

**Fitting the bike to the chain: An analysis of transitions towards
households' integration of multi-modal cycling**

Peter Atkinson

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In memory of a country bike-ride shared in childhood with my father, coming home by train.

Abstract

This study explores the integration of cycling with public transport (Cycling-PT) from a household perspective. Varied household types were reflected in the individuals and families who participated in forty-seven interviews and small group discussions in Nottingham and Leeds. Participants were recruited at railway stations, bike hubs and via activist and bicycle user groups and other gatekeeper organisations in the voluntary, local authority and education sectors between June 2016 and January 2017.

Drawing on literature from the Activity Approach (AA), Mobility Biographies and structuration theory, an interview topic guide was used during individual interviews and small group discussions, supported by visual cue cards. Additional visual elicitation methods supported a second phase of discussions with individuals and families, the participants assembling 3D Styrofoam models of railway stations, using miniature Lego characters to recreate scenarios of journeys when they had combined Cycling-PT. Together, these methods provided insight into the variability of household travel behaviour over the life-course, mental models and reflexive processes.

Interviews with eight family groups who took part with their children revealed how Cycling-PT had enabled the everyday activities of families through specialisation of roles for childcare and employment. Benefits to households included access to employment, particularly for people unable to drive. Time-savings over using buses to access rail journeys contrasted with more divided opinions on cost savings. Families integrated taking children to daycare, or school, with regular combined Cycling-PT commutes, carried by bicycle and train with their parents. Adolescent children travelling independently to visit relatives during school holidays. Childcare provision was influential in family travel decisions, collecting children at the end of the working day acting to constrain the combination of Cycling-PT. Parents valued secure storage for bicycles (and other mobility devices) at nurseries, schools, transport hubs and workplaces.

Qualitative thematic analysis of interview transcripts using NVivo revealed beliefs and related to physical activity shared within households that had motivated the combination of cycling with PT. Participants associated improved mood with the integration of cycling with PT, the combined modes enabling the transition between work or study and household activities.

Bicycle parking at PT hubs complemented carriage of bicycles on board trains to enable a full range of activities to be achieved. Workplace facilitation included flexible, or negotiated working arrangements, changing facilities, storage and showers for cyclists, salary-sacrifice bicycle purchase schemes and supportive colleagues.

These findings have implications for policy, transport design, and offer directions for future research.

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List of Acronyms, terms and abbreviations

AA	Activity Analysis
AT	Active Travel
ATOC	Association of Train Operating Companies
BF	Body fat
BMI	Body mass index
BS / BSS	Bike share scheme
Cycling-PT	Cycling with public transport
DCLG	Department for Communities and Local Government
DfT	Department for Transport
FLC	Family Life Cycle (see Backer and Lynch, 2017)
HHI	Household Interview
LSTF	Local Sustainable Transport Fund
NET	Nottingham Express Transit (tram system)
NPS	National Passenger Survey (rail)
NRTS	National Rail Travel Survey
NTS	National Travel Survey
PT	Public Transport
PUT	Positive utility of travel (see Singleton, 2019)
SRA	Strategic Rail Authority
TRL	Transport Research Laboratories
TTB	Travel time budget (see Mokhtarian and Salomon, 2001)
Undirected travel	Leisure travel
VOT	Value of time
VTT	Value of travel time

1 Introduction

This thesis presents a qualitative investigation from the user's perspective of the integration of cycling with public transport. Through participants' narratives, I explore when and how this form of multimodal travel behaviour has enabled the activities of individuals and households, why they decided to travel this way and the challenges they faced. This research considered both habitual and frequent journeys, such as when commuting, as well as long and short journeys made infrequently for leisure or other purposes.

Journeys made by public transport generally require the user to combine a trip by an intermediate travel mode to access the scheduled public transport services used for substantive parts of the journey. The intermediate modes may involve physical activity such as walking or cycling, or using another vehicle individually, or shared with others. Where more than one type of vehicle is incorporated into a journey of two or more trip stages, the journey can be defined as multimodal or more specifically, intermodal.

1.1 Multimodality and intermodality

Multimodality has been defined by Claudia Nobis as "the (flexible) use of various modes of transportation for travel within a certain time period", (Nobis, 2007) in her translation from the definition given by Chlond and Manz (2000). Particular attention is drawn by Nobis to determining what is considered the 'flexible' use of transport modes, and to the time period examined. This study adopts Nobis (2007) in using the week as the typical unit for multimodality, encompassing the many everyday activities that occur on a cyclical basis. The combination of various modes of transport within a single trip is considered a subset of multimodality, termed intermodality. The exclusive use of one transport mode for all trips within any specified period is described by Nobis as 'monomodality'.

Analysing household transitions to and from multimodality over time through mobility biographies, Scheiner et al. (2016) offer the observation that Kuhnimhof's (2010) (and by prior art, Nobis') definition of the use of two or more modes of transport implies that multimodality will become more prevalent as the defining period of time increases.

Typologies of people according to their propensity for multimodality have been generated by (Kroesen and van Cranenburgh, 2016) who defined these 'mobility styles' on a set of 'stayer-mover' classes as:

1. Strict Car Users
2. PT and occasional car users
3. Car passengers
4. Car and bicycle users
5. Bicycle and occasional PT users

The combination of cycling with public transport is an example of multimodal travel behaviour, sometimes incorporating or alternating with other modes according to particular conditions, constraints, needs, or altered capabilities. In this study, 'Cycling-PT' refers to the intermodal integration of at least one 'traditional' public transport mode, (i.e. bus, train, metro, underground, tram or ferry) (Krygsman & Dijst, 2001) with cycling for a combined trip as part of everyday and occasional journeys.

Against a background of increasing research and policy interest in multimodality as an alternative to monomodal use of the car, supporting public transport growth and promoting cycling and walking, this study aims to understand why people have combined cycling with public transport as part of their multi-modal travel behaviour. Viewed through a Theory of Structuration (TS) lens, individual agency and the activities of the bicycle and public transport user interact with structuring conditions imposed by family, employment, planning, policies and the transport network. Understanding these as processes from a household perspective can help not only to shape future transport policies and provision, but also inform a wider public about this particular form of multimodality.

The goal of this study is to identify the processes within households and capabilities that enable people to combine cycling with public transport, and to understand how these fit to the everyday circumstances in which people live. Travel decisions are not generally taken in a vacuum, activities within households can be complex and involve others, either through joint travel or encounters and joint activities at destinations. Activities and related travel decisions may be limited by resources, capabilities, skills, preferences or beliefs that can change over time. Consequently a biographic approach is taken in the analysis of the data. The study sought to analyse the experiences of others within households of people who had combined Cycling-PT, including the children in a small number of families.

Following a review of literature covering the topics indicated above, the study set out to answer the following research questions:

- I. How does the integration of cycling with PT act as an enabler of household activities?
- II. What role does cycling's integration with PT play in responding to household transitions?
- III. Why do households integrate cycling with PT as part of everyday activities?

1.2 Structure of thesis

This thesis begins with a literature review in five sections beginning with an overview of policy and practices related to the integration of cycling with PT (Cycling-PT). The second part of the literature review provides an overview of past studies on the multimodal combination of cycling with public transport (Cycling-PT), combined with selected studies of public transport (PT) and cycling from a UK regional perspective. In addition to the journey to work (commuting), other literature is included here which gives an insight into integration of the wider range of activities and mobility behaviours of households, families and young people. Concepts and categories linked to structuration theory are outlined in the third section before the literature on life course events and transitions between stages in the household lifecycle are identified in the fourth section as opportunities for potential change in mobility behaviour. The fifth section discusses theories relevant to the analysis of everyday scheduling of activities. The review concludes with a proposed model of cycling's integration with public transport, informing the theoretical framework for this study.

Chapter 3 begins by outlining the research design, next the choice of a qualitative methodology for the study is explained. The third section details the data collection procedures, followed by a description of the instruments and materials used in the fourth. The fifth section documents the thematic analysis process of the discussion transcripts and other materials generated within the research discussions and interviews. Both anticipated '*a priori*' themes directly related to the research questions, and emerging '*a posteriori*' themes

related to the theoretical framework were analysed in the data. The outturn sample is outlined and discussed in the sixth section. Some reflections on the effectiveness of the methods conclude this chapter.

Chapter 4 begins by detailing the analysis of themes around the initial research question, 'how cycling with public transport enables activities'. The analysis that revealed the two main themes is detailed here, namely: the integration of childcare routines through the combination of Cycling-PT, and the maintenance of health and wellbeing through particular forms of Cycling-PT.

The processes within the household that bear on the practice of combining cycling with public transport are discussed in the fourth part of this chapter. These include scheduling, negotiation, and role allocation, a process related to resource allocation and availability, as well as skills and capabilities.

While the use of PT is associated with certain inconveniences and uncertainties, the use of a bicycle can feel precarious and also offers experiences that at times are uncomfortable or physically dangerous. The combination of these two modes and the attendant challenges and perceived risks are categorised in the final section of Chapter 4, following a structural approach.

Chapter 5 reveals participants' experiences of mobility over time, situating these within individual and household biographies. Transitions in households are related here to the changing role of cycling and PT in combination and separately, over time through exercise of agency and the development of identities, capabilities and skills.

This chapter begins by presenting an overview of the people who took part in the study. Here the anonymised characteristics and the demographics of the range of participants are initially categorised by their household composition, geographic location, and car-use characteristics. In line with the biographic approach, participants were additionally categorised according to life-course criteria. This approximates to the family life-course and the growth of children, but has been adapted to be relevant for those childless individuals and households involved.

The second section explores in detail how the role of Cycling-PT had responded to transitions in households. This was examined in the discussions through probes about recent changes in activities and travel and other factors they considered had caused changes in travel behaviour over the past 18-months to two years. Biographic questions were also used to ask how (adult) participants had travelled as children themselves and their recollections of first experiencing combining Cycling-PT. In the group discussions and individual interviews, those that were parents were also asked about how their children had developed independent travel abilities and skills.

Chapter 6 focuses on the research results of why people have combined cycling with PT, both '*prima facie*' directly from participants' own given rationales and stated purposes, as well as from an inductive examination of narratives within the discussions. The benefits to the individuals, households and families involved are identified. This explores further how **individual activities** and **behaviours, beliefs** and **attitudes**, interact inside the institution of the family, and with other structural layers in society to generate **household values** and both individual and household **identities**. The selection of Cycling-PT as a form of multi-modal travel through rational considerations including '**saving time**', '**economising**' or enforced constraints, such as **not being able to drive** is also identified.

Complementing the cross-sectional descriptions of factors is a biographic interpretation of participants' narratives that allows prior formative experiences to be considered to help explain why people have combined Cycling-PT. Understanding the reasons why people have combined Cycling-PT enables the benefits to be identified and communicated to other households seeking alternatives to car-use, as well as to those looking to widen their range when cycling for leisure, recreation, or sport. Awareness of the wider range of purposes, activities and meanings that combining Cycling-PT can have to people should also have relevance to the formulation of policies that go beyond multi-modal cycling with PT as one alternative solution to traffic congestion in the context of commuting to and from work.

Chapter 7 provides the discussion of the significance of our interpretations as expanded in Chapters 4-6, and how these compare with the original aims of the project. The strengths and weaknesses of this research are considered in the context of an increasing body of literature on the study of multimodal travel behaviour and active travel.

The implementation of the study design described in Chapter 3 is examined with respect to the suitability of the qualitative methods and elicitation techniques used. Recruitment strategies employed are reflected upon in the context of the preponderance of higher-income households and university educated individuals that took part. The challenges of recruiting whole family groups as well as low-income workers within the regions targeted is considered here. The implications of the study for policy development, infrastructure improvement and travel behaviour change campaigns, In particular, the implications for transport operators and planners are also brought together here, with suggestions for improvements to design of physical elements of the transport environment and PT interchanges and vehicles.

2 Literature Review

This review comprises five main sections that together profile the gap in knowledge targeted by this study. The first section examines policy and practices related to the integration of cycling with PT (Cycling-PT). The second section examines cycling as practiced in the UK and reviews literature on the health and well-being impacts of cycling and multimodal travel. Concepts and categories linked to structuration theory are outlined in the third section before the literature on life course events and transitions between stages in the household lifecycle are identified in the fourth section as opportunities for potential change in mobility behaviour. The fifth section discusses theories relevant to the analysis of everyday scheduling of activities.

This study critically integrates theories that:

- link household activity participation with space and time constraints
- associate structural and institutional effects with those of individual agency
- explore explanations for behaviour related to prior experiences
- acknowledge the relational context of intra- and inter-household interactions
- recognise the potential for reflexivity in households over time.

Drawing on structuration theory and literature from the disciplines of transport studies, sustainability, and human geography, the theoretical framework for this study is informed by literature on household transitions at key life stages in particular biographical domains. The conclusion summarises gaps in existing knowledge and points towards opportunities for analysis of the integration of cycling with public transport (Cycling-PT) and how this travel behaviour changes over time. Here, the author presents a model of the integration of Cycling-PT that reflects the structuration of this practice through the influence of institutions, systems and agency.

2.1 Policy and practice on multimodal integration:

The integration of cycling with public transport in the UK is in principle supported by government policy, through the 2018 National Planning Policy Framework that urges the identification and pursuit of “opportunities to promote walking, cycling and public transport use” in local planning policies and guidelines for housing and other forms of development. The protection of sites and routes of potential use for “*developing infrastructure to widen transport choice*” in support of large scale projects are advocated alongside provision for “*high quality walking and cycling networks and supporting facilities such as cycle parking*”. The emphasis, however, is on (individual) choice and on avoiding and mitigating effects of traffic, rather than on reducing traffic. Effective use of land would be supported by policies and decisions that account for “*the scope to promote sustainable travel modes that limit future car use*” however the Framework considers low- and ultra-low emission vehicles (cars, vans, etc.) as sustainable and is equivocal on limiting car use through the imposition of maximum parking standards (Ministry of Housing, 2018).

While the co-location of developments with public transport interchanges is recommended, integration of public transport with other forms of sustainable transport is not addressed in the Framework. Travelling “*door-to-door*” required a strategy that would make using a sustainable means of transport “as easy as getting in the car”, according to Norman Baker. This strategy committed more than £107 million for cycle-rail integration, to improve

dangerous junctions and enhance cycling and walking routes, as well as improvements for cycling in urban areas and National Parks intended to encourage cycling for leisure and “business”. Measures for improving cycling integration with public transport also arrived through the Local Sustainable Transport Fund (LSTF) through improved interchange facilities and additional cycle parking provision.

People’s experience of transport integration is shaped by policy aspirations and actions (Hull, 2008; Vigar, 2001), system attributes (May and Roberts, 1995), and technological developments (Cairns *et al.*, 2014). Policy strategies (or packages) combine measures related to infrastructure, management and pricing to facilitate increased travel with minimal, or reduced environmental impact (May and Roberts, 1995).

In the UK however, measures promoting cycling are framed by a much heavier emphasis on policies that assume households require cars to access essential and discretionary activities. In 2018, 78 % of UK households had access to cars. At 43%, a level that has remained almost constant since the 1960’s, a significant minority of households own only one car, these being mainly single people, retired individuals and couples with more limited financial resources, single parents and parents with 3 children (ONS, 2018).

2.1.1 Regional policies

Transport policies in the UK’s regions outside the capital were described by (Shaw and Docherty, 2014) as having “*little sense of policy coherence*”. These authors believe that policy since the 1990s has supported the vision of public transport (promulgated by Margaret Thatcher’s government) as “*hopelessly out of touch with an economic model based on the desires of the consumer newly let off the leash*”. Comparing French and UK policy for transport, the ‘plan de déplacements urbains’ is highlighted as significant in delineating a different planning culture compared with the UK “*with an explicit focus on road traffic reduction, a ‘more rational’ use of the car and integration between the needs of pedestrians, cyclists and public transport users*”.

The authors also conclude that we should be, “*celebrating mobility and all that it brings to individuals and the society of which we are part*” believing that the choices offered to UK travellers are not extensive, predicated on access to a car and disadvantaging sections of society without this resource. Their view is that the notion of ‘subsidy’ vs ‘investment’ should be replaced by ‘expenditure’ when related to publicly funded support for various kinds of schemes, laden as the two former terms are with value judgements and political perspectives. They argue that some people will switch to alternative modes, (if seeking better transport options) simply through knowing what else exists - based on data from the ‘Smarter Choices’ programme (Shaw and Docherty, 2014).

The complex and unclear relationship between travel distance and urban form has been the subject of some studies. Banister (2011) identifies that travel distances have increased over time, and have stabilised recently with trips averaging seven miles. A “*decentralization of opportunities*” related to facilities and services leads to greater car use. This reduces options for activity and hence reduces accessibility in peripheral areas for low income groups, owing to uneven distribution and limited availability of transportation alternatives (Colleoni, in Pellegrino, 2011: pp.127-130).

The next section provides an overview of existing studies on the multimodal combination of cycling with public transport, with commentary on the integration of public transport and cycling from a UK regional policy perspective.

2.1.2 Integration of cycling with public transport

The integration of cycling with public transport (Cycling-PT) has been described as a ‘complex set of practices’ (Sherwin *et al.*, 2011) that individuals could vary for different journeys. Cycling-PT is principally of interest in research exploring alternatives to car-use for commuting.

