the research questions and to ask any questions of their own.

All interviews were conducted at a location chosen by the participant; their workplace, the author’s office, or a public location (café, hotel lounge). Prior to the interview starting, all participants were asked to provide their informed consent based on a description of the study that re-confirmed the information provided during recruitment. This included consent for the interview to be recorded, transcribed, and stored in a confidential and anonymised manner for the purposes of the research.

Appendix A contains the interview schedule and consent form

Analytic method

All interviews were conducted following the structure described above and lasted between 35-90 minutes, with the majority being around an hour in duration. Prior to analysis all recordings were anonymised; participant names were replaced with identifier codes (pseudonyms randomly selected from the names of Cycling Weekly magazine’s list of the 25 most stylish cyclists of all time, 2018). The interview recordings were then transcribed by a professional transcription service.

Thematic analysis was the chosen as the most suitable approach for meeting the research aims; it provides a flexible means of performing the analysis to deliver a rich and detailed account of the data and creates an explanatory thematic model that can faithfully capture its complexity. Thematic analysis therefore helps answer the research question through identifying the themes within the data relating the psychological determinants of cycling to work. It can be applied independently from theory, which is helpful in meeting the key objective of this study, which is to develop an original model of the interaction between physical/objective and psychological determinants.

An inductive thematic analysis was applied using all interview transcripts as the data, since it offers a fluid, iterative approach to analysis, free from an existing model or coding framework. This inductive approach enabled the analysis to follow a data-driven process to explore the research question.

The theoretical stance taken was constructionist/inductive; no existing model was used as a basis for exploration and data gathering. This stance enabled the analysis to deploy an open-minded, exploratory perspective, free from any a priori models, and follow an iterative process to determine themes relating to the research question.

The design also enabled the research to adopt an open-ended perspective rather than seek to impose existing models on the data. The analysis method was therefore a thematic analysis, employing an inductive-constructionist stance, to determine an explanatory framework from the ground up.

Themes were identified following an iterative process to articulate the determinants that influence choices, decisions, habits, benefits around cycle commuting. The focus of analysis was to identify primarily latent themes. Analysis was conducted based on the process and guidelines for thematic analysis described by Braun and Clarke (2006) and followed these steps:

1. Initial sweep: All transcripts were reviewed against recordings and interview notes to check accuracy and to encourage immersion and familiarity with data. The sweep was also used to gather initial thoughts and reflections
2. Identification of data relating to the research question
3. Generation of (initial) codes – a data driven process that reviewed the content relating to the research questions. This elicited 29 first order codes
4. A further sweep of the data using these codes – this enabled the initial codes to be clarified into 16 second-order codes and finally 8 initial themes
5. Review of the initial themes against data to confirm coherence within themes and across whole data set and to enable further refinement
6. Definition of final themes and review of data within each theme against the definitions

Steps 3-5 were repeated in an iterative process until the final set of themes were articulated. The objective was to create a parsimonious model based on the data. Across the process, emerging themes were shared and discussed with a second researcher for validity checking, to sense check, and enhance their development through subsequent iterations.

Results

The semi-structured interviews with the 22 participating cycle commuters yielded a total of 15 hours of recordings, which were transcribed into 284 pages of data. The participants shared their attitudes, experiences, and perceptions of riding to work. The interview structure prompted them to describe the detail of their commute, their initial decision to switch their mode-choice to cycling, their daily decision-making, and the range of positive and negative incidents they have encountered.

The interviews elicited a diverse range of contributions from the participants. The initial iterations of the analysis identified 29 first-order codes, which were used in subsequent sweeps to code the data. Subsequent iterations of the analysis grouped the data into 16 second order codes on the basis of congruence of meaning. These codes were then clustered into 8 third-order initial themes (each with two of the 16 second order sub-codes attached).

Appendix B contains a table describing the first, second, and third order codes and themes

Appendix C contains the initial codebook

Appendix D contains examples of coded transcript extracts

A discursive agreement process with a group of reviewers was performed at this stage. On the basis of this review, a final iteration of the analysis was performed to identify a more parsimonious set of themes to account for the results of the analysis. These were articulated into three over-arching themes:

1. "I feel fantastic"
2. "I can do this"
3. "I belong here"

These three themes were sufficient to account for the richness and diversity of contributions in the data set, while faithfully capturing the patterns of meaning at both the semantic and latent levels.

They describe the totality of the experience described by regular cycle commuters and the variance between individuals in terms of their perceptions, habits, attitudes, motivations, and emotions. The three themes provide a model for understanding the determinants of cycle commuting. Each of the three themes include a number of sub-themes that cluster together to define it. The sub-theme of infrastructure/facilities overlaps with all three of the global themes and has a discrete meaning and relationship with each one.

Figure 3 summarises the three over-arching themes and the clustering of the sub-themes within each.

Figure 3: Description final themes

Final themes	Summary description	Sub-themes	
1. I feel fantastic	Sense of rewards and benefits associated with mode-choice. Utility of choice. Positive experiences as a result of the choice	Cost and environmental savings Health & fitness Wellbeing Pleasure/ enjoyment Maximising utility	Infrastructure/facilities
2. I can do this	Feelings of personal control and behaviours, habits, decision-making. Perceived ability to overcome physical barriers and obstacles (terrain, hills, climate)	Commuting strategies Bloody-mindedness & grit	
3. I belong here	Sense of legitimacy. Acceptance by others. Sense of self and identity in relation to mode-choice.	In-group-attitudes Out-group behaviours	

1. I feel fantastic

Eddy Merckx: It's become that, it started because of fitness, it's turned into enjoyment but it's both... I just enjoy it, so it's being outside, so the enjoyment really is a big driver and that's partly because of where we are. You know, I just think I am incredibly lucky doing the commute that I do because it's, you know, I have got the coast or the South Downs,

By far the most commonly reported experience reported by cycle-commuters in terms of their mode choice was the pleasure it brought them, the resulting rewards and benefits, and how great they felt as a consequence of riding to work. Cycle commuters believed that riding to work made them feel fantastic on many different levels. The frequently passionate and heartfelt quality of the associated contributions suggests that this theme was a significant determinant. All participants were able to fluently describe reasons why they felt good about their mode-choice and its concomitant rewards and benefits.

Cost and environmental savings

The cycle commuters all identified rewards relating to saving money and reducing their impact on the environment. Many participants described cost savings as a prime, rational reason for their choice to switch to cycle commuting from other modes.

However, it was clear from the data that while cost savings were often expressed as a reason to start riding to work, they were not a sufficient motivator for sustaining the choice. The benefits of cycle commuting were articulated by participants in terms that are congruent with the two-factor theory of motivation (Herzberg, 1968). Saving money was frequently cited by participants as a motive for choosing cycle commuting; but while they continued to feel good about the money they were saving through their choice, it did not perform as a significant motivation for continuing the choice. In this way, cost savings appeared to operate as a hygiene factor rather than a meaningful source of reward once the cycle commuting had become habitual.

Similarly, data from this study suggests that while cycle-commuters may on a surface level feel good about the environmental benefits of their mode choice, it is far from the top of list of reasons to ride to work. Whenever participants described environmental considerations, it was at the end of their list of factors and often had the character an afterthought.

Two participants did not raise environmental considerations until the very end of their interviews. One participant emailed two-days after the interview to include the environment in their contribution.

This is not to suggest that cycle commuters are unconcerned or lukewarm about the environment, or indifferent to the benefits of reducing their carbon footprint. The environmental benefits of riding work are instead regarded as a given; an automatic consequence of the choice and not a result that confers a significant impact on their decision and ongoing commitment to riding to work.

Dietrich Thurau: But at that time the car wasn't really an option for me so even though I was aware of the environmental benefits and I would generally call myself an environmentally aware person, I am keen to do things for the environment, I wouldn't say it was my primary motivation at that time.

Helping to save the planet contributes to cycle commuters feeling good, but similar to cost savings, it acts a source of satisfaction (hygiene factor) rather than a more significant form of motivation. The analysis suggests that reducing cost and impact on the environment were related to feeling good as a result of cycling work; but these factors were far less significant and enduring than other determinants described by participants.

The role of these hygiene factors in feeling good confirms previous research which identified perceived benefits such as the cost savings and the environment (Heinen, Matt and Wee, 2010), (van Bekkum, Williams, and Morris, 2011). However, this study suggests that it was alternative, more motivating factors that contribute more significantly theme of feeling great as a result of riding to work. More motivational subthemes were health and fitness, wellbeing, pleasure, and utility.

Health and fitness

Health, fitness, and wellbeing benefits, while often described in the same context as cost and environmental savings, were described by participants as having a far more enduring effect as positive outcomes of the mode choice. Physical fitness and health were universally cited by participants as drivers behind their initial decision to start riding to work. In some case this was because of a feeling of a lack of fitness, often attributed to sedentary, desk-based jobs. In a few cases, it was related to health conditions.

Fausto Coppi: So I got a job and working in IT is very sedentary and all of that and I started to get fat and unhealthy and I didn't like it... I thought, maybe I will ride to work a couple of times a week and a couple of times a week became the vast majority of the time and then it became all the time.

In contrast to the sub-theme of cost and environmental savings, fitness and health became an enduring determinant; a motivation rather than a hygiene factor. Frequently commuters chose to increase the frequency and distance of their commutes because of the improvements in the way they felt. More generally, the rewards of fitness and physical wellbeing were described as a significant reason for sustaining the ride to work habit, even in adverse conditions.

The rewards of health and fitness appear to operate as a powerful perceived reward at the stage of making a commuting mode choice, but after that become reinforced once the choice is made; perhaps adding to the individual's sense of accomplishment and capability as a cycle-commuter. Only a minority of the participants described themselves as very physically fit or healthy prior to riding to work or identified themselves as enjoying exercise more broadly.

Tom Boonen: So if you go out on the bicycle then you don't need to consider going to a gym, which is again just, why would you do that? You are doing literally what you would do on a bicycle like inside some kind of horrible prison.

Most participants described the key benefit of fitness and health achieved through cycle-commuting in terms of being freed from the need to go to the gym. Participants regarded their daily commute as 'free exercise' (which they felt good about), which also made them fitter and healthier (which they felt really good about). The data from participants in this study reflect previous research where cyclists perceived benefits for health, fitness, weight management, and exercise (Heinen, Matt and Wee, 2010; van Bekkum, Williams and Morris, 2011; (Wooliscroft and Wooliscroft, 2014; and (Heinen, Maat and Wee, 2011).

Wellbeing

Previous research has identified how the positive perceptions held by commuting cyclists for its benefits for psychological health and wellbeing (van Bekkum, Williams and Morris, (2011). In the qualitative study conducted by van Bekkum, Williams, and Morris, regular cycle-commuters described the benefits for stress reduction, opportunities for reflection/planning, (bookending the day), and the experience of nature/outdoor environment.

Participants clearly discriminated between the health and fitness benefits they enjoyed as a result of riding to work and improvements to their wellbeing and general mental health. Cycle commuters described a range of wellbeing outcomes including stress reduction, improvements to mood, and performance at work.

Malcolm Elliott: Probably the thing I have realised more recently is the mental health benefits... I have increasingly realised how much cycling and having that gap, walking out of a stressful day at work and then cycling home can change my frame of mind.

These outcomes were attributed by participants to a combination of two qualities of the experience of riding to work; meditative mind-set and green exercise. Both were features of the ride to work that enhanced the sense of mental wellbeing and were distinct from the physical fitness and health effects.

The meditative element related to the thought process and emotional tone of the commuting journey, which was described as distinct from other modes. The meditative experience was characterised by the cycle commuters as reflective, in-the-moment, and free-flowing. This state invited rehearsal and planning for the day ahead during the ride to work and processing and closure of events from the day during the ride home. The cycle commute therefore provided a valuable book-ending to the working day, which enhanced mood and stress reduction.

Lizzie Deignan, I associate being in a meditative state of not really using your brain but more using your like body more and just like focussing on what is going on in your body rather than having thoughts about what else is going on in your life.

The meditative mind-set dovetailed with the complimentary experiential state of green exercise; a state created when physical activity is conducted in a natural environment (Pretty et al., 2005). Green exercise has been found to enhance mental wellbeing more powerfully than the same exercise is conducted indoors, or in an urban/built environment. The most significant effects of Green Exercise are elevations in mood and self-esteem (Bratman et al., 2015; Bodin and Hartig, 2003).

An IPA study that explored the experience of leisure cyclists found that Green Cycling (riding in a natural environment) helped to enhance the mental wellbeing of participants and their ability to deal with mental and emotional challenges in their wider lives (Glakin & Beale, 2017). Cycle commuters in this present study also described the wellbeing enhancing effects of green exercise. These effects were not solely restricted to natural environments; participants were able to articulate similar effects within more urban contexts. These effects were associated with an increased exposure to seasonality and an awareness of change.

Tom Boonen: It's like you can spot nature so you can see different types of wildlife, birds, plants and see how they change as the year goes on. You have got the view, the birdsong, unless it's windy and in that case it's just wind that's all.

The fitness, health, and wellbeing rewards reported by so many of the cycle commuters appear to be the consequence of a unique combination of characteristics of riding to work; exercise is a regular part of the routine of the day (requiring no additional, discretionary effort to make time for the gym or other activities), the activity is conducted outdoors, generally in environments with natural features (even in the most urban settings), and the activity provides opportunities for a meditative thinking, reflection, and stress reduction.

Pleasure and enjoyment

A strong component of feeling fantastic about riding to work was pleasure and enjoyment. This mode choice has been found to engender higher satisfaction among commuters compared with alternatives such as car and public transport (St-Louis et al., 2014). The cycle commuters in this study all described the specific pleasures that riding to work conferred. For many participants, the pleasure alone was the main driver for sustaining the mode choice.

Malcolm Elliott: it is the best bit of the day often, I am not saying that because I have got a family and families are lovely, but often it is the one bit of the day I have gone yeah, big smile really happy.

For many participants, there was pleasure to be found in simply avoiding the perceived horrors of alternative commuting modes. Bus travel in particular came in for frequent criticism in terms of the contrasts with the experience of riding to work. Many of the participants reported feeling good about avoiding the alternative of bus travel, which they described as over-crowded, unreliable, and stressful.

Other than avoiding unenjoyable alternatives, cycling to work also afforded participants opportunities to enjoy a range of pleasures, including avoiding being stuck in traffic, moments of thrill and exhilaration, and exposure to pleasant experiences. These included the exhilaration of going downhill fast, the buzz of negotiating traffic and busy road conditions, and moments of peak pleasure elicited from nature, sunshine, and amazing views.

The pleasure sub-theme overlaps with the Green Exercise sub-theme in terms of the enjoyment gained from experiencing nature, seasonality, and landscapes. Many participants reported planning and varying the route of their commute specifically to enhance the pleasures of the ride. Participants described pleasures such as sunsets, landscapes, birds, animals, and moments of peace and quiet.

These results chime with cycle commuters in the Guell et al., (2012) study who described the happiness and joy experienced as a result of riding to work. Unlike the tangible rewards of savings, fitness, and carbon reduction, pleasure played a much more implicit and powerful role in the day-to-day experience of feeling fantastic about the commute. The experience of pleasure is likely to be linked with the reported improvements in psychological wellbeing that participants associated with their commute.

Maximising utility

A very common sub-theme expressed by participants was the utility of their choice. Cycle commuters perceive the key reasons behind both their initial decision to ride to work and ongoing commitment as relating to the practical advantages it offers over the available alternatives. Participants cited the convenience and flexibility of riding to work as well as the freedom and independence it granted them. Every participant described their ride to work as being quicker than alternative modes.

Cycling to work enabled cycle commuters to transcend timetables, avoid delays, secure greater predictability and consistency in their journey times, and save time. In this way, the theme 'I feel fantastic' dovetails with the theme of 'I can do this' in terms of the pleasure and reward offered by their choice.

These same rewards also contributed to their sense of personal control.

Lucien Van Impe: It just seems like a big hassle to get public transport. Like I feel like, oh I'm just cycling, I'm doing something, I can leave when I want, I know it will take this amount of time.

Previous research has also reported of utility relating to direct, trip-based benefits as important to cycle commuters, such as convenience and time savings (van Bekkum, Williams and Morris, 2011) and speed and time reliability (Muñoz, Monzon and López, 2016). Wooliscroft and Wooliscroft, (2014) found that convenience benefits such as biking as a door-to-door service, and quicker journey times than cars over short distances (<5km) were important to cycle commuters.

Maximising the utility of their commuting mode through switching to cycling therefore seems to add to the overall satisfaction and enjoyment of it. Cycle commuting enabled participants to avoid delays and unpalatable alternative commuting modes, while travelling to work in a way that maximised flexibility, freedom and convenience.

2. I can do this

Eric Maechler: I have got a pair of shoes under the desk all the time and a pair of trousers hanging up in there on the rack whatever. And I suppose part of that kind of thing is to plan, thinking ahead making sure you have got stuff in the right place... I just got into the habit of kind of having a little work wardrobe which I would take a pair of trousers a week and a shirt every day, a separate pair of shoes, so I didn't have to carry them, a spare pair of pants and stuff in case of emergencies.

Theme 1 (I feel fantastic) provides an account of the rewards, pleasures, and benefits that cycle commuters perceive as the outcome and motivation for riding to work.

Theme 2 (I can do this) offers a different lens to account for decisions to cycle commute.

Commuting strategies

Cycle commuters demonstrated a range of strategies for maximising utility, pleasure, and manage risks of cycling to work. The daily decisions and choices made by cycle commuters were based on range of personal variable/criteria, such as terrain, weather, commitments, trip complexity. Planning based on weather conditions was a frequently reported habit.

The need to vary the trip or accommodate daily changes also placed demands on the planning and problem-solving capabilities of the participants.

Fausto Coppi: Yeah I check the weather the night before, I lay out my clothes, I kind of prepack so I lay out my cycle clothes and my clothes to change into the night before and before I do that I check the weather

Route choice was not perceived by participants as a one-off decision at the point of adopting the commuting mode-choice. Routing remained a live, adaptive strategy for maximising utility, pleasure, variety, and the avoidance of hold-ups. For some participants however, routing was a period of initial experimentation before settling on a consistent route. Participants described how they would route to avoid difficult terrain, hills, busy sections, poor infrastructure (cycle paths that were too slow or of low quality). They would also route to enjoy pleasurable sections, extend the ride, or add variety.

The same sense of control was described by participants as being extended to the management of risk.

Tom Boonen: any efforts I could ever make to avoid traffic I would do... By constantly tweaking the route until you find a good route that avoids too much contact with traffic.

The 'I can do this' theme therefore appears to extend to capabilities, skills, and strategies for becoming a safer rider. The sense of confidence that these capabilities help cycle commuters to adopt their mode-choice, even when hazards, obstacles, and adversity in terms of safety continue to exist.

Participants described how over time these daily choices eventually become habitual decision-making; experience as a cycle-commuter leads to the formation of logistical strategies that minimise the demand of planning and decision-making. The habitual behaviours, decisions, and experience developed by a cyclist are an important facet of the 'I can do this' theme.

Bloody-mindedness and Grit

Participants also provided an account of how they keep going, even in the face of more extreme adversity. They regularly described and demonstrated an emotional commitment to riding to work even in adverse circumstances. The perception of adversity varied between individuals, but often related to the weather, terrain, hills, risk, and physical-fitness demands of the ride. This resilience frequently took on an element of bloody-mindedness; a refusal to be deterred from their choice even in the most adverse conditions:

Malcolm Elliott: And I suppose with winter it is more a kind of fuck you I am going to get through this kind of thing, it's a different mind-set completely but there is still something to be enjoyed in that kind of perseverance and determination when everything can be thrown against you.

The degree of grit and resilience varied between individuals, particularly with regard to the weather conditions they were prepared to endure. Participants reported personal criteria for the conditions in which they would be happy to ride. Some would ride in any conditions up to the point where risks were perceived as too high (ice, strong winds). Other participants had very clear rules for conditions in which they would not ride (rain, cold).

Eddy Merckx: Less than 30% chance of rain is my criteria because I don't like riding in the rain, I don't do that.

However, for all participants in the study, grit was a key factor in adopting and committing to riding to work. For some it seemed linked to a competitive drive to beat the elements, terrain and their own previous record. For others they saw themselves as role models for cycling to work by being out in all conditions; proving a point to others who were not. The 'I can do this' theme both stems from and in turn reinforces behaviours, perceptions of risk, and emotional outlook that is a key to embedding the choice for the longer term.

3. I belong here

Malcolm Elliott: There is a bit of me that has always enjoyed being a bit different if I can and in his own stupid way being the one guy on a bike in the pitch black in the middle of January while everyone else sits in the car, there is a bit of me that embraces that and enjoys that kind of difference.

The third theme is concerned with a sense of legitimacy experienced by cycle commuters when engaging in their chosen commuting mode. This sense was moderated by the attitudes and acceptance of out-groups encountered by participants as part of their commute and the sense of self and identity they experienced in relation to their mode-choice. This theme relates to the research question (psychological determinants) in terms of cycling being seen as a legitimate choice to make.

In-group attitudes

Many participants identified as a cycle commuter, and not necessarily as a cyclist in the wider sense. The role of self-identity was nuanced, with some participants refusing to be pigeon-holed by their commuting model choice, while others were keen to role model their group membership. Some saw themselves as cyclists more broadly and sought to demonstrate idealised group behaviours through their choice. These participants often cycled outside of their commuting habit. For other participants, their identity as a cycle commuter was more arm's-length from their personal sense of self. They did not see themselves as cyclists, any more than someone who drives to work would perceive themselves as a motorist.

Alfons De Wolf: I like it, I like riding to work, I like being a person that cycles to work and I just love cycling, you know

Previous studies have also found evidence of sophistication in the in-group identities of commuting cyclists. Cole-Hunter et al., (2015) used data from a telephone survey to group respondents into four categories: frequent bicyclists, infrequent bicyclists, willing non-bicyclists, and unwilling non-bicyclists. Piatkowski and Marshall (2015) formulated a model of different cyclist types (the 'Portland Typology'), which sought to account for differences in propensity to cycle commute and the different effects of common determinants.

For some participants, riding to work was normalised by the number of people they encountered at work or during the rider doing the same thing. This could also lead to opportunities for social rewards and camaraderie.

Participants attributed positive traits to themselves via the in-group to which they perceived they belonged, such as reducing congestion/carbon, being different, beating the elements and adversity. In this way, the in-group aspect of the third theme confirms how elements of social identity theory (Tajfel and Turner, 1986) behave as a determinant of cycle commuting, especially when combined with the perceptions of the out-group. Participants in this study clearly assigned social categories to the world and people to help define the self (Social categorisation). Participants also adopted the identity and behavioural norms of groups to which we are assigned (Social identification).

Out-group behaviours

In social identity terms, drivers and pedestrians were perceived as the clear out-groups by participants (social categorisation). The out-groups helped to reinforce identity through favourable social comparisons and reinforcement of the distinctiveness of the in-group.

The most significant out-group phenomenon reported by participants was the negative attitudes of some towards cycle commuters. While most pedestrians and drivers were perceived as accepting the right of cycle commuters to be sharing the road, a minority within both out-groups was perceived as being hostile.

Fausto Coppi: I am a white middle class man, I am almost never an out group, but when I ride the bike I am... it's changing, it's certainly got a lot better after the last 10 years. When I first started it was still quite a, it still felt quite, it was downright weird,

While these out-group attitudes had the potential to undermine the 'I belong here' theme, the instead seem to help reinforce the mode-choice, perhaps as a result of clarifying social identity. Where out-group perceptions are seen as positive and supportive, the mode choice is legitimised, which facilitate the initial choice as well as the ongoing maintenance of the habit. Where out-group attitudes are perceived as hostile, then the 'I can do this' theme comes into play; cycle commuters plan and route to minimise hostility and risk while drawing on bloody-mindedness and grit to overcome the adverse perceptions.

The role of infrastructure

Throughout the interviews, participants frequently described the infrastructure and trip-end facilities they encountered as part of their commute by bike. The code of Infrastructure/facilities was frequently identified within the data set but is not described as a discrete entity within the final thematic structure of the 3 themes.

The data belonging to the infrastructure/facilities code played a complex role within the data. As a determinant it did not behave as a causal factor in terms of the decisions of participants to ride to work; instead many indicated they would cycle commute regardless of the provision of infrastructure or trip-end facilities.

Marcel Kittel: I don't think, if none of that (infrastructure) hadn't happened I would have still done it, it makes it feel that much more unthreatening and unchallenging but, yeah... I mean it made it nicer but it wasn't a condition for me

Infrastructure did play a role within each of the themes. The nature of the relationship was a complex one; with infrastructure having both a positive and negative effect on propensity to ride. The 3 themes each provided a basis for participants to engage with the available infrastructure in a way that exploited the potential benefits and minimised the negatives.

Infrastructure and I feel fantastic

In terms of Feeling Fantastic, participants frequently reported that infrastructure could have a negative effect on the enjoyment of their ride. The quality of the infrastructure played a big role in determining whether it was perceived as a force for good.

Where infrastructure had a positive effect on the experience of riding to work, it was by providing opportunities to avoid unpleasant stretches of the route, take the rider into natural environments, or free-up headspace for meditative thinking and reflection.

Giovanni Battaglin: The bits I enjoy are being on cycle paths or roads with no traffic where I don't have to think about that and I can think about my day, holiday, actually plan the rest of my life shall we say, it's very good for that.

Good infrastructure could therefore contribute to the theme of feeling fantastic, thereby helping to reinforce the perceived benefits of the mode choice. This helps embed the behaviour of riding to work, through encouraging the formation of positive perceptions of the benefits of adopting cycle commuting.

Infrastructure and I can do this

Infrastructure and trip-end facilities also interacted with the theme of 'I can do this'. Essentially, good quality infrastructure helped cycle commuters with their initial and daily decision making, such as routing and planning. Where participants perceived infrastructure as being good quality and effective in terms of convenience, flexibility and risk management, they would include it in their daily habits.

Lizzie Deignan: there is a really great cycle path and it's really wide which means that you can overtake people without it being, or two people can go at once... Yeah, I think the fact that there was a really clear, easy cycle route also influenced my decision.

In this way, good quality infrastructure served to reinforce the theme of I can do it. However, when participants perceived infrastructure as poor quality, then the personal control they described was in terms of taking steps to avoid or minimise the use of the infrastructure.