Cycling extends the catchment area for stations (Guthrie, 1999), in particular for faster modes such as railways (Martens, 2007). Cycling offers scope for flexibility (Martens 2004) and mobility at the beginning and end of trips (Baltes *et al.*, 2005) when compared with PT and is quicker than walking for distances over 1km (Pucher, 2009). Bike-rail is slightly slower compared to making the whole journey by car (Martens, 2007), but is often quicker than using PT as the access mode. A comparison of different access modes to rail journeys in the UK and in the Netherlands reveals that walking is the most common access mode in the UK, whereas cycling is used by a small number, whereas in the Netherlands the opposite is true, see figure 1 below.

The value of combining cycling with other slower PT systems over shorter distances does not appear to have been comprehensively evaluated in the literature, although results of trials and pilot studies in the Netherlands suggested positive benefits for some users (Martens, 2007).

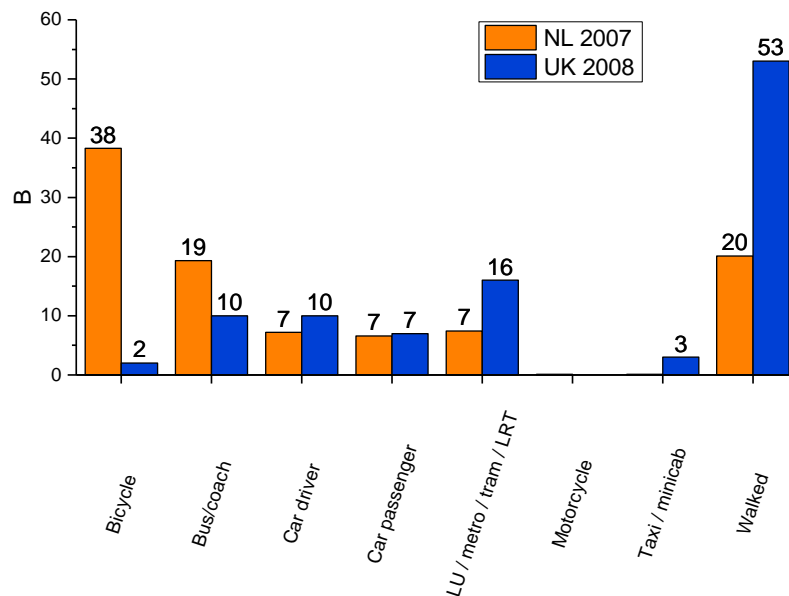


Figure 1: Comparison of access mode to rail stations in the UK and Netherlands

Source: data adapted from Givoni and Rietveld (2007) with bus separated from metro/tram according to Martens (2007) and 2008 UK National Rail Travel Survey, reported in (Adonis, 2008)

While many integrators access PT using their own bike, other options (particularly for egress trips) include using a second bicycle, PT bicycle, bike hire, folding bike, or other non-cycling modes (Martens, 2007). Each alternative enables particular ranges of activities, relevant for distinct types of users, and has differing advantages and costs to users and the agency or community (Krizek and Stonebraker, 2011).

In the Netherlands where bicycles are regularly integrated with rail, the carriage of bicycles on trains is considered a marginal practice (Kager *et al.*, 2016). Kager *et al.* (2016) have proposed the combination of cycling with rail travel as a distinct mode, however. These authors identified complementarity in the contrasts between the highly individualised properties of cycling with the collective system characteristics of trains. They also contrasted the ability to do other tasks on trains with the full engagement of mind and body when involved in cycling, with consequent physical and mental health benefits.

Martens (2007) defines integration in terms of conscious and constructive policy measures supporting the regular and occasional use of cycling to access and egress from the PT network.

National policies in the USA since the 1990s have funded schemes promoting the carriage of bikes on buses (Hagelin, 2005; Taylor and Mahmassani, 1996). The role of the bicycle in accessing PT services has also been explored and supported in the Netherlands as part of the 1992 Bicycle Master Plan (Martens, 2007). In the UK a number of policy initiatives have funded bicycle parking facilities at railway stations (Sherwin, 2010; Wilson and Le Masurier, 2011).

The word 'seamless' is commonly used to describe the ideal characteristics of the integration of cycling with PT systems (Baltes *et al.*, 2005; Givoni and Rietveld, 2007; Martens, 2004; Santos *et al.*, 2010; Sherwin, 2010). For all PT passengers, the quality of the interchange experience (Givoni and Rietveld, 2007) is considered significant to maintaining high satisfaction levels, places of transfer having been identified as requiring particular attention through design (Napper *et al.*, 2007).

A brief overview of each of the main modal combinations with cycling follows, addressing provision and practice in the integration of cycling with rail, bus and tram systems.

2.1.2.1 Bike and rail

Most British and Dutch trains have interior spaces with limited, or awkwardly designed spaces for bicycle stowage, hence the emphasis on parking facilities at stations where there is great demand. In the UK most trains can accommodate 2 bicycles on board, some trains even more, but conditions of carriage of bicycles are inconsistent nationally and accessibility varies even across individual train operating companies' services.

A 2007 survey in Bristol of 135 passengers who integrated with rail found that bicycles were used primarily to access the origin station of their daily trips, a smaller proportion using bicycles as the egress mode to their daily activities. Of those surveyed, commuting to work, education or business trips were more likely journey purposes than leisure activities, by comparison with NRTS data from the surrounding region (Sherwin, 2010; Sherwin *et al.*, 2011).

Secure cycle parking provision is needed for habitual utility cyclists making multi-modal commuting journeys (Pooley, *et al.* 2013: 168), and is recognised as a significant component of integration with the railway network, however some people are deterred by the risk of vandalism or lack of parking (Aldred and Jungnickel, 2013). The combination of cycle parking facilities at outlying stations in particular, in addition to those in the city centre (Pucher and Buehler 2008) supports the bicycle as a feeder mode for PT. Guidelines published by the Association of Train Operating Companies (ATOC) for provision at railway stations recognise that people may wish to park a greater diversity of bicycle types and tricycles (Sully, 2012).

The independent report Better Rail Stations published by DfT in 2009 argued for more proactive encouragement by the rail industry to increase station access by bicycle, speculating that cycle access could more than double from 2% nationally to 5% in five years. A £14 million Cycling England initiative would create 10,000 cycle parking spaces at 350 stations. Ten new Cycle Hubs offering cycle hire, repairs and secure storage would be opened, including one in Leeds (this facility closed in 2018). This optimistic view contrasted with another contemporary study intending to model the potential cycle user 'uplift' in demand for rail integration commissioned by ATOC that noted that: *"the decision to cycle to the station will be a complex one and, whilst good parking infrastructure may be a factor (an essential ingredient, even), it is unlikely to be critical."* (Steer Davies Gleave, 2009).

The railway industry has over the past few years responded both to government requirements to increase train capacity and to retain customers and attract new users by providing additional cycle parking provision. A TRL report from 2015 that predicted the level of unmet demand for cycle-rail facilities across the UK rail network involved station surveys that found that a greater proportion of cyclists than non-cyclists were commuters (York *et al.*, 2015). This is consistent with Kuhnimhof's (2010) finding that commuting was the most common travel purpose for those integrating cycling into inter-modal tours in data from Germany (Kuhnimhof *et al.*, 2010).

2.1.2.2 Bike and bus integration

A handful of UK bus services carry bicycles, mainly where serving rural leisure destinations, such as parts of the Lake District, Brecon Beacons (see Figure 2 below), Scottish Highlands and on the South Downs, near Brighton. One bus operator serving parts of Nottingham (Trent Barton) permits bicycles to be carried inside its buses, or in luggage compartments on the coaches used for its Red Arrow service between Nottingham and Derby. There was no data available on the uptake of this facility, nor reports of users' experiences of these bus services.



Figure 2: Brecon Beacons Bike Bus and trailer

Image source: <http://www.breconbeacons.org/bike-bus> accessed 21/07/2015

By contrast, buses with front-mounted racks carry the largest share of bike-transit integrators in the USA (Wang and Liu, 2013). A TRL technical report (2004) on the safety risks of front-mounted bike racks restricted the fitment of racks in UK bus operations to a small number of vehicles which carry the bikes more safely but less conveniently for the bus driver and the

cyclist - on the rear of the vehicle (Lawrence and Brook-Carter, 2004), as illustrated in Figure 3 below.



Figure 3: Nottingham University Hopper Bus with external rear-mounted rack for two bicycles

Image source: <http://universityhopperbus.co.uk/features-facilities/bikes-on-buses/> accessed 03/08/2015

The study of bike-bus integration in the UK has been neglected since a limited survey was made in the 1990s of park & ride buses (Martens, 2004; Taylor, 1996).

2.1.2.3 Bike and tram integration

Studies on the integration of cycling with tramways, despite the prevalence of this modal combination, for example in France, have been largely neglected since Wood (1995) speculated on its potential UK application (Wood, 1995). The carriage of bicycles on board Edinburgh Trams during off-peak hours has remained a permanent feature since a two month long trial (May-June 2015) reassured the operator of the safety of this practice.

Nottingham Express Transit (NET), the city's tram system has been partially funded by the Workplace Parking Levy (WPL), Nottingham being the only UK city to have implemented such a scheme (Dale *et al.*, 2014; Frost, 2009). Although folding-bicycles are carried, other types of bicycle are not permitted on board these trams. Nottingham's local cycling representational group 'Pedals' were involved in the planning and phased implementation of the NET routes, achieving signed alternatives to cycling directly along the tramline along several parts of the route, cooperating on publicity materials and the design of stops and lobbying for widespread bicycle parking facilities (McClintock, 2007). Bicycle parking facilities have been provided at many of the NET tram stops around the city and its suburbs (NET, 2015).

2.2 Who cycles

In addition to the journey to work (commuting), other literature is included here which gives an insight into integration of cycling into the wider range of activities and mobility practices of households, families and young people.

2.2.1 The journey to work

The level of cycling as the mode share of commuting trips to work in the UK according to the 2011 Census is 2.8%, (ONS 2014). Active People Survey data reveals that approximately 3% of people in England cycled at least 5 days per week when including recreational trips between 2012-2014 ONS (DfT 2015).

Gatersleben and Appleton (2007) (cited in Shaw and Docherty's *The Transport Debate*) commenting on observe that regular cyclists in Britain are few, and they do so because of their liking for cycling.

By comparison with other countries with higher rates of cycling, the UK is amongst those considered 'low cycling' nations, as seen in Figure 4, below. In the EU and Japan, most cycling is for utility purposes, while in the USA cycling is predominantly recreational or social, although an increase has been observed in cycling to access PT (Pucher *et al.*, 2011).

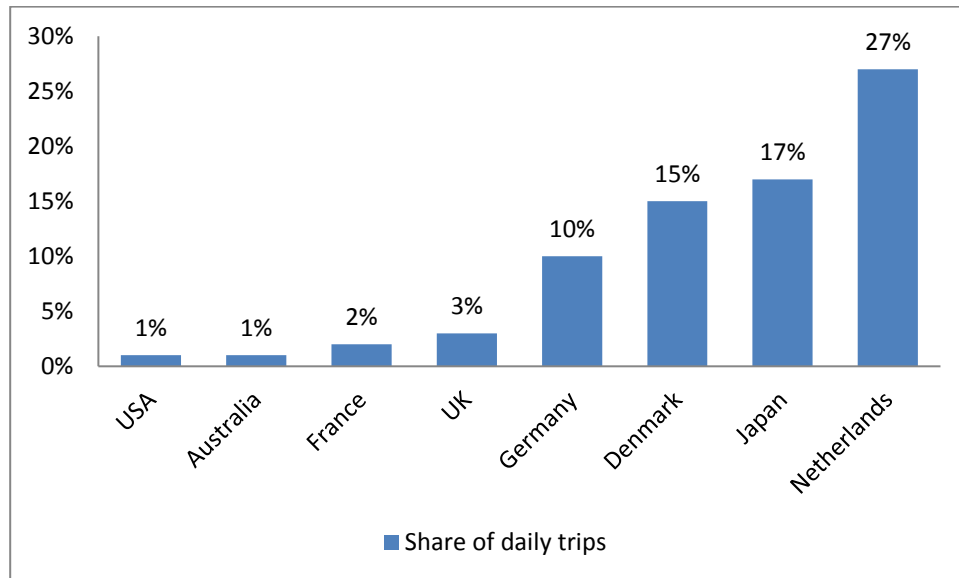


Figure 4: UK cycling mode share of daily trips compared with other industrialised nations

Chart created by the author. Sources: (Andrade et al., 2011; De La Fuente Layos, 2005; DfT, 2015; Harms et al., 2014; Heesch et al., 2012; Pucher et al., 2011)

The more accommodating environment for cyclists in the Netherlands may mean that the effects observed there may not transfer to the UK context. Differences may exist in the spatial characteristics between Northern European cities and British cities and towns in terms of land use and planning, as well as cycling provision and infrastructure (Pucher and Buehler, 2008).

2.2.2 UK differences between recreational and utility cycling

Cycling is a popular activity for sports and recreation in which 4.29% of people in England participate weekly (Sport England, 2013). Fifteen percent of the UK population cycle at least once a month (DfT, 2015), particularly in environments where the recreational cyclist feels 'safe', such as in the countryside, on car-free tracks and alongside waterways (Pooley, 2013), as well as on footpaths and in parks. In twelve UK Cycling Cities and Towns 28% of adults over 16 surveyed had cycled in the preceding year (Chatterjee *et al.*, 2012), indicating the scope for recreational cycling to be explored as an integrated household activity.

Trends towards off-road cycling and a reduction in cycling on roads suggest that cycling is shifting towards a recreational role and away from its use in utility journeys in England, a trend echoed for the wider UK in NTS data to the year 2012, as shown in Figure 5, below. Alternatively it could reflect the slight decline observed in the Census in the proportion of workers who undertake a regular commuting journey – down from 86% in 2001 to 81% in 2011.

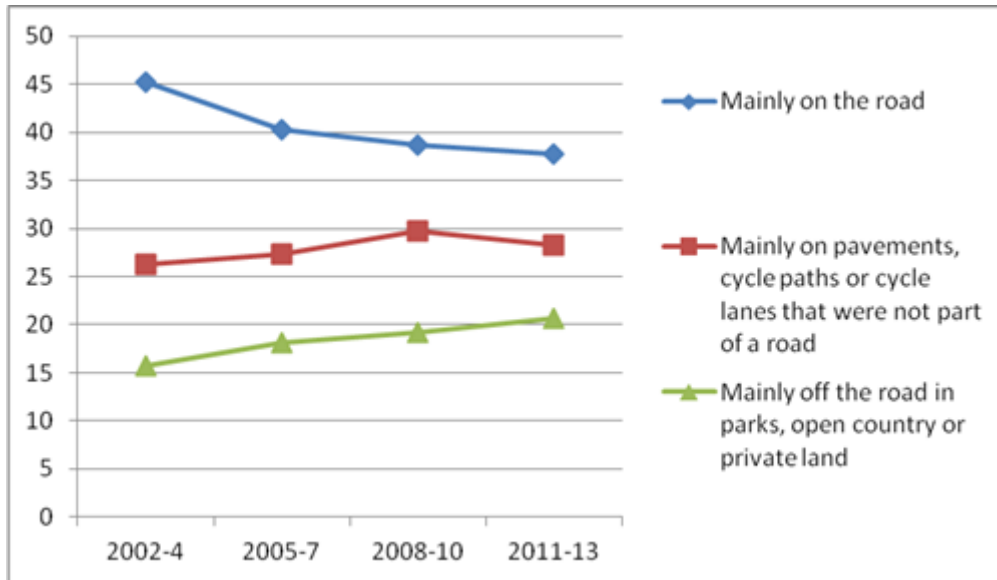


Figure 5: Where usually cycled in the last 12 months: England

Graph produced by the author. Source: NTS0315 Average distance travelled by mode: England, 1995/97 to 2013.

2.2.3 Cycling among men, women and children

Gender can affect the propensity to cycle. In countries with high rates of cycling such as Denmark, Germany or the Netherlands, numbers of trips by men and women cycling are similar. In ‘low cycling’ countries such as the UK and USA, however, males represent a larger proportion of all utility cyclists (Garrard *et al.*, 2008; Heesch *et al.*, 2012; Pucher and Buehler, 2008). In Belgium, differences in the distance cycled by men and women seem to correlate to regional differences in cycling infrastructure provision, topography and the commute distance (De Geus *et al.*, 2014). Variations are also evident in British cities, such as Cambridge, or Hull, where high cycling rates are associated with a more equal gender balance than has been observed elsewhere in the UK (Aldred, 2013a).

Heinen *et al.* (2009) has suggested that gender differences observed in some studies of average bicycle trip distances could result from differences in choice of activity or location for women compared to men.

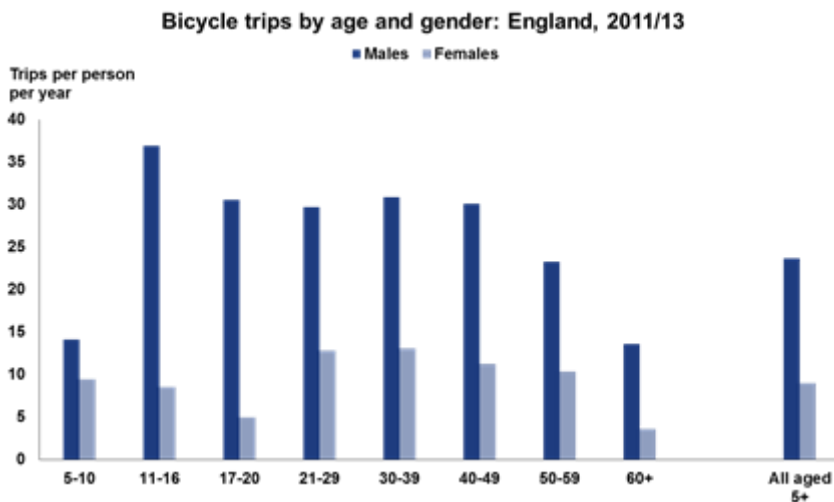


Figure 6: NTS0609 Bicycle trips by age and gender – England

Source: DfT 2014

Cycling participation also relates to people's age. Figure 6 shows cycling rates declining from a peak during early adolescence until a fairly constant level is reached from 20-50 years (DfT 2014). A similar trend can be observed in rates of bicycle ownership with a rapid decline as children's bicycles are outgrown during teenage years and not replaced, see Figure 7, below.

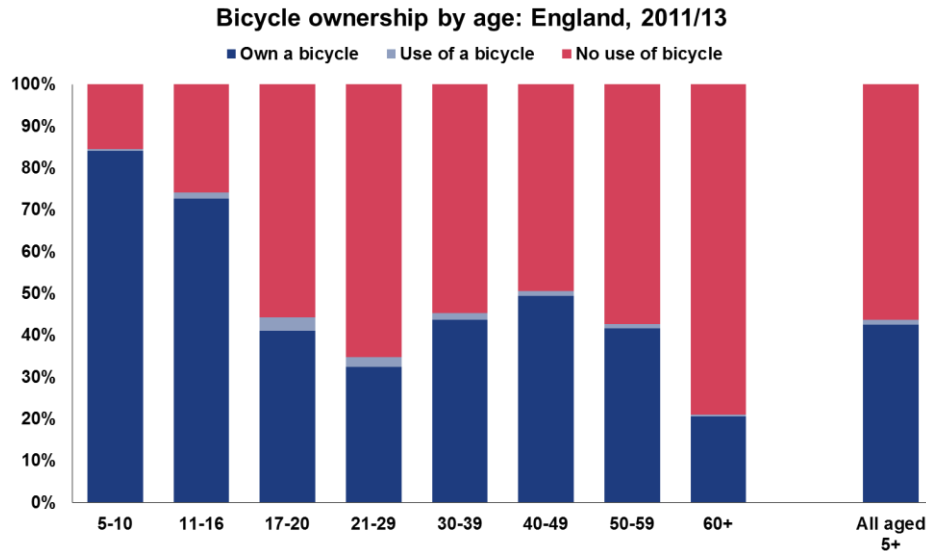


Figure 7: NTS0608 Bicycle ownership by age- England

Source: DfT 2014

Children have been argued to be 'mode neutral' and responsive to the particular modal choices and travel behaviours of their parents (Susilo, 2015). Currently, children and others who by choice, financial circumstances or through capability limitations are unable to drive, are poorly served by policy. For children, cycling offers an expanded spatial horizon, but policies intended to promote cycling tend to ignore the local and juvenile, in favour of measures to encourage commuting to work by bicycle either to optimize productive time, or to reduce sickness absences through improved public health (Spinney, 2016). Critiquing UK policies intended to promote cycling and walking, Pooley et al. (2013) commented that measures only partially addressing the challenges people face, for example provision of infrastructure alone, would be unsuccessful in facilitating behaviour change in even people who were positively inclined to do so. The creation of local urban environments conducive to walking and cycling require more coordinated programmes that include spatial, legislative, social and economic measures. With respect to their role as members of their local communities, children's mobility has continued to be neglected by policy over many years since John Barker commented "current transport policy fails to treat children as political citizens, neglecting to represent or respond to their travel needs." (Barker, 2003).

2.2.4 Health and Wellbeing impacts of mobility

This section considers the health and wellbeing benefits that may arise from the combination of cycling with public transport, initially through literature on active travel, cycling and public transport use and health.

The present study follows Ziegler and Schwanen's (2011) cross-disciplinary conceptualisation of wellbeing (or 'well-being'), as a phenomenon integrating people's objective living conditions and subjective experiences of their quality of life. Their holistic concept of

wellbeing was based on the lay approach used in other studies of old age that emphasised: health, social networks, participation in society and community, security of income and housing, and access to information and activities. Wellbeing integrates these factors that enable personal independence (and growth), together with, “*mental factors such as a positive outlook on life and acceptance of circumstances that cannot be changed*” (Ziegler and Schwanen, 2011).

Cycling with public transport may combine positive, as well as negative aspects associated with both cycling and public transport use as the factors affecting health through travel behaviours are complex (van Wee and Ettema, 2016).

Recent research has considered cycling as a potential contributor to sustainability of the city, as well as delivering economic benefits, reduced congestion and improved population health (Davis, 2014; Ogilvie *et al.*, 2004; Woodcock *et al.*, 2013). Ogilvie’s (2004) review found evidence of positive improvements in mental health and vitality, as well as cardio-vascular health benefits of walking and cycling. Reduced mortality in men and reduced depression were identified through modelling the population effects of using a bike share scheme (Woodcock *et al.*, 2014). Public Health researchers have also associated physical activity with mental and physical health, and reduced vulnerability to chronic disease (Rutter *et al.*, 2013). Cycling trends have also been suggested as a proxy for parallel trends in uptake of walking, as well as being supportive for levels of PT use and corresponding decreases observed in car use (Goodman *et al.*, 2013).

Health and environmental quality were found to be highly rated attributes of journeys to work and for leisure by bicycle (as well as walking) in comparison to car and public transport journeys (Anable and Gatersleben, 2005) as well as for being relaxing and relatively low on stress. Analysis of the American Time Use Survey’s wellbeing module by Morris and Guerra (2015) found that cyclists were, “*the happiest travelers...*” in a study of mood affect across a number of modes and controlling for the fact that most cycling is considered a solitary activity. These authors also found that travel had intrinsic value, and that the desire to travel could induce the demand for activities. By contrast bus passengers were the least happy, assuming this to be by association with this mode’s disproportionate use for commuting to work (Morris and Guerra, 2015). Other factors also contribute to enjoyment, such as the exercise from cycling or enjoyment of scenery experienced during the commute (Guell *et al.*, 2012).

The duration of the commute can also impact on health and well-being. Recent analysis of Understanding Society panel data identified that shorter commuting times could be beneficial for mental health, job and leisure-time satisfaction (Clark *et al.*, 2019). Clark’s analysis suggested that people in good health were more likely to experience longer commuting times and that those who commuted by cycling reported higher levels of health compared to driving. By contrast, those commuting by bus reported lower levels of health. Increases in duration of commuters’ bus journeys were associated with decreasing mental health. Clark interpreted paradoxical associations between reported life satisfaction and commute duration as due to compensating factors related to improved income and satisfaction with housing or employment related to commuting longer distances.

Reviewing the literature on commuting and subjective well-being (SWB), (Chatterjee *et al.*, 2019) proposed that policy should consider evidence suggesting that commuting impacts on different aspects of SWB. Their review found that commuting journey experiences can have an effect on mood in the workplace and at home and recommended several policy actions

that could be delivered by employers, in addition to those related to national and local government, planners and developers, highway authorities, PT agencies and transport providers. While Chatterjee et al. did not focus on multimodal cycling, their review included policy recommendations to enhance the commute experience for cyclists and improved PT integration to ameliorate the strain of longer commuting journeys. They also emphasised recognition of constraints and flexibility in commuting routines and recommended further in-depth research to investigate their impact on SWB.

A beneficial effect of cycling on obesity has been found, with an average weight difference for male cyclists of 5kg, and female cyclists 4.4kg below averages for car-only commuters in analysis of data from the UK Biobank (Flint and Cummins, 2016). Flint and Cummins (2016) also confirmed previous findings that mixing public transport use with active modes was associated with reduced bodyfat (BF%) and body mass index (BMI), to a level similar to that found with walking to work. A public health survey-based study in Skåne, Sweden, found significant gendered effects on obesity for female cyclists, and on both obesity and overweight+obesity for male public transport users (Lindstrom, 2008). As men form a lower proportion of PT users than women, these authors speculated that the lower overweight+obesity levels among men who selected to use PT might reflect exercise and diet-related behaviours associated with men's higher salaried jobs.

Public transport use has been associated with reduced probability of being overweight by researchers who also associated reduced likelihood of diabetes in a dose-response relationship with walking or cycling distances over 2 miles (Laverty *et al.*, 2013). These authors observed a tenfold difference in public transport use between UK regions and London, highlighting the poorer provision outside the capital. While public transport is often grouped together with active travel (AT) in studies of population health benefits, the distances walked to stations or stops are considered to account for potential differences in benefit, with passengers expected to walk further to rail stations compared with bus stops (Martin *et al.*, 2015). The higher average income levels observed by Martin et al. among people who had switched to rail, compared with bus passengers, also suggests inequalities in benefiting from the additional physical activity related to the socio-economic context of those accessing public transport modes. For socially disadvantaged groups, such as poor single mothers, being obliged to walk or to use inefficient local bus services may also have negative effects on emotional well-being (McQuoid and Dijst, 2012).

The health and wellbeing effects of multimodality have been examined in more recent literature. Cambridge (UK) car-users who were regularly multimodal or only used their cars occasionally were strongly associated with active modes of walking and cycling, compared with monomodal car users who rarely used active modes (Goodman *et al.*, 2012). Goodman et al. also observed a "*choreography of avoidance*" related to commuters' desires for a pleasant or safe journey, while car-drivers and public transport users often left home early to try to avoid delays and unpredictable schedules or a lack of parking spaces at rush-hour. Wellbeing conceptually extends beyond physiological and affective feelings to include life projects and the ability to respond to changeable circumstances. For example, Goodman et al., (2012) argued that commuting by car "*facilitates well-being by allowing individuals to achieve long-term goals such as home ownership, and to negotiate short- and medium-term challenges such as illness or organising childcare.*" Mokhtarian et al. (2015) found that multimodal trips were most often considered to be physically or mentally tiring and unpleasant in their review of French travel survey data that also found that talking to others, in person or by phone appeared to make the trip more pleasant. Their study also found

cycling trips to be more often considered pleasant than walking (Mokhtarian *et al.*, 2015). Heinen and Bohte (2014) found that monomodal cyclists considered the health benefits and comfort much more important than multimodal public transport-bicycle commuters, whereas public transport users were less concerned about health benefits or traffic safety (Heinen and Bohte, 2014).

Beliefs about health and well-being have been explored amongst student populations and found to be less important as a driver for mobility behaviour change than other factors such as cost and autonomy (Simons *et al.*, 2014; Swiers *et al.*, 2017).

Risks of cycling accidents have been found through a UK survey of cyclists's health, to be associated with demographic and behavioural factors, the greatest risks of injury being reported by younger male cyclists (Hollingworth *et al.*, 2015). Perceptions of the risks of cycling were associated with the threat of collision with cars (Winters *et al.*, 2011) and often corresponded with observed safety (Winters *et al.*, 2012). Qualitative analysis by Dalton (2016) suggested that safety concerns about cyclists were more typically associated with respondents' key female contacts and partners rather than emanating from male social contacts. Perceptions of risk were often based on 'near miss' incidents that heightened a sense of vulnerability when cycling (Aldred, 2016). Although experiences of accidents and injury contributed to a sense of risk proportional to the frequency of cycling for regular cyclists, potential and occasional cyclists also had particular worries about being hit by a car, despite having no personal experiences of cycling accidents or near miss incidents (Sanders, 2015).

2.2.4.1 Children's activities, Independent travel and wellbeing

Studies of child and adolescent travel and activity differentiate between 'Active Travel' and public transport use (Schoeppe *et al.*, 2015), some characterising bus or train as a form of passive transport (Pont *et al.*, 2011), or do not consider public transport's use in discussions of children's active travel. It has been noted that public transport use increases with the age of children and adolescents (Johansson *et al.*, 2012).

Active travel by children has been extensively studied, particularly as an indicator for (or outcome of) overall levels of physical activity and benefits reported for physical health (Panter *et al.*, 2008) and mental health and well-being (Chillon *et al.*, 2017). Models of children's active travel have been proposed by Panter (2008) and Pont (2011) that recognise the dynamic complexity of decisions made by families regarding participation in AT (active travel). The barriers to families wanting to cycle together were found to be associated with lack of confidence about safety, the concerns about risks from traffic and the need to understand the norms and structures surrounding cycling (Clayton and Musselwhite, 2013).

Since Hillman's study 'One False Move' found that children's independent mobility had reduced significantly in the UK between 1971 and 1990 and to a lesser extent in Germany. Other researchers have confirmed a trend towards more children's journeys by car and reductions in cycling and walking (Fyhri *et al.*, 2011; Kyttä *et al.*, 2015). However, Scheiner (2016) exploring the gendered relationship of escorting (accompanying) with children's independent trips to school, found that using active modes to commute to and from school did not imply that German children were not accompanied (Scheiner, 2016). His study identified that accompaniment could involve many other kinds of companions, including siblings, friends or their friends' parents, debunking the binary notion of parental accompaniment, if not challenging the concept of parental involvement in their children's travel decisions. Identifying that women were still most likely to accompany children to and

from school, Scheiner found that fathers were less likely to collect children at the end of the school day, associating factors such as parental employment with patterns of accompaniment.

Examining children's interactions with their neighbourhood environment, Mackett (2007) through a GPS and diary study found that boys and to a lesser extent girls aged 8-11, when walking independently of an adult tended to move about laterally to the general direction of travel. This was suggested by the authors to reflect interactions with friends, playing and exploring the neighbourhood (Mackett *et al.*, 2007). Mackett also found that independent bus travel had been experienced by the lowest proportion of children in their study, compared with those permitted to cross main roads, walk to friends' houses or to a nearby park. In a study that problematised the concept of independent mobility in children, Mikkelsen and Christensen (2009) identified companionship as important to children, but also to parents who, in ways that differed between suburban and rural areas, also valued companionship on journeys in and around their neighbourhoods (in Denmark). Suburban parents often facilitated their children's mobility by car, to activities that were often in the company of other children, whereas rural families more often took part in physical activities or leisure together. The authors concluded that parent's involvement in children's activity and related travel could be regarded as both a facilitator, as well as a barrier to children's mobility.

Christie *et al.* (2011) found that real barriers to children cycling to school existed in socio-economically disadvantaged areas with higher levels of casualties, they proposed a more integrated, multiagency approach to mitigation of areas hazardous for cycling through traffic or antisocial car and motorcycle use (Christie *et al.*, 2011). Amongst other measures, they identified the need for targeting cycling skills courses (e.g. Bikeability) and addressing parental concerns about theft of children's bicycles through provision of secure cycle parking near key destinations for children's travel to address an economic barrier to cycling. Children in economically deprived communities in Coventry were found to have more opportunity to engage in physical activity at school than in and around their homes, reflecting both parents' and children's safety concerns about the suitability of their local environment as places for children to play outdoors (Eyre *et al.*, 2014). Barriers to active forms of travel include a lack of engagement from institutions such as schools and planners (Terron-Perez *et al.*, 2018).

Promoting the ability of children to travel independently within their neighbourhood in Seattle (USA) would lead to increased levels of children's physical activity and health by Henne *et al.* (2014), who also proposed that parental concerns over safety could be addressed by measures such as 'walking school buses'. Active travel by children was associated with similar active travel behaviour among the parents, although they found no association of children's active travel with parental involvement in vigorous exercise, nor with neighbourhood walkability. Analysis by Copperman and Bhat (2007) of the 2000 San Francisco Bay Area Travel Survey, found that individual children (5-17 years old) had participated either in active recreational activities, or had travelled actively at weekends, but rarely both on the same day. Children's independent mobility was also associated with capabilities in Goodman's (2014) study of children and young people's experiences of a free bus travel scheme for young people under 17 years old, operating in London since 2005 (Goodman *et al.*, 2014). Exploring concepts of 'independence' through interviews with young people, they concurred with Mikkelsen and Christensen's (2009) findings that independence did not necessarily equate to independence operationalised from an adult's perspective as

‘travelling alone’, as companionship was often important facilitator of children and young people’s travel without their parents.

2.3 Structuration theory and the contribution of time geography

This review builds on structuration theory as defined by Giddens who analysed social life by exploring the relationship between agency of individuals and ‘collectivities’ acting within social systems, infrastructure and institutions. This approach is intended to assist in revealing the processes, capabilities and tacit knowledge integral to routinised everyday activities, in addition to assisting in analysing the discursive explanations given by the practitioner (i.e. the person/group combining cycling with public transport) based on their experiences.

2.3.1 The contribution of time geography

Hägerstrand’s work on the time-space analysis of activities resulted in the proposal that space-time prisms could visualise the physical and temporal boundaries for sets of activities conducted both individually and ‘bundled’ or ‘coupled’ in groups with other people (Hägerstrand, 1970). Hägerstrand’s original contribution has been adapted in the analysis of people’s activities within a 24 hour period, the path between activities conceptualised as a ‘prism’ that illustrates the physical extent of travel possible within the period measured. Recognition that repeated activity patterns also extend over several days is reflected in diary studies that can enable the analysis of social interactions, both within the household and with people within a participant’s wider social network.