Francisco Moser: So I actually find it safer going on the road there than going on the cycle road

The same was true of poor quality or non-existent trip-end facilities. Participants frequently reported the work-arounds they employed to overcome the deficits in the availability of showers, parking, and in particular drying facilities at work. Dry parking and drying facilities most valued by participants and least commonly experienced; however, commuters employed work-arounds instead.

Infrastructure therefore appears to perform a positive role in fostering a theme of personal control; both good and bad provision triggers consequent planning, routing, and emotional responses that contribute to the take up and commitment to cycle commuting. Even its absence does not appear to impact significantly on the propensity of participants to cycle commute.

This effect contrasts with previous research that indicated a link between infrastructure provision and cycle commuting rates. (Dickinson et al., 2003; Vandenbulcke et al., 2009; Nkurunziz, 2012). These results suggest that the relationship between the two is not strongly causal; instead the decision to cycle commute is in part driven by perceptions of personal control; infrastructure may contribute to this through either its presence or absence and by being perceived as either high or low quality.

Infrastructure and I belong here

Previous research has suggested that infrastructure can encourage cycle-commuting rates by visibly normalising the activity and the rights of cyclists to share the space (Muñoz, Monzon, and López, 2016). Participants in this study described a more mixed picture. On the one hand infrastructure did confirm the legitimacy of the activity, and helped minimise conflict with more hostile elements of the out-group.

Malcolm Elliott: And that track has been there for maybe 3 years now. Yeah I used to get quite a lot of abuse from drivers; people were always just shouting things at you, so it's really nice.

On the other hand, the presence of cycle paths was described by many participants as increasing hostile out-group attitudes, specifically when they chose not to use the infrastructure because of its poor quality.

Alfons De Wolf: where cycling infrastructure has been made but it has been made in a way that I think has put me at more risk because if I don't use the cycle infrastructure that has been provided then the driver attitude diminishes even further.

In terms of encouraging cycle commuting rates, infrastructure again has a complex role to play. In one sense it does help normalise and legitimise the presence of cycle commuters, but on the other it can reinforce the perception of outgroup members that cycle commuters who choose to use the road do not deserve to be there.

Discussion

What makes people ride to work? Identifying the role of psychological determinants in cycling to work has significant potential for unlocking the benefits of increasing uptake for congestion, public health, environment, time lost to commuting, impact on performance and well-being at work.

This study was designed to develop a psychological model that describes the processes contributing to decisions to ride to work. Through the thematic analysis conducted with the data gathered from cycle commuters three themes were identified relating to the determinants of cycle-commuting.

Theme one, 'I feel fantastic', relates to the perceived benefits and rewards associated with the commute. The most significant sources of reward for participants were pleasure, physical health, mental well-being, and utility.

The second theme, 'I can do this', describes the sense of personal control over adversity, obstacles, and constraints that participants both feel and demonstrate. Participants described strategies, habits, and daily decisions that enabled them ride despite challenges such as perceived risk, trip complexity, and adverse terrain/weather conditions.

The third theme, 'I belong here' relates to social psychological sub-themes of in-group and out-group attitudes serving to encourage, reinforce, and support the choice to ride to work. The 'I can do it' theme provides an explanation of how cycle commuters perceive hostile out-group attitudes, where they exist. Positive in-group attitudes dovetail with the 'I feel fantastic' theme to provide additional resources for enduring negative behaviours from other road users.

Taken together the three themes confirm the picture of an earlier systematic review that physical/objective determinants (such as infrastructure) alone do not explain decisions to cycle to work (Redman et al., 2018). This finding supports previous research, such as a conjoint analysis of self-report data collected by Wooliscroft and Ganglmair-Wooliscroft, (2014), which found that cycle lane provision was the weakest determinant of cycle-commuting. While the code of infrastructure/facilities was frequently identified within the data, it was generally in the context of shortfalls, deficits, and negative experiences.

Participants frequently demonstrated the qualities relating to the 'I can do it' theme in the context of overcoming difficulties presented by poor infrastructure or its absence. This supports previous findings, where self-efficacy and confidence in personal capabilities to deal with obstacles such as risk were found to be more significant than physical/objective determinants of cycle commuting frequency (Muñoz, Monzon and López, 2016; Nkurunziz, 2012).

Where participants described infrastructure such as cycle paths in positive terms, it was always in the context of the 'I feel fantastic' theme. Positive experience of infrastructure provision served to enhance the pleasure of the commute rather than provide a reason for doing it. Where infrastructure helped to encourage cycle commuting it was in the form of sending out a positive out-group message that cycling was a tolerated activity along the commuting route. This reflects previous research comparing self-reported data and objective, geo-locational data, which found a positive correlation between proximity to home address and cycle commuting rates (Cole-Hunter et al., 2015). This relationship and the effect of psychological factors were further elaborated by Braun et al., (2016), who found that self-reported perceptions of proximity to infrastructure were more strongly related to cycle-commuting rates than actual proximity, suggesting that subjective beliefs regarding how close an individual lives to cycling infrastructure are a more powerful determinant of cycle-commuting than the physical existence and proximity of the infrastructure. The authors argued that the effect was the result of infrastructure encouraging personal beliefs about the environment being conducive to cycling and perceptions of the legitimacy of cycle commuting.

Infrastructure was not the significant determinant of switching to cycle commuting, rather, it interacted with all three themes. To encourage people to switch to cycle commuting, infrastructure needed to contribute to pleasure, enjoyment and utility; while allowing people to deploy personal control to get the most from it; and also communicate the legitimacy of cycling to work.

This study therefore suggests that infrastructure's role in increasing cycle commuting rates may be that of a moderator of the determinants described by the participants. The benefits and rewards relating to the all three of the over-arching themes were strengthened in their positive effect by good quality infrastructure; effective provision enhanced pleasure, utility, and belongingness.

The extent to which the lack of provision or poor-quality infrastructure acted as a barrier to cycle commuting was less clear. Participants described how the existence of infrastructure could increase hostility of other road users when they chose not to use it. Infrastructure could also be slower, contain hazards, such as pedestrians, or be incomplete. Absence and poor quality therefore do seem to have a negative moderating effect on the determinants identified in this study.

Participants did describe work-arounds that they used to navigate absent and poor infrastructure (as well as challenging terrain, hills, and weather), such as routing, cycling skills, and grit, so its role as a potential barrier is ambiguous. Similarly, the role of infrastructure in sustaining the cycle commuting habit after initial mode-switch was also unclear. Experienced cycle commuters described skills, habits, and rewards that enabled them to sustain their mode choice despite the availability of infrastructure. This study therefore indicates that the role of infrastructure and other physical features in the uptake of cycle commuting is a complex one, behaving as both a positive and negative moderator of the determinants, and potentially a barrier. In contrast to previous research that focused entirely on infrastructure and other physical features (terrain, hills, climate) in isolation (e.g. Braun et al., 2016, Buehler, 2012, Cole-Hunter et al., 2015) this study provides an account of the interaction between infrastructure and psychological determinants of cycle commuting.

Towards a psychological model

The purpose of this study was to develop a deeper understanding of why some people ride to work and many do not despite having access to the same infrastructure, facilities, incentives and exposure to the same terrain, hills, weather and other physical trip characteristics.

The three themes expressed by cycle commuters in this study provide a possible explanation for why people decide to ride to work and how they maintain the choice to do so in the longer term. In terms of prior psychological models, these themes overlap most closely with Ajzen's Theory of Planned Behaviour (TPB, 1985, 1991), which describes how the conditions for a decision to make a planned change in behaviour are in place when the individual perceives the benefits, norms, and personal capabilities positively.

The theory comprises three components:

- 1. Perceptions of benefits (attitude)** - a subjective judgement about the likely rewards and outcomes of making a behaviour change is required for a decision is made
- 2. Perceptions of social norms** - the individual must form a judgement about the likely social evaluations of the planned behaviour; will friends, family, colleagues and other social groups regard the behaviour positively?
- 3. Perceptions of personal control** - the individual needs to feel capable and confident to perform the new behaviour; will a behaviour change lead to desired outcomes.

The Theory of Planned Behaviour (TPB) has been used extensively in research into health and exercise contexts, where the motive for effecting changes in behaviour are often around adopting new, beneficial behaviours. (e.g. physical exercise, Bozionelos and Bennett 1999; condom use, Asare, 2015; healthy eating, Povey, et al., 2007). These interventions share similarities with the switch to cycle-commuting, where the change in behaviour involves starting something (rather than stopping), requires committed action and effort, and brings a range of benefits both personal and at a more macro-level. This suggests that the theory of planned behaviour offers a framework for understanding psychological determinants of cycle commuting and developing interventions to increase mode switch.

Previous research has found links between cycle commuting determinants and TPB. Guell et al., (2012) described how habit established by social practice processes moderate the automated and unconscious decision-making processes described by the Theory of Planned Behaviour (TPB); Heinen, Maat, and Wee, (2011) identified four factors through a factor analytic study, which mapped onto the theory of planned behaviour. A 'direct benefits' factor, which related to perceptions of the cost saving benefits of cycle commuting, was linked to the TPB component of perceptions of benefits. An 'awareness' factor, (of environmental, health, wellbeing benefits) was also linked with TPB perceptions of benefits. 'Safety' and 'perceptions of others' factors were both linked with the TPB component of social norms.

The three themes identified in this study map across the three TPB components. Theme 1, 'I Feel Fantastic', relates most closely to the perceptions of benefits component. Cycle commuters described their motives for choosing and sticking with the mode in terms of a range of hygiene factors (cost savings, environmental benefits) and more implicit rewards (health, pleasure, utility). This chimes with the Heinen et al., (2011) study, which found that the strongest influencing factor on frequency of riding to work was the attitude factor of 'direct benefits'. Heinen et al's 2011 study also found the effect became stronger as the trip quality of distance increased, while over short distances (<5km) the attitude factor of 'awareness of environmental, health, and psychological well-being benefits' was most strongly related to the decision to cycle on a daily basis. Muñoz, Monzon and López, (2016) conducted a survey of commuting choices structured around the theory of planned behaviour. Their exploratory factor analysis identified attitudes relating to desired outcomes (lifestyle, safety, comfort, and awareness) being positively correlated with cycling commuting mode choice.

Theme 2, 'I can do this', is congruent with the TPB component of perceptions of personal control. Both the Theme and the TPB component account for initial behaviour change through perceptions of confidence and capability. The theme goes further through also encompassing themes such as grit, planning, competition, routing, and daily decisions, which were more strongly related with the ongoing maintenance of the behaviour, especially in the face of adverse conditions. van Bekkum, Williams, and Morris, (2011) also identified personal safety perceptions as an element of perceived control along with cycling confidence/experience, self-efficacy, self-motivation (overcoming perceived challenges/barriers/physical features and demands), and effective planning/strategies/coping skills. Nkurunziz, (2012) found a positive link between propensity to commute by bike and confidence in ability to engage in new behaviours.

The TPB perceptions of social norms and Theme 3, 'I belong here' both provide an account of how the perceived attitudes of other people influence mode choice. The theme included both in-group and out-group attitudes. The Redman et al., (2018) systematic review found that the importance of social norms as a determinant was identified in over half of the studies in the review. These findings contribute to an understanding of how individuals make different choices in terms of cycle commuting in similar contexts of physical/objective determinants such as infrastructure.

Participants in this study only described infrastructure as having a peripheral relationship with the TPB components. It was not perceived as a benefit but good quality provision could moderate levels of the pleasure and enjoyment determinants. Infrastructure had a moderating role in perceptions of personal control in terms of routing and safety perceptions, but conversely had an inverse effect where personal control was exercised to overcome its absence or shortcomings. Infrastructure also demonstrated a slight role in terms of perceptions of social norms, where its availability fostered a sense of legitimacy or belongingness for cycle commuters. A study conducted by Braun et al., (2016) found that the existence of bike-hire stations (Barcelona's *Bicing* stations) encouraged greater incidence of regular cycle commuters through an increase in perceptions of the environment being conducive to cycling. This is congruent with the results of this study, indicating that the role of infrastructure as moderating positive determinants of cycle-commuting is primarily through psychological mechanisms.

Through the lens of TPB, the importance of context as a moderator of the psychological processes determining behaviour change is brought to the fore. In the case of cycle commuting, objective/physical factors are the contextual elements that influence the formation of TPB beliefs. In their review of behaviour change models, Davis et al. (2015) argue that research tends to emphasise internal, psychological factors and situation, but environmental contextual variables less. The results of this study suggest that while the theory of planned behaviour is a significant component of the model describing the determinants of cycle commuting, research using TPB should include a focus on the role of contextual mediators and moderators on behaviour change.

The theory of planned behaviour therefore provides a theoretical basis for operationalising the three themes identified in this study. Whilst the themes are somewhat broader in content, the three TPB components potentially provide a means for further quantitative exploration of the area. While previous research has explored psychological determinants, the focus was more limited to attributes such as attitude. This is the first paper to bring physical and psychological determinants together into a single model that seeks to explain how they interact to change and maintain behaviour, which is described in Figure 1.

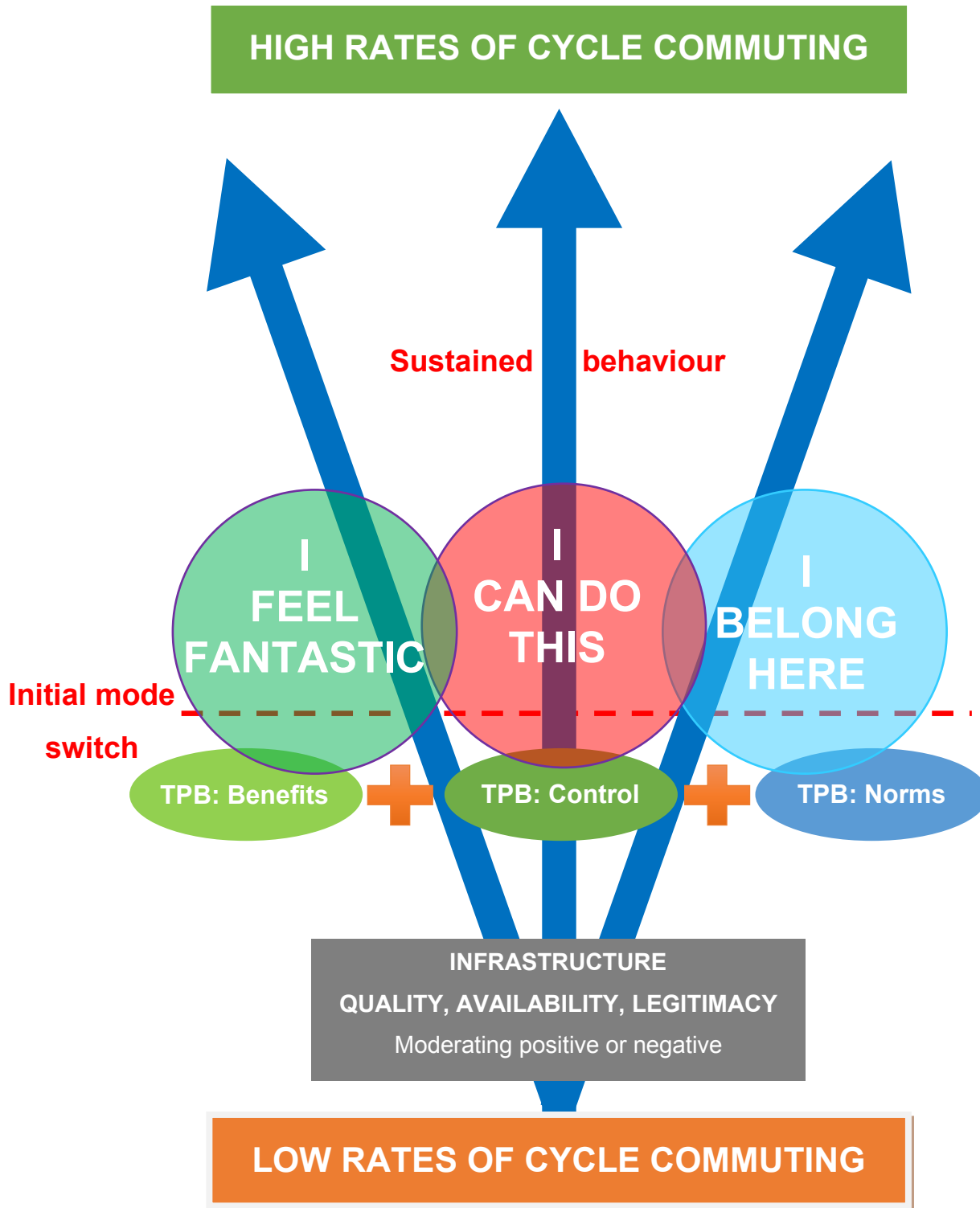
The model that has emerged from this study has psychological determinants at the heart of both the mode-switch and subsequent sustained behaviour change. Prior to the mode-switch, physical/objective factors, primarily infrastructure but also terrain, hills, climate, play a role as a moderator of cycle commuting determinants.

Characteristics of infrastructure of quality (how good it is), availability (whether there is provision or absence), and legitimacy (whether it fosters positive or negative attitudes from other road users) moderate the psychological determinants in either a positive or negative way. Physical features such as hills, terrain, and climate may also moderate psychological determinants in terms of their positive or negative effect on the experience of the journey. The direction of the moderating effect is determined by the interaction between the physical context and the individual's psychosocial processes. This will vary between people. For example, an absence of infrastructure may prevent some people from feeling a sense of personal control (in TPB terms), while for others, who plan, route and draw on grit, its absence increases the feeling of control.

At the point of mode switch, psychological determinants relating to the Theory of Planned behaviour best account for behaviour change driving mode switch. Themes in this study relating to perceptions of benefits, control, and attitudes of others that overlap with the three TPB components (Perceived benefits, perceived personal control, social norms) become the more significant determinants for the change. Any positive moderating effects of infrastructure also contribute to change at this point.

Once mode-switch has occurred the three overarching themes of I feel fantastic, I can do this, and I belong here become the key determinants for ongoing and sustained mode choice. The sub-themes develop and are reinforced by commuting experiences. Infrastructure becomes less significant as a determinant at this stage, unless there is a significant change in its provision or quality. When cycle commuting is a long-term, sustained habit, the regular cycle commuters in this study describe the range of determinants captured by the three over-arching themes in the model.

Figure 1: A psychological model for cycle commuting mode switch and maintenance.



While the proposed psychological model for cycle commuting is underpinned by the theory of planned behaviour (along with the moderating effect of contextual factors of physical/objective factors), the findings can be usefully be considered in the context of other theories of behaviour. The model conforms to the stages of change described by transtheoretical theory (Prochaska, 2011), in particular the stages of Pre-contemplation, Contemplation, Preparation, Action, which can be conceptualised as way-points as individuals ascend through this model to make the change. In this way the model created by this study suggests an approach to integrating these two theories of change within future research and practice. Transtheoretical theory was initially developed as a means of researching smoking cessation change interventions (Aveyard et al., 2009); further research that relates it to the psychological model of cycle commuting described by this study could explore the usefulness of applying the stages of change model to positive behaviour change (starting something) as well as negative change (stopping something).

The nature of change inherent in the switch to cycle commuting differs from many of the contexts in which many behaviour change theories have been developed and researched. The move from intention to action is likely to differ in a smoking-cessation context from a commuting-mode switch; the existing habit of smoking will play a more powerful inhibiting effect on achieving the desired goal than an existing commuting habit will on a mode-switch. This is because in contexts such a smoking cessation, the existing habit forces one behaviour while the conscious goal (cessation) pushes for a change (Wood and Neal, 2007). In this situation, habit prevails more easily over the conscious goal because it implies stopping something that leads to outcomes such as improved health and cost savings, which in terms of this study, were more surface-level benefits. In the context of taking up cycle commuting, the goal has a more positive orientation; to start something that will reward the individual with both surface level benefits such as cost savings and health benefits as well as more motivating outcomes such as enjoyment, fitness, and utility. The psychological model described by this study acknowledges the distinctive qualities of behaviour change in the context cycle commuting in contrast with smoking cessation. Embedding the theory of planned behaviour within the cycle-commuting change model helps to account for the distinctive features of behaviour change, where perceived benefits, control and social norms help to overcome the forces of existing habits to effect a positive change.

At the point at which the change has become a long-term sustained behaviour, models concerned with embedded habits and more deeply held values and beliefs may offer additional insights. At the level of habits, repetition of an action is thought to be key to the formation of a sustained, long-term unconscious, automatic behaviour. Lally et al., (2010) found that behavioural change transformed into automatic, unconscious habit on average after 66 days of repetition. The participants in this study had all been cycling to work for at least 6-months, and the proposed model shares a connection with Lally et al's results which suggest that while a habit is triggered by a goal (to start cycling to work), over time the goal becomes unnecessary as the habit becomes automatic.

More deeply held values and beliefs are less amenable to change than the actions and behaviours that can work to embed habits. However, our values and beliefs may help determine our behaviours and emotional responses to situations and contextual cues. Behaviour change may be positively influenced when values that are part of the individual's self-concept are activated. This process has been demonstrated in the context of healthy eating, where a value for self-control increases take-up of healthy eating behaviours (Adriaanse et al., 2014). The same process was demonstrated by Verplanken et al (2000) in the context of travel-mode choices, where university employees with a concern for the environment within their self-concept were more likely to adopt sustainable travel behaviours when context change prompted a conscious behavioural choice that drew in deeper values relating to self-concept. These findings have implications for leveraging the values associated with the 'I feel Fantastic' component of the proposed model.

This present study describes the range of antecedents and determinants of cycle commuting that can be targeted by future research. Further theoretical investigation using interventions based on the results of this study would extend our understanding of how the intervention brings about change. This conforms to a model of evidence-based research into behaviour change (Michie and Abraham, 2004; Rothman, 2004, 2009). This study has implications for wider research into commuting-mode choice through application of the model to decision-making in relation to each mode; the model particularly lends itself to active travel mode-choice given the overlap between walking and cycling in terms of barriers, benefits, and behavioural changes required (Ogilvie, 2004). Research investigating physical/objective determinants of commuting behaviours can also include the model of psychological determinants described in this study to develop a more integrated picture of the process driving cycle commuting rates.

Limitations and suggestions for future research

The results of this study were based on a small group of cycle commuters in the city of Brighton. While broadly representative of other urban centres in the UK, appropriate caution should be applied before generalising the results to other contexts. The results may be generalised to countries and cultures outside of UK, however care should be taken to accommodate differences in terms of social norms and any prevailing cultural beliefs relating to cycling that may affect the mechanisms within the model described by this study. Previous research into cycle commuting rates for example have found that social status has a negative effect in cultures where cycling is regarded as a mode of travel used by low-status members of society (Nkurunziza et al., 2012). In terms of the theory of planned behaviour, it is the belief around social acceptance that is likely to be the most significant in terms of cultural differences. However, the model itself will be remain meaningful in international contexts, provided any local cultural values are considered.

The group comprised a much larger proportion of female participants (50%) than would be expected to be present in a randomly selected group of cycle commuters (25%). Previous research has found more significant differences in the rates of cycle commuting between genders; in the UK the typical picture is twice as many men as women cycling at least once a week in the cities, and this was reflected in the data analysed by previous studies. This study therefore has the advantage of being based on a sample with a more even gender split and also found that both male and female participants were consistent in their descriptions of the determinants. However, further research into the enduring gender differences in cycle commuting rates found in other surveys and studies would be valuable.

This study explored the experiences of people already engaged in a regular cycle commuting habit. It does not therefore explore the determinants of this mode choice in the context of commuters who use alternative commuting modes, such as car or bus. There are practical challenges to recruiting participants who might cycle to work but don't yet. Further research should focus on the role of barriers and resistance to mode switching among non-commuting cyclists. The three themes could form a lens through which to examine the mechanisms underlying actual mode switch. However, this approach was chosen to reflect the UK government's criteria for what constitutes a legitimate mode-switch to cycle commuting in terms of distance and frequency.

This study focused on the determinants of cycle commuting; it did not explicitly examine determinants of sustaining the behaviour over the longer term. However, all participants were regular cycle-commuters and the average length of time that the group had been cycling to work was 6 years (range 6 months to 15 years). The determinants identified by the analysis are likely to be linked to uptake and maintenance of the mode choice. Future research should examine the determinants of making the change enduring. In this way, this research based on the framework articulated by this study may provide the means to develop initiatives that develop and enable long-term change and increasing the financial, economic, health and environmental benefits of cycle commuting.

While this was an exploratory qualitative study, its outcomes both corroborate and extend previous research in this area and has resulted in the development of an initial model demonstrating the psychological determinants of cycle commuting. This model could serve as the basis from which to test this empirically on a larger population in a quantitative study. In so doing, this model could become the basis upon which policy recommendations are made.

Practical implications of this research

This study describes the key determinants of cycle commuting based on the experiences of cycle commuters in the UK. This adds to current theory by developing our understanding of the interaction between objective/physical determinants and psychological determinants. The study developed a psychological model that can be used as a basis for subsequent actions and research to encourage uptake of cycle-commuting. From this study, recommendations can be made from three levels; policy (local and central government), organisations, and individuals considering mode-switch.

While the results of this study suggest that infrastructure cannot alone account for cycle commuting rates, it does not conclude that investment in cycling infrastructure is an ineffective means of encouraging cycle-commuting. Participants described how infrastructure and trip-end facilities contributed to their decision to ride to work through creating conditions that were more pleasant and convenient. However, determinants other than infrastructure contributed to decisions to ride in a more meaningful and enduring fashion.

In many cases, participants described how they cycle commuted almost despite the availability of infrastructure, where it was poor quality or decreased pleasure and convenience. Regular cycle commuters deploy personal control to overcome any shortcomings in infrastructure.

Roger De Vlaeminck: The cycle tracks are not built to as good a quality as they could be, sort of a thin layer of tarmac, tree roots have made them very bumpy and uncomfortable. There is quite a lot of glass around... some of them are really sort of interlaced with foot paths and they have got dog walkers, you know, and it's a bit of a pain really. So in the end, I have ended up not using that many of them... I do like cycle tracks if they were well maintained and a good standard I would use them in preference to roads every time

The recommendations for policy that can be drawn from this study therefore do not include a reduction in the building of cycling infrastructure. The availability of good quality infrastructure helps foster conditions in which the more profound determinants of cycle commuting described in this study can be nurtured. A practical recommendation from this research therefore is to ensure that when infrastructure is provided, investment should also be made that encourages the development of personal attributes relating to the three themes, such as cycling skills, confidence, grit, personal control, and perceptions of personal benefits.