Building on this concept, Jones et al. (1983) developed a method of analysing household activity in detail using household interviews and activity diaries. While their project developed and tested a series of life stage categories for family households (detailed later in this chapter), other research has explored the impact of external events and social networks (Axhausen, 2007; 2008) and significance of life-cycle events (Chatterjee *et al.*, 2013; Lanzendorf, 2010; Scheiner and Holz-Rau, 2013b). However, little travel behaviour research to date has focused on the household as a unit of interest particularly within the UK. Notable exceptions would include the work in Canada of Doherty (2005).

Arguing the case for the inclusion of social theory in human geography, Thrift (1996) proposes adoption of a structurationist theoretical stance, highlighting a common conceptualisation of time and space as essential to social interaction. Social structure is linked to temporal and spatial structure, recursively rather than hierarchically. Thrift described human agency as a continuous sequence of actions in time and space set against a context of social structure. People have limited time to decide on, and conduct their activities *“human action takes place in time as a continual time- (and space-) budgeting process and as an irreversible sequence of actions.”* (Thrift, 1996). People have limited time for their activities, obliging ‘ad hoc improvisatory strategy’ that is part of their practice. Everyday practice and activities are situated in places such as school, work, or the home; links to structure that these institutions represent. Thrift highlights the approach of Giddens for the relative sophistication of his ‘recursive’ model for combining human agency and structure. The characteristics of structuration relevant to the study of the integration of Cycling-PT are outlined in the next section.

2.3.2 Structuration Theory as a lens for exploring Cycling-PT

"An ontology of time-space as constitutive of social practices is basic to the conception of structuration, which begins from temporality and thus, in one sense, 'history'." (Giddens, 1984)

Anthony Giddens in *The Constitution Of Society* (1984) outlines a theory that incorporates concepts borrowed from functionalism and structuralism, with aspects of interpretive hermeneutic and phenomenological thinking incorporating models of human agency and action.

Giddens (1984) describes as 'co-presence' the episodes and encounters of interaction between people. Describing human action as characterised as a 'durée', rather than a series of discrete acts, action is viewed as being interpolated through time-space. Associated is the notion that the 'reflexivity' of the agent is, *"the monitored character of the ongoing flow of social life"* rather than episodic self-consciousness.

Giddens defines as sets of embedded processes within the agent related to action:

- rationalization
- reflexive monitoring
- motivation

Rationalisation of action is a routine process related to intentionality and is the basis for the evaluation of generalised competence in others. Influenced by social norms, the reasons people may give discursively for their action may be different to their own rationalisation of action as it occurs. Reflexively monitoring action includes monitoring the interaction's setting. People can usually give their reasons discursively to explain the basis for action, whereas they are not necessarily able to report motives, these relating to the desires that prompt action and underlie longer term projects and plans. Neutens et al., (2010) reviewing more recent advances made in time geography, highlighted that *"assessment of freedom of action in the context of spatial and temporal constraints, is its focus, rather than the prediction of travel behaviour"* (Neutens et al., 2010b). Exploring people's motivation behind their travel behaviour and choice of modal integration is one of the aims of the present research study.

Giddens (1984) referred to Hägerstrand's conceptualisation of the term 'projects' to describe the guiding purposes of agents (i.e. individuals) when formulating their activities. To be realised, projects required use of the time and space resources available to agents to overcome their constraints. Giddens critiqued the lack of explanation of the nature and origin of projects and the notion of 'constraint' as being limited to movement through time and space. One important aspect of the time geography influenced structuration framework posits that places are shaped by the flows and interactions of those people who pass through them and that the reverse of this also applies. That is places also shape the 'projects' of those members of communities of passengers, cyclists, transport workers who occupy and populate these spaces. Giddens proposed the term 'locale' to describe the settings for interaction rather than 'place' or 'stations' as used by Hägerstrand, providing scope for greater contextualisation of geographic locations. This notion of the 'locale' suggests that widening the focus of experiences of Cycling-PT to include aspects of the environment surrounding the places of interaction will help to provide context for action.

Giddens (1984) calls "*mutual knowledge*" that practical knowledge inherent in the capabilities related to the routines of social life shared by various actors in a given situation. Complementing the discursive consciousness that actors can express about their involvement in everyday life, is his concept of "*practical consciousness*" or, the generally unspoken knowledge and beliefs about social conditions and the circumstances in which they act. The boundary between discursive and practical consciousness is fluid, or permeable, unlike the difference between these and the unconscious. The study of the everyday activities and behaviours should attempt to identify and reveal some of the typically unspoken beliefs and knowledge that shapes people's travel behaviour and facilitates the integration of Cycling-PT.

Practical consciousness infuses everyday encounters, activities and interactions. According to Giddens (1984) it is part of the way in which human agents are able to go about everyday activities as a result of their integration into the continuum of their lives. Reasons for actions can be given at a discursive level, interpreting the nature of their behaviour, based on their developed reflexivity. However, the ability to 'go on' with everyday life is also practised at a non-discursive level through 'practical consciousness', an integral characteristic of the ongoing reflexive monitoring of activities. Not to be confused with the unconscious, Giddens argues that there is no barrier between practical and discursive consciousness, "*there are only the differences between what can be said and what is characteristically simply done.*" Through its association with the "*flow of day-to-day conduct*" (Giddens, 1984, p. 282), practical consciousness is integral to the enactment of routines.

Rules of various kinds help to structure human activity and interactions, (pp.22-23), these include 'rules' with both informal (tacit) and formalized (discursive) characteristics, the informal being the most intensively invoked/encountered, having a deeper impact on social comportment (conduct) than 'codified law': "*Most of the rules implicated in the production and reproduction of social practices are only tacitly grasped by actors: they know how to 'go on'.*" (Giddens, 1984, p.22). In other words, many of people's everyday interactions (and activities) involve the routinised observance of unwritten, but commonly observed rules. Rules imposed by authorities, such as transport providers, employers and other institutions are likely to influence behaviour, as are unwritten codes for comportment in the interaction spaces for cyclists and other travellers. These may be part of the lived experiences of people who have integrated Cycling-PT.

Within this conceptualisation structure is defined as a set of 'recursively organized' resources and rules, that form properties of social systems. Giddens (1984) defines systems as being made up of the "*situated activities of human agents, reproduced across time and space. Analysing the structuration of social systems means studying the modes in which such systems, grounded in the knowledgeable activities of situated actors who draw upon rules and resources in the diversity of action contexts, are produced and reproduced in interaction.*"

Giddens (1984) defined integration as "involving reciprocity of practices (of autonomy and dependence) between actors or collectivities." He distinguished between two kinds of 'integration', Social integration refers to "*reproduced practices in interaction settings*" in the context of co-presence, whereas system integration identifies the context of connections between actors and collectivities not physically co-located, the social mechanisms of system integration being in some respects underpinned by those of social integration, but being also distinct from these. Domination (connected with power) "*depends on the mobilization of two kinds of resource: Allocative resources, such as capabilities or transformative capacity through the command of objects, and Authoritative resources having a transformational character with respect to people or actors...*" (Giddens, 1984, p33). Resources related to

Cycling-PT include access to bicycles and PT as well as bicycle parking provision. These may be conferred by external authorities and institutions as well as within the household or family or other social system.

Giddens (1984) categorises (after Lévi-Strauss) three kinds of time, 'reversible time', i.e. characterising the *durée* of day-to-day life, as well as the longer currency of institutions. The human individual life-span he describes as 'irreversible time'. The life cycle is defined as a concept describing the "*succession of generations*", implying aspects of repetition and thus "*the longue durée of institutional time*". This conceptualisation of time is helpful, framing the everyday activities and longer-term projects of individuals and households within the longer timespan of institutions such as the railway network, schools and workplaces and authorities that shape activities of households and individuals.

2.3.3 Identity and mobility

In the study of motivation for Cycling-PT in a household context, it is useful to explore where behaviours and beliefs may be shared, supported or reinforced by others in the household or family. Early exploration of people's narratives uncovered a theme related to self-image and identity that led to a review of literature on this theme and to the later work of Giddens on identity. This section addresses the theme of identity related to travel and transport modes, and to group identity related to the household.

A sense of ontological security is essential to a person's Identity, it is who the individual defines themselves as and requires biographical reflexivity: "*It is the self as reflectively understood by the person in terms of her or his biography.*" (Giddens, 1991) (p.53).

2.3.3.1 Household and family group identity

While intra-household group decision-making has been studied (Ho and Mulley, 2015; Roorda *et al.*, 2009; Timmermans and Zhang, 2009), a more limited body of literature explores aspects such as shared values, beliefs and behaviours or lifestyles associated with the collective activities of households with respect to mobility practices (Axsen *et al.*, 2012; Murtagh *et al.*, 2012; Van Acker *et al.*, 2016; Whitmarsh and O'Neill, 2010). Social science studies of household and relational environmental practices have explored the theme of identity related to energy use behaviours (Axsen *et al.*, 2012), finding that biographic and relational factors to be involved in identity-forming processes with regional effects (Roberts and Henwood, 2018).

Describing a concept of 'Family Strategy' in a cross-cultural study of family behaviour, Saraceno (1989) identified a number of conceptual problems, including the notional 'subjectivity' of the family. The family's strategies and identity result from structures of power and authority relationships, diversity of access, and resource availability. Policies (in the 1980s at least) involving the family were generally targeted at individuals members within archetypical families. This author describes the family subject as a 'collective', sharing some common interests. Family members sometimes conflicting, diverging or having diverse definitions of needs and unequal access to resources.

A similar concept was proposed by Day *et al.* (2009) who identified the 'family paradigm' as a, "*constellation of collected schemata about beliefs, values, and viewpoints*" shared by a household. Day *et al.* consider that family members subscribe in different ways to shared ideological themes, themes and goals, or "*group mission*" (Day *et al.*, 2009).

Saraceno (1989) identified that resources are not only of a material, instrumental or social nature, they may also be symbolic or cultural. She defines family cultures as “*systems of definitions of needs, of priorities, and of relationships. These are elaborated by families through time and embody definite traditions handed down from one generation to another...*”. Over time, family traditions, cultures and strategies change, either influenced by changes in household composition, or through experiencing changes in constraints and resources.

Strategies involving the evaluation of external resources against individual and family need, self-knowledge, self-image and identity lead to differing perceptions of the value of resources between families and individuals within them. Perceptions of resource constraints also vary between different families and individuals. The identification of family needs results from differentiation of interests and the availability of resources for those needs of individuals and the family beyond those required for subsistence. Family identity arises from the intentional allocation of roles and resources and their associated social identities (Saraceno, 1989).

The family as a system interacts with the workplace through its members, the two systems therefore being interdependent. Because workers are simultaneously living in both systems they can be subject to stress through events that occur in either system. The degree of influence people believe themselves to have is a key factor in successfully dealing with these stresses (Renshaw, 1976).

2.3.3.2 Mobility identities

McLaren (2016) studied the transport modal practices of families in four Vancouver districts, defining the practice of some households who walked or cycled with their children to everyday activities as ‘altermobility’ (McLaren, 2016). However, the mobility identities of households and families, as well as multimodal transport users are under-researched. Helen Wilson (2011) has discussed the “*situational negotiation of personal space*” in bus passengering practices, including interactions between different racial and cultural groups and how these contribute to identity building in urban contexts (Wilson, 2011). Passengering in certain contexts can extend beyond being a passive experience as people monitor their journeys, or participate in navigating (Adey *et al.*, 2012; Cass and Faulconbridge, 2017).

In other mobility research, identity has been associated with cycling, (Aldred, 2010; Aldred, 2013b; Fussl and Haupt, 2017; Gossling, 2013; Steinbach *et al.*, 2011), but self-identity as a cyclist or public transport user has been found to be of lower importance than being a ‘motorist’... (Murtagh *et al.*, 2012), most people preferring not wanting to ‘stand out as different’ (Pooley *et al.*, 2013) in terms of their mobility identity. However, Guell *et al.* (2012) found that commuter roles and identities could be ambiguous, neither clearly ‘car driver’ nor ‘cyclist’ as travel choices were contingent on setting, time, and destination.

Individual mobility identities have been studied, particularly for cycling (Aldred, 2013a; Anable, 2005; Horton, 2006; Steinbach *et al.*, 2011), and car users (Steg, 2005). Larsen (2017) found that cycling, unlike in low-cycling countries like the UK, did not have a particularly strong identity for many Copenhageners. For some in the city, however, cycling was associated with a sociable ‘hipster’ urban lifestyle for the speed and convenience it offered and because it ‘feels right’ rather than any environmental benefits it could provide. This research also identified how families integrated cycling alongside automobility within their wider household mobility practices and the capabilities required.

The association between social-, place-, transport- and self-identities and travel behaviour has been explored by Heinen (2016). Her analysis of data from the Netherlands revealed that cyclist and public transport identities were more strongly associated with use of these modes, than being a car driver was with driving. Only having part time access to a car increased the likelihood of sometimes commuting by bicycle, and having a social identity of being 'family-oriented' reduced use of the car for occasional commuting. That a 'sporty' self-identity should be negatively associated with always cycling for part of a commuting trip, was an unexpected finding (Heinen, 2016). She concluded by contemplating whether identities might act as mediators for behaviour change.

Horton (2006) contemplates how the everyday lives of bicycling environmentalists are structured by the bicycle which is used in the course of travelling between their intra-urban activities. With the bicycle as a main form of transport, their geographies more constricted than those of car-users. The distinctiveness and visible nature of cycling only partly defines identities that are primarily as 'environmentalists' rather than cyclists. The bicycle being a facilitator for their activities, some accessories, such as: "*waterproof jackets, child seats and trailers for carrying children or other loads...*" support the everyday cycling practices of environmental activists.

Horton aligns the bicycle and cycling as a practice with the three types of 'identity building' proposed by Manuel Castells (1997), these being: a 'legitimising identity'; a 'resistance identity'; and a 'project identity'. This identity involves: conformity with governmental promotion of cycling, or 'legitimation'; experiences as marginalised and vulnerable outsiders, or 'resistance' (to an automotive culture); striving for improved conditions for active mobility, and wider sustainability developments, or 'project-building'. Horton sees these practices integrated in the 'Critical Mass' protest bicycle rides. In another qualitative study by Hansson (2015), parents from "differently mobile families" cycling while carrying children and balancing shopping bags over the handlebars in Sweden had their identity defined as irresponsible "biking citizen parents".

Building on the concept of 'symbolic stigma' and 'particular social interaction' in analysing cycling identities, Aldred (2013a) thematically coded narrative interviews to identify how the image of cyclists varied, what the social or cultural associations of the cycling identity were, and how identity was assigned. She found that having a cycling identity involved also managing the identities of others through self-consciousness about their own image, fearing recognition by their cycling attire, while concerned at the risk of not being sufficiently visible. Cyclists made moral judgments about other cyclists' behaviour and identity as cyclists, sometimes having internalised past policy initiatives or car precedence discourses that drew attention to 'bad' cycling behaviours, also to resist being stigmatised themselves. Everyday cyclists distanced themselves from others they regarded as 'proper cyclists' or as a 'bike nut' to establish identities that, "were not too competent..." but competent enough not to be considered a 'bad cyclist' (Aldred, 2013a). Social and gendered influences on cycling, both acting on and disseminating outwards from the participant, were identified by Dalton (2016) who found that pressure for cyclists to appear attractive and smart at work was greater on women than men.

Processes of becoming a 'proper cyclist', a self-identity of club cyclists, involves decisions around the types of clothing worn and helmet use, as well as learning and maintaining emotional and mental processes related to the activity of cycling. Various categories of 'cyclist' were associated either with competence, sportiness, or utility; particular approaches to cycle clothing and behaviour helping to define the different identities. Other research has

suggested that the kind of clothing worn by the cyclist may have little effect on motorists behaviour in reality, clothing suggesting different levels of 'experience' made no difference to close-passing by motorists in a recent study (Walker *et al.*, 2014), only giving greater clearance if they thought they were being recorded on video, or when the rider wore clothing that gave the appearance of the cyclist being a police officer. The image of cyclists as perceived by others has been studied in some detail (Daley and Rissel, 2011; Davies *et al.*, 1997). In particular, Daley and Rissel (2011) analysed negative perceptions of 'risk takers' and 'law breakers' as stereotypes, as well as the more positive "green" activist connotation that were not welcomed by all cyclists (see also Aldred, 2013; Larsen, 2017, above).

The relationship of place-based cycling culture to social identities, including narratives around mobility choice and social class, has also been explored by Aldred and Jungnickel (2014). Based on qualitative interviews in Bristol, Cambridge, Hackney and Hull, locales (places) had either an 'emerging', or an 'established' and 'normalised' cycling culture. Cycling was perceived as a more ordinary activity in the Hull and Cambridge, cities where it was an established practice, but was seen as 'exotic', or 'cool' and associated with "local 'alternative' cultures, including arts, small business, and community organisations" in Bristol and Hackney. Established locales were seen to be "*resources of competence through which, for example, cycling knowledge is passed around*". Unlike the identification of cycling with the Netherlands, the relationship with 'place' in the UK is more localised. Cities with a high cycling level were often viewed as geographically isolated compared with other parts of the UK, but perceived as connected virtually or by (maritime) transport links to other cities in Europe where cycling was commonplace.

Other processes can be observed in an analysis of the complexities of walking in one's own neighbourhood. Investigating the skills and competencies used in walking, Hodgson (2012) has argued that key resources of people's social network are its collective memory and skills:

"the skills and competencies of individual and collectivities are those social skills learned informally and in practice with others and form part of the skills of being social."

These skills include location-naming, landmarking, navigation and observation to reduce 'strangeness' of previously unencountered infrastructure such as cycle paths. Competencies for 'being safe' such as 'vigilance' and 'danger reduction skills' were used in selecting paths to avoid the possibility of being pursued. Other skills were used to facilitate positive encounters, or to establish one's familiar position through repeated patterns of being seen, echoing Giddens' part defining their identity through the narrative they present about themselves in a series of real-world events where skills are used to respond to perceived threats.". These and other skills form part of a repertoire of competencies for social interaction and walking. The social reproduction processes of everyday walking competencies involve the ability to share memories and for people to learn from each other through synchronisation. (Hodgson, 2012).

The sense of biographical identity is considered by Giddens (1991) as linked to the "*fragile nature of the biography...*" that a person presents about themselves. Their identity is not necessarily defined by behaviour, although that can influence others' perceptions, but is to be found in the narrative they maintain about themselves, integrating any fictional notions with real-world events. A 'robust' characteristic of identity is its ability to transcend transitions and stresses within the social environment experienced by the individual. In his description of the embodiment of the self and how the body and its associated experiences and skills are able to respond to perceived threats, Giddens observes that competence is

presupposed by “*routine control of the body*”, a characteristic that transcends cultures and is featured continuously in everyday life by the “*competent social agent*” and is also integral to being regarded as competent by other people. The outward presentation of the person is carefully managed through their “*bodily mannerisms*”, despite appearing to be achieved without care (Giddens, 1991, pp.57-58).

Combining these concepts to the analysis of intermodal cycling helps to frame people's management of bicycle, luggage and clothing through control of the body in a demonstration of competencies and skills as part of their identity. These competencies are displayed, perceived and potentially contested in a number of everyday scenarios, including when navigating the highway and the public transport system, at the workplace and in other situations.

2.4 The Household Lifecycle Stages

Life course perspectives have enabled the incorporation of elements of time, and changes, into the study of human activity and behaviour, adding this to the ecological exploration of influences on behaviour and psychosocial aspects typical in studies and programmes related to the promotion of physical activity (Li et al., 2009). The life course of the individual is related in sociological studies to the development of capabilities and social connections over time and the influences of social spaces. In the present study the ‘group’ examined is the household, the ‘social spaces’ that are involved in forming the activities and behaviours of interest are the physical environment where combining Cycling-PT takes place, and the homes, workplaces and other destinations that encompass the household’s activities. According to Li et al. (2009), the life course perspective observes the following principles: human agency; linked lives; time and place; life-span development; and timing.

2.4.1 The household as unit of observation

UK National Statistics survey define a household as: “One person or a group of people who have the accommodation as their only or main residence” (DCLG, 2012). For this study’s purposes, the focus is on households with resident children around the ages of transition from primary to secondary education.

The trend in recent years towards more diverse types of family composition offers an opportunity to explore, for example, the complex travel patterns which emerge in households resulting from divorce or separation (Scheiner and Holz-Rau, 2013a), such as a separated parent’s relocation to the child’s grandparents’ home (Mitchell, 1983). Households comprising more than one family within a single home, although a small minority, are the fastest growing type of household in the UK.

Household composition and situation may affect activity levels, travel patterns and mode choice. Living in a single headed household in the UK was associated with lower levels of physical activity and higher levels of sedentary behaviour in boys (Gorely et al., 2009). Reduced participation in organised leisure activities was found among Norwegian adolescents from single-parent households (Bjerkan and Nordtømme, 2014). Where the parent was unemployed, informal physical activities, including hiking or biking, were more likely than organised activities (36% vs 26%), with around 65% of trips to leisure activities on foot or by bike.

Single parents were considered likely to have less time for chauffeuring duties for their children, whose PT use and cycling or walking to school has also been associated with single parent households. Analysis of Scottish households suggested that single parents (Stradling et al., 2005) had a greater reliance on multimodal travel than other social groups.

The organisation of the household is considered essential to understanding travel behaviour (Fox 1995). Patterns of activity and the resulting derived travel, in particular trip-chaining behaviour, have been found to be associated with characteristics of households (Lee, Hickman and Washington, 2007) and social interactions (Mackett, 2000).

Mapping household activity (rather than travel) led to more detailed recall of small trips, particularly walking, and enabled substitution effects to be understood in considerable detail (Jones *et al.*, 1983). Interviews with the family group, rather than with members individually, proved valuable for both stimulating the discussion and ensuring accuracy of recall, as any one family member may comment on the travel details of another. The 'coupling constraints', scheduling considerations and other intra-household interdependencies were investigated in depth by Jones et al. (1983) who identified a number of key life stages, each with particular characteristics of travel for a conventional family of the time.

2.4.2 Households of difference and change

Christie et al. (2011) identified that children living in disadvantaged and poorer communities are at greater risk to harm from accidents owing both to the nature of the street environment, as well as household and economic factors that may diminish parents' capability to safeguard children. They also recognise that parents want to balance keeping children safe with allowing them to develop a sense of independence. Christie identifies in the literature that parents' fears that lead to them preventing children from cycling on the road are justified by accident data revealing that drivers from disadvantaged areas are over represented in crashes involving their transgressional behaviour. Christie surveyed children aged 9-14 thought to represent the stage at which children were becoming independent travellers, supplementing this with focus groups with parents from the communities. Parental anxieties related to poorer safety records in their local areas, often caused by other local young people driving cars, or riding motorcycles in an irresponsible way, had led to increases in risk aversion. This in turn negatively affected the lives of the children, limiting their freedom to cycle, and even to walk and play, in some cases, in public spaces and recommended a multi-agency approach involving enforcement, education and infrastructure (engineering) measures to combat the risks imposed by the hazardous traffic environments. Christie identified that around 30% of 9-10 years old primary school children wanted to cycle to school, a proportion that dropped off markedly after the transition to secondary school. Differences were also identified between ethnic groups, with much lower cycling levels among Asian (Indian, Pakistani, Bangladeshi) and African people than white or black Caribbean people (Christie *et al.*, 2011).

The term childcare is used here to identify activities intended for the supervision (or management?) of children aged between 5 and 12, the age range served by after school clubs in the UK according to Smith (2000).

As households' composition and parental roles have changed over time, so too have the structures in place to support families and their activities. Trends towards increased reliance on formal childcare, have been supported by policies such as the "Out of the school childcare initiative". Families' lives are recognised by Aitken (2000) as being managed by parents in

increasingly complex ways, leading to the structuring of young children's lives around the economic provision and availability of childcare and other activities.

Applying the study of the life course to the field of transportation research, the 'mobility biographies' method was proposed to observe and analyse dynamic changes in people's lives and offer explanations for changes in individuals' behaviours (Lanzendorf, 2003). Recognising that attitudes could help to explain behaviour over the long-term, Lanzendorf argued that a qualitative retrospective method could be used independently of traditional quantitative approaches to review factors affecting relevant changes.

Studies have analysed the effect of life stages on travel (Clark et al., 2014; Ryley, 2006), while changes may also result from learning processes and experience between life stages (Scheiner, 2014). Jones et al. (1983) identified and defined a number of particular household lifecycle stages (see Table 1), each with distinct household activity patterns, explored in more detail around specific themes, for example the 'event' of childbirth (Lanzendorf, 2010).

Several other definitions of the household lifecycle can be found. When considering the lifecycle of the family, see Backer and Lynch (2017) for discussion of the Family Lifecycle (FLC) in their analysis of how FLC affects Visiting Friends and Relatives (VFR).

2.4.3 Household transitions, life course events and changes in travel mode

Following Lanzendorf's (2003) definition of 'mobility biographies', Scheiner (2007) proposed the incorporation of biographical processes of individuals into the study of spatial mobility. A deeper understanding of spatial mobility would be obtained through a biographical theory of travel demand that would bind together various life course domains or trajectories, some of which previously had been studied separately, such as the effects of relocation, or employment.

As Jones et al. (1983) show, households' transitions, inherent with children, may be defined by the variable rate of the youngest child's own development. Other 'life events' including major changes in personal relationships, residential location and physical health conditions can also change activity patterns and act as a 'turning point' in cycling behaviour (Chatterjee *et al.*, 2013). While any change in mobility resources may be classified by researchers as a *de facto* 'life event', underlying causes may better explain changes in the availability of mobility tools such as acquisition or disposal of a vehicle, before this is considered an 'event' in itself (Lanzendorf, 2010).

	Adults	Children (defined by youngest)	Impact of children on activity patterns
A	Young (couples + single) Both working, home-making shopping for big items, sports and leisure clubs	- None -	- None -
B	Younger parents – often only one in employment, changed shopping patterns	New-born – pre-school	One main worker travelling to work, other PT or ‘at home’ carer
C	Parents evening free time starts to get ordered by chauffeuring older child.	Youngest still pre-school & other young school children	Child-driven demand for additional trips, one parent tied to the ‘school run’
D	Both adults able to work, though one parent often PT, holidays limit employment	Younger school children	More discretionary trips responding to child activity
E	Car availability rural requirement for PT working, wider range of employment for 2 nd wage earner	Older school children	Considerable ‘chauffeurage’ of older children by either or both parents
F	Younger adults most mobile for discretionary activities, but if no personal transport could be ‘mobility deprived’	All children are now 16+	Plenty of wage earners = no. of vehicles per HH at its peak in this category
G	‘Empty nesters’, greater work differences (were) observed between male & female partners	No children living at home	Younger family members tend to visit the older people.
H	Retired adults – not working now, weekday day times for shopping trips, chores, etc.	Children & other relatives come to visit	Tend to keep weekends and evenings free, Cars reduced to 1 per HH.

Table 1. Ten household lifecycle stages.

Source: Jones et al. (1983) from a study of ‘nuclear’ families.

Parenthood is one of the life course events that tends to influence car ownership, as (Oakil et al., 2014) confirm. However, other transitions such as starting employment after university have been observed to influence travel mode choice (Busch-Geertsema and Lanzendorf, 2017). The arrival of small children influences travel behaviour, but can have positive effects on cycling. Lanzendorf (2010) found in Germany that while the birth, particularly of a second or subsequent child, can cause increased car use, a young child can also be the catalyst for starting to cycle. Scheiner (2014a) using German Mobility Panel data to investigate the effect of life course and accessibility events found some moderate effects on modal changes. These included an increase in women’s walking after the birth of a first child and a reduction in cycling. As this had less impact on fathers’ cycling the authors considered this to reflect the mother’s responsibility for the baby. Mothers’ cycling reduced further with the birth of a second child but their driving increased.

The cycling environment may be more supportive for Amsterdam mothers, who have been observed by Eyer and Ferreira (2015) to cycle more than childless single women, finding

cycling with their children gratifying. Their study found that travel by mothers increased during the afternoons suggesting strong time-space constraints, with changes to the specific mobility challenges faced as their children grew older.

Changes also occur in children's modal preferences. For example, social norms and emerging stigmas among American teenagers were found to have reduced cycling in qualitative biographic interviews with older adults (Underwood *et al.*, 2014). Activities and travel are also liable to change in later life, some people narrowing their range of activities, changing mode from those used previously, such as reducing or giving up cycling (Ryan *et al.*, 2016).

While many of the previous studies focused on the examination of travel behaviour following a particular type of change or event, such as residential relocation (Jones and Ogilvie, 2012; Scheiner and Holz-Rau, 2013a). For example, Scheiner and Holz-Rau's (2013) biographic study of residential relocation effects found that moving from urban centres to urban fringes as the number of people in households grew led to increased car use in households at the expense of public transport and, to a lesser extent, cycling and walking. Behaviour changes also occur after parenthood (Lanzendorf, 2010). Others have explored transitions by typology of the person's life course stage, gender, geographic or other defining context such as inter-generational socialisation effects (Döring *et al.*, 2014; Grønhøj and Thøgersen, 2012; Scheiner, 2018).

2.4.4 Biographical domains and contextual definitions

Rau uses the term 'mobility milestones' (Rau and Manton, 2016) to distinguish mobility-related life events, such as driving licence or vehicle acquisition, from other life events which are associated with more general life course transitions such as the passage from childhood to adolescence and adulthood. While Lanzendorf (2003; 2010) focuses on broader domains, e.g. the mobility domain encompassing travel routines and mobility resources, Rau and Manton (2016) focus on discrete life events but anticipate connections between life events and mobility milestones, such as between driving licence acquisition and the passage of a young person into adulthood.

Three terms are used in mobility biography studies and other kinds of behavioural biographies: trajectories, transitions and turning points (Li *et al.*, 2009). Trajectories have been defined as 'careers' with respect to residential location, employment, incarceration as well as mobility (Bailey, 2009), or 'pathways' (Li *et al.*, 2009) of an individual's biological or psychological states and social and behavioural states. Trajectories in behavioural states, for instance in travel behaviour or social states have been studied at an individual level (Jones, 2013; Scheiner, 2017), but as Scheiner (2007) identified, an individual's biographical processes related to mobility are correlated to, "*mainly events in the household biography (e.g. starting apprenticeship, choice of a profession or choice of a workplace)*". Scheiner (2007) footnotes that the partial biographies are also described as 'cycles', i.e. family cycle, employment cycle.

Three dimensional household trajectories in space-time have been described as collections of individual space-time paths (Buliung and Kanaroglou, 2007), however the term household trajectories in the mobility biographies sense seems to be applied only to residential or household compositional states.

Li *et al.* (2009) defines transitions as a change in state or role, or the shifts experienced as individuals change their social roles or settings. It is also commonly taken to encompass experience of change in socially constructed 'transitions' such as moving from education into

the workplace, moving into a partnership (e.g. getting married) or become a parent. The change of state experienced by families, households and individuals may not be sudden or brought upon by key events; many transitions are process that evolve gradually over time.

Some households will be characterised by the 'family cycle' (Scheiner and Holz-Rau, 2013a) including processes of fertility and child-raising. Scheiner also identifies an interest amongst researchers on the effect of socialisation on child and adolescent travel behaviour.

Behaviours informed by transference of behaviour from parents or institutions to children instilling behaviours continued into adulthood. Transitions related to learning and ageing or maturing may not be triggered by key events, but may be the product of experience acquisition over time. Scheiner also argued that the family is not necessarily constructed of just a unique household, but individuals, particularly children, may regard members of several households as part of their family.

Socialisation effects have long been associated with spatial practices (Pred, 1984; Thrift, 1983). More recently, children have been considered to learn time-keeping values through regular travel and the number of cars available to the family, additionally influenced by peer groups at school and in the wider community and messages in the media reinforcing children's perceptions of the benefits of car use (Baslington, 2008). Intergenerational effects on pro-environmental behaviours in adolescents have been found to reflect their personal attitudes, but also reflected parental behaviours, mediated through children's perceptions and their visibility – children were more receptive to *"what parents practice – much more than what they preach"* (Grønhøj and Thøgersen, 2012, p.300). These authors found that these effects were irrespective of the size of the generation gap between child and parents. While recognising that the direction of causality was not proven through their cross-sectional study, they found it likely that the parent influenced the child more than vice-versa. Socialisation is also considered to be a life-long process (Chatterjee, 2015).

Other learning processes in childhood have been found to influence attitudes to walking in adults (Mjahed *et al.*, 2015), and through the development of social norms through childhood interactions at home and with peers, as well as repeated behavioural decisions, either observed or directly experienced, in the case of car use (Haustein *et al.*, 2009). Flamm and Kaufmann (2006) describe as 'motility capital' those skills and competencies, such as cycling or using PT, that result from the individual having *"accumulated a specific 'stock of experiences' during youth"*.

This study recognises the potential fluidity of children's competence, skills and agency that augments the concept of childhood encompassed by the term 'childcare' as defined by age in Section 2.5.2. Children also may be capable of contributing to the construction of their own life trajectories observed Buzar *et al.* (2005) quoting the sociologists Brannen (1999) and Valentine (1996; 1997), so enabling the mobility trajectory to also be explored from the perspective of the child's or adolescent's agency and competency. Boundaries on children's independent spatial range and temporal boundaries are negotiated with parents against a context of a culturally, and often locally defined 'regulatory framework'. Valentine (2004) has argued that children interact in a sophisticated way within the household and externally to access public spaces as *"responsible social actors in their own right"*. Children's competence is conventionally evidenced through levels of 'maturity', their age is considered by Valentine to be a *"performative act that is naturalized through repetition and therefore is both fluid and contested."* Parents' encouragement for their children's development of *"autonomy and streetwise skills"* also varies, ranging between giving children licence for specific journeys, to cautiously keeping their children under surveillance. Children can actively negotiate parental

understanding of their own competencies, and also play a part in constructing their parents' competence levels (Valentine, 2004).

Life histories have been viewed as collections of event histories in separate but often interconnected domains such as education, occupation and family formation (Giele and Elder, 1998), event histories being records of changes in status, rather than a complete accounting across time. Additionally, Giele points out that some kinds of transitions between states (e.g. attitudes and beliefs, emotional status, mental or physical capabilities) are gradual processes rather than discrete events and may not be easy to define by their start and end times. Giele argues that the unit of analysis for life histories can be specified both by time, as well as by cases that may comprise individuals, households or kinship groups.