However, policy for encouraging uptake should also include measures to improve prevailing social norms, especially with regard to driver attitudes and behaviour. A policy that combines infrastructure, improved social norms, and communication of benefits will be most effective in TPB terms in encouraging uptake. A joined-up cycle commuting policy aligned at national, local, and organisational level, which integrates with infrastructure provision while pulling the psychological levers, will be most effective in increasing the numbers of people who ride to work. This approach conforms to best practice for behaviour change interventions published by the National Institute for Health and Care Excellence (2007). The NICE guidance states that interventions are more effective if they simultaneously target variables at different levels, such as individual, community and population.

At an organisational level, practical actions could include measures that increase the salience of the implicit rewards (I feel fantastic), empower commuters with strategies and planning tools to sustain the mode-switch (I can do this), and counter any organisational practices and attitudes that are antithetical to cycle commuting (I belong here).

Measures that employers could use to achieve these outcomes should contribute to the creation of the culture of a cycling-friendly organisation, through provision of high-quality trip-end facilities, cycle skills workshops, guided rides, commuting buddies and rewards and incentives for mode switch and sustained habits. Disincentives like free car-parking should be minimised. In this way organisations can create a positive moderating effect on the psychological determinants within the three themes.

At an individual level, whilst selling the benefits of cycle commuting may be influential in terms of fostering perceptions congruent with the I feel fantastic theme, the results of this study indicate that benefits such as cost savings and environmental benefits may be less significant to cycle commuters than more motivating rewards such as pleasure and utility. Promotion and education initiatives should therefore aim to communicate the full range of potential benefits, including the more powerful motivators such as pleasure, enjoyment, green exercise, convenience, flexibility, fitness, health, and wellbeing.

Conclusions

This study applies a uniquely psychological perspective on the determinants of cycle commuting, drawing from the experiences and insights of regular cycle commuters within an urban context representative of others in the UK and beyond. The research adds to previous studies by developing a psychological model describing the determinants of cycle commuting and their relationship with physical/objective determinants like infrastructure and terrain. People who cycle to work clearly perceive and experience personally meaningful rewards, feel a sense of personal control, and are exposed to conducive social attitudes from both in-groups and out-groups. People will cycle commute whether or not cycle paths exist; but good quality provision can positively moderate the three cycling themes articulated by commuters in this study. To increase the numbers of people riding beyond the hardcore of 2-3% requires measures that combines investment in infrastructure with actions to foster the three themes in commuters who are considering making the mode switch. Further research is required to determine the validity of these themes and the effectiveness of any related interventions in increasing cycle commuting rates.

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Process Review document

1. Scoping out your research idea

The goal of a single, specific research question seemed overwhelmingly difficult to approach; I came into the process with no preconceived notion of what my area of research should be. My thinking initially was to make life easy for myself by going for an area that related to my day-to-day practice (something in the domain of assessment/psychometrics/performance), which would give me ready access to data, clients, and study participants. However, a single research idea was elusive. It was somewhat intimidating to hear how others in my cohort clear and passionate ideas about what they wanted to research; it seemed a tough task to come up with something that matched their level of focus. I initially decided to base my research on attributional style, specifically Seligman's model of attribution management. It is a model I've applied successfully in practice before and one that I felt had been historically under-researched and under-exploited. I began to focus on attributional style and call centre performance/resilience as a potential research area. I struggled at this early stage to conceive of a research model that was more sophisticated than a simple correlational study and was worried about being able to deliver an appropriate substantial piece of research for doctoral standards (something more than a validation study).

I initially overcame these challenges of uncertainty, anxiety and lack of more complex research experience by comforting myself with the thought that part of this process to acquire and develop more sophisticated research skills, using more complex models than I might in my daily practice. I also felt happy about basing my research around attributional style since it's a theory I have always found very compelling. I therefore focused my early thinking of reading around research relating to the application of application of attribution management interventions in the workplace, with a view to identifying any trends, issues, controversies or gaps to which my research could contribute.

My initial idea changed completely! Throughout my initial exploration of the attribution management research idea, I still felt it lacked substance or scope. Quite by chance, during an early course session, I read a paper that had been given to us as an example of a qualitative study. The paper explored career journeys and chaos theory (Peak and McDowall, 2012) and woke me up to two things:

My first degree (Social Psychology) included qualitative research to a significant degree – and I'd really enjoyed it. My practice is generally quantitative in terms of the methods used. A theme from the paper was the nature of peoples' career choices, and how they are often guided by what they enjoy doing, rather than down to some structured plan

I had a bit of a minor epiphany and decided that my research should be totally divorced from my practice areas of the last 20+ years in order to develop myself and to provide motivation and focus for the journey.

I therefore decided to focus on the area of cycling commuting, with the aim of adopting a qualitative approach, possibly IPA (if it was appropriate to the research question).

I changed to this because it is something I do feel passionate about; because there are genuine and significant benefits for policy, organisations, individuals and society if research could identify psychological tools that could be deployed to encourage greater numbers of people to ride to work; and from my initial exploration of literature, there did not seem to be much evidence about out there.

I didn't really have any clear expectations; and certainly, very little idea about how research ideas are formulated. I did expect to be able to identify something given time and effort; I was unprepared for the sudden penny-dropping moment when my eventual research idea emerged. It was very much a significant learning process of developing language, techniques and ways of thinking that were unfamiliar to me as a practitioner. My key learning is very easy to articulate with benefit of hindsight – I had to learn the process of reading papers, understanding key models/theories/landmark studies, identify issues, controversies and unanswered questions in order to identify my research focus. I also understand now the importance of a story for my research, in terms of its rationale, objectives and contribution. If I had known this from the beginning, then formulating my research idea would have seemed a much less mysterious and ambiguous, and anxiety provoking process.

I also learned how the question drives the study design and choice of analysis, not the other way around. At a more prosaic level, I have learned research skills that did not exist when I was last at university, in terms of access to technology.

It would be easy to say that I would simply follow the process and skills that I've now learned now – that's what I'd do next time if I did it. But the way I learned these skills was in large part through the experience of this part of the journey, so I'd have to do it the same way again and learn the hard way once more.

The pro-forma (drawn from Briner and Denyer 2012) was a very helpful structure. Developing the protocol seemed a relatively straightforward process since the research question itself provided a pretty clear steer. It seemed easier than perhaps anticipated.

The value of the structure in terms of clarifying the precise plan for the SLR. It's a very valuable practice in terms of making sure that my thinking is clear before proceeding. It gives you something to refer back to later on if you're in danger of following assumptions rather than the evidence. I'm not sure that there is anything I would do differently if I were to go about developing a protocol again.

2. The systematic review: Conducting searches

Inclusion/exclusion criteria were straightforward and seemed uncontroversial choice at the time. The database selections seemed clear from the options available through the search portals. I had to ensure that I included dBs outside of the usual psychological ones given the overlap of the research question with transport, facilities, health/medical research. Key words were made harder because of the prevalence of the term 'cycle' across all research. The term was therefore included in the search strings with other relevant terms (cycle commute)

I'd used databases and constructed searches/queries in the past, so the process seemed reasonably straightforward with a bit of trial and error. Different interfaces had their foibles. Didn't need to use the library staff for help; it was all OK.

The search process didn't really differ from my expectations/plan - and was more straightforward than I'd perhaps expected (based on anecdotal experiences shared within my cohort...)

My key learnings from this stage were to focus my search terms – refer back to the protocol/research question. Don't be panicked by tales of stress and anxiety.

There's nothing comes to mind in terms of what I'd do differently if I were to go about conducting systematic searches again. It was a process.

3. The systematic review: Assimilation and write up

The clustering suggested itself in some respects – Infrastructure was inevitably going to emerge as a common determinant in research. I wanted to draw out the story of how psychological factors were either unaccounted for or rarely explicitly reported, but again, this evidence pretty much suggested itself. There was a lot of papers from Transport/infrastructure journals, which made for a different tone of study to what I'm more familiar with. This did make the choice of journal fairly clear – Transportation Review. It was the most regularly featured in the literature, and a number of its papers did extend to more psychological issues. It was also a well rated journal.

Main challenge at this stage? The reading! More reading than I've had to do in a concentrated spell for many years. I had to develop my reading style, to begin with I think I was spending too long note taking and really assimilating and accommodating the detail in the studies, when what would have been more pragmatic was a review of each study to get a grip on the overall spread of evidence. The writing up was more intense than I anticipated – more than just a simple retelling of the facts, but going further to draw out more implicit patterns. I went long as well, which meant a painful pruning process prior to submission to the journal.

In terms of my expectations/plan, the whole process took longer than I thought it might; so, my plan simply had to accommodate that. My key learnings therefore; Write shorter sentences. Reviewing an area of personal interest helps – there's always interesting stuff to keep you going. The biggest learning however, was just how useful a technique the SLR is. As a practitioner it would be really helpful to be able to do this before embarking on solutions. Allow more time. Rein in the length.

In terms of what I learned from my SLR in regard to the design of my second study, there was a real predominance of quantitative methods in the literature (unsurprisingly I guess), but what was surprising is how much was based on secondary sources. Lots of querying pre-existing data sets like census, travel survey stats, geo-locational data. Very little actually drawing measures directly from participating commuters. Only one study took a qualitative approach (IPA) to explore actual experiences. What was missing was the psychological focus. Testing interventions for effect, or explorations of lived experiences.

There wasn't much in the research in terms of 'what happens when you provide infrastructure – do cycling rates increase?' More exists which compares areas with/without provision to compare rates. Very little about personal decision making/individual differences in mode choice. Nothing on establishing clear model of psychological drivers. As a psychologist there was a clear opportunity to add to the evidence by applying deeper understanding of psychological models and research methods.

Alternative conclusions I could have drawn from my SLR in terms of opportunities for further research? I could have accepted the speculative use of the Theory of Planned Behaviour as a means of accounting for the range of determinants in the literature and used this (in a quantitative way) to explore differences between cycle commuters and non-cycling-commuters. I could have explored a particular issue within the evidence (gender differences in uptake; role of risk perceptions). However, this seemed a bit cart before the horse; a clearer picture of the psychological determinants was needed first.

4. Research Study: Design

I felt that psychology has a contribution to make to influencing more people to cycle commute; as a discipline, it has much to offer in terms of models for driving change, motivation, confidence, and risk tolerance. I wanted to apply this to the area of cycle commuting in an exploratory way by gathering insights from a group of cycle commuters.

My SLR identified that there was a preponderance in the current literature towards research that focused primarily on determinants like cycle paths etc, with far less attention given to psychological determinants. My SLR also illustrated that where positive effects were found of the physical determinants there was also a potential for a psychological explanation for the limited uptake of cycle commuting (in other words, why infrastructure provision only seems to go so far). Finally, my SLR was able to begin to illustrate how a psychological model of change (theory of planned behaviour) could be used to map the relationship between psychological and physical determinants. The SLT therefore provided a basis for my study, which was to gather more evidence of psychological determinants, and also pointed towards a design - explanatory and open minded - to build current knowledge from a low base in the absence of a current model.

My research was therefore unique in focusing primarily on psychological determinants of cycle commuting (and their interaction with physical ones). It was unique in its objective to articulate an initial psychological model; and it was surprisingly novel for investigating the experiences of UK cycle commuters (much of the current research being from outside the UK and often not gathering data directly from the source - people riding to work).

I felt that there was no psychological model that should be imposed on the research question and that an exploratory approach was most appropriate at this stage. I believed that a qualitative approach using face to face interviews would maximise the richness of the data gathered. I felt that a thematic analysis would be most appropriate for taking an inductive, data-driven approach for building the model.

I felt that the qualitative approach was the most suitable, so my initial thinking was concerned with the type and the analysis method to adopt. I was initially considering an IPA design to really get into the depth of the cycle commuting experience. There were 2 IPA studies (one into leisure cycling, excluded from my SLR, and one gathering data from Edinburgh commuters). I felt that both studies revealed some interesting insights (but also had some flaws in terms of how they made sense of some of the themes). Having reflected, I felt that IPA was not ideally suited towards a study whose objective was to articulate themes or a model. I also realised that perhaps I was being drawn to IPA because I liked the sound of it! It appealed as a design methodology because it was new to me and I enjoyed reading IPA studies and the reflexive nature of the approach. However, I realised that this was not a sufficient reason for adopting it. Content Analysis also seemed a bit premature in the absence of a current theory or coding model. So, thematic analysis seemed the most appropriate approach.

I considered a quantitative approach, but the design and measures seemed unclear given the absence of a theory or model to test (which determinants would be manipulated, what would an intervention be focused on?) I felt that before quantitative study can happen, an exploratory study was necessary.

Early on I had to decide what kind of cycle commuters I should target - regular ones, lapsed, aspiring? I had to grapple with this for a while. In the end I felt that people who are currently actively engaged in the activity would be the richest source of data concerning determinants. Lapsed or aspiring cycle commuters would be a better focus when a model exists against which they can be tested.

Other than that, the design process was quite straight forward; Through my practice, I have experience in designing and conducting semi-structured interviews (and felt that focus groups would be less effective in terms of probing individual experiences). The design process did not really differ from my expectations or my plan.

I learned a lot about the distinctive features of different qualitative analysis methods and had to really deepen my knowledge of IPA in order to reach certain key design decisions. Through my practice, I am far more familiar with quantitative designs, so while the data gathering tools were familiar, I did need to go back to basics and read-up on best practice for this sort of study. I came away with an understanding of how I can sharpen my practice in future when conducting qualitative research for the purposes of delivering consultancy projects.

I felt that the obvious, easiest, and most meaningful approach was to recruit participants directly while they were engaging in riding to work. The most pragmatic approach was therefore by flyer, which could be given to a cycle commuter to read at their destination. The flyer gave an overview of the study and selection criteria and sold the value of taking part. As a cycle commuter myself, I knew that I had to use points where cyclists would be stopping anyway, rather than trying to flag down or interrupt their travel. By including a number of sites across the city in my recruitment I was able to ensure a breadth of routes, experiences, and a diversity of participants. I chose not to target individual employers or organisations because I wanted a diverse sample (and I felt that recruitment via third party would be less effective in engaging interest). I chose not to use local cycling clubs since this would attract a narrower cross section of serious sporting/leisure cyclists.

I had an initial target of two-dozen participants as I understood this was a typical number for this design of study, so continued to recruit and work towards this number. I was data gathering and adding participants at the same time; at the point of interviewing around 18-20 participants I was aware that I was starting to experience thematic saturation, so at that point I curtailed my active recruitment, and worked with the sample I had already recruited, which ended up being 22 participants.

I chose an opportunistic recruitment approach since I felt this was the best way to attract a heterogeneous, diverse sample of people who met the selection criteria. It felt I would get a live representative sample of regular cycle commuters. I also felt that direct recruitment, by me, gave me personal control - I wasn't relying on others or advertising to do the job for me. I recruited between January-April, so avoided getting any fair-weather cyclists who would not meet the criteria.

Booking interview slots was inevitably time consuming and challenging, what with everyone's diaries. The data collection process therefore took much longer than anticipated. Handing out flyers is a bit of a thankless task. In February in the cold and dark. That said, there was a general sense of willingness to participate; I think people saw the potential value of the study and wanted to contribute.

I definitely learned not to underestimate the length of time required for this kind of recruitment and data gathering process. I learned a pretty effective elevator pitch when handing out flyers.

I would have started earlier with recruitment. I realised in hindsight that I could have piloted my interview, but to be honest, its design seemed straightforward and was effective in gathering the data I needed.

I chose an inductive thematic analysis method so I could really start with a blank sheet of paper and be guided by the data to let the model emerge. I did a lot of initial reading, re-reading, and reflecting before embarking on my initial coding; I found mind-maps valuable in getting down my early and developing thinking.

The volume of data was of course a challenge - finding the time an obvious (and anticipated) challenge. I lost an early version of my coding notebook, which was a bit of a setback. I did it all manually, preferring to keep in touch with the data rather than going down a more technological approach. I had to persevere in reading, thinking, re-reading, articulating thoughts over and over. I had to keep open minded about being ready to refine/ditch codes/themes through the many iterations of the analysis and not be resistant to alternative interpretations when they emerged. I had to remain mindful of my own experiences as a cyclist and not let these colour my analysis or interpretations. I had expected it to be time consuming; but it went largely to plan in terms of the schedule.

I found that the first coding, where I went through the data and identified quotes relating to my initial codes, was a real breakthrough point - it felt like progress and it moved my thinking along really helpfully. The Braun paper (and reading other exemplar TAs) was very helpful in getting a handle on the process. Sharing initial themes with my supervisor(s) was very valuable in terms of challenge and developing my insights. If I were doing it again, I might begin coding sooner.

5. Research Study: Writing up

Length was the first obvious challenge; I'd anticipated a qualitative study being necessarily more descriptive and therefore longer, but I was surprised when I got to the end of my results section how long it ran. It was hard getting perspective on the write-up; I was under some time pressure and wanted to complete the initial draft. Once I'd done this it was quite hard stepping back and appraising what I'd written; I felt too close to it. At this point, I found feedback from others really valuable in trying to get a clear story and trying to articulate my results clearly. I had to take care not to run away with rewrites while the review/feedback process was ongoing. I had to really focus on trying to articulate a narrative thread.

I found that my analysis hadn't ended at the write up stage. The creating initial draft introduced refinements to my analysis and its outputs. Subsequent revisions also prompted me to revisit themes and challenge my thinking. In this way the analysis/writing up process felt more reflexive than I anticipated.

I did have a structure mapped out prior to writing, but the revisions made clear how this structure could have been more concrete in terms of the story and key points that I needed to stress and communicate. So next time I would think much harder and try to be much more explicit in the plan for the write up. That said, the slightly iterative nature of the write up/analysis/feedback/revision process helped to produce a better result. Ideally, allow more time so that I had greater space to step-back and evaluate what I'd written as I completed drafts. Having said that, the supervision/review process was invaluable.

6. Overall Doctoral Process

I feel that over the course of my doctorate I have developed technical skills, theoretical knowledge, and in terms my values relating to research and practice. Technically, it has been a stretching process in terms of becoming familiar with contemporary research skills. While much was familiar to me from my earlier degrees in terms of basic research design, the process has required me to become better acquainted with the process of conducting research and confident with new methods that have become available through advances in research technology. In terms of theory, it has been an opportunity through greater access to research literature (not readily available as a practitioner) and the requirements for reading around my research interests to become exposed to theory not associated with my everyday practice. I have also been able to revisit theory that I may have learned in years gone by, but had not had the chance to keep up with. In terms of my values in terms of science and practice, I can now understand how the two can better linked within my own work; especially in terms of evidence-based practice.

My research area for this doctorate was (deliberately) disconnected from my day-to-day work and area of practice and I can genuinely see myself trying to develop this into my practice once the doctoral journey has ended. This dovetails with a general sense of a mid-career change in focus, so I will look for opportunities to continue in research. However, my day-job will also continue to be influenced by what I have learned; as noted the evidence-based practice focus and techniques will become far more central to my regular practice. A greater confidence and fluency in science and research will also benefit my work.

It has shifted my understanding and emotional connection to science and research. While I was never a believer in a 'divide' between science and practice (preferring to see it as a continuum), I historically placed myself firmly at the practice end. Science and research seemed inaccessible and difficult. While it definitely isn't easy, it now feels more accessible and achievable; The way the process has equipped me with research skills and confidence has shifted me along the continuum closer towards science.

This has been the most useful and rewarding element of the process. I have also felt rewarded by having to think really hard about something - it's been intellectually stimulating always having something to grapple with day-to-day - especially at the TA stage, when I'd always be thinking about themes, patterns and how to tell the story.

The early stages of the journey were difficult. Identifying a research question seemed really hard at the time; the concept of a research question was pretty alien to me. That now seems like a long time ago and I feel that having got this far I would not grapple with that initial part of the process in the same way. Combining my work with the demands of the research was actually OK, and if anything, I welcomed the extra demand/stimulation of the thinking and effort relating to my research.

I'm sorry to say that, on reflection, I can't think of anything that I found frustrating. I actually feel that things went pretty smoothly.

To someone just beginning this journey, I would tell them not to worry - follow the process, make sure you use any structure or process that is available, and you should get there. I'd encourage them to keep things simple and not over-complicate their life. I'd advise them not to try and solve every conceivable problem in their research area - but to focus on something important and specific that needs addressing first. I'd encourage them to base their choice of research on something that they really enjoy.

Appendices

Appendix A: Interview schedule and consent form

Introduction

Before the interview begins

Thank the participant for their time today and start by reminding them of the purpose of the research:

- To build on previous research into **what influences people's decision to choose cycling** as their mode of commuting
- To develop a **deeper understanding of the personal/individual factors** influencing the choice
- To understand how these personal factors may be **affected by external factors** such as cycling infrastructure, facilities, and incentives

Introduce the consent form

- Tell the participant that the **interview will be recorded**
- A **transcript** will be made of the recording. This is **anonymised**
- All transcripts from the research are pooled for the **purpose of analysis and identification of themes**
- **Direct quotes from transcripts** may be reported in the study, but will be **non-attributable** to real participant identifies
- Remind the participant of the **consent form** sent to them for review when the interview appointment was confirmed
- Explain each of the points on the form in turn and **ensure that the participant is clear, informed, and happy** to give their consent
- Ask the candidate to **initial and sign** the consent form
- Complete the **anonymised bio-data** form

Describe the structure of the interview

- The interview comprises a series of **questions about their cycle-commuting**
- We will be exploring their **decision-making processes** involved in cycling to work
- Other questions will explore their **experiences** day-to-day as well as **perceptions of positives and negatives**
- **Check** the participant is happy to get started
- **SWITCH ON RECORDING**

Interview structure and questions

1. About your commute

Can you tell me a bit about your commute?

Prompts:

- *Where do you go to and from?*
- *What distance is your commute*
- *How long does your commute typically take?*
- *How long have you been doing this commute for?*
- *How many times a week do you do this?*
- *How do you commute on days that you don't ride?*
- *Do you have access to a car?*
- *What cycling do you do when not commuting?*

Please talk me through the route(s) you take

Prompts:

- *Can you describe what the environment is like along your route?*
- *What is the ride like in terms of hills and terrain?*
- *What is the traffic like along your route?*
- *Do you have to make any stops or break up your commute?*
- *What cycling infrastructure (bike lanes, bike signals) are available on your route?*
- *What facilities are available at your place of work for you and your bike?*

2. Decision making processes

Can you tell me the story about how you first decided to start cycling to work?

Prompts:

- *What were the main factors in your decision to start cycle commuting?*
- *What benefits did you think you'd get from starting to ride to work?*
- *What did you perceive as the main challenges, demands, and obstacles you'd encounter when you started?*
 - *Physical challenges?*
 - *Practical/logistical challenges?*
 - *Emotional/motivational challenges?*
- *How confident were you of your abilities to meet the different demands of your choice?*
- *What did others at work and at home think and feel about your decision?*
- *Once you started, what benefits did you get from your choice?*
- *Once you started, what challenges, demands, and obstacles did you encounter?*
- *How did your perceptions of the benefits and challenges change once you'd been riding a while?*

Can you tell me the about the daily decisions you have to make in order to ride to work?

Prompts:

- *What factors do you consider when deciding to ride each day?*
- *What day-to-day planning is required?*
- *What variations do you make to your habits or route?*
- *What drives decisions behind these variations?*
- *How have your abilities to meet the daily demands, challenges and obstacles developed?*

3. Ride experiences

What's the day-to-day experience like during your rides to and from work?

Prompts:

- *What would you describe as the best bits or highlights of your commute?*
- *What are the pleasant elements?*
- *What are the immediate benefits and rewards you experience while riding?*
- *What do you think and feel during the ride?*
- *How does the experience of your ride contrast with other modes of commuting?*
- *What attitudes from others do you encounter before, during, and after you ride?*
- *What are the attitudes of people you work with towards riding to work?*
- *What attitudes do you perceive from drivers and pedestrians?*
- *What's your feelings around personal safety while commuting?*

4. Critical incidents

Can you bring to mind a specific ride to or from work where something happened to make it particularly difficult or unenjoyable?

Prompts:

- *Tell me about the lead up to what happened*
- *What were you doing immediately before the event?*
- *How did you respond when it happened?*
- *What were the results?*
- *What were your thoughts and feelings during the event?*
- *What were your thoughts and feelings after the event?*
- *How do you think or feel about it now?*
- *What would you do differently next time?*

On a more positive note, can you bring to mind a specific ride to or from work where something happened to make it particularly enjoyable or rewarding?

Prompts:

- *Tell me about the lead up to what happened*
- *What were you doing immediately before the event?*
- *How did you respond when it happened?*
- *What were the results?*
- *What were your thoughts and feelings during the event?*
- *What were your thoughts and feelings after the event?*
- *How do you think or feel about it now?*
- *What would you do differently next time?*

Wrapping-up the interview

- Ask the participant for any **further reflections or observations** they have about cycle commuting
- Tell them that once the study has been completed, they will **receive a summary** of the results
- Ask them to put **anyone else that they know who rides to work** and might be interested in taking part in touch
- **Thank them again for their time today**

Psychology of cycle commuting research: Consent form

Thank you for agreeing to participate in this research. Your views will be greatly valued. In accordance with university ethics procedures, please complete the form below to confirm your consent to your participation.

	Please put initials in the box to confirm
I confirm that I have read and understand the information for the above study and have had the opportunity to ask questions	
I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason	
I understand that all information collected during the interview will be given complete anonymity: I will not be identified on the interview notes or transcripts and the views included in any of the final outputs will not be attributed	
I agree to take part in the above study	
I agree to my interview being audio recorded	
I agree to the use of anonymised quotes in publications	
I agree that my data gathered in this study, after it has been anonymised, may be stored safely for the purposes of this research and within the limits of the law, accessed only by members of the research team, and disposed of securely	

Your name

Date

Signature

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Contact email: alan@criterion.co.uk

Appendix B: Analysis iterations and results

First-order codes	Second-order codes	Third-order initial themes	Final themes and sub-themes	
Buses suck Congestion Enjoy Pleasure	Positive experiences	Pleasure/ enjoyment	I feel fantastic <ul style="list-style-type: none"> • Cost and environmental Savings • Health & fitness • Wellbeing • Pleasure/enjoyment • Maximising utility 	Infrastructure/facilities
Green exercise	Green exercise			
Health	Fitness/health	Well-being		
Meditative Stress reduction	Mental wellbeing			
Convenience Flexibility/freedom Purposeful	Convenience and flexibility	Utility		
Control Work-arounds Routing Weather Terrain	Planning, problem-solving, decision-making			
Money Time	Time & money			
Environment	The planet			

First-order codes	Second-order codes	Third-order initial themes	Final themes and sub-themes	
Infrastructure	Cycle paths, ASL, traffic lights	Infrastructure/ facilities	I can do this <ul style="list-style-type: none"> • Commuting strategies • Bloody-mindedness and grit 	Infrastructure/facilities
Facilities (Trip-end)	Trip end			
Risk perceptions	Risk perceptions	Risk/ safety		
Confidence	Confidence	Bloody-mindedness & grit		
Grit	Grit			
Competition	Competition			
Role model	In-group	Social identity	I belong here <ul style="list-style-type: none"> • In-group-attitudes • Out-group behaviours 	
Self sufficiency				
SIT	Out-group			
Attitudes				

Appendix C: Initial codebook

Code	Inclusion examples
Grit	Bloody-mindedness. Determination. Overcoming adversity. Resilience. Not giving up. Winning against the odds. Emotional satisfaction from enduring difficulties that would beat others. Drive to achieve. Motivation to take on challenge. Focus on beating obstacles and difficulties
Attitudes	Attitudes of drivers, commuters, pedestrians, family, friends, co-workers and team. Positive, negative, ambiguous, normalising, socialising.
Buses suck	Freedom from making antithetical mode choices (generally buses, but also trains, cars).
Competition	Being faster. Getting up a hill. Beating other people. Challenge self.
Confidence	Capabilities, skills, strategies, habits developed to be a better rider and overcome hazards, obstacles, adversity associated with commute. Assertive/defensive riding techniques; anticipating hazards. Familiarity with route/junctions.
Congestion	Busy roads, being held up in traffic, wasting time.
Control	Being in charge of own destiny. Not hostage to conditions such as delays and congestion. Diversity of decision-making options. Choices over routes, timings, habits.
Convenience	Advantages over alternatives in terms of freedom, flexibility, daily choices, door-to-door,
Enjoy	Pleasant. Positive experiential effects. Peak experiences. Positive affect outcomes.
Environment	Saving the planet, reducing carbon, congestion, car use.
Facilities	Showers, lockers, drying, bike-parking. Security. Trip-end availability.
Flexibility/freedom	Freedom to make changes to commute. Freedom from timetables and other constraints on time and route and habits. (bike train negative?). Extend rides through choice
Green exercise	Being in nature and outdoors. Enjoyment of natural environment, seasonality, change.
Health	Physical good health and fitness. Alternative to gym. Routine exercise

Code	Inclusion examples
Infrastructure	Bike lanes, advance stop signs, cycle-specific traffic lights.
Meditative	Opportunities for reflection, relaxing thought patterns, switching-off, clearing mind. Ear-worms.
Money	Financial savings, cost reduction, avoiding other commuting costs; fares, petrol
Work-arounds	Planning. Routines and habits for commute. Thinking ahead. Anticipating needs and obstacles. Solving problems. Resourcefulness. Decision-making and preparation.
Pleasure	Moments of peak positive emotional experiences. Fun, exhilaration, thrills, adrenaline rush, excitement
Purposeful	Cycling with a clear aim. Distinct from leisure, exercise, sport-related cycling
Risk perceptions	Beliefs, attitudes, and judgements relating to danger during the commute. Traffic, pedestrians, road conditions. Risky driver attitudes/behaviours
Role model	Being a positive example. Changing the opinions of others. Encouraging social change. Leading by example.
Routing	Identifying best route, optimum journey, most enjoyable/least unpleasant commute. Exploring and discovering new routing options. Introducing variation.
Self sufficiency	Independence, drawing on own capabilities. Self-reliant. Being different from others.
SIT	In-group membership. Sympathising with norms and attitudes. Contrasting with outgroup. Satisfaction from group membership choices.
Weather	Good/bad conditions. Criteria for daily mode choice. Personal limits on tolerance of certain weather conditions. Rain, ice, gales. Also darkness.
Stress reduction	Mental and emotional health. Mental well-being.
Terrain	Hills or other natural features (such as traffic levels, road/trail surface quality, regular strong winds etc) that affect the commute
Time	Quicker than alternatives. More predictable than alternatives. Avoid wasting time from life because of commute

Appendix D: Coded transcript extracts

Infrastructure
AC03: And also I find that for me personally, someone who cycles a lot, 9 times out of 10 if someone builds a cycle path I don't really use it anyway, it's too slow. I like the one that I think of is like when there is traffic going up Rottingdean towards Saltdean, you are faster up there than anything on a bike if you are fit but yeah still people who use cycle paths. I have had it in Newhaven and they go, why aren't you using the cycle path and I am doing 36 mph mate in a 30 do you need to go any faster? You shouldn't need to overtake me anyway really should you?
AC03: No because people presume that their tax money that they are paying extortionate rates for their car tax entitles you to have to use the cycle path and for them not to be able to use the road.
AC03: where cycling infrastructure has been made but it has been made in a way that I think has put me at more risk because if I don't use the cycle infrastructure that has been provided then the driver attitude diminishes even further, you know. I think it all comes back for me, the biggest single off-putting factor to me cycling to work is the attitude of people in big metal boxes that might well kill me
LD06: they didn't used to have the track so I used to have to ride on the road which was a lot more stressful. And that track has been there for maybe 3 years now. Yeah I used to get quite a lot of abuse from drivers, people were always just shouting things at you, so it's really nice. And you can just look at the hills instead of looking at cars, so it's a lot better, a lot nicer.
GA05: Yeah so there is a junction of Elm Grove as it turns into Warren Road, Tenantry Down and the other road along the racecourse, it's a 4-way junction, it's not nice to go through and then equally crossing the main Falmer to Woodingdean Road just as it goes from a 30 to a 70 limit is pretty scary, unless it's at a standstill. Other than that I have gone out of my way to avoid almost all road traffic entirely because cycling on the road is horrible.
GA05: Well when I started I think they had just built the cycle path, in fact, yeah, they had just started developing the cycle paths from old fashioned red stones to newer ones, they done it all in what seemed to me a bit of a rush. There was several issues, firstly because it was slick paved whenever it rained the rain just sat on it so you would get soaked from the ground upwards, so that's not great but you can deal with that. The issues were crossing the road, the Lewes Road, in order to get onto the cycle path from Hartington and going up and down Hartington people would overtake you far too close, even if you have your own dedicated cycle path, buses would still come into it because they were allowed to. So there would be points where you would have run ins with buses, by which I mean the bus would cut into you if it was trying to avoid other traffic and not see you, which is incredibly scary.

GA05: Other parts would be up on the junction of Falmer and Colding Lane I think it is where you traffic turning left across which I think they are rebuilding at the moment but I mean, I puzzled it over, I couldn't think of a better way of doing it but it's very scary being essentially a pedestrian where cars are driving, they don't see you as a pedestrian.

GA05: Yeah you go there is a cycle path it's going to be great, it's going to be completely separate from everything and there is going to be no issues but of course very, very often you have to look out for traffic coming at you, it might not see you, you know, you might have a bus coming at you... Because there was a cycle path my initial perception was it would be easy because there was a cycle path but you find at the points where the cycle paths interact with other traffic which is basically every side road and every junction then you start having larger problems.

FC04: I come mostly along the Old Shoreham road, $\frac{3}{4}$ of the commute is along there which has got a dedicated cycle lane. That has been there all the time I have lived where I live which is pretty cool, so that was put in a few years ago. And yeah, so apart from that I cycle on residential roads near my house which are quite small and quiet and then across Seven Dials, they have also redone the roundabout up there which has improved things a lot for cyclists, they have got a lot of cycle infrastructure actually. It's interesting to know I did used to commute to Hassocks before I got this job so that was a very different commute, it was 10 miles each way, country roads, so I was cycling anyway. So it's hard to say if all that infrastructure is what has made me cycle but I definitely benefit from it, so yeah, I am lucky.

FC04: I mean, I do dislike traffic, so if there was a way I could do it without going through traffic I would. You know, the number of times that people have pulled out on me and all the stuff like that, I just kind of think it's a numbers game if you keep doing it eventually you are going to have something done to you but as I say I have got some infrastructure like cycle paths and stuff, forward stop lines. There are a lot of forward stop lines everywhere now, so yeah, I don't feel too bad, they could fix the potholes though.

FC04: I do like cycling through the park but they opened the bi-lingual primary school by Hove park and now it's a bit of a nightmare down there. And you always feel like you are just about to kill a child, so I think, yeah I don't know they have not designed it very well basically, it's all shared use and they haven't really taken into account it's an arterial sort of cycle route. It's a national cycle route actually through there through the park and a lot of people use it going both ways, cyclists, and then there are lot of people with a lot of kids on

FC04: yeah so we have this problem where I cycle past the primary school, a lot of people with little kids believe that the cycle route past there is in fact the driveway to the school. And because that is in their minds they see you as somebody who should not be there, they see it as very dangerous, a bit like if you were cycling through a playground of something. Actually that is not true, the reverse is true, it is a cycle route and they should probably take more care but, so there is a bit of conflict there.

<p>FC04: But it does take quite a lot of concentration, if you are the sort of cyclist that doesn't want to think about what you are doing, then I guess you had better stick to things like the seafront cycle path, which... Well then you have all the pedestrians on it, well tourists generally yeah, but if you don't want to go that fast, then just chill out and follow the people</p>
<p>GB01: I live in (redacted) Road in Worthing which is East Worthing, cycle down to the seafront which is about 3 minutes and then pick up the cycle path and just keep going east round Widewater Lagoon, Lancing, over the bridge at Shoreham and then of course there is the bit which is on the road where of course it would be nicer if it was a cycle path,</p>
<p>GB01: knowing that there were the Widewater Lagoon path and the one along Worthing seafront, that helps and the other one from Southwick, it does mean that life is a lot pleasanter during that and I think there should be more cycle paths for safety. I do feel vulnerable when I am on that stretch but if it's early enough, you know, if I leave the house at 7 then there is not too much around, it's not too bad</p>
<p>MC05: with the pedestrians it's when they go on the seafront and they wander just because they don't see the cycle lane and you are just ringing the bell like can I please go by. So I actually find it safer going on the road there than going on the cycle road with the people because they just turn at random moments and you don't know what they are going to do but with the car you are going to have that whole confidence that they are there, I don't know, they are not going to do anything, they are just riding on their road.</p>
<p>RG05: it's when you come into Brighton, (on the cycle path) where you got to look out for not only other cyclists but pedestrians as well, you have to try and anticipate what people are up to.</p>
<p>RG05: Certainly I mean if there was one straight cycle path from Lancing to Brighton I think a lot more people would do it. Because you do feel as if you have got that own space, that is a safe,</p>
<p>DT06: I don't think, if none of that (infrastructure) hadn't happened I would have still done it, it makes it feel that much more unthreatening and unchallenging but, yeah... I mean it made it nicer but it wasn't a condition for me</p>
<p>DT06: once I am off the streets and on to the bike path that's more enjoyable because I have to pay less attention, whereas there is this particular stretch between, what's it called? Or is it Upper Lewis Road between, it's supposed to be 20 mile but there are cars parked passing you kind of both directions and you just have to be really aware and so when you get on to the bike path after the gyratory which is the whole way, that's, so you don't have to concentrate except for other bikes</p>

VB04: There's a cycle path all the way up to the office erm, although people do tend to park in it so you have to kind of come out erm... there's a cycle path by the Level but I don't bother to use it because I'm like going to go in and out of it, not for that long so it doesn't make sense to me. And then the Lewes Road, there is a cycle path but loads of people park in it and that is a bit annoying. But I've never, I don't think I've ever lived anywhere where I've had a cycle path all the way to work for such a distance.

So, I'm actually just, it's, yeah it's good. And I think car drivers in Brighton are more... they don't like bikes being on the road so much.

SC05: But then from Sainsbury's to the University, there is a really great cycle path and it's really wide which means that you can overtake people without it being, or two people can go at once. And yeah, generally you don't get interrupted that much and it's just a really nice cycle because the road, like where the path is, the road is quite smooth as well... (that route) is like the fastest, easiest way to get here, so I probably would still use it (if there was no cycle path), but in the same way that I like find different routes for the bits that, I probably would take variations on it, I think I probably would deviate a bit because other routes would be as bad as it, I don't know if that makes sense? Yeah, I think the fact that there was a really clear, easy cycle route also influenced my decision.

BH05: the new (cycle) route through the gyratory is amazing... I used to volunteer with the bike train so we used to lead back rides up to campus and they were really popular before the infrastructure came in and then afterwards there didn't really seem much point in doing it. People felt like they didn't need a group to ride in, so yeah, it was much better, you don't have as much aggression from motorists because you are not getting in their way. You don't feel like cars are passing you as close because you have got a little bit of room. Maybe the occasional bus might edge into the cycle lane but I never feel like it's dangerously close, yeah, I guess when you have had a near miss, you end up being quite tense and that does affect your mood. Whereas when you don't and it's more often that you don't now that the infrastructure is there, you arrive much more in a pleasant mood.

PS05: Well the whole section is horrible in terms of not having a cycle lane so when there are suddenly parked, I don't know exactly where it is on that road but suddenly there will be some parked cars which means I have to move further into the middle or when you might have someone open the door

RS06: you know, having a separate part of the road, you know, just for bicycles is obviously a lot nicer, a lot, it just feels a lot safer. Obviously a car could swerve in and, you know, yeah. I mean the parts that are just completely separate, you know, that feels a lot safer obviously like it's, you know you have got very often that's also because you have got a bus stop there. So like there is even more say protection from any oncoming traffic, especially because now they have made the bus lanes motorcycle lanes as well, so those guys go past really, really quickly. And even buses because they are wider than a normal car they come in quite close to the lane so I think that's why when it is sort of separate, when it's so much further than, you know, from traffic, that feels so much safer, that just feels a lot better and I feel a lot more relaxed then when it's just sort of painted pavement.

MI02: I suppose Crawley is well equipped with cycle tracks and at first we used to use those cycle tracks but there is a few things. The cycle tracks are not built to as good a quality as they could be, sort of a thin layer of tarmac, tree roots have made them very bumpy and uncomfortable. There is quite a lot of glass around, I think Crawley are pretty good at cleaning up but I think the Crawley teenagers are pretty bad, and so I have had a few punctures from that and I have had, not really bad, but just a few, and bumps drive me insane and you really can't go very quick on them. And some of them are really sort of interlaced with foot paths and they have got dog walkers, you know, there is bits of tree and all sorts of dog walking sticks and things all over the place and it's a bit of a pain really. So in the end, I have ended up not using that many of them or, you know, I am using bus lanes which are pretty good, they are pretty clear, good standard of road and most of the time they are clear of buses so. What else? I do like cycle tracks if they were well maintained and a good standard I would use them in preference to roads every time

EM02: I go down to Brighton (seafront) actually which obviously isn't part of my commute but being aware of other (cycle) path users who are primarily pedestrians, I mean I just feel that it's my duty as a cyclist that they have priority. Because so many of them aren't aware there is a cycle path there so you have to be, as I think car drivers should be to cyclists personally, that the car driver should have the greater responsibility because they have got the bigger weapon. Just as a cyclist should be more responsible than a pedestrian, so I always assume that they are never going to see me so I always prepare to brake and stop or pull aside. And you know if there is a confrontation I try to be as magnanimous as possible, you know, it's completely their fault they got in the way but that's what it is a shared path and if it's shared that's fine but you do have to concentrate even this time of year when there is people out and about there is lots of cyclists

EM02: So I would say that that would be the biggest factor of all is cycle routes and paths. Obviously there are routes through towns where there are kind of sign posts as being the rational route so there is one through Shoreham which I don't like cycling very much because I find there is speed bumps everywhere, my bike is not great on speed bumps, and there is pot holes, it's not very well looked after and it's quite busy. There is cars dashing between speed bumps and restrictions and as a cyclist it's patchy, not a great route, I prefer going along the coast where it's fairly wide and fairly consistent, then taking this what is supposed to be a cycle route I think it's actually not as, it doesn't feel as safe as actually being on the coast.

GL04: I love being by the sea, I have grown up by the sea so just going down by the sea front (cycle path) in the morning it's a nice bit of head space. I can kind of switch off and not worry too much about cars and dealing with drivers trying to run you over etc. And I think it's quite quick as well, there is no traffic lights to deal with or anything like that so it's partly ease and partly I like it that way... I do try to be a nice cyclist and not go on the foot path too much, so I will go on to the road whenever the cycle lane runs out for my bit of the commute.

CF03: There is one of those white line cycle lane lines painted at the side of the road but there are very often taxis, delivery vehicles just random cars parked in it so you can pretty much disregard it to be honest. The only bit of cycle path I use is from Hove to West Street which is alright, you know. Although slightly hazardous in places with people crossing over it but at the time of day I use it it's generally not that bad

JJ05: The divided bike lane along the Old Shoreham Road is a really good facility on one side and then has a whole load of roads crossing on the other and obviously just nose out across it.

And the trouble with a boundaried facility like that is you have got nowhere to go because normally if there is a cycle lane and someone is kind of, I mean I ride round a junction anyway when there is traffic as much as I can but if someone noses out I just go round them. You can't do that if you have got a kerb dividing. So it kind of helps but it is down to how drivers use the stuff and how cyclists use the stuff. I find quite a lot of facilities aren't really useable for me and probably I wouldn't like to recommend anyone use them or I certainly wouldn't recommend anyone who rode regularly use them because they are just too, I mean, because there are just parts that are problematic because you can poodle along at 10 mile an hour on them but I don't poodle along at 10 miles an hour. And it feels like, again, some drivers find that as an excuse to get angry at your presence on the road and go, why aren't you using the cycle lane? The same reason you aren't driving along the country lane that runs alongside the motorway.

JA04: It's generally along this road, Lewes Road often on Western Road along the seafront or it can be up to Old Shoreham Road, there is a really nice infrastructure up there, I really like that cycle path until it stops.

Facilities

RG05: because I like to get in early of a morning, really on a number of levels, one is I can leave work quicker but also to add to that the roads are quieter and plus the shower conditions at work can mean that if you get there late you could be waiting for a shower and yeah, the early bird catches the worm... I think there are three (showers) but there is five floors and there is about 700 people that work there and there is three showers. There is secure parking to put your bike... only a small (locker) but, you know, I can manage, I leave a towel there, there is a coat rack I generally chuck my towel over the coat rack or hang it on the coat rack bit and let it dry out in the morning.

LD06: Yeah even when there isn't the proper infrastructure like in Food Tech they have got a tumble drier, so if I get soaked I just go in there and chuck my stuff in the tumble drier and get it. So it might not be stuff that is set up for cyclists but it's stuff that's within the building which we kind of are okay to use.

GA05: it (cycling kit) generally tends to stay wet so I cycle back in the wet clothes from the morning, the outer gear that dries out because it's built for it but my shoes tend to get a bit wet, shoes and wet socks that kind of thing. I am sure there are ways round that, I am sure people have built special solutions.

<p>FC04: There is yes, so there is a car park and cycle parking, so I am pretty spoiled... There is a shower there as well, I don't use it, but in the previous job I did and they had a shower in the basement. I mean again like we were saying, on a commute bike you are not doing the Tour de France, so you don't get that hot and sweaty really... I mean if you don't have cycle parking you can just by the cheapest bike and just lock it up outside the office, you don't have to worry about where you are going to put it really.</p>
<p>AC03: I haven't really got anywhere to dry my clothes or like to wash in the same way I did when I was at Shoreham. Which I will sort that out but it's not in place yet so I need to get somewhere to hang my clothes properly and stuff sorted. They had a shower at Shoreham and lots of warm places to put your clothes so they would dry by the afternoon.</p>
<p>RS05: we have got cycle racks, the only thing I would say that bothers me slightly is the fact that it's not entirely covered and so there aren't lockers so to speak, not that they should provide that really but, you know, they are secure in the sense that you know, you have got the metal bars moulded into the concrete, so that's all fine, that's secure and I don't fear that my bike is going to get stolen because someone can just pull that up out of the ground. But it is a bit annoying when it rains and so I go outside and the way that, you know, it can rain any way, you know, the rain can go any way and it's not just the way that the shelter is that it's going to only rain from this side, so you know the bike is going to be fine. Because sometimes I go in and my seat is soaked and I am just a bit put off by it but that's fine. So there is a covered shelter and there are also showers which I don't normally use but there are showers in the building, my building particularly. We have got like three downstairs and one or two dotted around the building on the higher floors, there is quite a few shower facilities.</p>
<p>DT06: Yeah there are racks at my office where it's in the view of my colleagues, whereas other people, it's not a great bike but it's, I mean someone tried to steal a very similar one before, well someone did steal one, so yeah, I want to avoid that. I don't want to be carrying a D-lock around</p>
<p>PS05: I don't like that feeling and getting sweaty, so in Worthing I can cycle there for an hour and have a shower there that's fine or I can cycle home which is obviously fine because I am at home. But if you are always changing placement and I was always in different places, and you never quite know if there is a shower. It's also way too much hassle to carry everything, a change of clothes, a towel and this and that... it would be great to have a locker, that would make it even easier but I don't, I just have a shared office with the other doctors, and that's why every day I have to bring my towel and my change of clothes but it's okay because I have some panniers now which makes it easy because you don't have to carry it, it's not heavy on your back it's just there at the back.</p>

SC05: There is a shower upstairs which is very useful, I don't use it but I think it's nice, I have thought about it a few times and it's nice to know there is one. Also there is really good bike, a lot of bike racks and I feel like I know there have been lots of like thefts on campus but I feel like in this area for the hours that I lock my bike up that it's fairly safe. Yeah I guess the bathroom to get changed in, that's probably, I don't think there is any other, yeah, I feel that those things mean I am happy to do it... there is not really any radiators in this building but I think a radiator to dry clothes on would be really great. Yeah, no I think that is everything. Oh also another thing which is good is that all the bike racks are covered, if it's raining your bike won't get wet, that's a good thing.

JJ05: So they have showers which is good, really good, the storage for the bikes isn't great, it's Sheffield stands which are fairly open to the elements, they are kind of sheltered a bit. I think the stands get very, very busy at certain times of the year so the stands aren't great, I would much rather have, I mean my bikes lives indoors in my flat. It has always been one of those things where people who don't ride bikes think of them as, think of the analogy that you care for them as a car. So you keep your car outside largely unless you are very lucky in which case you keep it in a garage, whereas I think most cyclists think of them more like a pair of shoes. You wouldn't just leave your shoes outside in the street

JJ05: We also have a lot of cyclists which is great, but that means there is real competition for facilities. At the moment we have got some heated lockers actually here downstairs, which I don't use because I can never get into them, there is not enough room in them, so I am fortunate enough to have some space behind my desk where I can dry things out instead when the weather is not as predictable as it was this morning.

JJ05: any it's just the quality of the facilities that are there are a little bit perfunctory, it's a little bit of , yeah you have got those, it's that kind of box ticking rather than actually like trying to make it, you know. What I would really like to have is a nice place where you can kind of ride the bike in and just leave it without stripping all the lights, I ride with a camera as well, so, all the bits off it every day and to just leave it without having to worry about it and know that it isn't going to get rained on.

SK02: in the underground car park they have got a cycle area under both the buildings and then there is a locker room, so I keep clothes, changing stuff, wash stuff in my locker. There are showers but they are in the building and upstairs which is a bit of a pain but I generally find I don't need to use them, especially in the winter when it is freezing.

JU04: If it's up to about 3 miles I will just wear what I am wearing and cycle a bit slower, if it's over that I will pack my suit in the bag and get changed when I get there... Just in the loos, disabled loo if there is one... we were in one office so I was having to hang my sweaty cycling gear next to people's coats which they ended up buying me a hook the other side of the office because it wasn't particularly pleasant, so that didn't particularly worry me but they didn't really like it. But otherwise there wasn't too much to consider, I didn't have to have a shower when I got there, I just got on with it.

GL04: So in our work, there isn't access to a decent shower, there is no, we actually have the same changing facilities as the patients so we can't exactly, you know, even go in early and spend time getting ready there is nowhere really to go. So that would be another reason not to particularly bomb into work because I don't want to arrive as a sweaty mess and then have to be in a clinical environment, it's not a nice feeling.
JA04: I often wonder if I had a job where I had to look really, really smart and there were no showers, would I keep cycling? But I think I would.
CF03: I can only get changed in the toilets at work and we don't have any like changing room facility, hanging wet cycling gear on a radiator for the day, I even had my shoes upside down on the radiator today

Risk perceptions
AB02: And in my current state of being heavily pregnant, I don't feel quite as sort of secure on my bike because I don't have the speed to kind of match or almost match the speed at which car drivers are going. So I do feel a little bit more, I suppose a bit more cautious and I suppose, I am not sure if that's related, but I don't normally kind of have any aggro with car drivers but recently, mainly because I am going a bit slower, people are getting a bit more antsy. And I have had some people really kind of have a go at me for being on the road which hasn't been very pleasant, but that's a normal, for me that's not a normal state of affairs. I don't normally get, I am not normally on the receiving end of aggression but yeah that is just something I have noticed over the past few weeks.
AB02: I mean I usually cycle in places that are familiar but I did recently cycle in, well not recently, this will be about a year ago, so I cycled for the first time in London which I definitely wouldn't have done if there hadn't been so much stuff in the news about cycling levels rising in London and there were a lot of cyclists so I did feel, yeah, I felt safer.
AC03: I think Peacehaven is horrible to be honest, the worst area for bad driving on my commute is as you leave the 30-mph limit going towards Newhaven to get to Peacehaven and then it changes again once you get to Peacehaven and vice versa on the way back. Anywhere you are in that 40-mph zone it is atrocious, threats, intentional close passes, people shouting. A friend of mine has been shot at with a paint ball gun along there, horrendous and do you know what makes it all worse? There is a perception and there is now a cycle path, so obviously there was that bit that never used to be a cycle path but people thought it was anyway and now there is a cycle path it's made it so much worse. That is now a dangerous piece of road to not use the cycle path

LD06: It used to be harder on Falmer Road, car drivers not giving you much space, giving you abuse, like I said, with the cycle lane that's kind of fell away a bit now. And I find, I don't know, 98% of drivers are considerate and nice, it's just the odd 2%. Most drivers are really considerate, really helpful, and I think it's getting better and better, I think the more people who cycle the more someone knows a cyclist they are considerate to cyclists so I think it is just getting better and better and there is a better set up. But there are some who make idiotic decisions and pull out in front of you because they think you are just a cyclist, hurl abuse at you because you are just a cyclist.