By contrast, Scheiner (2007) assumes that household activity spaces and travel behaviour including mode choice, remain generally stable for extended biographical periods. These are punctuated by "*biographically key moments*" related to key life-course events that influence decisions on mobility resources and alter the modes used, as well as the periodicity of activities and trips, activity spaces and distances covered (Scheiner, 2007). Suggesting that the term 'biographies' was more appropriate than life-'cycle', three categories of biographical events were proposed (see table below): household biography, employment biography, and spatial mobility. Observing that contemporary families were characterised by "*an intricate diversity of forms and combinations of the 'partial cycles'*" Scheiner also argued for use of the term 'household biography' instead of 'family biography'. The term Mobility Biography was also considered broad enough to include the concept of 'social mobility'.

Lanzendorf (2003) theorised in his original paper 'Mobility Biographies' that dynamics affecting travel behaviour were observable in three 'life domains', each with a temporal dimension in a modification of the model developed by Salomon and Ben-Akiva (1983). Lanzendorf also recognised that leisure activities may be associated with attitudes and that changes in leisure-related activities occurred with compositional changes in the household, in particular with the arrival of children. He observed how changes in leisure activities affected mobility biographies.

Although Lanzendorf (2003) identified generational effects and compositional changes in the household lifecycle, his work then did not comment on the capabilities and physiological changes that may also interact with factors within the other three domains. Scheiner (2007) however, also focused attention on the two age-related biographical periods: childhood, reflecting debates around socialisation, and entry into 'high age' recognising stages when adaptations are made in response to health and physical constraints. With an increased emphasis in recent research on the effects of ageing on mobility and travel behaviour other authors' work will assist in shaping this as a possible fourth domain in the life course approach to analysing travel behaviour.

Table 2, below, compares the domains as defined by Rau and Manton (2016), Scheiner (2007) and Lanzendorf (2003). Also included is Salomon and Ben-Akiva's (1983) original Lifestyle concept for patterns of behaviour identifying three areas of life decisions that influence travel demand.

Mobility Biographies - different models			
Salomon & Ben-Akiva 1983	Lanzendorf (2003)	Scheiner (2007) biographical event categories	Rau and Manton (2016)
Life-style choice	Life style domain	Household & residential biography	Key Life Events
Family formation, participation in labor force, orientation toward leisure	demographic, household, educational, professional careers (social, cultural or political, e.g. establishment of a family, participation in work or orientation towards leisure)	Forming a partnership, children's birth, divorce (or separation). The number and different ages of children can be associated with mobility resources and residential location. Childhood and 'high age' are additional categories or domains.	Marriage, Childbirth, Change in hh composition, retirement, illness/injury. Events associated with passage from childhood to adolescence and adulthood, for example.
Mobility choices	Accessibility domain	employment biography	Spatial changes
Employment location, residential location, housing type, automobile ownership, mode to work	Location of residence, workplace, leisure, shopping and other locations, or transport infrastructure.	training for work, or starting a university course, starting a career, or changing job or study programme, leaving work temporarily or upon retirement. Changing mode of work, from part time to full-time and vice-versa.	location of residence, education and employment.
Activity and travel choices (nonwork)	Mobility domain	Spatial Mobility	Mobility Milestones
Activity type, activity duration, destination, route, mode	Availability of modes. Car Ownership, Season ticket, actual activity and daily and holiday travel. Actual activity patterns (Lanzendorf 2010)	Activity spaces. getting a driver's licence, acquiring or disposing of a car, moving home.	driving licence, vehicle acquisition/availability, (or disposal?), PT season ticket, traffic accident, cycle training, cycling environment changes, PT envt changes.

Table 2. Mobility Biography categories

Table analysing Lanzendorf (2003; 2010), Rau and Manton (2016), Salomon and Ben-Akiva (1983), Scheiner (2007).

2.4.5 Gendered differences and travel options within households

Gendered household activity patterns related to economic and time constraints may be observable in any household with the arrival of children (Best and Lanzendorf, 2005). Daily trip chaining between activities related to home maintenance, healthcare, (part-time) work, education and childcare often characterise the mother's role as one of 'time poverty' (Turner and Grieco, 2000). For single mothers, flexibility in scheduling activities is supported through childcare help from friends, or co-parenting arrangements with former partners are (McQuoid and Dijst 2012). Gendered patterns of travel have been associated with women's participation in childcare and part-time employment (Best and Lanzendorf, 2005; Ettema *et al.*, 2007; Scheiner, 2014a; Schwanen and Dijst, 2003; Schwanen *et al.*, 2008; Taylor *et al.*, 2015).

Gender differences amongst motorists are starting to converge in the UK (see Figure 8, below), partly because women aged 20-29 marginally increased their mileage, mainly for non-work related activities, while women aged 39-59 increased their use of personal cars and annual mileage for all purposes (Le Vine and Jones, 2012).

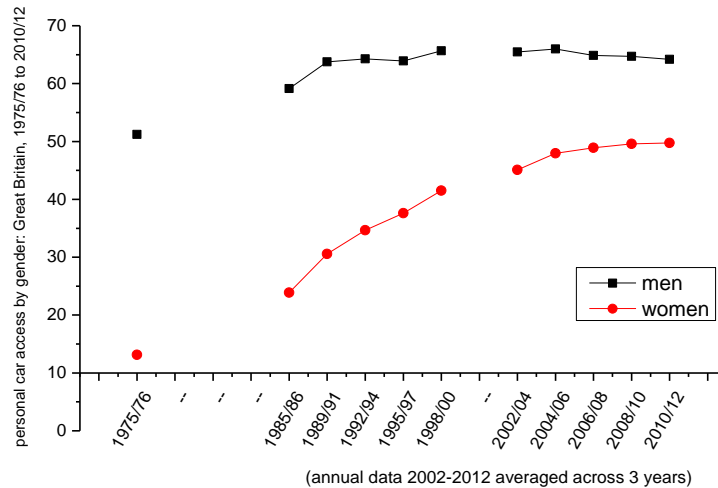


Figure 8. Graph illustrating convergence of car availability for men and women in Great Britain

Source: the author, based on NTS data for Great Britain (NTS0206), accessed 19/07/2015.

Kuhnimhof *et al.* (2012) has associated the long-term downward trend in car ownership amongst men in Great Britain and Germany, with increasing multimodality. Lower levels of access to a car and other individual and household characteristics were associated cycling behaviour (Panter *et al.*, 2011), explaining variance in cycling. Panter *et al.* (2011) speculated that behavioural choices about travel to and from work (i.e. in Cambridge, UK) are influenced by consideration of other household members as well as through interactions at the workplace and in other social settings. A recent study of commuting trends indicates an increasing trend in the numbers of people who describe themselves working from home, and increasing number of, “workers who do not have a single usual workplace” and factors such as people who work from home occasionally (Le Vine *et al.*, 2017).

Households with cars predominate in the UK, many households have at least one car available, and while personal car ownership has been identified as a factor mitigating against multimodal travel (Krygsman and Dijst 2001), many cyclists are also car owners so the correlation between car ownership and cycling is not straightforward (Harms, Bertolini and de Brömmelstroet 2014). In quantifying the space-time implications of multi-modal transport, Krygsman and Dijst’s (2001) study found that while ‘household heads’, especially those in full-time employment, are more multimodal travellers than their partners, carers of young children are less multimodal (Krygsman and Dijst, 2001). This apparent contradiction with literature reviewed on p.28 may be explained by the qualitative nature of Lanzendorf’s (2010) study that drew attention to the initial adoption of active travel by some young mothers in their home neighbourhoods as one of a variety of behavioural responses to the birth of a young child. Responses in households to parenthood will vary with employment, geography, regional travel customs, local affordances and infrastructure provision and governance, individual and household characteristics, with both positive and negative change regarding active travel, reflecting observation by Sunitiyoso *et al.* (2013) of ‘churn’ that in its asymmetry underlies gradual trends towards car ownership.

The availability of a car in a household with one car does not necessarily mean that all members have equal access to its use, as Shaw and Docherty (2014) point out, “To all intents

and purposes, a one-car household becomes a no-car household once one member of the family is using the vehicle...”, positing that women and children are likely to face particular accessibility challenges in areas of poor transport provision.

There are, nevertheless, households who do not own cars, and individuals who cannot drive, or have never learned and in some cases, never wanted to drive a car. A survey of people who had travelled to National Trust properties led to the identification by Anable (2005) of two categories people without cars and four of car-users. Those without cars were either ‘Reluctant Riders’ who typically had an older profile with fewer children at home, or ‘Car-less Crusaders’. This more environmentally motivated group perceived fewer difficulties with alternative modes of travel compared to using cars (Anable, 2005).

2.5 Towards a conceptualisation of scheduling activity

The scheduling of activities and the conceptualisation of time are central considerations (Schwanen, 2008) for the activities approach with its origins in time geography. Household interactions have been a focus for the modelling of activity-derived travel since the approach developed (Ho and Mulley, 2015), and various conceptualisations of the fixity of geographic and temporal constraints or ‘moorings’ have been described from both a space-time and Mobilities theoretical perspective (Cullen and Godson, 1975; Merriman, 2016; Neutens *et al.*, 2012; Neutens *et al.*, 2010a; Schwanen *et al.*, 2008). The Activity Based Analysis (ABA) considers travel to be an ‘induced’ or ‘derived’ demand, “*motivated by the need or desire for activity participation at spatially separated locations*” (Pas and Koppelman, 1987). Fox (1995) described the ‘activity approach’ as the study of travel behaviour as derived from the demands of ‘daily household activity patterns’ (Fox, 1995).

2.5.1 Organisation of household activities

The “*wide differentiation in the household’s organisation and mobility*” evident in empirical data from families in Copenhagen was investigated by Wind (2013) who, using Actor-Network Theory reasoned that households demonstrated elasticity through the ability to conduct activities in a dispersed way and when together. The nature of families is as “*multi-relational assemblages*” with household members affiliated with each other through affective and mental bonds, and physical proximity in daily life (Wind, 2013). Wind proposed as ‘household elasticity’ the measure of enacted mobility within households, a theory distinct from motility or mobility capital.

Reviewing the social impacts of products, Rainock *et al.*, (2018) found that the roles of individuals within the family may be affected by the adoption of new products or technologies (Rainock *et al.*, 2018). Either needs and obligations could be altered, or existing roles or inequalities were reinforced. One study reviewed (Thrall, 1982) by Rainock found that use of specific equipment led to a distinct task-related division of labour. Quoting a 2016 study of women’s diaries by Gershuny and Harms, Rainock found that time-savings through use of domestic equipment had been offset by increased time involved in childcare, shopping and doing paid work. The introduction to the household of a new bicycle, car, or other mobility resource may also be imagined to have a role-reinforcing effect, or alter specialisation amongst family members.

Journeys involving escorting or chauffeuring children formed a large part of Amsterdam mothers’ travel activity (Eyer and Ferreira, 2015), and reflected space-time constraints and

additional travel during afternoons. Mothers' work location and schedule is found to influence escorting children to school (He, 2013).

Gendered effects in regional commuting patterns have been demonstrated to be associated with different conceptions of gendered roles through household negotiations around employment opportunities, childcare responsibilities and car use between partners with young children (Gil Solá *et al.*, 2016). This author identified 4 types of 'gender contract' in household arrangements: traditional; gender-equal; mixed gender, and proposed the 'reversed-gender contract' as the fourth. It was argued that the effects of Swedish governmental policies intended to promote economic growth through support for 'high mobility' had led to inequality in commuting conditions through placing greater time-space constraints on households and straining household negotiations.

2.5.2 The Activities Approach

The work of Schönfelder and Axhausen (2010) gives insights to a framework based on the activity approach, suggesting that its incorporation into travel behaviour modelling and analysis would lead to advances in: *"concepts such as innovation, solution generation, life goals and commitments to people and ideas."* These authors hypothesised that people balance the generalised costs of travel with the generalised costs of activities which combine to form the generalised costs of people's day-to-day schedules. These authors positioned travel as a disutility in most circumstances, *"the spatial separation of functions such as living (home), work or leisure initiates travel as a prerequisite of having relationships with others, taking part in economic processes or generally being embedded in modern society"*.

Schönfelder and Axhausen acknowledge research by Mokhtarian and Salomon (2001) and others suggesting that people might have an intrinsic desire to travel in some circumstances. The assumption that travel is a disutility purely derived from activities, has also been questioned more recently, for instance, in exploring the influence of household structure on individual travel time budgets, (i.e. the amount of time thought to be available for travel on a typical weekday) Susilo and Avineri (2014) hypothesised that for young or unemployed individuals whose 'travel time budgets' were not fully allocated, their travel might be at a minimum level, representing travel as a positive utility (Susilo and Avineri, 2014). Susilo and Avineri found in their analysis of UK NTS data on household travel that only the full-time worker's time budget had reached its limit. Comparing mobility patterns of couples in England and Switzerland using household panel survey data, Manderscheid (2014) found that most English couples remained in their region, with male partners commuting long distances to work, but that women had both long and short commuting times. She argued that mobility decisions were taken within social networks contextualised by *"social and spatial structures"*, women with children often having medium length commutes in both countries. Her research confirmed that families with children tended to have lower residential mobility (Manderscheid, 2014).

In contrast to traditional methods of travel behaviour research focusing simply on traffic movement, or on the movement of individuals, consideration of interactions is balanced with daily activities within the activity approach. Day-to-day attempts to reduce activity costs through scheduling are traded over the longer term with investments in travel resources or communication tools as people change the constraints they operate within. Constraints are either self-imposed, external (social or structural), or result from previous decisions governing the location of home, workplace or school, or investment in a season ticket or a driver's licence, access to a car or bicycle, for example. The connection between short-term

activity-travel scheduling and longer-term resource decisions has been explored with respect to household car ownership (Roorda *et al.*, 2009),

Schönfelder and Axhausen's theoretical framework incorporates 'social content', defined as 'social signals' that situate the person within their social network. Social content has superficial similarity to nominal trip purpose classifications used in existing VTTS methods as proxy for the social context of activities reached by travel. It also recognises the monetary aspects of activities and the more obvious social aspects, eg. the size and composition of the group. Social content should also account for the 'prestige' associated with activity locations, and the fulfilment of obligations or ambitions, "*whether an activity helps to keep a long-standing promise, or whether an activity is part of a long-range plan or project...*" (Schönfelder and Axhausen, 2010). They categorised the social content of activities in three dimensions:

- Kind of activity (basic description – e.g. cooking, cycling)
- Purpose (intended instrumental outcome)
- Meaning (moral objective, value or significance to identity). (p.21).

The dynamic model of travel behaviour proposed by Schönfelder and Axhausen (2010, p.87) was a significant advance in understanding travel behaviour over previous simplified approaches that considered scheduling to be dynamic during the day, but static from day-to-day. Through its incorporation of social content and context, and recognition of individuals' reflexivity, their model took into account the changes people make to their activity patterns over time:

"...social networks in which people live and the personal world they continuously update as they experience the success of their schedules." (Schönfelder and Axhausen, 2010).

The 'Personal World' is defined as the person's combined mental map, activity repertoire, and their "*generalized knowledge of the environment*" (p.13). The 'mental map' has been defined by Schlich *et al.* (2004) as the traveller's "*spatial knowledge and orientation*" (Schlich *et al.*, 2004). The mental maps of individuals have been described further as repertoires of activity travel (AT) scripts considering modes and destinations for activity (Hannes *et al.*, 2008), in research aiming to understand the impact of travel demand measures (TDM).

Schönfelder and Axhausen argued that people attempt to optimise their schedules, using their mental map, responding to new information, exploring a new route or a solution suggested by somebody else. Day-to-day scheduling also includes ad-hoc experiences including response to surprises, small crises and new opportunities arising. Basic elements of day-to-day scheduling dynamics include:

- 1 - Interactions
- 2 - adjustment to unexpected circumstances, or opportunities (re-learning)
- 3 - activity repertoires
- 4 - mental maps

Activity repertoires have been described as habitual patterns of task allocation at a household or individual level and the conditions that can drive households to employ other learned patterns (Timmermans and Zhang, 2009).

Associated with repertoires, Gärling and Axhausen (2003) proposed that in circumstances of habitual travel behaviours, 'script-based' choices (that are sets of previously experienced sequences of activities and travel modes) contrast with planned behaviour involving

deliberation, as well as with impulsive behaviour that like habitual or 'scripted' behaviour requires no or little deliberation to implement (Gärling and Axhausen, 2003).

According to Schönfelder and Axhausen (2010), activity decisions in the short-term result from interactions with others in the social network and its geographic distribution, and crucially, with longer-term projects and constraints: the relative location of home, work, frequented shops, medical, sports, religious and cultural facilities, etc. These short-term scheduling processes result from people's attempts to realise their life goals and "*their understanding of themselves*" (i.e. their identities), thus, echoing Giddens' (1984; 1991) concept of the 'reflexive project' as integral to self-identity formation, longer term processes include:

- 5 - Project formulation
- 6 - negotiation
- 7 - synchronisation
- 8 - adaptation / re-configuration of projects
- 9 - re-shaping the personal world
- 10 - drawing on the social network's knowledge, capabilities and resources

People's 'risk aversion' attitude and 'variety-seeking' behaviour, are interrelated in a social context, as selecting new activities, or a new destination involves social or monetary risks. Thus, key variables of day-to-day schedules include:

- generalised costs of a schedule for given locations
- social role (including demographic variables)
- social network geography
- income levels
- mobility tools / resources
- risk aversion
- variety seeking

The term 'negotiation' is used in various ways in the literature, however here it is used to represent interactions that result in decisions around schedules, roles, resources and obligations within households. Negotiation in families can occur around childcare arrangements and employment responsibilities, according to Schwanen and de Jong (2008) (Schwanen and de Jong, 2008), and are shaped by caring obligations, roles, power relations, or identities (Elizabeth, 2000; Jensen *et al.*, 2015) and in response to incidents of "*minor destabilisation*" (Wind, 2013). Modalities of household negotiation as well as being face-to-face and dependent on predetermined schedules around activities that are fixed in space and time, has typically included use of mobile phones (Schwanen and Kwan, 2008) and nowadays potentially involves other communication devices too.