GA05: I would avoid all interaction because it is just not safe. If cycles didn't exist and someone said I would like to create this vehicle that a pedestrian ride intermingling with other traffic, you would not be allowed, you would not be able to get a licence for it. And I think that bicycles and cars need to be separated because essentially bicycles are just pedestrians walking in the road very quickly but not as quick as a car. Bicycles hold up traffic and I can understand why there is antipathy towards people who ride bicycles.

FC04: Yeah, yeah there is a few odd things like I have never worn a helmet, I have never really thought about wearing a helmet because again, I can't really justify it to be honest, I have this conversation with people, but it's just such a natural thing for me to do anyway. No one wore a helmet when I was 10 so I have just never started... I don't wear a helmet though because I kind of feel like well I have always kind of thought that if you get hit and squashed you are probably dead anyway. And also I did read, and it fitted my pre-existing beliefs so I believed it, that basically the more you look like a safety android, the more dangerously you get treated by road users and the more you look delicate if you like, the more care people take around you and I felt like it fitted my beliefs.

FC04: so I think in the winter months when it's dark at obviously commute time in the evening and it tends to be bad weather, I would say it is quite risky. I have bought loads more lights, I bought lights to go on your spokes so you can be seen from the side because I have noticed that your risk often is on a roundabout, obviously people have to give way to the right often they don't see you and when they are pulling out into the main road from a side road. And actually the cycle path down Old Shoreham Road kind of makes that worse because people pull forward into the cycle lane, people who don't know the road that is, sometimes, it always makes me a bit nervous.

MC05: And then it's also the cars that just stop on the cycle lanes and then you have to overtake them but then you have to overtake them on the bus lane and the buses are coming and you don't really have space. Or there is road works all the time on Lewes Road so that kind of makes it inconvenient as well. I don't know, I have just had a lot of stupid cars in my years just trying to overtake me when they didn't have enough time or some people, I don't know why, they all take me and try to park on the cycle lane and I am like, I am pretty sure you just saw me there, so this kind of stuff wasn't nice.

GB01: Partly lorries who wouldn't see me, yeah I mean I suppose you could say that in a traffic queue I should be going on the outside not the inside but I feel more vulnerable going on the outside against oncoming traffic, so I do go on the inside. Sometimes I have to on to the pavement because there is not enough space and there is always that thought of maybe the lorry won't know I am there and move towards the kerb. But that is more possible to deal with then a car coming towards me at speed on the other side and I do see in that Shoreham traffic queue, cyclists go out, I think well I wouldn't do that. But then also I have made a choice to have a bike that's not going to be making me travel fast because I do think that cyclists can't be seen and that is possibly how cyclists are knocked off bikes because they are travelling fast and motorists don't see them quickly enough. I have got a German Kalkhoff which is a City bike and it's comfortable, it does the job.

GB01: I wear a reflective jacket on top of my stuff but I am castigated frequently for not wearing a cycle helmet but I can't stand the feel, so I don't... Yeah, well I do have one but I just can't stand the thing. I have got a colleague who cycles, she lives near Seven Dials and she got a little pink Brompton and all the kit and cycle helmet, and she keeps saying, you should wear a cycle helmet but it's not about appearance, it's about the feel of the thing on my head. But I also think if I don't do anything stupid which I am sure a lot of the cyclists that get killed on the roads are doing stupid things, like jumping out in front of, you know, things like this.

MC05: because it's a road and cars are parked right next to it, that's where people usually when they park a car, you know, they don't look on the street they just go into their car or something. If I go behind a car and I want to go inside, you know the driver's side, then they don't usually see me because they just kind of look for the cars not for the bikes, so that's when one time the lady came out and I just crashed into her.

SC05: I think I was cycling home down Lewes Road and someone didn't, turned up without seeing me and my brakes weren't working that well so I like bumped into their car, they kind of looked round and were like, oh are you alright and I was like, oh yeah and they just drove off and I was obviously just like a bit panicked and I think that made me feel really vulnerable for a while afterwards and really unsafe. And also it was raining and really dark, so yeah I think that wasn't a good experience and it made me feel more vulnerable in the following days, I did not feel like, well just feeling like no matter what decisions I make essentially I am a bit at the mercy of lots of other people's decisions.

BH05: there is lots of cars parked outside like the chemist and the takeaways and stuff and sometimes there double park so that's manoeuvring into the bus lane, so that's one of the few places where there are cars parked and so the risk of someone opening their door on to you. Coming down Hartington Road, so that's quite a busy junction, so I would often either overtake the cars that are waiting to pull out if there is no cars coming up Hartington Road or I would go on the pavement to get to the front of the queue but I do it often so it's not, it doesn't feel challenging but maybe to other cyclists it might be challenging. I don't tend to find the gyratory that challenging, I know that there is the filter in where the Sainsbury's is where cars filter off to the left up Pounding Road but, yeah, I never felt like I was in danger, I always err on the side of caution and let cars go left rather than risk getting hit there. I did almost get hit once by a car pulling in to the Habitat entrance, they were coming from the other side of the road and I was coming quite fast round the corner but yeah, it's all pretty straightforward really.

PS05: (In Germany) if a car turns right and would be cutting your way, every single car that turns right stops and looks for bikes, they just automatically, it's been drummed into them so much that no one ever just turns right, they all stop and they wait to see if there is a bike going along. And if there is a bike then they let them past and obviously it is also dangerous to assume that they will always do that so you should always still check but I have never been cut off in Germany like that.

RS06: Yeah foul language but I was shitting myself for about a month every single time I was on my bike like on the streets because I used to go by the Old Stein, because you either have to get off your bike and like go round and cross or you are just going, you know, you just brave it and go with the traffic and it was just absolutely terrifying because you just go straight into traffic right in the middle of it... . So you are literally like you have to peel off, like peel into traffic rather than you have to go straight into traffic and it was absolutely terrifying.

JJ05: It is usually close passes, unpleasant experiences, there are some bits that just seem to, bits of road that precipitate bad driving. I mean, for me, my day lines up with peak commute times so that can be both a good thing and a bad thing, it means passing long lines of static traffic and that's fine but when traffic is a bit freer it can be risky. I have had a variety of incidents some of which have gone to the police over the years, that's why I ride with a camera, or partly why I ride with a camera, partly because it lets me forget about things that have happened. It's like if I can look at the camera, sometimes when you have like a close, you have a close shave and my experience was that it would go round and round in my head over and over again, having a camera means I can get look at it, figure it out, change if I need to change or report it to the police if it was someone doing something really horrible and then I don't have to worry about it anymore it's kind of done.

<p>JJ05: I think, yeah, so I think it feels a lot more risky than it really is, I am a nerd and I have looked into the statistics and I am aware that cycling from a really big picture point of view, you are better cycling than not. The risks of being sedentary and the risks of all of those other things and the stress the builds up when you drive a car and you can't do anything about... it's stress on a bike and stress in a car are very different things because we are evolved to physically express stress that's why it exists, you know, it's to prepare you for action, it's fight or flight and you can ride that out. Whereas if you are in a car, you just sit and it goes round and round and round and that's, I think that is actually quite a harmful thing, psychologically and physically</p>
<p>JJ05: I think in terms of increasing cycling that perception of risk and making it a pleasant experience, having facilities where it's useful, having quiet roads and when I mean quiet roads I really mean almost no cars because certainly my experience in Brighton is that back roads are actually worse than main roads because the flow is more uneven. I used to ride back roads, I used to avoid the main roads and actually I have found that, you know, people are doing stranger things and kind of speeding along because there isn't anything in front of them. And actually, the roads that have an even flow are kind of the most pleasant to ride along, you know,</p>
<p>SK02: I hate people driving when I am on my bike. I must nearly, although it's only a short distance, someone must nearly knock me off my bike every commute, at least one person, it's crazy... It's really close passes or yeah, just like overtaking and, because it's normally busy people overtake then just slam their brakes on and you are like, what are you doing? There genuinely have been a couple of times where I have feared that I will make it home or not especially in the dark when it is wet and you have got pot holes everywhere and you don't know whether that puddle is covering a pot hole or whether that puddle just surface water, that's quite scary. I try and stick to the routes that I know when it's like that and where I know where all the little dents in the road are. Manhole covers are sometimes quite slippery.</p>
<p>EM02: I don't feel that I am likely to get hit but that's partly because I try to ride, I ride without fail with ultra-bright lights flashing back and front and some people really don't like that, you know, you get people coming towards you and holding their hands up in front of you and I say, well yeah tough if I am on my bike I am going to be seen</p>
<p>GL04: Drivers not great, I think drivers are probably the worst being very pushy, so if you are, for example, at a junction and you are clearly turning whatever way they are turning they will turn over the top of you rather than just wait for you to go. Pedestrians never see you, so you sort of feel like you are invisible and end up getting, you know, slamming your brakes on to avoid doing them an injury and probably yourself.</p>
<p>JU04: Where I go it's not too bad, I normally get a couple of near misses every day but that's about average. The gyratory is pretty horrible but, you soon pay for it, I think they are changing that anyway soon</p>

Confidence

AB02: Well experience and having done it for a long time so having an awareness of how other road users tend to act and react to situations. I also did some bike ability training as part of my job which was really helpful and the main thing that I learned from that was how to a more assertive cyclist and things about kind of road placement and knowing when it's appropriate and actually safer to be in the middle of the lane, kind of help manage traffic and kind of, I suppose, they talked about encouraging people to drive safely around cyclists, so being in the middle of the road to sort of help prevent people from overtaking dangerously. Because it can be tempting if you kind of stick to the side which I used to, it can be tempting for people to like quickly nip past and there is like a massive lorry coming up. So that was really key and that was only in the last, it was probably about a year ago but that was really I think a turning point for me. Because as I don't drive as well, I mean now I think back, I just got on my bike and got on the road without really knowing the rules, and I think, oh my God I must have been mad. But I didn't have that training so I was possibly a bit less aware of things when I first started then may be other people who might be picking up the bike who already know how to drive, yeah a bit reckless maybe

AB02: I think dealing with lots of traffic, busy roads, fast roads is less pleasant, I mean I feel confident most of the time on the bike but especially at the moment with the speed issue that we touched upon earlier, I find myself increasingly looking for much quieter routes. Before I would look for the fastest routes and now I am definitely looking for the more quiet ones.

JU04: I don't feel I am at a huge amount of risk because generally the speed of traffic I am cycling with is lower than what I am cycling at. If I am being threatened, I will make my presence known to a car anyway, so I will slap the side of the car or something if they go into the cycle lane or, so I am probably not particularly, I don't know, I kind of assert my right to be on the road as a cyclist and quite a few drivers don't like that when you point it out to them. But, no, I work on the principle that regardless of how much they swear at me at least they know I am there and they have seen them, so unless they are a complete psycho they weren't try and kill me.

FC04: (on not wearing a helmet) I do cycle extremely defensively. Basically watch all the time, eye contact, hold the brakes all the time because cars are big and heavy aren't they? I think eye contact is probably like the main one, once you have seen the white of their eyes they are probably not going to kill you because they have just looked you in the eye. I think that is the one I use more often than anything. Yeah also it's just predicting the sort of things drivers are likely to do so when someone overtakes you with their indicator on, they might be just about to turn left and to crush you or whatever. Pulling away from lights is another one as well, people, the old classic where they are turning left and you are on the inside, I guess any times where it's a bit ambiguous where the road should be used, you need to assume the worst really.

MC05: Since the accident I am kind of always trying to see if there is someone behind a car coming out of there... I believe I had two accidents not just one, I can't remember so this kind of sets you back, I don't know, you get more and more comfortable with cycling and you think, oh it's so nice, if it's nice weather you can cycle outside, you go downhill, you don't think about anything, you know what I mean? Like especially downhill you feel like it's so nice you don't have to cycle but then if you get such an injury it makes cycling not so much a convenient thing anymore just because I could actually get a proper injury. And I wasn't wearing a helmet at that point, since then I have been wearing it all the time, so yeah.

MC05: with experience you are going to learn what to look for once you are on the bike, so in the beginning you are going to feel like there is so much around you you are going to look at everything because there are people, there are buses, there are cars, there is like stuff on the road, I mean the roads are like, especially in the beginning, the first road up by the little, that had so many holes, it had a lot of big bumps in the middle, so like to avoid that bump in the middle of the street I had to go round the cars which wasn't nice. But in this past year I did notice I can go straight now so that's cool. But this is the kind of stuff that you really notice when you are on a bike just because it affects your stability on the bike so much. But like after some years you learn where people cross the most and where, I don't know, how you should behave with the buses all those.

MC05: , I have a habit of looking at the car in the lights or something like in the first part so you never see where they think to do, I have kind of learned you have to look at the people in the car in their eyes or whatever to see where they are looking or what they think to do because then you can predict better what their next step is or if they have seen you. Now I think my commute is much safer because I always look a person in the eyes and you see they let me go or I have confidence now to kind of go.

JA04: I guess I, when I first started I was a very nervous unconfident cyclist and yeah I kept really into the side of the road. Now I feel reasonably safe on the road, I mean you get some drivers who do some very crazy things, I would say generally I don't take that many risks on the road. Sometimes I will look at cyclists and be like, whoa what are you doing? And 99% they are absolutely fine doing that and that's partly because I get seen a lot round town as well so I have to be careful what I do but I generally feel okay on the road now but I think the fact that I didn't before can help me in my work, so I can relate to people who don't 'feel okay on the road and you talk to them about different things you can do. And I mean I cycle quite a lot in London which I probably wouldn't have done 10 years ago and I feel fine there as well.

RG05: Yeah I think regardless if you are driving a car, bike, skateboard or what, you need to try and pre-empt what other people are trying to do or could potentially do.

VB04: So, like hills were like “oh, no this isn’t fun”, and gears were just like kind of “what am I doing with this gear? I can’t get up the hill, oh” and trying to figure it out on the hill. Erm... things now I totally take for granted I’m like “it seems really easy” but I remember at the beginning I was like “what am I doing”. Erm... and actually, when I first started I remember going on roundabouts that I probably wouldn’t cycle on now. And then people be like “you should not cycle round there” and I was a little bit naive and I was like “whatever this is just the way I want to go”. And actually working at Sustrans I’ve got a lot more safety conscious, I think I was a little bit more like “whatever, I’ll just go where I’m going”. So, yeah I’m more, more cautious these days.

SC05: I think understanding like road rules, yeah understanding. Also I have learnt to drive and got a driver’s license which maybe also helps in like knowing where, how like junctions work or how you have to like signal or all of those things and just understanding the ways that drivers and cyclists act on the road and what the different signs mean. Also feeling confident like riding my bike and like being able to like look elsewhere other than in front of me and like take one arm off the handlebars, yeah I think that’s what being confident means to me.

SC05: I think on a daily basis I don’t feel like I am in any danger, generally because the route I take I feel like there are a lot of cyclists who also take the same route so car drivers tend to be more respectful and yeah, I think, but then also having been in a few minor accidents and also knowing people who have been in really major accidents, it makes me be a lot, perhaps like before these things happened, I would be a lot more like carefree and maybe feel like I was a bit invincible on my bike but now after these like really awful things happened, I think I am a lot more conscientious of like the risk. But I think in a way that just kind of corrects my cycling without it being a, it doesn’t make me scared every day, it doesn’t make me like nervous or it doesn’t make me want to not cycle but it definitely has changed my cycling from just being to being a lot more aware.

BH05: Imagine cycling in the gutter and having cars and buses overtake you quite closely and I think before I worked at Sustrans I didn’t really understand about positioning on the road and I think I was a gutter cyclist, which kind of happens when you are in a bike lane anyway, but at least when you are there you are not having to share that space. But yeah when you are sharing the lane and you are right in the gutter, it does cause a lot of near misses.

PS05: So very consciously not going too far to the side so being very present, not quite in the middle of the road but far enough so that no car can just drive past me without actually having to go into the other lane, which means that they can’t just speed past me 1mm away from me. They have to wait until there is a space and then do a proper turn around me, yeah that’s the coping strategy. Other than that I try just to focus on the road and try not to get killed I guess.

<p>PS05: I had one lesson in London when I was cycling in London when I lived there and the Council did some cycling lessons. That was one main advice that they gave me, just try and, don't make yourself small, be present in the middle of the road, maybe not in the middle but far enough away so if someone suddenly opens their door from a parked car you won't get hurt, yeah that was a lesson I had</p>
<p>RS06: So that was cycling for me, I never thought I would ride a bike, I wouldn't ever be able to even ride like from one end of a tiny street to the other. So the fact that I was actually riding my bike every day, you know, 5 days a week into work and back that was massively motivating, it was just amazing that I could do that.</p>
<p>JJ05: but for me a lot of conflict comes from the differential in speed with traffic and I am kind of fit enough to largely, you know, 20 mile an hour limit across Brighton when people actually do 20 miles an hour I can largely keep up with it on the flat and on the downhill sections and that makes riding a lot easier, you kind of ride in the flow of traffic. But that implies a certain level of physical effort so that is part of the reason to ride that, yeah.</p>
<p>EM02: So when I am looking, I am scanning at least twice when I drive and when I am on my bike but I know that there are drivers out there who will miss me so that is one of the reasons why, you do your best and you be prepared to know that sometimes someone will look towards you and they still won't see you. And you have got to be prepared and to know that might happen because you know about, because I know about this factor where despite someone scanning they don't see you. It's not because they have not looked it's just their brain doesn't see you it's as simple as that.</p>
<p>GL04: I think a lot of it is your own responsibility but you just have to be really aware. And I have become much more safety conscious as time has gone on from seeing near misses or just thinking it through or walking past a CT scanner when a cyclist is being put through the scanner, that certainly does sharpen you a little bit. I have become much more consistent with being a helmet wearer, I used to be a bit like if I am on the cycle lane and I am not going to go on to the road at all and you know, it's boiling hot I don't really wear my helmet but if I am going to touch on the road at all, then I will have helmet on and if I am for whatever reason, not riding with a helmet I do go really slowly. I just accept the annoyance of everyone around me that I am not going to be taking any risks.</p>
<p>JA04: Things like moving out into the centre of the road like around the road gyratory because the cycle lane wasn't there so cycling in the middle. Before then I had always been quite a stick to the kerb and keep out the way cyclist and now I am the complete opposite but yeah just sort of realising actually I have a right to be on this road and it's safer. You are not going to overtake me until it is safe.</p>
<p>MC05: But now like I have kind of learned how to do it better and I also think practice for you to be able to turn round, look backwards without swerving the whole bike, that was kind of like my fear in the beginning like if I swerved the whole thing and then a bus comes from behind me, that wouldn't be nice. So I just kind of learned to be more confident and go once I signal I have to go otherwise the cars aren't going to let me go.</p>

GL04: Balance whenever people rip past you to stay on. A lot more awareness like listening for people coming you are not always going to see someone pull out so if you are cycling along and you hear an engine coming probably from a side road, I don't chance it I just assume they are going to pull out in front of me. I think assume the worst of everybody is the mentality I have had to develop, which is a bit of a shame really. And don't follow the person you are cycling with ever if they have pulled out don't assume it was the right idea because they are probably a POB (pedestrian on a bike).

AB02: yeah, I suppose I am not necessarily matching their speed, I don't cycle at 30mph but I feel as long as I am able to roughly go at 15mph than that is sort of okay to me and I feel car drivers may be a bit more asserting, I suppose.

JU04: Road positioning really, proactively visible, so yeah not hugging the kerb, staying on the right-hand edge of the cycle lane, taking the road position when you go in between islands so you can't get overtaken, just staying visible, also hanging back from lorries as well, especially with those left-hand turns coming up

SK02: Just pre-empting a lot of the time what people are going to do, like at roundabouts if I am turning right at a roundabout, a mini roundabout, I will be so cautious and slow doing it because I would say 50% of the time the cars coming that should be giving way don't give way. They think, oh it's a cyclist I don't need to do that.

Pleasure/enjoyment

LD06: I love that kind of quietness, when I go the longer way home part of the attraction is the buzz of the traffic, if I am honest I do enjoy that as well as the quiet nature side, I do enjoy how alert you have to be when you are riding in heavy traffic. I wouldn't want to do that all the time but as a change once a week it's fun in its own way. The Lewes Road is really good it's got cycle lanes most of the way, so it's good. Yeah that bit and I like coming in and out of the cycle lane but also central Brighton is quiet, so when you get down going past the big church you have got a moments peace, so when you are kind of going past that area I don't go on the cycle lanes I stay on the road because it's quicker

LD06: Like you said with the danger thing, I do get a genuine buzz of that, that kind of, if there is lots of fast-moving traffic and I am keeping up with it and I am moving in and out of it, there is a part of me that does search that out and embrace that and enjoy that.

LD06: it's about money, it's about time, it's about mental health, it's about physical health, it's about being a bit different for me, these are the motivating factors. And I am always just trying to encourage other people to kind of do it. I mean I am lucky I live nearby, if I lived in Crawley it wouldn't be an option and I wouldn't take a job in Crawley because I wouldn't be able to cycle to work. So I think it's that important to me that it guides my career decisions because it is the best bit of the day often, I am not saying that because I have got a family and families are lovely but often it is the one bit of the day I have gone yeah, big smile really happy.

GA05: You don't come to live in a place like Brighton to get the experience of feeling you are in a horrible city, you come for the idea that, you know, you are by the Downs, you are by the sea, you want to make the most of that, so it stops being a commute and it becomes something that people would do as a leisure activity.
GA05: it's an enjoyable activity because you get to go faster than a human can run which is an exciting thing on itself. But yeah it's a hard thing to get across. I have always cycled so whenever you go for a period without it and you get back on again, yeah, it's enjoyable.
FC04: I mean psychologically in terms of pleasantness, in terms of stress levels and stuff because cars are always a stresser aren't they? So it's pretty nice when the roads are clear, I guess you don't really get stuck behind the traffic like you do in a car.
FC04: yeah if the weather is really nice it's just so lovely cycling to work and you get there and you meet someone in the car park and they are sort of jealous of you I think on a nice day... Sometimes I like the short punchy climbs because, you know, if you have had a bad day or a good day or something that's good to get that out, that's quite nice to get that done. The bits where you have nice separated cycle lane and you are breezing past all the traffic, you sort of think, this is definitely the best way to be doing this.
FC04: So when I worked in Watford and I used to cycle from Bushey I had this really lovely route which was just through, like it went through the back of the estate, all like really quiet roads and then it went along like an old road but it had just been bollarded off so, a dog walking road I suppose, but it was tarmacked, so it was like the perfect road I suppose for cyclist, smooth, tarmacked and very quiet no traffic. You know, trees, birds tweeting and all that in the morning, quiet and peaceful, green, really nice way to start your day, clear your mind and all that sort of thing. Yeah, so I used to really enjoy that half of the commute, that half was really lovely. So I think if there was more commutes like that, yeah it would just be brilliant.
GB01: The bits I enjoy are being on cycle paths or roads with no traffic where I don't have to think about that and I can think about my day, holiday, actually plan the rest of my life shall we say, it's very good for that.
MC05: I think what I really like about commuting is, I don't know, especially when it is nice weather, that's kind of a highlight for me, you know, if it's nice and warm and you can just kind of go with the cycle and you don't feel like it's an effort it just kind of feels like a, walk in the park, you don't feel it's an exercise, you are going to feel it's a relaxing kind of thing to do
MC05: I like to observe as well, it's nice to like, the scenery is not too bad especially when it is nice and sunny and especially because I go through Queens Park. I literally ride through the park, so it's actually a very nice cycle and, I mean, I don't know about you but I think most of the people really enjoy riding down the hill, it's just something that whole effort up the hill is worth it for that feeling that you get down the hill.
RG05: I remember one time when I was cycling along the seafront it was just calm, you know, the sun was up in the sky and the sea was just really still and that was quite a nice moment.

DT06: Well I think both on road and off road, I am feeling I am so lucky that I can do this as part of my work, it really makes the fact that my job makes this, encourages this, that's really, that's a bonus. The fact that I'm taking less time, spending less money, doing something which is physically good for me and is enjoyable whether it's because I am passing someone who is younger than me or maybe on a better bike than me that I am kind of getting one over and I am off road, it's rare to meet someone else whose kind of light has come on and thought, I can get to work by going and doing something different. So yeah, that's great.

SC05: It's up a hill so every morning I start off going up quite a steep bit up to and then it's down like for a good 5 minutes it's just completely downhill which is really great in the morning because it just wakes you up and makes you feel alive... so from like the centre of Brighton to here is actually, it's kind of like slightly uphill so it goes the other way on the way home I have quite a long sort of fairly downhill and then at the end there is a big hill, so when I get home I feel I have done some good work

SC05: Okay, yeah, I really like going down, I think I mentioned this already, I really enjoy going down the big slope to start off with because there aren't many, it's not a very busy road, there is a few schools on it which if it's at 9 in the morning there is a lot of school run people around but generally it's a really long downhill, not many cars and it's just really nice to go downhill. It's because I am going really fast, it's exhilarating and I will have just done quite a steep climb and then going downhill is just, yeah, really nice.

PS05: in terms of enjoyment, I really, contrary to what I thought previously, I really, really like the one-hour bike ride because it's along the coast mostly without traffic lights, watching the sea, in the sun. The most enjoyable parts are I would say between Shoreham and Worthing because it's very close to the pebbles on the beach and not very busy. So in comparison here you go along, in Hove you go along the beach but you are quite far away from the beach you are cordoned off by this Hove lawns and at some point, you join the pebbles for a little bit and then you go off, so it's not quite as nice. And then you go, at the end of Hove to Southwick on the industrial road that is also nice, it's not busy but you have the big trucks passing you and you can't really see the sea very well from there. That's why I think the ride from Shoreham to Worthing is the nicest because it's quite scenic. And obviously the bit between Southwick and Shoreham is not nice at all because it's on the road and it's shared with cars who are often not very polite or just not used to cyclists

JJ05: To be honest I am not sure if any of the ride is really that enjoyable, the Lewes Road is quieter since they fixed it, since they have improved it, (but) like all of the best cycle paths they run out when you really need them. So a bit of the Lewes Road is probably the quieter bit of my commute but it's shared with a whole load of diesel whatever vehicles, there is just no really kind of part that I, there is no part of the ride that I would choose to do if it wasn't between my home and my work, put it that way. I would much rather be out riding in the countryside

JJ05: I mean I enjoy, I kind of do enjoy the commute, I enjoy, I just enjoy being on a bike, I think certainly, to some extent no one likes commuting, for me it's very much a least bad option. It's still being out on the bike, it's still being outside getting a bit of fresh air at least once you get out of the middle of Brighton. You do see the full craziness of Brighton, you are much more on the streets when you are on a bike then you are in a car and I quite enjoy being a kind of, you know, being an observer of the, you see such weird things commuting over time that it's just hilarious sometimes.
SK02: It's not really an enjoyable cycle it's just on roads full of traffic, no, the only more enjoyable route would be down on the sea front which just adds quite a lot of extra distance when I am trying to get to work. I just want to get to work.
EM02: Pleasure, so one other aspect of it is I love this part of the world, I mean riding on the sea front here is a pleasure, riding on the downs, fantastic, you know, going up and down the downs is hard work but I just enjoy it, you know, it's just lovely.
EM02: It's become that, it started because of fitness, it's turned into enjoyment but it's both. I am also a photographer, although I am Director of a company my trade really started as photography and I just love an excuse to have my camera, I always have my camera with me all the time, if I am cycling I am always on the lookout for photographic opportunities, stuff to shoot, just for the fun of it. Very occasionally it might get used in work but not often, I just enjoy it, so it's being outside, so the enjoyment really is a big driver and that's partly because of where we are. You know, I just think I am incredibly lucky doing the commute that I do because it's, you know, I have got the coast or the South Downs,
JA04: I like to have at least half an hour of commute ideally because it gives me some exercise, it wakes me up, my mind comes awake, that would be my ideal. When I work in schools that are a lot closer, I don't get that same sort of buzz from doing it and if I can cycle along the seafront all the better because it's just beautiful. So I guess Lewes was quite a good distance, I could do it in just under half an hour.
JA04: I signed up to do the London to Brighton and at that point I had never cycled 50 plus miles so that made me actually go, right I need to cycle in every day to up my fitness. And then once I got into the habit of it, I actually realised that this is easier, I am really enjoying this, I am going to keep going.
GL04: if there is a pretty sunset I might go down and go along the whole sea front a little bit more... I like to see around me, so landscape and seeing the sea and watching people doing whatever they are doing. Speed is fun, I like going fast.
JU04: They (the employer) just moved me to home based so I now commute from the bedroom to downstairs but like this morning I cycled over to the Old Eddington building over in West Sussex so I went there and just sat there and did a load of work because it's just nice to get out of the house really... And I want to try and work that into my work routine, so I will start cycling to Worthing and work in a café there and cycle back again so I can get some good miles in.

JU04: I suppose, it's my little sanctuary of doing what I want to do for the day. It does tend to become just part of your routine and I can zone out or I will just, there will be certain points on the route where something will change... The cycle path there is the Wetlands Reserve and there will be loads of different kinds of birds according to what time of the year it is and you will see sort of different birds flying around. When I was in London cycling up to Paddington, you go through the really posh parts of Mayfair, is it Barclay Square? So it would be a case of seeing what supercars are on the square at that time or what princes are in town, if it was Hyde Park you would see the Horse Guards rehearsing in full kit about 6 or 7 in the morning some times and it was just the, you get to see a real variety of life.

Green exercise

DT06: while the (off-road) terrain is you have to be aware where it joins, rucks or brambles or branches or whatever, yeah just the idea that here you are commuting and you are going through single track or going downhill fast or going over a path, it's, and you are doing something that very few other people get to do at that time of day. It's win win 100%... Oh yeah, I have got a smile on my face, I have generally got a smile on my face even when I am on the road but that much more. When I go over the bridge I can ride down the steps, you know. I mean also there is certain times of the year when there is bluebells out and it is just, you think, this is fab, how great is this, you know and of course it gets warm enough and dry enough that you work so hard, that's really ace.

AC03: I could go through Friston Forest on my way to work, which was brilliant because it meant that I could rattle my hybrid bike through certain trails in Friston quicker than people because I knew every single corner, I knew where the dog walkers were going to be in the morning and things, that was really fun.

GL04: It's really nice to get some fresh air in the morning so being down by the sea front, you know, there wasn't really very many sun rises at that point I don't think because it was still pretty early in the year, just being outside. I mean I love being outside anyway, I do a lot of things outside, fitness did improve so I felt like I was fitter, didn't have to think so much about, you know, doing anything else indoor,

GA05: So having this route it really did feel like I was on holiday, I thought well this is the quality of life thing that people would want to move to Brighton for, you could take a photograph and say, hey this is what my commute is like, what's your commute like? So yeah it was entirely positive. You know, nature, birdsong, space, a view, a heck of a view, I can see the Isle of Wight some days.

GA05: It's like you can spot nature so you can see different types of wildlife, birds, plants and see how they change as the year goes on. You have got the view, the birdsong, unless it's windy and in that case it's just wind that's all.

AB02: And it feels quite fun, I suppose, sort of going down hills is fun and being outside I enjoy, especially on nice days like this, even if it's raining I quite enjoy it, I just like the sensations of kind of connecting with my environment.

GA05: only this morning the fields full of, I am going to say, buttercups but fields full of buttercups just there, there is horses as you go by. You get to cycle along and you actually get birds flying along with you at the same time as you, beside you, or you are flying, you are flying? You are cycling above birds that are flying beneath you which is fantastic. Cycling through the snow is fun, although it took ages, it was freezing literally, yeah that's just generally it, that will be it really yeah. Just stuff that you would get, because we have the privilege of having this kind of route for this particular direction, you get to do things that you would do on a holiday every day

<p>FC04: Yeah so cycling through the park is quite nice because you are separated from the traffic, bits where you have a bit of exercise. Yeah it's a nice, yeah that's right, and early morning and all that and if the sun is shining, you don't have to think about getting run over for a few minutes, yeah it's pleasant.</p>
<p>RG05: I think the fact that sometimes because you are so cooped up in an office just getting out and having a bit of fresh air that kind of makes you feel as if you have still got out and about rather than being stuck in an office, then being stuck on a bus then being stuck in the gym, do you know what I mean? It kind of gives you that feeling of actually I have done stuff.</p>
<p>SC05: Yeah it's really beautiful and also you just feel, I just feel like I am in the country, well it is in the countryside but yeah, I am from the countryside so I miss it a lot and so going that way. Also sometimes I go up through Stamner Park and down Ditchling Road which is also a really nice way to go home and just, yeah, it's a really good like release of energy and also leaving work behind and like going home, I find cycling really beautiful for that.</p>
<p>BH05: I used to cycle through Stanwood Park every day which was amazing. So on the mountain bike quite often going through some trails, getting up a bit earlier yeah incredible, really nice way to get to work, you just arrived feeling, yeah really happy, really positive and really lucky to be living in a place where you could get to work like that.</p>
<p>JU04: Yeah it's the if you are doing the river path in the morning, seeing the wildlife, seeing the state of the Thames that morning, whether it's in high or low tide, I like that bit.</p>
<p>EM02: maybe three times a year I will commute the whole way and half of that time is on my old ancient 1994 mountain bike, climbing up on to the downs, going along the South Downs way and up and down and I pick a beautiful morning in July, you know, late June through to late August probably when it is really light in the mornings and there is going to be a lovely long sunny day I will do that.</p>
<p>EM02: occasionally is I will go actually up onto the downs again, just for the hell of it and because I, exceptionally it's very few times, I normally always ride on my road bike, I will end up gingerly crossing the downs, you know, from Truly Hill to Devils Dyke even on my road bike where it's kind of viable. I don't know if you are interested to look some people who are struggling up the hill they are on the grass and stuff, it's fine, on a nice day it's quite fun to do.</p>
<p>EM02: I think if I was looking at commuting by bike inland somewhere, it would be a very different story and I think it would have been very different depending on what roads I would have available to me or what routes I would have available to me, huge factor. I am not sure I would be anything like as interested if I was living on the outskirts of a big city somewhere where it's just a battle with traffic all the way to work and back I think it would be much more of a struggle to be persuaded to do it. I don't know if I can say that I would or I wouldn't because it would then mostly be about the fitness and car use and stuff which might be enough.</p>

LD06: My favourite part would be the off road section just because it's a beautiful view across towards Lewes so just seeing the sun come up, you can see the sun go down over Brighton if it's that time of year. At the moment it's beautiful, poppies are in bloom, there are some blue flowers that the farmer has grown which I have no idea what it is but it's beautiful, so that is the favourite part of the ride. And this time of year when its daylight its bright and its beautiful scenery you can almost sort of go, I am not religious but you just go along and go, thank you God, it's beautiful, it's just brings your soul alive, so that's a favourite... it's just pure joy at looking around and seeing all the beauty that is going on in nature and this time of year it's beautiful.
JJ05: there is something kind of longitudinal to riding regularly with the seasons, you are much, much more aware of the seasons and the weather. Like for example, May has been really, really warm, like unseasonably warm and everyone is like, no one notices, if you are not out in it every day like over years, you just don't notice the change and I really like that. I think when it's quiet the one actual highlight, I get to ride by the bottom of Stanmer Park, that is very nice, it's usually, that road can be quite busy but when it's peaceful it's lovely, it's kind of trees and everything, so yeah.
JJ05: I also have an aversion to gyms, I don't like being indoors and exercising, I think it's helpful being outdoors, I think we spend too long indoors, so it's just time outside.

Health & fitness
AB02: Well I like the fact that I can sort of get exercise whilst getting somewhere, so yeah, again it goes back to the efficiency argument that I don't need to go to the gym because if I am cycling sort of 40, upwards of 40 minutes a day often I don't need to do anything else. So it's just working out, I find going to the gym quite boring, so it's just a, I suppose it's, what's the word? There is probably a word it's like multi-purpose I suppose, I can get to work but also I can do exercise at the same time
AC03: And when I started working in Eastbourne I used to ride to work, I tried it once, tried it twice, I built a hybrid bike, I tried it 3 times a week, I tried it 4 times a week, I got to doing 5 days a week, it was great. The difference in my body was amazing.
LD06: Quite often, at least once or twice a week I try to commute the longer way home just to get a bit of extra exercise. I have got into that and just try and go faster and further, particularly in the winter because the mountain bike trails turn to slush, it's just a way of getting out on the bike and keeping fit, keeping my mental health together.
GA05: Well the rewards were kind of things I did expect which were the physical ones, you know, your body doesn't feel stiff, you don't feel like you are going to start getting back pain because you're, every day you are doing essentially a workout.

FC04: Fitness really, so yeah, I had a baby like 2 and ½ years ago, so it has kind of been quite hard to, obviously I have started going out at the weekends but in terms of getting time to do my own thing it's pretty difficult. Whereas if you just have a regular, if you have a fitness thing which is a regular part of your routine which you just need to do every day, it's kind of fantastic because even if you have not at all, if you haven't slept or anything, you still do it every day without thinking, so that's really awesome

GB01: I had the westerly behind me so it took me 45 minutes to get here but getting back, but I do need the exercise as much as anything to keep my blood pressure down so therefore it's going to be good. I mean any opportunity I can I take because it's providing exercise in my daily routine. If you belong to a gym you have got to actually make the effort to go there and put up with other people, whereas cycling is just nice thinking time, the whole lot... when my doctor said that it's time to go on blood pressure tablets because I am pre-hypertensive, I decided right I am going to do something about this. And so I almost cut out alcohol and I cycle, he is going to retest me in March.

GB01: Yeah but I also am one of those people who likes to exercise, especially if I have to be at school the whole day at least having that cycling in the morning and the evening, I feel like I did something for myself to stretch my body I guess.

DT06: I guess the other thing is I went back to my weight I was in my 20s without trying to, so that was, again that makes me feel, hey this is good, I can eat whatever I want to eat, which I always did but suddenly I am fit.

VB04: I am not wasting my time going to the gym, I don't like gyms, so I don't have to go. I just exercise where I'm going and then I don't need to go to the gym which is boring. Erm... yeah like I do Yoga in the winter but I don't follow in the summer because it's too nice. And then apart from that yeah, like I just generally cycle everywhere and that's enough, it's fine.

SC05: I mean doing an hour of exercise every day that's just purely how I get to work is, I think really amazing and also it means that I don't really do any other, yeah, I don't really do any other exercise because that's enough, that kind of makes me feel, yeah I feel like that's, I would like to do more but as it is, that's enough to make me feel good about myself and my health.

PS05: I arrive home having cycled even if it was cycling in the morning and then I just arrive home cycling from the station, I feel more ready to just relax. If I haven't cycled and if I haven't done any other exercise that day I feel a bit like, I need to do something. Some of it is physical, just really needing to do something and some of it is also psychological just having that pressure, putting that pressure on myself to do some exercise every day.

<p>RS06: Well I didn't really think so much about the sort of savings part of it, although it's still important to me that I am saving money by not taking the bus or the train but because I am doing it now on a regular basis that's kind of like something, that's the bonus now and the thing that has taken priority now is actually my health. Because I do a desk job at the moment and then the training that I am doing as well when I practice, I am sat, when I see my clients, I am not pacing around a room, we are sat down, we are talking and it's extremely important to me to sort of be moving. Not just because I can't sit still for long periods of time but I genuinely know that that's good for your health so I try to move as much as possible in the day and sort of having that at the beginning of the day and at the end of the day, you know, that really, really helps.</p>
<p>JJ05: So I got a job and working in IT is very sedentary and all of that and I started to get fat and unhealthy and I didn't like it. So I looked at ways to address that and one of those was to get back on the bike because it's fun, so I started riding the bike kind of, you know, got a hybrid for just riding out and poodling around as I got a bit fitter again I thought, maybe I will ride to work a couple of times a week and a couple of times a week became the vast majority of the time and then it became all the time.</p>
<p>JJ05: Fitness wise I mean, yeah, I was quite unhealthy and now I am very much, very comfortable with my level of kind of overall health, I have never really wanted to be like super healthy but I have always wanted functional fitness, you know. It's a very easy way to that, it feels almost free, you know, you just ride to work, ride home and then you don't have to really worry about, you know, about eating wrong you can just do whatever, you know, and you don't have to worry about if you want to do anything. You can go out, you can walk, you have got a level of functional fitness that you lose in a sedentary job otherwise if you don't do something about it.</p>
<p>EM02: Fitness that was one of the main drivers for me, so fitness, enjoyment, use of car, less uncertainty about traffic, not contributing to the traffic, there is loads and loads of reasons. It's nice to be fitter, it's nice to feel healthier as well, it's all those little things and yeah, those are the main drivers if you like.</p>
<p>MI02: I used to get headaches on a Sunday, I think it's through sort of, you know, every day you are getting up early and driving to work and sort of getting back and everything is in a rush all day, not so much anymore but it's kind of a your body is all geared up for it's kind of stress isn't it and then your body clock goes a bit slower on Saturday and, you know, on Sunday I used to get headaches. Not every Sunday but quite regularly and I don't anymore, I generally think I am a bit fitter and yeah... I don't really get headaches any more, I think you are a bit more kind of, what's the word for it? Calmer I suppose, it controls your stress levels, particularly if you have got a stressful job you know, it's time to think about stuff and time to unwind and I think activity helps you deal with it as well doesn't it?</p>

Wellbeing
DT06: Yeah partly because of the work I am doing, I am not doing physical work and I have learned that I need to be physically active otherwise, it's just good for my mood and my attitude and the whole thing so in that sense it's very therapeutic.
LD06: But if I am honest, I do embrace, the same with the mountain bike, the mountain bike is about risk management, it's about, you have to be totally focused on the moment of what you are doing otherwise it is going to go wrong. The same reason I used to like playing squash, it's that kind of totally immersive thing because otherwise you start to think about the problem within your relationship or problems at work, so.
JA04: if there is something going on in my mind, I think it just slows my mind down a bit, it gives me a bit of space to think about it. And quite often an answer will just come and I think oh that's really obvious.
GA05: Well yeah definitely, I would say that when I was riding the road way I would arrive into work angry because there would invariably be, you know in air quotes, some idiot who had done something. But the point is if you are cycling and you don't have to interact with life threatening situations, which are generally stressful, then yeah you come in refreshed as it were. But I wouldn't say that that was necessarily, it's not a necessary property of cycling on its own, it's cycling outside of traffic. Another key difference is that cycling this way is a very human cycling where cycling along a cycle path where you are constantly interacting with faceless vehicles, so they are just a car or a bus is a lot different to cycling in and then being put in a position on a human scale. So you say good morning to people who come the other way, slow down for people who are walking their dogs and you talk to them and you talk to their dogs, so that's an immensely positive difference. You are actually operating as a person rather than a driver.
SC05: I think just the feeling of like being able, the feeling of having a very like, brainy day and being able to translate that into getting it all, putting it all through my body and putting everything into like the happiness that I am feeling through like cycling home.
FC04: Because it was all very green and stuff, a part of it was like a track and a dead end road which you could only get through on a bike and things like that, so yeah you could just sort of zone out a bit... because you are not concentrating so your mind just wanders doesn't it and you just daydream really, that's what it is. I think that's quite something that adults don't really get time to do to be honest our lives are quite full and normally, you shouldn't be daydreaming when you are driving, you should be paying attention, so yeah, it's quite a nice opportunity to just daydream. Maybe you end up thinking about things you have got to work on that day or whatever but that route is just a chance to not think about it.
GB01: I might be thinking about my teaching, I might be thinking about the next job I am going to do at my house here or my house in France which I think about... Or I could be thinking about things to do with my family. Yeah, some people see that as sometimes wasted time, I don't, I think it's good to actually have time when you can just be doing nothing.

GB01: On a bus I kind of fall asleep because it's just so warm and, I don't know, you just sit down but on the cycling because I don't know, I am moving, I am kind of waking my brain up I suppose, and I start thinking what do I need to do next and I feel like I am just much more productive. Yes I need to pay more attention to the road but it's also when you are going on the Lewes Road your mind kind of wanders but in a good way.

RG05: Generally I have the same song on repeat in my head which is really annoying but I don't know, I think that's a good point actually because I do feel you kind of clear, you just sort of think about what you have got to do or how you are going to approach something so you do a little bit of, and also I won't say alone time but time to reflect on other things you might have going on, you can try and sort of plan or get done.

RG05: I certainly feel a lot more relaxed in the morning, I think it's because there is less people so certainly on the way home I think for me it's very much looking out for other people first of all. And then when you get a clear place you go into your own little world to some degree but other than that it's thinking, oh what is that car going to do, do they realise I am going to turn right, they could turn left, or is this pedestrian going to walk out in the cycle path?

LD06: Probably the thing I have realised more recently is the mental health benefits, I think I always kind of knew physically it would help, financially it would help all that kind of stuff, time wise it would help that was logical. But I think I have increasingly realised how much cycling and having that gap, walking out of a stressful day at work and then cycling home can change my frame of mind. By the time I get home I can be in a completely different frame of mind to the one I was when I left. I mean it is getting to the point now where in winter I will deliberately going out in all sorts of weather because I know I need that headspace, if that's the right phrase, I don't know what the right phrase is. I don't know what it is with cycling but there is something that is definitely kept me mentally a lot happier and I was expecting that.

VB04: Yeah I guess like cycling I feel like things that pop into your head and it's kind of like more flowing. Whereas on a train I feel like the main difference between public transport and riding is that you pick up on other people's energy and generally people are really dissatisfied

SC05: Also once I started doing it, I really started being, yeah, just really appreciating the way it made me feel in the mornings, the way I could be really tired and then I would cycle and then it would instantly wake me up and just doing a bit of exercise in the morning would make my day so much better. And I would really notice the days I would get the train in how much less awake and alive and ready for the day I was

SC05: I think it would be a good time to think about my oncoming day and to close up the oncoming day at the end. But I actually don't do that I think I don't think about anything, most of the time I use it as a really like valuable time actually because I don't have anything on my mind and that's really good just to have like a bit of empty brain for half an hour. But I think if there is something that's, if there is something that is bothering me and is on my mind, that's when I will probably have a bit of time to think about it and process it

LD06: It's quite kind of Zen if that's the right word, I am trying to empty my mind but things keep popping up. I suppose in Buddhism you are supposed to let them go again straight away but sometimes like, sometimes the ideas and thoughts that come into my head about work or home or kids or relationship or whatever or what I am going to do at the weekend are very valuable and useful. And often I will get home and the first thing I need to do is grab a pen and bit of paper and scribble down something to do with a lesson the next day or something that has popped in my head. So I wouldn't say I am trying to think about anything, it's more trying to let go but those thoughts do come through. Same as having a bath, sometimes the best thoughts tend to come when you are trying to switch off a bit.

SC05: I associate it with like emptying your mind, I think I, yeah, I associate being in a meditative state of not really using your brain but more using your like body more and just like focussing on what is going on in your body rather than having thoughts about what else is going on in your life.

BH05: Yeah I definitely more alert when I have cycled, yeah, I feel like I am slightly still half asleep if I have got the bus in. I am more mentally prepared to start work if I have cycled.

PS05: I think I don't tend to ruminate about anything unless something very dramatic happened and maybe I will still think about work on my cycle home but generally I try to look at the sea, enjoy the sea, feel grateful for living here and being able to do that commute. Yeah I feel like it takes me a little bit away from the small problems of life and work, it's like a break and you can more think about the bigger picture

RS06: But yeah on the days that I have my therapy practice as well, I am kind of going through what's happened and sort of making sense of what's come up and most of the time when I leave work, I don't know, I listen to a lot of music so I have often got a song stuck in my head so I will probably just, that will probably like loop constantly. I kind of sing a long, I kind of sing to the tune but I obviously, well not obviously but because I am trying to go fast as well I like manage two words and I am like (gasps for breath noise) so I have to stop that but yeah.

JJ05: Occasionally I think of things that if there is something going on subconsciously that pops into my head when I am riding in the same way that you quite often do when you are doing something completely different. But otherwise that's about it really and I kind of, yeah, inhabit my surroundings, look around, I try and look around more than just on the traffic and stuff but it is still quite external as an experience.

JJ05: I find one of the things, riding to work feels more like a kind of preparation, it kind of gets, it's more, it's like a warm up. Whereas riding home can be either quite tired and slow or can be kind of can ride out frustration and that's the other thing that sometimes happens, if you have had a tough day and you have still got some kind of leftover pent up physical energy which happens when you haven't got physical outlet for it, it's very good to be able to ride out the annoyance. I find that actually quite a big benefit on the rare occasion, it's not so much it happens now, I kind of have other practices to manage that side of things but it's still useful to have as a, you know, just to ride away the day as it were.

JJ05: But yeah, otherwise it's getting out massively improves my mood, actually if I am on the bike and coming to work I actually, it helps improve my kind of work capacity both to deal with difficult things and just to be kind of happy and present and kind of awake at work.

MC01: I enjoy the ride, it gives you time to sort of unwind a bit, you know, I do an office job, computer work and things and it's something a bit more physical, you can think about, you know the things that happened during the day and things and it's, I quite like the nature bit, you know,... If I have just done a normal ride, I just feel a bit more, I feel a bit more awake when you are at work, you know, a bit fresher in a way... the wife says I am better tempered, I think it mellows you out a bit really.

EM02: I find part of the whole cycling thing for me I am sure it does me a power of good, not just physically but mentally as well, it's downtime. I find that whilst I, this is quite a few a big part of my downtime actually cycling or me time. Because I find the weekends with the best will in the world can be absolutely rammed end to end with just dealing with stuff, doing stuff and at work.

EM02: I do mull over stuff to do with work sometimes if it is really troubling me... But I will be looking at scenery, I will be looking for photos, I will be just soaking up the enjoyment of where I am it is downtime quite often. So yeah that is one of the reasons it is nice because you can be down, not always sometimes I am thinking about work. But I think what is quite good about that is that you can end up with your mind on tick over and suddenly you get a good idea for something or you are thinking about something and you have got time to mull it over particularly if you are on a cycle path where there is no one around, there is time to think about stuff you haven't got to worry about, going up river for example you can just let your mind wander on things and come up with ideas. I find that, you know, I have phoned (work) once or twice having done that actually from the bike saying, I have just had an idea.

JA04: Yeah I always find when I arrive at the office I am really calm and ready to work, whereas quite a lot of my colleagues would get in really angry with the traffic or annoyed because it was pouring with rain and they had to walk a minute from the car. Whereas on a bike I would wear waterproofs and I would be dry and they would be like, this isn't fair you cycle for half an hour and I was like, well I have got the right equipment. I think it's a good way to prepare especially if you are in an office all day which I was at that time, now it's a bit different, as I am outside all the time, I just love it.

MC01: no I really like the whole, that it makes me awake kind of thing and because it's like most of the time in the morning that I have to go to class and I get there and I am so much more alert and my day is just so much nicer I think just because I am more awake.

JA04: I think it's quite a good time to process what has happened during the day. I often make some of my best decisions when I am on a bike so if I have got a decision to make at work or if I am trying to figure something out, that commuting time can really help... Yeah so if I have got to make a decision at work or there is something going on and I am not sure what to do about it I find that riding my bike and that commuting time gives me that space and I make better decisions on my bike.

GL04: I was very happy to be further from work because it was actually starting to stress me out being too close. You don't have any time to switch your brain off between work and home and it is quite a stressful job so I think my, psychologically my experience has improved hugely by actually moving away from work and having that bit of time out or bit of extra exercise

GL04: So actually having that 20 minutes or so between work and home and, you know, you have to concentrate on other things when you are cycling, you obviously can't switch off completely but you can kind of cook over the goings on of the day if anything has gone wrong or whatever like that and not bring it home with me. And I know that that was definitely an issue with my partner as well that if I am coming home and saying, you know, this happened and this happened it was awful and blah, blah, blah, he doesn't need to hear that. And I am quite glad that I don't have to hear about his so it's definitely improved, yeah my feelings about work when I get home I don't even think about it.