Amongst the limitations of their own conceptual model, Schönfelder and Axhausen (2010) considered that it did not allow for the intervention of new ideas, nor for the impact of social interactions taking place within the space-time of activities themselves.

2.5.3 Travel as activity and the mobilities turn

By contrast to Schönfelder and Axhausen (2010) who argue that travel is a disutility based on a model of generalised costs, Watts & Lyons (2010) found through the application of creative social research methods that travel offers people an important piece of thinking time, 20-30 mins being considered the ideal commuting period. A sense of ongoing movement was also an essential ingredient offering the possibility for creative use of travel time or transitioning

between activities, their proposed model would recognise that economic benefits could be derived from the enhancement of passengers' experience of travel time (Watts and Lyons, 2010). In their proposal to include passengers' experiences of travel time in models of travel time, Watts and Lyons (2008) proposed that by auditing travel "travel-time use" future policy could attend to "*providing appropriately designed moving places (trains/buses) and waiting places (stations/stops) that engender many different affordances for multiple activities and uses of time*" (Watts and Urry, 2008).

Lyons and Urry (2005) queried the standard transport appraisal and travel modelling approach adopted by DfT in the UK with respect to how waiting (for public transport) walking and cycling were valued. They highlighted previous VOT studies' recognition of the changes likely to be occurring in people's use of travel time through the advent of mobile phones and portable computers enabling productive use of travel time. Recent updating of UK national appraisal guidelines for the valuation of travel time (VTT) has investigated time use while travelling amongst other factors but found it to make little difference to VTT. These authors speculated that people may not be able to relate their real journeys to the hypothetical choice methods used in the survey (Batley *et al.*, 2017).

Perceptions of commuting by public transport have been suggested by Ettema (2012) as being related to the journey purpose, with different 'mindsets' affecting passengers' satisfaction with the journey to work, compared with that homeward (Ettema *et al.*, 2012). Perhaps surprisingly, their analysis found that journey satisfaction was not affected by whether people could work during the journey. This hypothesis contradicts both the operation of Watts and Lyons (2010) proposed model, as well as Mokhtarian and Salomon's (2001) hypothesis of a positive utility outcome being the likely result of using a journey more productively. The intrinsic desire to travel was one of three kinds of affinity for travel identified. The other affinities being activities at the destination, and those activities and "*anti-activity*" conducted while travelling. Ettema speculated that the opportunity to work while commuting may have led to greater satisfaction in other life domains, e.g. by saving time for other activities. The complementary physical engagement in cycling proposed by Kager *et al.* (2016) (see Section 2.1) being an example of a satisfying recreational activity integrated into a primarily utilitarian intermodal journey.

Through focus groups with car and PT users, Jain and Lyons (2008) explored how time was used when travelling revealed new concepts: 'time out' when fixed or social obligations could be escaped, and 'transition time' when readying oneself for activity at the journey's destination (Jain and Lyons, 2008). Affective experiences of mobility have been considered through understanding the satisfying aspects of dispersed practices associated with travel, such as navigation, listening to music, monitoring the journey's progress using GPS and in the operation of equipment related to travel (Cass and Faulconbridge, 2017). These authors found that changing between different modes over the life course was facilitated by "*the ability to reproduce satisfactions in another mode.*" They proposed that the performative practices they identified as forming part of people's trajectories deserve attention in policy initiatives for behaviour change.

People differentiate between types of public transport, Hine and Scott (2000) found bus services to be considered as unreliable compared with rail. Positive aspects of public transport were the opportunity for older citizens to meet people, and some enjoyed the experience of the journeys, or used it to read or relax after work. The experience of interchange between services, however, was to be avoided if possible, particularly on journeys to work (Hine and Scott, 2000). Recent analysis of self-reported pleasantness and

fatigue data in the French national travel survey revealed that while driving a car is often considered more mentally tiring than travel by other single modes, multimodal trips are perceived as mentally or physically tiring and unpleasant more often than trips by single modes (Mokhtarian *et al.*, 2015).

2.5.3.1 Temporal Rhythms

The combination of short- and longer-term processes identified by Schönfelder and Axhausen implies different rhythms driving activity participation. Daily physiological needs combining with other desires, e.g. for novelty, stimulation or company, or commitments and obligations, each with their own particular rhythms. Rhythm as used in this work describes the periodicity of behaviour over relatively short timescales up to monthly. Longer-term changes, such as changes to employment or home location occur at "periodic intervals".

Citing Doherty's (2005) analysis of the CHASE survey of activities and travel in Toronto, Schönfelder and Axhausen (2010) identified relatively low levels of apparently routine travel behaviour, that approximately 40% of activity decisions involving travel were taken on the day, and that longer time horizons were associated with activities of longer duration (pp.90-91). This implies that the 'planning horizon' for activities ranges from spontaneous decisions - taken on the same day for generally short duration activities and including many described as routine, through 1-3 day horizons, to other activities planned either weeks, months, even years previously. Doherty commented that the trip details in their survey were reported as attributes of the activity planning event, not as discrete activities. This suggests a limit to the inference that could be made about the trip planning horizons. Doherty (2005) suggested that trip plans may be resolved at some point after the activity has been decided upon.

Rhythms of activities have also been associated with being together or apart as a family according to, "*daily, weekly and seasonal temporalities*" (Jensen *et al.*, 2015). Rhythms of mobility are part of household synchronisation over long and short time-cycles from everyday schedules through to holidays and family events. They are also governed at the daily level, by children's activities at or after school. As well as the rhythms of activities, Jensen *et al.* (2015) identified rhythmic practices which include switching between travel modes, or the periodic phone call made to a close relative.

Other activity-travel research, particularly where based on diary studies, has also observed intrapersonal variability and found it to be related to availability of resources and socio-economic class (Pas and Koppelman, 1987), with similar factors affecting modal variation (Heinen and Chatterjee, 2015), although some researchers did not find socio-demographic factors able to explain variability in intrapersonal travel (Raux *et al.*, 2016). Intrapersonal variability has been found to be greater in proportion than inter-personal variability for joint activity when accounting for interactions with other household members (Kang and Scott, 2010) and that travel resource (i.e., car) availability was related to joint out-of-home activities suggesting these might be attributed to some benefits of travelling together, such as companionship or economising on fuel costs.

2.5.4 Intra- and inter-household effects on travel behaviour

2.5.4.1 Key household activities and travel

Examining travel in support of family activities, Rubin *et al.* (2014) explored the effect of the following factors when visiting relatives, (i.e. parents, and siblings), with travel mode as the dependent variable:

- Car availability
- Commute mode
- Presence and number of children in the household
- Distance to corresponding family households
- Age of respondents (Egos)
- Degree of urbanisation in the residential area

These authors found a non-linear relationship of the number of children with use of slow modes (walking and cycling) and for PT for travel to visit parents (grandparents of the young children) with negative association for one child under 6 years old, but no association with greater numbers of children and PT. Two different associations were found of distance between family members with PT use; a positive for distances over 50km ('between-effect'), but negative for distances longer than 11km resulting from short-term effects of distance changes due to relocation of either the respondents or the parents, in favour of car use.

Rubin found that the majority of those who did not commute by car changed to a different mode for visiting parents, mainly favouring the car. The car was also used more to visit siblings than parents. Increased levels of car ownership were associated with decreased levels of walking, cycling and use of other modes for family visits. However, where children were in the households, there was a positive associated with walking & cycling, possibly explained by factors specific to the local Netherlands context where having children is correlated with living closer to other family members.

Changes in family and household structure, including those related to events in the lifecycle of children were found to be implicated in walking and cycling trajectories of individuals interviewed by Jones (2013) in her study of transitions in walking and cycling behaviour across the life course. Her study explored the effect of experiences within personal histories, finding for example that behaviour changes commonly occurred in conjunction with multiple and connected household events related to residential and employment change, sometimes as children started going to school.

2.5.4.2 Childcare arrangements

The journey to work is not the only structuring element in the lives of households and families, where there are young children with working parents, the collection of children from childcare or school forms an additional space-time constraint on the activity-travel behaviour of working parents (Schwanen and Ettema, 2009). Formal childcare provision, such as nurseries, indicated preferred times for the collection of children, the 'clock time' by which parents were to have collected their child often being a few minutes before the official closure time of the facility. Females collecting children often viewed arriving after most other children had been collected as 'too late', suggesting a boundary phase before the formal last collection time. Schwanen also identified through qualitative work that parents, particularly those that cycled (in a study from the Netherlands) did not have strong mental models of the potential variability of their own travel times – often giving only one value for this, but were able to recall specific instances of delays caused by unusual or critical incidents. In examining the context in which travel decisions occur on journeys to collect children from childcare, Schwanen's study observed gendered differences in attitudes towards late arrival, but recognised that these ignored heterogeneity amongst fathers and mothers, and might be associated with other factors, such as the allocation of the main chauffeuring role within the household. For example, Weiss and Habib (2017) modelled day-care drop-off and pick-up trips finding that where these duties were allocated to one person, this was likely to be the

full-time worker where their partner was unemployed or worked part time (Weiss and Habib, 2017). The relationship of spatial structure to chauffeuring duties was found by Schwanen et al., (2007) to be unrelated to location factors, but that women had a greater obligation to chauffeuring as a gender-role constraint. Their analysis suggested a greater level of specialisation in the chauffeuring role with larger household sizes, observing gendered effects of car availability on chauffeuring with women with cars doing more solo chauffeuring compared with men's chauffeuring more often a joint activity with their partner. Where men held rail season tickets they participated less in chauffeuring, but did more shopping, something the authors ascribed to the availability of convenience shops at or near railway stations in the Netherlands (Schwanen *et al.*, 2007).

Studies of mobility and activity of children typically address themes related to journeys to school (Carver *et al.*, 2014; Chillon *et al.*, 2012; Chillon *et al.*, 2017; Cooper *et al.*, 2008; Emond and Handy, 2012; Henne *et al.*, 2014; Johansson *et al.*, 2012; Larsen *et al.*, 2015; Panter *et al.*, 2010). Other studies examine children's and adolescents' activity outside school, either at weekends or by comparison with weekdays (Copperman and Bhat, 2007; Lin and Yu, 2011; Mackett *et al.*, 2007; Mikkelsen and Christensen, 2009; Sener and Bhat, 2007), however children's activity travel during holidays and vacations is under-researched. Other social sciences, paediatrics, dietary and education studies have addressed children's physical health and educational attainment related to activity differences between school term-time and holidays or vacations. Some have identified reduced levels of physical activity and increases in children's and adolescents' weight during the summer months (Ergler *et al.*, 2013; Gillis *et al.*, 2005; Tovar *et al.*, 2010), others have explored correlations between child poverty and the gap between rich and poor children's educational attainments due to unequal access to enriching and social capital-forming organised activities during summer holidays (Chin and Phillips, 2004; Stewart *et al.*, 2018).

2.5.4.3 Family and household processes

Family processes are those that demographically shape the household, through formation and reproduction, or reduction through young adults leaving home, separation or mortality (Nelissen and Vossen, 1989). They classified households into five types:

- parental homes
- one-person households (including non-family households)
- marital family households (a family household headed by a married couple)
- non-marital family households (a family household headed by an unmarried couple)
- one-parent households.

According to Nelissen and Vossen (1989), re-cohabitation is the "*non-first pair formation*" of people separated from an unmarried family household, or from a divorce. Bengtson (2001) describes the majority of the 40% of north American children growing up in the 1980s and 90s that experienced their parent's marital breakdowns subsequently lived in a "blended family" following their parents' re-marriage (Bengtson, 2001).

2.5.4.4 Inter-household activities and interactions

Granovetter (1973) explored the relative strength and weakness of social ties and proposed that people's personal experiences are defined more by connection to wider networks through weaker and transitory social connections than by their close personal ties. Weak ties link different groups of people and are both a resource providing opportunities for career mobility (as well as resulting from that mobility) and instrumental to generating a "sense of

community". Within professions or specialist technical domains they are important for the integration of people into communities (Granovetter, 1973).

Researchers have previously explored the impact of external events and social networks (Axhausen, 2007; 2008) and significance of life-cycle events (Chatterjee, Sherwin and Jain, 2013; Lanzendorf, 2010; Scheiner and Holz-Rau, 2013b). Larsen (2017) identifies "*making alliances with other commuters*" as a method for building a healthy cycling culture. He also identifies "*passing on knowledge to new practitioners*" as a method by which cycling is "*co-produced*" by other cyclists. Women returning to cycling in their late teens or 20s often mentioned the social context of friendships or partners who were also cycling (Bonham and Wilson, 2011).

Ettema and Schwanen (2012) identified through a review of literature about leisure travel that going to cultural venues, entertainments and other social destinations are important kinds of leisure activities, mostly enjoyed in the company of others. Factors identified as affecting leisure activity and travel included sociodemographic, life-cycle stage and spatial settings. Travel for leisure activities includes a tendency to visit new locations, and that choice of locations is less regular and more idiosyncratic than in travel for other purposes including family visits. The relationship between leisure activities and friendship ties reflects a greater transitory nature compared with family and household activities and relations.

They proposed emphasis on motivations for behaviour to understand better how concepts like competence, autonomy and relatedness can be matched to analyses of the role of 'place'. The authors proposed examining the performativity aspect of conventional travel behaviour research methods and tools as a way of eliciting poorly understood dimensions of leisure activities, supported by methods with ethnographic capabilities that would contribute to understanding the following factors:

- Autonomy
- Behavioural patterns
- Practices
- Competence
 - Skills
 - Comportment
- Identity
- Sense of belonging
 - Insideness
 - Out-of-placeness
- Artefacts
- Motivations
- Social pressures
- Relatedness
- Routinisation
- Connecting and disconnecting relationships

Travel by and within households has been studied as distinguished from other social relationships (e.g. friendships and social networks) by the pre-existence of some household structures and slower-changing family relations (Ettema and Schwanen, 2012).

For children, activities with a parent enable bonding through sharing experiences, (Wind, 2013). longer trips, for example visits to relatives by car, provide opportunities for familial bonding (Jensen *et al.*, 2015), and Durko and Petrick (2013) reviewed research on the benefits of travel to families and relationships and found that family holidays were important

for bonding by creating lasting shared memories (Durko and Petrick, 2013). For estranged fathers in particular, leisure activities during contact times were important, sometimes a crucial means of engaging with their children through sharing this aspect of life, learning about each other, developing skills and bonding (Jenkins, 2009).

2.6 Conclusions: existing knowledge, gaps and opportunities

The transport network is a set of systems operated and governed by institutions, while the people who travel are often considered to be agents exercising individual choice between mode options and routes for journeys along highways, byways and as passengers during trip stages on public transport. This traditional individuated approach to transport planning and design often overlooks a layer of negotiations and decisions influenced by the other people who shape or generate the demand for travel, i.e. the family members and wider sets of contacts with whom the individual traveller interacts at home, workplaces or social spaces. As a consequence this study will focus on the household as the unit of analysis in a structural study of activities and agency interacting with systems and institutions with the objective of identifying how the integration of cycling with public transport works from a household perspective.

Figure 9 below, represents a model of the multi-modal integration of cycling with PT. Integration does not depend on carriage of the bicycle on board the vehicle, per se, but this facility closes a loophole in enabling a full range of activities to be achieved. Factors related to individual agency and household interactions are interleaved with institutional influences and facilitation. Integration involves interactions across and along the identified domains, which can be conceived as layers, with outer layers informing and shaping travel behaviour and decisions through interaction with the agency of people who integrate Cycling-PT, situated at the centre of the diagram.



Figure 9: Model representation of the integration of cycling with public transport systems

Created by the author.

The term 'integration' can be applied at all conceptual levels from the personal experience of travel to the domain of policy that shapes the systems that deliver travel opportunities. Integration describes the relationships of people within social capital networks, for example resulting in "*inter-dependence of choices*" (Di Ciommo *et al.*, 2014) amongst several individuals. Their spatial proximity and geographic scale is identified as a significant factor in the integration of people into social networks (Axhausen, 2008). This study will contribute to the knowledge gaps, identified largely through observation of a lack of focus in existing research on a number of issues, as summarised below.

Previous work on household travel has tended to focus on nuclear families, although some studies on travel behaviour (Bjerkan and Nordtømme, 2014; McCreedy *et al.*, 1991; McQuoid and Dijst, 2012) have also involved single-headed households. Researchers on the family and married life from the 1980s onwards have included or focused on experiences of separation, single-parent families and those that have experienced re-cohabitation (blended families). Acknowledging the changing demography and increasingly diverse patterns in the life-cycle of the family, this study aims to include experiences of a diversity of family and household types.