GA05: Yeah they talk about mindfulness these days, that's like, I would say without positively having to make it a technique that you try that's a very enjoyable way of looking at things and seeing things. And yeah your mind does wander as well... it's not like a way of sorting out the day's problems or anything like that but yeah it's useful to have a period of time after work to not be thinking about work, yeah exactly... if you were driving and you were like fussing about not letting people in front of you and trying to keep in a chain of traffic and not running into things then that is going to add on top of any days stress that you have had. But the fact that is if you finish your work and then the day ends and you are cycling home, you have that period of not having to focus on anything...

Bloody-mindedness/Grit

LD06: Yeah it's dark, so it's pitch black, you can often get 20 mile an hour cross winds which are kind of pushing you in or out of the traffic, so yeah, it was less pleasant back then. I realised it was doable, I think the darkness was something that put me off I remember in the beginning but when I got used to it. There is a bit of me that's like I do actually enjoy cycling up hills in horrible conditions and there is a bit of me that is like fuck you I can do this kind of thing.

LD06: And I suppose with winter it is more a kind of fuck you I am going to get through this kind of thing, it's a different mindset completely but there is still something to be enjoyed in that kind of perseverance and determination when everything can be thrown against you. And you get, when I go the long way home in the middle of winter and you go along the under cliff when it's pitch black and there is no one down there, that's beautiful in its own way, you can look out and see the moonlight on the sea and that kind of brings your soul alive as well. So it's not all bad in winter just some of it is quite bad... Yeah and you notice like in spring every day you go out and it's just like there is just a chink more day light, there is just a chink more day light and you can kind of see the seasons change, no that's definitely part of it.

<p>FC04: I do have a car now so I do have to be honest I am kind of a fair weather cyclist now. If it's, like we have had some dreadful weather, I will just drive I won't try to prove a point, I will just drive if it's nasty and I cycle sort of 80% of the time if it's not raining. I mean if it's raining it always holds up the traffic and they are doing roadwork's on the Safield Road junction, so it takes like, well it takes bloody ages in a car, 25 minutes something like that, so it's very frustrating, still when it's slow as well I think, well at least I am not out in that.</p>
<p>FC04: Well the main barrier for me is the weather, I know some people cycle in all weathers, and I did buy all the wet weather gear. So at one time I basically decided okay, this is what I am doing cycling to work every day I will like spend a bunch of money on quality waterproofs because it's expensive but then it's not really if you think about replacing your car commute with a bike, think of it that way. And after that it was a lot easier because if I do get rained on I don't get wet, so that's 'just me I just hate getting wet, so for me as long as I have completely got all the gear in,</p>
<p>GB01: the first time I did it and there was a gale and it was a point where I just couldn't carry on cycling and I just had to walk the bike and so I got to Brown Road in Worthing and then the wind was not against me, but that's the only thing, I thought to myself, am I going to carry on doing this?</p>
<p>GB01: I have had an internship with someone in Hove and I was cycling there was also a none intern, going there and one time I took the bus when it was windy and rainy but he still cycled, so I was like, hum, so he said the next time, so since then I have kind of been cycling a lot more and during the wind and rain also because I am kind of like oh other people are doing it, like I am not so weak that I can't do it as well.</p>
<p>MC05: yes it can be hard but you know, just stick to it a little bit longer that's all, the bad days get easier and you will be fine. You know, imagine how much money you can save and where you can travel and commute with all that money you save from spending on buses and all the time you save where you can sleep half an hour extra and take a bike instead of a bus. Especially if you are going 9am when all the buses go by and they are like, oh I am full sorry, next one, and then I go by with the bike and I am like, ha ha I always have a ride.</p>
<p>DT06: And then I guess it was nice, it (my commute) was far enough unlike my other commute to feel like it was a small achievement each day, you know, you feel like by going 4 miles you get a bit of a work out and I only started the swimming part after I broke my neck on a bike...</p>
<p>DT06: And I cycle, any conditions I go cycling in, I don't think there are any, I have got the right clothes, it's not far and I have got dry clothes at the other end and it's not a problem.</p>
<p>DT06: Yes, I am taking more time to get to work which is, why am I doing that? Why would I want to lengthen my commute when actually I want to do it because actually it's not a pain it's a pleasure, so yeah, it's worth getting up that 20 minutes earlier or whatever.</p>
<p>DT06: Well it wouldn't occur to me to be put off by that (driver behaviours), I just think then that the forces of, what's the word? Of anti-progressive forces would be willing and I think there is so much, cycling is such a cause and a such potential benefit in so many ways for people cycling everywhere it would never occur to me not to cycle.</p>

VB04: But actually there's only been one day when I got really soaked and apart from that, I'm not – don't care about the weather, it, it doesn't bother me. And like it doesn't rain as much as people think. Like, I've really only got really wet once, most of the time it's fine. You're outside more in the winter, otherwise people are inside the whole time and even if you're outside for an hour a day I think it's better, vitamin D.

SC05: I think the weather is a big factor, like this morning it was raining really hard and part of me thought, should I cycle? I am just going to be soaked when I get there and that's really rubbish. But then, yeah, normally I think my, like the reason I don't cycle in is because part of my can't be bothered or like I have just woken up but I am not feeling that great but then actually I always do it because I know that afterwards I will feel a lot better and feel great.

PS05: I never use the bus, I have used a car when I was doing nightshifts because then it's easy to park over there and I thought I might be too tired after nights to cycle but I actually regretted it, I thought it would have been great to cycle home on a Sunday morning. So next time when I do nightshift I will make an effort to cycle.

RS06: Well I learned how to ride a bike when I was about 23 for the first time, I couldn't ride a bike... so I just got it in my head that I needed to learn how to swim and how to ride a bike at the age of 23, so I learnt how to ride a bike at the age of 23 and then at 24 I learned how to swim so there we go, yeah. So yeah I didn't have a bike and I bought one when I decided basically that I was going to ride my bike to work. So yeah it's been a slow process but I went straight for it, you know, like I went straight into it once I got a bike I was just like riding to work every day.

RS06: Well in terms of how I was feeling when I was riding my bike I was just absolutely terrified because I was fearing death but obviously I amplified it in my head, it's not quite that bad but yeah, I was basically afraid that I would do something silly not knowing what I am supposed to do in traffic. So I was terrified but also very determined at that point, I was just like I am going to go for it... I don't know, I just got it in my head, I was just like I want to do this, I want to like, I think it was genuinely like the fact that I couldn't ride a bike before and like I was riding a bike, it just felt really, I don't know, maybe not empowering but it made me feel really good about myself at that point because I had done something that I had always thought I would never do.

JJ05: I ride whatever the weather and I just wear waterproofs if it's raining and I wear waterproofs and insulated thick gloves if it's cold and it's raining. About the only thing that keeps me off the bike, in fact I get to the, I get to work more reliably than people who drive, so, yeah, the snow doesn't really. The only thing that keeps me off when it snows is not my ability to stay up but car driver's ability to control their cars in the snow.

EM02: Well you know putting the effort in sometimes, you know, I think the worst thing of all, given that I don't ride in the rain, I am really good at not riding in the rain. I suppose the worst thing is probably wind, when you are going with the wind it's fantastic, the other way, you know if you have got a real westerly howler and you are going along the coast and you are barely getting to 10 miles an hour... it must be massively psychological the whole thing about riding into wind is such a hugely difficult to thing to do. It's partly the buffeting and the disappointment you go so damn slow, I think the wind is probably one of the biggest things which is why I often will ride inland, in fact usually if it's going to be 25 miles an hour or more, you know, forecast 25 miles an hour, you think, I will stay inland, mix with the traffic a bit more but you get half the wind.
GL04: think I cycled the first day when it was horrendous weather, I thought right I am going to get the bus tomorrow. I got the bus and was not enjoying that experience so I was actually really late for work as well because I got the bus and I went right, I am either going to have to get up significantly earlier or just brave it (the bus). And I think after that I got the bus maybe twice in that entire year, it was quite a long time until I actually braved it again. It turned into a habit very quickly, I wasn't really put off by the weather so much,
JJ05: On a nice day, enjoy it and find, you know, there is a certain sort of kind of madness that where I enjoy really bad weather, I don't know what it is. There is some kind of pleasure in it but it is a perverse pleasure and it's not, I don't think selling riding is, I don't think the way to sell cycling is to remind people that some of us are crazy enough to do it in a storm.

Competition
AC03: Yeah and going into the end of last year there were some hills which I was getting up flat out not slowing down for and I would come to them at the speed I was on the straight and go straight up them to the top and that was the first time that has ever happened, that was a real motivator, yeah I love it.
GL04: I do like it if I have got energy and I am feeling like yeah I am in good form, I like the thought that I am actually, I am realising that I have improved fitness and it's kind of paying off. And also know that I am getting wherever I am going quicker than I would on any other route it's quite satisfying. It's quite fun having the wind behind you as well, you know, you feel like you are 10 times fitter and stronger than you actually are. And it's quite nice being a part, a lot of people do cycle and it's quite nice, well first of all in a slightly mean way to overtake people, that's fun especially if they have got a motorised bike, that is the aim and if one of them overtakes you, you can accuse them of cheating.
GB01: Well I guess I was more unfit at the beginning, I mean I always was quite a fit person I guess because I play a lot of sports but it was just because my first route was quite hilly, so that was quite a challenge but I guess I am quite resistant I like the struggles so, having that challenge to get to the top of the road. I know at the beginning I did sometimes get to the half and stepped off the bike and kind of walked to the end of the hill but I was always had that challenge to myself to be like I want to get to the top of the hill this time.

GB01: Yeah its personal goals like get up the hill and do it in the winter as well like other cyclists and all that kind of stuff. It just makes me want to do it as well because, I don't know, I just want to be better than the rest.
EM02: there are a few routes for that but quite often I end up going down the A23 on the cycle route next to the A23. Which although it's noisy I quite enjoy in a funny sort of way, sometimes I go to Devils Dyke which is a bit of a challenge.
JA04: I get quite travel sick on buses so I am not a massive fan of them and I play this game with one of my friends we race each other across town, she gets the bus and I cycle and I always win. So it makes me a bit smug about the whole thing because I get everywhere on my bike.
GL04: Yeah I do push it a bit more, so if I was feeling really tired and I went down the sea front and it was full force wind in my face and I was like, this is ridiculous, if that was a kind of training day I would say, right I am going to do it for that reason... So yeah if I am particularly concerned about a training day or a non-training day sometimes I would push it a bit more
GB01: I really get there tired because I am quite a competitive person so if I am on the road and like there is people in front of me I will want to take them over so, yeah I do get quite tired to work, so I do feel like I have an exercise.
JU04: I also like the kind of cut and thrust of cycling on the roads as well, I kind of get a little bit of a buzz from that, just seeing if you can beat a car on the Fulham Palace Road from Putney Bridge to Hammersmith, which you normally can.

Maximising utility
AB02: well I think it's because going to work is my longest journey or at the time, it was my longest journey in the week and it's a journey that I do on my own. So for me it makes sense to do it as fast as possible I suppose
AC03: Yeah if I need to be quick or maybe the weather is okay on the day but the ground is wet and I just don't want to be ruining my kit and getting covered in mud or whatever, usually for speed and weather convenience it will be just the road.
AC03: I find it odd; I can't believe people sit in traffic for an hour. I have done it from time to time, like sometimes you need to take the car or whatever, it's just soul destroying, soul destroying, mad isn't it?
LD06: So buses are what I traditionally used I guess as my main form of transport when I was younger. Because living where I am in Woodingdean and commuting to here would be 2 buses, you have to get a bus into the centre of town and then you have to wait around 5 to 10 minutes and get a bus up to here so it takes over an hour on the buses and you are still exposed to the elements because you have got to walk from your house to the bus stop and from the bus stop to the bus stop and from the bus stop to school. So even if it's raining you are still getting wet, if it's cold you are still getting cold. So for about a year I just (cycle) commuted on a Friday and got buses the rest of the week and then just thought actually this is a damn sight easier to do it so I might as well do it every day and then started to commute every day.

GA05: I would not like to be sitting in a car having to do exactly the same thing but not getting any exercise. I wouldn't like to get on the bus because it's; they can be packed, so the days when I do have to come in on the bus if I am feeling too ill to cycle, coming in on the bus is not nice at all. It's too packed, I would be too hot, too noisy, full of germs, defeating the object entirely, so yeah, in fact if I ever get to the point now where I do feel too ill to cycle in, I will just work from home, it's normally the easiest way of doing it, rather than going on a bus.

FC04: When I got the job in Brighton I got rid of the car and then I lived in town so I walked to work so that was fine eventually I was further away, cycling was just my basic obvious means of getting around really, so it wasn't really a great conscious decision.

FC04: And quite often I will get a text, can you get milk on your way home and stuff, so I stop by the supermarket and things like that again that's really convenient. I am always amazed when I turn up at Waitrose in the car that I can't just stop, I can't just abandon my car right by the door and go in, like when you are on a bike you just get used to that sort of thing. The bike parking outside Waitrose in Hove is just literally right outside the door, you just jump off, park your bike up and go. With a car you drive around, it's bad weather, there is no spaces, etc so, so I think if you don't like friction in your life that's quite negative really.

MC05: every single time I try to take a bus it's like delayed, or I am always late for work or something like that because I do leave at the same time as if I would go with the bike which is my mistake... By bus it takes a lot longer yes, if there is traffic it takes me an hour or more than an hour... But the thing is (the bus) might be round maybe once per hour like they say it runs more but it doesn't, it doesn't even show up... Yeah it just makes it very annoying because the commute is just long and I feel like, and I get sick on a bus so I cannot do anything like I can't catch up on my work or anything and I feel like it's unproductive just waiting for a bus. When I am cycling, I don't know, I always think about the stuff that I will do or that I have been doing...

GB01: Just the flexibility I would say because I go with the bike anywhere in Brighton essentially like a bus just doesn't get you to the end point, you know, you have still got to walk there and a car is impossible to park anywhere plus you have to pay for parking, plus you have to pay for a bus. But with cycling it's just, I can do a lot of stops, that's what I like as well because sometimes I think I should take a bus to the City but then you want to stop here and then you want to go to the other side of the centre to do some other thing and then it's like the whole waiting for a bus to go along and then get off and then waiting for another bus to come along because they are never at a time when you need them so cycling is just so much easier. You just lock your bike go in, go back out, unlock it and go on, you know, that makes it so much easier.

RG05: you always step out thinking oh this is cold and then as soon as you start cycling you soon heat up, it's always that initial shock and then you get over that and once you get going it's not too bad.

RG05: I don't like to be hot and sticky and it's stifling on the bus sometimes and certainly when everyone is too British to open the window because they are too polite in case it annoys anyone else or shut it because there is a cold wind blowing through.

DT06: I ride here on the bike, take the bike over the car and then I sometimes swim after that as well. And I usually combine, I do that and then I will do my weekly shop in the car so it's, so I can kill lots of birds with one stone. when I, occasionally I need to take the dog to work with me believe it or not and I have to then drive which is, I find it really depressing, it's really slow, it's irritating being in traffic, it's irritating having to park somewhere, yeah it's, I hate having to drive somewhere.

SC05: But also always using it to like have a destination, I think I really like the utilitarian is that the right word? Like not just, yeah, making it useful as well as really loving it, it's better for me if it's like to a useful destination.

BH05: I did take the bus quite a bit then actually, I used to walk down to Waitrose and get a bus or sometimes get the train. But again it was always much quicker to cycle, much more convenient, and yeah, that meant coming through Preston Circus up Newland Hill or something, but yeah I think that was just like a 20, 25-minute ride compared to maybe like 45 minutes on the bus. So again it was convenience, it was exercise and yeah, time saving.

RS06: I prefer cycling because it is faster (than the bus) most of the time because I just bypass all the traffic, you know, I am not dependent on anyone else, you know. It doesn't matter if someone has forgotten their ticket or whatever or is taking ages to pay for it or haggling with the driver because they don't have 20p or whatever, I am just going at my own pace.

RS06: buses fill up really quickly and there is no guarantee that I will actually manage to get on the bus that I need to take, especially because the 25X is obviously really popular, everyone takes it to get to Sussex. So it is really variable and that's why I really don't like the uncertainty, I like being able to leave around the same time every day and knowing that I will get to work around the same time so I can plan my day

JJ05: Bike is quicker, yeah it is and plus one of the reasons I ride is because it's exercise, it's the most efficient, driving took, when I drove, it used to take about, it used to vary between 25 and 45, 50 minutes depending on time of day and traffic. But if I am riding the bike I am getting some exercise and that is time that would otherwise be, you know, not quite wasted but it seems like the most efficient use of time to get me to work and get some exercise, so yeah.

SK02: so I used to walk to work and then I moved to Shoreham and work in Hove. And it was what is the best way of getting to work and the quickest way and the cheapest way? And that was cycling... sometimes it can take 40 minutes to drive, there is no parking on site other than your fixed day, I would much rather be on a bike and know I can get there. I don't have to worry and think, oh it will take me longer today because there is loads of traffic.

<p>EM02: No, I never really, I don't like doing exercise for the sake of doing exercise, so I tried to go to the gym, I tried, I had a rowing machine, sold that. Tried watching films with a rowing machine, can't do that, going for a walk either with the dog just going round the same circle, I kind of struggled with that. I kind of need a purpose really then I enjoy it, so exercise for the sake of exercise I struggle with. And actually I have absolutely no problem getting on my bike in the beginning or the end of the day because there is a purpose, it's like I have got to get to work or home, you know, so it's absolutely fine,</p>
<p>JA04: And just getting into that routine of this is when I leave, this is how I get to work, and actually realising it was easier than getting on the train because you are not stuck to certain timings, if you are two minutes late you don't miss the train, you still get to work on time.</p>
<p>GL04: I hate it (The bus), absolutely hate it, I arrive really stressed. I usually feel more tired than I do if I have cycled, I am a social person but I do not like people in my space on my way to work and I just think it's cramped, it's hot, it's just an awful experience, it's so slow. It takes me, as I say, 15 or 20 minutes to get to work on my bike, if I get the bus it's taken me up to an hour to do the same distance essentially but on a bus when you get barely get a seat it's just a horrible experience and people who do it regularly I question their sanity and my own.</p>
<p>CF03: Then when we first moved I didn't want to cycle for about six months because I thought it seemed like an awful long way but then I realised that I was spending too long on a bus and the train and too much money on that so I got the bike out again and actually it's really easy.</p>
<p>CF03: knowing that it doesn't take time out of my day and I don't have to make a point of going to, it's the integrating it into something I have got to do anyway, so travelling into work is a chore by public transport or by motorised transport around an urban area. It's quicker to cycle, it doesn't take any other time out of my day, it's not like I have got to get up early and go to the gym or I go home and have my tea and then go out to the gym or go out and play a sport and this, that and the other. It's completely integrated into my daily routine and cuts down the time it takes doing the transport if you see what I mean? ... but cycling is quicker than all of them and that's going at a steady pace not even rushing it.</p>
<p>JU04: The point was mostly financial but time was the other thing as well, it's just quicker to cycle, health is the other thing as well. Because it's such a long day, 14 hours, you don't have time to get to the gym or anything so that gives you your hour a day or whatever it is.</p>

Commuting strategies

AB02: Yeah often I have to navigate because I go to new schools or do a route between two schools that I haven't done before. So I have normally got Google maps in my hand or in my pocket and I am sort of listening out for the instructions so that's how I get around... and it does normally by default, pick the national cycle routes I think, which usually take a bit longer but I do prefer to take them because they tend to be lower traffic and they may be a bit more scenic if I am lucky

SK02: So I normally try and drop down on to the more quiet roads, route depends on whether the train barriers are down, what the traffic is like, what time of day I am going to work, school rush things like that. It's mainly flat really, I have probably got four or five different routes that I regularly take.

RG05: I think some of the logistics for me were getting a change of clothes, so my trousers, shirt, tie and you know all that with me when I go to work. Luckily I hang my towel up there so I only have to take my towel home and give that a wash but that's really sort of the big logistical thing... I mean tonight I will be going home and the bike will be serviced, and just prep everything for the morning so I can just put my cycle stuff on, my bags already and then off I go.

MC05: I just take the least kind of, the (route) that is the least amount of effort I guess but also is not the longest. Because I could have gone straight into the City and upwards which is like the least hilly but it's longer but if I go up to Queens Park and then go down towards Elm Grove and then up the Lewes Road, so you know that's kind of the best route I discovered through the years. Like I have adapted my routes throughout the years and this is the best one I have seen... there is a hill up to Queens Park, there is a steep hill towards Elm Grove which is not nice when it is raining and then others, well the whole time it is a little bit up the hill as you go on Lewes Road, it isn't noticeable on the bike, and then the last hill that you go like up to the University of Sussex but that is hard for everyone, yeah. Yeah it's slightly up hill, yes, you don't feel it but when the wind is in your face, you really feel that hill it kind of makes you exercise more but its fine.

FC04: Things to do with the kids drop offs and stuff but that doesn't really affect me so I now drop my step-daughter off at primary school, so I just push my bike up there, it doesn't really affect my decision, I just push the bike there, drop her off and cycle from there. My daughter is going to start nursery next week so we are going to have to adapt then and I think I am going to get a bike with a baby seat on so that I can drop her and then continue on on my bike. I am trying not to make these other factors force us towards more car use I suppose, certainly in summer any way when the weather is good, again it comes back to weather.

GB01: I look at the weather forecast in the evening and morning and if there is going to be a strong wind coming towards me, then I, I mean I am not prepared to arrive at school being totally bedraggled. I mean I don't wear separate cycle gear I just wear my normal stuff and I don't mind how I arrive home because I can recover from that, that's a rather nice feeling having been battered by the weather to then be inside and warm.

AB02: I factor in the weather obviously as to how much waterproof gear I need to take. But then at the moment yes it is very much is there going to be a hill and I will take a longer route to avoid a hill at the moment. Previously I wouldn't have done because actually I quite climbing but on a road bike it's obviously quite easy to do but I just can't do hills at the moment so that very much comes into play. Also having to, at the moment I generally give myself double the time to what Google map says, which seems to be about right for me at the moment, so I am having to make sure I leave plenty of time.

MC05: I kind of look at the map and try and see if there are like side roads that I could bypass that and I was just looking at the route that I could go downhill for as long as possible and then somehow get on to that route. So I am kind of going in between some streets, once again, on top of that Queens Park and go down towards Elm Grove I am kind of taking the routes there that keep going downhill but I would go as much towards Lewes Road as possible. Weaving down yeah just makes it the easiest and quickest way because you are going downwards and I can avoid Elm Grove, so that's my route at the end.

LD06: so if I am thinking I will go home tonight and I will be thinking about the ride in tomorrow so the first thing I need to do is check the weather forecast and dress accordingly. So you need waterproofs, you need stuff to keep yourself warm in winter, you need stuff to keep the wind off you, yeah so that is the main thing that I probably do as prep for the next day in, just making sure I am appropriately dressed. So I leave suit, trousers all that here and I just bring in a fresh shirt every day and a fresh tie so that can get in the back pack quite easily, I leave my shoes here, so yeah. It does take a bit of organisation but it's just part of the daily routine really.

GA05: it's no fun, it's no fun at any point where you are meeting with traffic, you are either not seen or if you are seen you are seen as a liability or something and people just do not pass you with enough space at all. So yeah, any efforts I could ever make to avoid traffic I would do... By constantly tweaking the route until you find a good route that avoids too much contact with traffic.

DT06: Yeah the main one is am I wearing something appropriate to what the weather forecast is going to be, is it cool enough, does it need to be rainproof and I tend to keep stuff at the other end so if the weather turns worse when I am at work I have got over shoes and I have got a vaguely rainproof jacket. Do I wear long fingered gloves or short fingered gloves, those kinds of things, so yeah, those are. I mean I guess it depends if I taking stuff to work, how am I going to carry it, I generally use the same bag day in and day out.

SC05: so sometimes if I am not going straight home after work I will go into town and stop there and come back another way. But also I can, if I am not feeling very strong and I don't want to do the big hill on the way home, I can go along Preston Park which is really flat and then there is just a short hill, like a lot shorter hill at the end for me. And sometimes after work if it's a really nice day and I am feeling like I have got a lot of energy and I want to be on my bike for a while on my own, I sometimes go up to Woodingdean and then down all of Elm Grove.

SC05: But I think another decision that I make in the morning is like what to wear when I am cycling, sometimes I will wear something that can get wet and then get changed when I get here which is I guess a bit annoying and takes, means I have to faff a bit in the morning. Yeah, what to wear and how much, is it going to be cold, should I wear layers or should I not wear many layers?

BH05: Checking the weather to see what clothing I should wear. I'm packing a bag, well my bag is generally packed with, my bike bag is packed with stuff that I need for my ride, so like spare inner tube and puncture stuff and lights. And then that's pretty much it, there is not really many decisions, I make more decisions when I am not riding, so the habit of riding is, takes less thought than deciding to go by another means. I guess I am keeping an eye on the time to make sure that I have got those 15 minutes to get to work in time. But then there is the faffing, so I suppose unlocking of the bike and maybe taking a rain cover off and stuff like that so just factoring in like 5 or 10 minutes faffing time as well.

PS05: I tend to cycle with the wind, so if there is very strong wind blowing west to east then I will only cycle home and take the train to Worthing and if there is a very strong easterly wind than I would cycle from home to work and then take the train back. If there is not much wind than I might do both ways by bike and if I am tired I might do part of the way with the train, so I might just decide to get on to a train in Southwick. So I cycle from home to Southwick, get onto a train and complete the journey to Worthing, so it's quite flexible.

JJ05: Yeah there is a very steep hill, one of the steepest hills in Brighton up towards the Seven Dials, up Newland Road and Chatterham Close, that's on my commute, there just isn't a way, a non-hilly way to get there other than riding all the way down to Old Stein and then riding along the seafront which takes significantly longer and means either moodling along on the cycle path on the seafront which is impassable during the summer or mixing it along the road which I do occasionally if I am, you know, feeling quick but it's still not a very pleasant ride that seafront road.

JJ05: Yeah I have experimented with different routes over time and I have settled on this one and I haven't changed this one for a good few years now. There are a couple of points along the route where I have kind of, which can cause, where you reliably get conflict with drivers. So I have tried experimenting with different routes to avoid those points but to be honest you just end up in a different route really, there is no route that doesn't have some kind of conflict, some kind of difficult bit that I found. I tried longer routes, slightly more kind of circuitous routes but in general I just try, unless I want a really long ride, unless I actually want a long ride home which I do occasionally, in which case I go along the Lewes and down to Newhaven and along the coast, which is a nice ride.

JJ05: Yeah I check the weather the night before, I lay out my clothes, I kind of prepack so I lay out my cycle clothes and my clothes to change into the night before and before I do that I check the weather... so I carry the clothes I change regularly like a shirt, underwear and all that and I keep a jacket at work every week, I keep a change of shoes at work, that kind of thing.

DT06: I have two different routes depending on whether I am going on the road, if I am in a hurry which is a 20 minute trip. It's about a 40 minute trip if I go basically up to Hatcham and then across the A27 than I am off road pretty much the entire way on the other side and then through Stanmore Woods and single track, I don't often do that it's brilliant. And actually what I also do which makes it work for me in a way is at the end, before I actually go into work, across the road from Sussex is the Virgin Gym and I go and swim for a few, 20 or 30 lengths, have a sauna and then I am all fresh and not sweaty and I just go across the road, couldn't be better.
SK02: Preparation definitely all my stuff is ready, I have got it all set out I know where everything is, my bike is the first one in the garage. Making sure lights are charged, things like that, keeping up with bike maintenance and yeah, just being generally more prepared and thinking ahead about how I am getting into work the next day and what I need to do to do that rather than just absent mindedly jumping in a car and job done. How am I going to pack my bag, have I got my laptop, is it going to be raining, do I need to take anything else?
EM02: I have kind of found a place where I can park, quiet streets where my park won't get broken into, somewhere residential that's not kind of crammed with cars and stuff, so it's about finding somewhere and I have found some places where no one seems to check, not parking all the time, just occasionally and then I will cycle in from there from one of those places. I don't always take the same route,
EM02: And sometimes if it's really windy I will take an inland route because it definitely makes a difference, dark, grey, you know, I stay inland. If it's fine and nice and as long as it's not windy I will take the coast or as far of the coast as I can. And if I want a push up the backside I will go on the coast as I will get that, it's fine going with the wind isn't it, it helps with that. Goring and Steyning offer longer rides, long commutes, less driving.
EM02: I try to plan it so that if I have got to carry stuff home or to work, I will try and plan it if I can so that those things either stay here for longer or, you know, whatever it might be. So I am always having to think quite a long way ahead about when I am next going to ride so it's a combination of the weather, what I am going to carry, what I am going to, you know. So I put quite a lot of thought into it but it becomes second nature to do that, so you may be thinking several days ahead and I mean I have got something that is coming from Amazon that I need to take home, can't get it in my backpack so it stays here for three days until I am next in the car.
EM02: I will always ride if it's not going to rain, if I think it's going to rain, so that's on Weather Pro, less than 30% chance of rain is my criteria because I don't like riding in the rain, I don't do that. 50% is too high a risk and that could be at either end of the day so I might, obviously I might discover that it is going to be good weather in the morning but it's going to be raining by 2 o'clock so I probably won't ride.

GL04: I like being by the sea and it's nice to be away from the buses, so just go along the sea front. Usually go up at the Sea Life centre which heads on to the slope at the bottom of is it Marine Parade? I can't remember what it is called, that one up there and then I usually go on to the road from there and cut through Kemptown and go up that way. So I tend to steer off any hills of every hills on the way and zig zag my way through Kemptown but very occasionally I will go in land so that would be down North Road, North Street sorry, and then up St James Street that way. I usually go for the pretty way.

CF03: Having to carry stuff I suppose, change of clothes but that again I will leave, I have got a pair of shoes under the desk all the time and a pair of trousers hanging up in there on the rack whatever. And I suppose part of that kind of thing is to plan, thinking ahead making sure you have got stuff in the right place... I just got into the habit of kind of having a little work wardrobe which I would take a pair of trousers a week and a shirt every day, a separate pair of shoes, so I didn't have to carry them, a spare pair of pants and stuff in case of emergencies. So there weren't really any big draw backs.

Cost and environmental savings

AB02: Well I used to walk to work, this was ages ago, this was a completely different job and I worked in central Brighton, it was about a 20-minute walk, and a friend of mine was going travelling and didn't know what to do with her bike and said, did I want to borrow it? And I did and I realised oh it's really fast getting to work, it's about 5 minutes instead of 20, oh that's good. So that was the catalyst really

AC03: So yeah, in terms of getting to Shoreham, it would was an hour and a half on the bike or over two hours on the bus, over two hours for sure, and here it's quick, it's real quick, I can do it in 45 minutes so I can even wake up late and still get here in a decent amount of time.

AC03: I got the train to work for two years, fucking idiot, just idiot, a waste of time and life, so stupid now when I think about it.

LD06: Time, so 20 minutes to get to work instead of an hour, that being kind of more self-reliant, independent and not kind of waiting on a bus driver and not waiting on a bus, I am my own kind of, yeah, just self-reliant. Not relying on a bus service going wrong and being frustrated standing at a bus stop for half hour getting stressed just in control I guess. Part of the reason I suppose as well is I am quite, I won't say tight is the right word, because I do enjoy spending money on things I am passionate about but I don't want to spend 10, 20 quid on bus fares if I can sort it out myself and not spend any money.

GA05: To the alternatives. Well I would need to buy a car for starters which is phenomenal expense that I couldn't really afford. Again there is the expense of bus commuting as well. And the other thing is also that you have that period of time at the beginning and the end of every day, how are you going to spend it? So if you go out on the bicycle then you don't need to consider going to a gym, which is again just, why would you do that? You are doing literally what you would do on a bicycle like inside some kind of horrible prison.

FC04: I didn't have a car, so public transport would have been like whatever 1,000 pound a year, so obviously I would prefer to spend a grand on a bike, you know. So yeah, I did that.

RG05: So I found that with cycling if I left at 5, I would be back by quarter past 6 and that was my exercise done, you know, that kind of cut out one thing really, so yeah. And another factor why I like to cycle is it helps with time management during the week if I am trying to cram a load of things in.
DT06: the commute I do is by far the quickest way to get there. It's an easy one, it's not strenuous, it's not physically demanding, you can get right to your door. I don't mention the financial one because that just seems so obvious.
VB04: I don't save any time getting the train. It can be, yeah it's – it's isn't yeah, it's not any quicker. Yeah it's (cycling) free, that's the main thing and I don't like waiting and all of that, it just seems like a big hassle to get public transport. Like I feel like, oh I'm just cycling, I'm doing something, I can leave when I want, I know it will take this amount of time. The trains are terrible, nobody's really happy on the train so, yeah.
VB04: Yeah it feels like, yeah it (the train) feels like a waste of money, like it doesn't enhance my life by – and people think oh, it's not a lot but over a year you spend hundreds of pounds on getting the train when you could have just cycled for free. I'll never, I don't get that
SC05: Yes it is slower by train or if my, if I haven't had time to fix a puncture or something like that, that's when I wouldn't cycle but the rest of the time I am quite, yeah, it's a really big part of my day, so yeah.
BH05: I mean probably time, time is a big one, like I would choose to ride because it got me there quicker and I think, I guess I made, like now I think, cycling would be my default mode of transport wherever I was going unless there was a reason that I shouldn't be cycling like I was going to go for a drink or something, maybe it was too long as I was going to get sweaty and not have time for a shower or something like that. But that is rare, the majority of times that I use my bike to get to work those barriers aren't in the way, so it's always the best way to get to work for me.
RS06: So basically I wasn't getting paid much, you know, I wasn't making much money and I just thought I needed to save a bit of money and also, you know, in terms of time I kind of thought actually it looks like I could shave a bit of time off my, well it wasn't really a commute then it was just sort of 20 minutes, but yeah so I could get to work a bit faster, I could save a bit of money and I could also maybe work on my fitness. Although then I used to teach, so it wasn't really so much, because I would be standing anyway and sort of moving around all day, so it wasn't so much a fitness concern really, that came as a bonus of riding a bike. But it was mainly to save money and to save a bit of time, so yeah, that was it really... Well I didn't really think so much about the sort of savings part of it, although it's still important to me that I am saving money by not taking the bus or the train but because I am doing it now on a regular basis that's kind of like something, that's the bonus now and the thing that has taken priority now is actually my health.
EM02: So part of the reason for doing this was, part of the numerous reasons for doing this is to, one of them is to save fuel, save on being stuck in traffic in town and stuff so, you know

JU04: Yeah well, I was, so I got made redundant about 3 years ago from a job in Brighton at the University and I cycled there every day. And I got this job up in London which is in Paddington and I just wanted to find the cheapest way of getting there because I was paying for the season ticket, it was a big whack, so I worked out it was just to get the train to Victoria and then cycle the rest of the way
FC04: I think in the background there is other things like environment stuff, you know, I suppose I like the idea of a society where people are on bikes instead of cars and I don't like the idea of us turning into America. Those things are kind of in the background, I don't think they kind of drive me every day
GB01: Saving on petrol obviously, that's an immediate one and the knowledge that I am not polluting the environment which is something that I try to do but modern life doesn't always (allow). Certainly the health benefits, saving money and the environment. And not everyone likes thinking time and all that sort of stuff but those are very positive traits I think.
SC05: Also I didn't mention before but I think probably the fact that the environmental impact of public transport or any other transport other than cycling is a reason why, was another motivation to cycle
PS05: Well environmental and also it's much better for my physical health to cycle and for my mental health as well, I feel, much, much better after I cycle home rather than having set in a car for an hour... I don't think there is a massive difference between cycling and using the bus because the bus is running anyway although you could argue that if anyone went to cycle then maybe there may be fewer buses but I don't generally believe that cycling is as less of an impact that using public transport. I think they are equally good in environmental terms but they are both better than using a car. But at that time the car wasn't really an option for me so even though I was aware of the environmental benefits and I would generally call myself an environmentally aware person, I am keen to do things for the environment, I wouldn't say it was my primary motivation at that time.
EM02: part of the reason I am doing it is complex it's reducing wear and tear on my car, it means I am less likely to get stuck in traffic because I am doing the commuting on the car out of town. I am emitting less CO2 because my car is a diesel, less particles in town.
JA04: And another key reason I ride my bike is because it's good for the environment as well, I don't think I have said that at all, but that's a massive reason.
JA04: General fitness, I get my daily exercise through riding my bike, I feel it keeps me sane. I think mentally it helps me more than physically in a way, possibly it's both but.

In-group attitudes
AB02: And I suppose also a kind of extra benefit is that I have got some friends who have got more into cycling and we have started going on leisure rides together, so it has had a kind of knock on effect on my social life which has been really positive.

<p>AC03: If I am cycling I am one more person visible on the road, I am one more not in a car. I tell you what I like to do, I like to make sure my kit is fresh partly because it's nice, partly because I want someone to look out of their car door and see me and be like, that cyclist doesn't look like some idiot in a half knackered faded disgusting coat, that person is not cycling to work because they are poor, that person is cycling to work because they enjoy it. So that's one thing I like to do I like to be seen to be like actually I am enjoying my cycle to work, you know. I like cycling past the traffic in the morning that's stationary and I like to do it quickly and I like to make it look like I am not at 190 beats per minute because I want people to see me overtaking another car and not perspiring. That's how I get over it, I try to just think about maybe I will encourage some other people.</p>
<p>AC03: I like it, I like riding to work, I like being a person that cycles to work and I just love cycling, you know</p>
<p>LD06: I have always been a bit kind of counter culture, so there is a bit of me that has always enjoyed being a bit different if I can and in his own stupid way being the one guy on a bike in the pitch black in the middle of January while everyone else sits in the car, there is a bit of me that embraces that and enjoys that kind of difference.</p>
<p>LD06: People yeah at work can find it a bit weird, particularly in the winter months they are like, really you cycled in through that? So people do find it a bit strange and there is a lot of cyclists I noticed here that have kind of cycled March to October and then drop off. So people think you are a little bit crazy I guess but I am not the only one, there are others that are kind of committed throughout the year</p>
<p>FC04: It probably just comes from my parents, you know, they have both got bikes, we would go out on rides and things. My dad would do the shopping on his bike sometimes and stuff, so I guess it was our family, I think that's probably where it comes from actually when you try and trace it right back. It's just what the norm is during your upbringing, whereas if your family has never had bikes it would probably never occur to you to get on one, you just think it's something for other people don't you?</p>
<p>FC04: Actually a lot of people of work cycle so it's kind of almost the norm, in an office of about 25 people and we only have 4 or 5 parking bays but when I drive I always get a bay because literally 90% of people either walk because they are just really close or they might come in by train because they are right by the station, so very few people drive actually, so yeah it's just kind of considered the norm. When I used to cycle to Hassocks people thought I was a little bit odd because it's quite far I think because it's quite far may be.</p>
<p>MC05: I get a nice feeling of satisfaction when people kind of tell me, oh you come from so far, like good job and you go up the hill and especially other cyclists as well if they are coming from close by and they know how hard it is and they kind of look at me like, you come all the way from Whitehawk and I feel like, I don't know, once you get the whole approval of what you are doing is the right thing.</p>

MC05: But then again I discovered another three people on my team that actually do cycle as well so if we get more people on the bikes and actually commute then I commute with them home they take shorter routes down Elm Grove but at least the first part down Lewes Road we still get the whole team bonding and talking together, especially on Lewes Road where you can two bikes on the lane, at least there is that first bit and you get like the motivation is bigger to cycle just because there are so many people doing it and if you kind of text them and ask are you going to cycle today? Yeah, yeah it's not too bad then it kind of makes you want to go as well because it's not actually that bad then when you are alone and kind of stuck in your own thoughts like thinking, oh no it's raining, I am going to get all wet today at Uni and like, with more people commuting it makes it much easier I would say... So it's kind of like a more old fashioned thing, you know, you have to connect, I think you make like a better connection because you talk more when you are on your bike then actually when you are on a bus just because you have that whole social mobile thing in front of you. So yeah, in a way, kind of I guess it makes your social life even better.

DT06: It was a long while where I was trying to get other cyclists to be more aware of their impact on other road users but I think I have kind of given up on that. You know people run red lights, ride on the pavement, just making pedestrians feel uncomfortable and stuff... (they) are creating an environment where people treat me as a problem, whereas actually you are the one who is adding to that perception. But finding ways to have that kind of level of interaction in a few words is challenging.

DT06: I think the other thing is it, you feel validated for not, for being unconventional, so it's kind of, so it has that kind of satisfaction of I found a different way to do this, I am thinking outside the box, you know, that kind of thing. It makes you feel a bit smug.

VB04: I went to critical mass once and I was like this is fun. And then I ended up like, kind of getting into it and cycling everywhere and then I ended up, it was weird – I guess in Birmingham pretty much everybody I knew cycled like, it ended up just, I don't know loads of people, I'm friends with cyclist. It was fun, it was like – you felt like you were like a kid again, just cycling around... But I compared to Birmingham where like everyone I knew cycled pretty much, here I hardly know anyone who cycles, I find like it's the complete opposite because it's walkable. Most people just don't bother,

SC05: And then also I think the fact that a lot of my friends cycled and the fact that it was a done, it was an accepted thing that a lot of people do and there was this really easy way to Uni. I feel like I was already quite confident in cycling because I had done it beforehand when I lived with my parents I cycled quite a bit but not as much as I have done here.

BH05: Yeah so I helped set it up (the Bike Train) and because I worked on campus I was doing the ride anyway so I was stewarding and leading the ride quite a few times, so yeah, it was a nice thing to do, nice way to get to work. Yeah there was a bit of aggression but not, probably on average at least one driver each day had something to say that was negative but yeah, most people were like cheering or like waving or yeah but I think it was nice. And the experience for people on the ride was great, they get to chat and be a bit sociable and feeling like you were in a safe group. So I think, we didn't really do any studies, but it was, yeah, it encouraged people to cycle because they knew that they had some company to cycle along with. I guess they were worried about how to manoeuvre from one bit of road to the next and yeah worried about like how close to the cars they might be and I think probably most of them were either novice cyclists or they had an issue. A lot of people I think came from quieter towns and so Brighton seemed a bit overwhelming with the number of cars, so I think just knowing that you had a cycling buddy to get to work with made a difference.

PS05: Positives mainly the sea and the sun and lots of other cyclists along the way, you start to know some of them, they smile at you, there is a certain camaraderie amongst cyclists.

JJ05: you are vulnerable, you are kind of, you are at the mercy of the people in a way that, I think it feels more vulnerable than it is, as I say, I know the stats around mortality but it certainly feels unpleasant. It also just feels socially unpleasant, I think there is something around kind of intention and bullying and feeling like, you know, it's one of those weird, I am a white middle class man, I am almost never an out group, but when I ride the bike I am and it's changing, it's certainly got a lot better after the last 10 years. When I first started it was still quite a, it still felt quite, it was downright weird, whereas now it's like, everyone knows someone who rides a bike now at least in Brighton, whereas previously it was seen as a bit deviant. So that has definitely improved a lot but still, I also feel, you know, I do genuinely feel as someone who both drives and rides and I used to drive for work as well so I have done a lot of driving in my life, that you have a unique position to understand both groups if you do both. And many people talk from one position or the other with very little understanding of what is going on for the other group, very little understanding of the demands of it.

SC05: And actually I didn't mention this but maybe like once or twice a week I cycle home with the person I work with and that's a really good time for us as well to just chat about things that aren't, we have quite a, it's just us two working on the project so it's quite an intense, like can be an intense work relationship so it's nice to cycle home and decompress with that person and yeah, have a bit of a gossip and chat about what is going on for us.

MI02: Yes I mean it's much nicer going in with someone else because for the puncture which you are going to have, you know, you have got two lots of kit and there was one day when we both forgot our bike pumps, you know what I mean, it happens doesn't it? But when you have got two lots of kit there to sort things out it's a bit easier, you know it's not very nice getting a puncture sort of in the dark and it's a bit rainy and horrible and cold but when there is two of you there it's mildly a bit nicer. There is a long straight bit we could take in turns to, you know, if it was windy or anything, and I think you were a bit safer as well, you know, you have got a bit more visibility with 2 of you on the road.

GL04: Initially when the Brighton (hire) bikes things started I was like, I hate them this is ridiculous, all these people they don't know how to ride a bike, they are everywhere but actually now I really like it and I think it's brilliant that people are out and about and enjoying it. I might change my mind in about a week when it gets warmer but at the moment, it's a sort of community thing as well, I find most people who ride fairly friendly, I am not going to say all because I am sure you have met them, those people who shout and roar.

Out-group attitudes

GA05: lots of people do cycle but it's kind of treated as a novelty but also other people think that you are a cyclist or you love bicycles. In the same way that, you know, it's just a mode of transport, people who drive cars aren't perceived to be petrol heads.

GA05: Car drivers hate cyclists that's it, it's almost like a known fact but the fact of the matter is that people who are currently riding on a bicycle might at other points also be people who drive cars.

JJ05: you get from time to time, you get people that are just looking for an outlet to bully someone and they like to try and pick on cyclists, I don't take very kindly to that... I am very careful with road positioning and lights and looking, you know, intention, making everything really clear. But one of the consequences of road positioning particularly riding not in the gutter, which is really important for giving yourself a safety margin for, just being visible, is that it enrages a handful of idiots and you just have to live with that as a trade-off. From my point of view there's, you know, many, many inattentive drivers who are, you know, dealing with screaming kids in the back or distracted by the radio or whatever they are distracted by out there and there is a handful of them, you know, a very small number of angry idiots. But the effect of that is that I have fewer incidents but when they do they are very aggressive and somewhat unpleasant.

GA05: I can see there is obviously, there is also social conditioning as well, so people think that people who ride bicycles are the kind of people that they don't like, like you are making a political point instantly by riding a bicycle, you are making a passive aggressive holier than thou point.

GB01: that if a motorist decides to criticise my existence on the road, I can always yell back I pay my road fund licence for my car by sitting on my drive. And I am one less car on the road clogging up the road... The bad things obviously are sharing the road with cars, some are very pro cycle and they move over and things but the rest aren't.

<p>GB01: I think that motorists need to be educated to know that cyclists are actually improving the roads rather than being perceived as a nuisance. That there is one less car on the road because I think most cyclists do also own a car as well and if they were using their cars the, for example, Shoreham traffic queue there would be a lot more people waiting in that a lot longer. And it's also saving government money because there is less wear and tear on the roads and there is also health benefits, it's saving government money as well, the NHS budget is going to be better off. So rather than seeing us as the enemy, you know, which I am afraid they do, I talk to people, you know, cyclists and I think we should be put on a pedestal for doing something good and people in cars should be made to feel naughty.</p>
<p>RG05: (Challenges are) Traffic, pedestrians, other people basically I think, I think I consider myself quite a considerate person but there are other people out there with, I wouldn't say hidden agenda, but misconceptions about cyclists, general common courtesy.</p>
<p>RG05: they (pedestrians) tend to go into a bit of a daydream sometimes, so you have to have a bell. But I feel rude once again ringing the bell because you think people are thinking, oh this cyclist thinks he owns the road or the cycle path but it's not it's just like letting them know you are coming up rather than get out of my way. I overthink things, probably not what people are thinking but that's how I perceive it to be.</p>
<p>GL04: Most cyclists I find, you know, get on with it, do their own thing but there is the occasional swear, shouty, bell ringers that are a bit over the top with people who are not doing anything on purpose, they have just strayed, they have just strayed into the cycle lane and mostly if you say politely, they are fine. Every now and then you have someone, you know, who tells you to get the F off the footpath even though you are pointing at the big cycle sign on the floor but most are pretty good. There is the occasional, I am the most sporty cyclist that has ever lived and I am going to overtake you and give you a look that goes, oh yeah I have got this. And I really hate people that go through red lights on bikes, so I don't like the renegade and my boyfriend is one of them and I can't stand it, so you know, no helmet, no lights, straight through red lights, no consideration for other road users, I do get quite annoyed with them.</p>
<p>RG05: Yeah the one comment you get regularly from pedestrians is oh, pay road tax, which would be good if it wasn't based on car emissions or get off your bike when you, I know you shouldn't ride on a pavement, I don't ride on a pavement but when you are quick cutting across to wait at the thing, they feel the further need to give you a snidey comment.</p>
<p>RG05: Oh yeah, yeah, there has only been a couple of times but it's still you are just thinking, yeah mate, yeah, your winning today aren't you? There is no need for it, yeah, like I said I was acting like a twit but like most people on bikes they are just trying to get to and from work or from A to B and it's the only mode of transport they have got. They don't need to meet someone who is self-righteous with their two cents.</p>
<p>SC05: I maybe had a bit of an attitude which I think a lot of cyclists have of it being us versus them on the roads and being like, oh I hate all these car drivers etc., I think I have changed to being a lot more like, okay, we all need to look out for each other and car, yeah, we need to share the roads rather than feeling like we are the kings of the roads.</p>

BH05: But then I think as far as a road user is concerned, you are treated differently on a motorbike, you are treated as an equal to car drivers I think and probably given a bit more space because you take up a lane a bit more but with a cyclist I think you are not by some drivers.

PS05: And he just got more and more angry and eventually said, oh well you don't pay tax and I pay tax and that was his whole reasoning that apparently we don't have as much right to the road because we don't pay tax as cyclists. And then I even tried to get into a discussion with him about the environment but he was just, I don't know, wouldn't engage, so for me that summarised the attitude that people just think you don't belong there. If you are on the road they think, why are you not on the pavement, if you are on the pavement they think why are you not on the road? So there isn't, so there just isn't space for cyclists.

GL04: I think it's probably partly from a female perspective is (the need for) changing attitudes to how you should look in work or, well I guess you are looking at work so that is the main thing. You know, if you are going to spend the first hour of your shift with a big helmet mark across your head and looking a bit dishevelled that actually that's fine, that's just part of it. And that is a safety reason, you know, you have worn a helmet to stop yourself dying on the road, you are not wearing a full face of makeup because, you know, you would have sweated it off or whatever else so it's more if you are in a job role that involves you having to, you know, look presentable or whatever else that the facilities are there.

JJ05: I would like to see cycling get to the point at which it is considered very similar to walking and as far as I am concerned, the duty of care goes with the greatest capacity for harm. And, you know, we should have a hierarchy of care that pedestrians are looked after, then cyclists, then car drivers, then truck drivers, you know, it's that, we should just think about it in those terms. I think one of the interesting things is that people tend to see, there is dehumanisation aspect to some of this, people behave in cars particularly once they get inside cars, but even so a little bit on bikes, in a way that they wouldn't behave if they were on foot and they interact with people in a very different way.

JA04: I am very much a wave, smile, thank everybody, stick my thumbs up, let buses go and sometimes, yeah you get some real idiots on the road. I mean, yeah, and I have been shouted out for cycling on the road and told to get on the pavement, if I was on the pavement I would be told to get on the road. Going round the gyratory I quite often go up those roads so I am over the other side, I have had a few people shout get in the cycle lane and I am actually do you want to stop telling me what I am doing here.

JA04: I think from cycling on the bike train when we were at one point everyone was anti the bike train and we did get quite a lot of abuse at the beginning, I sort of got used to that and sort of got used to being, okay, that's your opinion I thought what I was doing was to look after my safety I am not doing it to piss you off.

RG05: I was overtaking a car on the right-hand side, seeing a quick gap and then sort of darting across to go to the bridge and a car didn't like my zippiness too much and he gave me a toot. But that's the sort of thing you are faced with it's like because you are moving a lot quicker than the car, sometimes they don't see you, so when you want to try and move along, you feel like you are an inconvenience. So for me the least problems I can cause for other people and just try to blend in essentially with the traffic the better

GL04: And just attitudes towards people who do that on a daily basis is not that you are a fitness freak it's not that you are some sort of lunatic who will cycle in all weathers but that should just be normal. There is nothing abnormal about it and I think if you took, you know, 50% of the people off the buses and put them on a bike, the whole commuting experience for everyone would be better. It would be a lot less congested.