Studies exploring the involvement and influence of children in household activities and decision-making were found to be under-represented in the literature. Few studies have explored the impact of children's discretionary activities on parental travel, this study intends to address the lack of research on multimodal travel for leisure and recreation by examining how intergenerational activities within and across households and families may influence motility and intermodal travel behaviour in particular. The incorporation of biographic methods should reveal processes that shape travel through predicting or responding to changes and transitions within households across different time-scales, particularly those related to the presence, growth, or departure of children. The exploration of experiences related to the process of change and adaptation, inherent in the context of a household with young people and children, should be a novel contribution to this study of cycling's integrating role for activities within households and its interactions with other transport modes.

Although multimodal travel behaviours have been researched from a household biography perspective, as has the role of cycling in the family life-cycle stage as children develop skills and capabilities for independent travel, it would be too simplistic to attempt to understand the more complex integrated behaviour of Cycling-PT based on studies that address these topics as separate themes. There is considerable scope for developing knowledge about how the intermodal integration of cycling with PT responds to changes in household factors in over time. Through its conceptualisation of time at three scales including the reversible time of everyday routine activities, irreversible time and the *longue durée* of institutions, Giddens' interpretation of structuration theory influences this study of integration of Cycling-PT.

Travel behaviour responds to factors beyond individual preferences, factors that reflect developments in biographic domains and interaction with others during the life-course. Activities and associated travel behaviours change as people experience significant events, or 'triggers' that can precipitate changes, either through altered capabilities, geographies, obligations or schedules, or simply as a result of personal reflexivity. At an intra-personal level, travel patterns vary over much shorter timescales of a month, or a week. The context behind any observed variability has been under-researched in previous studies of cycling's integration with PT.

Policy impacts of this study will be derived from identification of the benefits perceived by those UK households and individuals who choose to combine Cycling-PT, as well as for those whose travel options may be limited by financial resources or other constraints on car ownership and use. Understanding how, when and why people choose to combine Cycling-PT may reveal opportunities for improvement in PT provision and the wider development of intermodal facilities and the promotion of multimodality as part of a sophisticated repertoire of travel options for those able to choose. The value and meaning to users of intermodal cycling to or from public transport trips has not been the focus of previous studies. Scope exists, therefore, for the exploration of how the combination of cycling with public transport may have a positive utility for the users, either through integrating activities, alignment with values and beliefs, or for other perceived benefits.

Giddens' concept of 'practical consciousness', suggests methodologies for data collection and analysis that bring useful understandings and meanings to the surface that are generally unspoken alongside people's descriptions of their beliefs and experiences. The multimodal combination of cycling with public transport involves interaction between the physicality of people, and the affordances of spaces and places and the design of the vehicles they travel in and on. It is proposed that this structural nature of the integration of Cycling-PT will also be identified through observation of repeated or interrelated patterns across the wider range of people's descriptions of their activities.

The research questions that resulted from the review of literature (listed above in Section 1.1) have informed the methods chosen to investigate travel behaviour and experiences related to cycling and public transport use. The author's background in design of transportation vehicles, their physical form and the interfaces they create with their users and operators also influences some of the research methods selected. These are detailed in the next chapter and address biographic changes in activities and travel behaviour over time, the combination of cycling with public transport, and the relationship of Cycling-PT in the context of wider household activity-travel.

3 Research Methodology

This chapter begins by outlining the research design, the aspects that justify the qualitative approach and those that influence the research design. The second section identifies the methodology, it explains the choice of methods including the pilot study, refining the questions and targeting households as the study sample and the study locations. The third section details the data collection procedures with the instruments and materials used. This is followed by details of the outturn sample. The qualitative analysis procedures and coding process are described in detail in the fifth section. The outturn sample is outlined and discussed in the sixth section. Some reflections on the effectiveness of the methods conclude this chapter.

The flow chart below (see Figure 10) offers a schematic summary of the methodology. This is followed by a description of the research design, followed by sections detailing the other steps outlined above.

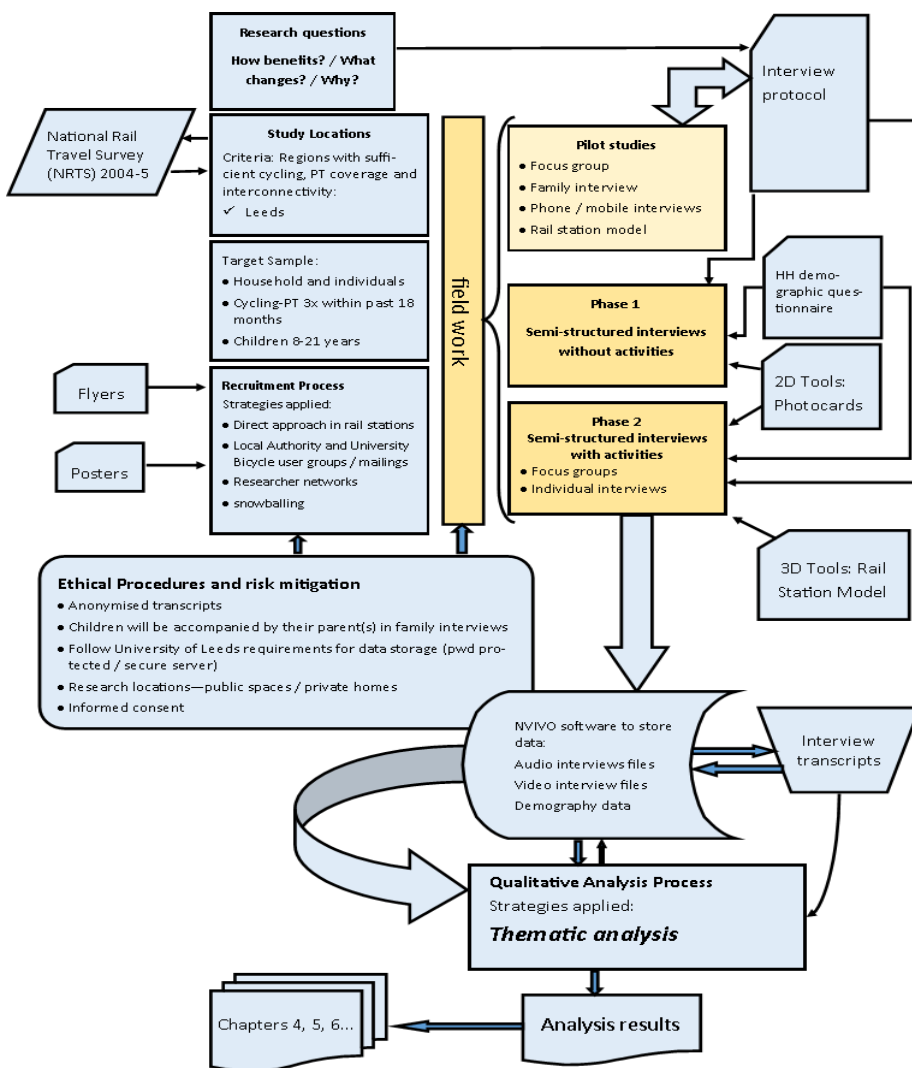


Figure 10. A flow chart representing a schematic summary of the research methodology.

3.1 Research design

To answer the questions of this research study, see Section 1.1., this study has principally used qualitative semi-structured interviews incorporating biographic questions.

Qualitative analysis methods are justified for this study because they give value to rich verbal descriptive detail and allow analysis of themes that occur in the natural language of conversations between multiple participants. In particular, concentration on qualitative methods facilitates understanding the practices and beliefs, values and constraints on the practice studied, implying “*an emphasis on processes and meanings...*” (Denzin and Lincoln, 1998), that may be discovered to be involved when people combine Cycling-PT.

Within transport studies, qualitative research methods have been argued to offer advantages when applied to studies of experience and the complex processes in practices of mobility and travel, as an alternative approach to the econometric valuing of travel time (Guell *et al.*, 2012; Jain and Lyons, 2008). By focusing the discussions on the experiences of ordinary people who had combined Cycling-PT, those life course events relevant to the research questions would be brought to the fore by the participants themselves.

An interview form that elicited narratives of people’s lived experiences was developed. This was applied in individual and small group interviews, and a small number of household interviews (discussions) involving families and their children. The involvement of children with their families resulted use of more stimulating visual methods and techniques. The subject of transitions in both spatial and temporal terms would be addressed using a modelled 3D representation of a transport interchange (detailed in Section 3.4 below), as well as memory-jogger images in support of some biographic questions. Group discussions were helpful in this respect, allowing participants to compare their experiences and turning the topic at times to unanticipated themes.

3.1.1 Biographic methods

Researchers in transport studies have undertaken biographical analysis of individuals, sometimes applying it to specific events in the life course such as parenthood (Lanzendorf, 2010; Scheiner, 2014a), levels of car ownership (Clark *et al.*, 2016; Prillwitz *et al.*, 2006; Sattlegger and Rau, 2016; Zhang *et al.*, 2014), or residential relocation (Prillwitz *et al.*, 2007; Scheiner, 2014b; Scheiner and Holz-Rau, 2013a). Two approaches emerged in research, the ‘Life course’ approach and qualitative biographic approaches, these are described below.

Life course studies typically involve the systematic cataloguing of location in time and place, links to other people through groups and institutions, personal goals, values and identity, and timing,- i.e. the chronological order of events applying to individuals, groups and that set them in historical context (Giele and Elder, 1998). Life course calendars have been found suitable for investigating changes in spatial context and accessibility (Schoenduwe *et al.*, 2015), for example.

Qualitative biographic interviews have been applied to develop understanding of mobility behaviour, focusing on everyday sustainable travel practices such as cycling and walking (Bonham and Wilson, 2011; Chatterjee *et al.*, 2013; Sattlegger and Rau, 2016) and are often based on semi-structured or narrative interviews (Chatterjee, 2015), although mobile methods have also been proposed to explore human biographies (Kusenbach, 2003) and the cultural biographies of objects (Buescher and Urry, 2009). Retrospective biographical interviews have also been complemented by life history calendars to explore behavioural

changes in walking and cycling behaviour across the life course (Jones *et al.*, 2014; Jones, 2013).

By comparison with individual biographical narratives that were assumed to be likely to have favoured cycling, recording participants' reported contemporary activities and behaviours in interviews with family groups were relevant for enabling contradictory experiences and perceptions within households to be heard, including from those for whom neither cycling nor its combination with public transport was a regular activity.

When interacting with members of the public, designers have often used physical props and visual representations of their concepts to elicit comments, feelings and experiences about proposed designs (Chamorro-Koc *et al.*, 2008). Sanders *et al.* (2010) categorises the use of 3D mock-ups as relevant to explore understanding current experience, or for generating ideas for future contexts in face-to-face research interactions. In this study, the researcher-created 3D toolkit used by the participant to reconstruct an interaction space from memory reflects, "...*designerly ways of doing research...*" (Sanders and Stappers, 2014, p.6). The selection of a rail station as the focus of the cultural probe in this study reflects its critical importance to the user of multimodal transport: "*Transfer is the core problem; through it multi-modal travel amplifies service inadequacies for passengers, and exacerbates incompatibilities between vehicles and environments.*" (Napper *et al.*, 2007).

Photographs have been used to elicit memories in participatory research into children's experiences (Dennis Jr *et al.*, 2009; Driessnack and Furukawa, 2011) as well as gendered experiences of cycling (Dalton, 2016). Research activities involving small-scale models and physical modelling have been used to stimulate recall of experiences and interactions by children in clinical psychology (Salmon, 2001), applied to transport research in focus groups (Rahman, 2013), and used as 'ice-breakers' when beginning discussions with new groups of participants (Krueger and Casey, 2015). These methods involving 2D visual stimuli and interactions with 3D models were considered likely to be productive when discussing lived experiences with children and their parents in household discussions.

3.1.2 Ethical and other considerations that influence the research design

The project conformed to University of Leeds requirements for research involving human participants. Two forms of formal ethical review were undertaken. 'Light touch ethical review' was initially sought to establish the geographic and demographic scope for recruitment.

Light touch ethical consent was confirmed on 22 October 2015 (LTTRAN-062). Subsequently a full formal ethical review was undertaken prior to the data gathering using interviews with members of the public and approval granted in July 2016, (Ethics Reference 'AREA 15-088 amendment July 2016') (See Appendix 12.b).

The primary ethical issues were identified that as those associated with interviewing children aged between 9 and 15 even with adults present; interviewing multiple members of the same family and the potential to stimulate sensitive or acrimonious topics; confidentiality; and anonymity.

In this study children were interviewed only as part of a group interview with other adult family members present. In addition anonymity was ensured by (a) pseudonymisation and (b) by not revealing exact locations of routes, homes or workplaces. Steps were also taken to ensure the confidentiality of the data by following procedures for secure storage of material.

Consent was obtained from participants after they had been fully informed of what was required of them in the interviews, as well as about the analytical procedure and the reporting of findings and by providing the option to withdraw data at any time up to 6 weeks after the data collection procedure (see Appendix 4). In addition participants were offered a small remuneration for taking part, this was small enough and given prior to the research to be a reward rather than an inducement to take part.

As part of the preparation for ethical review the researcher had also enquired whether he would require CRB/DBS checking and clearance, but received the advice from the University's DBS HR Policy & Projects officer that DBS clearance would not be required as all interviews with young people and children would take place in the presence of their parents. Had interviewing children in certain places, including schools, nurseries or children's hospitals and other formal children's institutions been proposed, or if traveling alone with them, then a DBS check would have been required.

3.2 Identification of methodology

This section outlines the alternatives chosen in terms of the qualitative data collection, followed by the sampling strategy, and explanation of the criteria for selection and confirmation of the study locations.

3.2.1 Brief consideration of alternatives chosen

Pilot studies were conducted to help to validate the questions developed for use in the interview protocol, evaluate alternative interview methods, identify issues with the use of props and visual cues, and to evaluate the engagement of children and optimise the interview protocol for their participation.

Following a pilot focus group that confirmed the relevance of questions in the protocol, it was decided to concentrate on smaller group interviews that would include parents and other adults. Difficulties recruiting large groups of participants to planned events and the limited time available for all participants to contribute were factors in this decision.

Go-along interviews were considered, and one was piloted successfully, but revealed potential logistical challenges in the accompaniment of a participant throughout an intermodal journey that required the availability of bicycles at both ends of a trip. While conducting an interview on a train proved feasible during an hour-long off-peak journey, this would have been more difficult had the train been more crowded, or the journey shorter.

GPS tracking was also considered as a follow-up activity to interviews, as can be seen in the participant information letters (see Appendix 3), however, time and budget constraints, and concern over participation burden prevented use of this potential supplementary data collection.

Small group interviews without activities were conducted immediately following the pilot focus group and the pilot household interview. These collected data used for the analysis but did not specifically probe into the potential benefit of Cycling-PT to others in the household.

Small group interviews with activities followed those above, and included 8 household interviews with children, and two older couples without children amongst others, all of which involved some model-making activities.

Interviews took place in Public libraries and similar community sites, pre-booked university meeting rooms, cafes and hotel bars, and private homes. The place of the interview was selected by the small group participants and was set up to ensure that the participants felt at ease.

3.2.2 Target sample

The sample target was focused on households which included at least one child; households could be headed by dual parents or a single parent (with separated parent contactable for the study).

The cycling integration biographies, activity patterns of individual separated parents and interactions with their children, other family members and wider social contacts were also of interest to this study. For this reason, participants without children were invited to take part in discussions with groups of other adults.

Criteria for inclusion:

- People with direct and recent experience of combining cycling with public transport
- HHs with a resident or dependent child/children in school years 5-12, or older children who are continuing to live within their childhood household;
- One or more HHs members (adult or child) currently integrate cycling with PT on a regular or occasional basis (at least three times a year), or who had done so until very recently.

3.2.3 Pilot study activities

The purpose of the pilot focus group was to test the interview protocol, ensure the relevance of questions, refine the sequence in which questions were ordered and confirm the feasibility of covering all of the questions during the estimated hour of the interview.

Prior to this, a pilot family activity discussion was held. The purpose of this first interview with a family group was to evaluate the way adults and children would interact together and respond to stimuli, including marking the household's activities on maps and to observe the children's engagement, in particular with 3D modelling activities.

In phase 1 (small group interviews without activities) interviews took place with 12 adult groups and 6 individuals.

In phase 2 (small group and household interviews with model construction activities) 10 household interviews, including 8 with families with children were conducted, 13 small group interviews and a further 6 individual interviews.

A summary of the outcomes of the phases is given below in this chapter, in Section 3.7 "Outturn Sample".

3.2.4 Study locations

Regions in the UK of relevance to this study of multimodal household combination of Cycling-PT were those adjacent to regional cities characterised by moderate levels of cycling, with sufficient PT coverage to provide widespread accessibility and connections into the region beyond the immediate city. Interconnectivity with suburban areas, surrounding towns and

cities by rail was considered to enhance the prospect of region-wide recruitment of people who combined cycling with rail.

It was decided to limit the study to two cities, one of which would have a PT network enhanced by either a tram system, or a regional metro-rail service. This section describes briefly the method used for identifying and confirming city-regions and localities suitable for the likely recruitment of households for in-depth interviews. The intention was to ensure there was sufficient evidence of PT integration by cyclists, particularly those in households with children, to enable effective recruitment of participants.

Data from the National Rail Travel Survey (NRTS) of 2004-5 (DfT Rail Statistics Team, 2010) was used to explore levels of cycling across a number of regions centred on 13 regional cities. NRTS data included the range of recorded journey purposes and other variables, such as the time of day, demographic profile of the integrator, size of the group distance travelled, and comparison of access to egress mode. The NRTS focused on weekday journeys, and surveys and passenger counts had been taken at 1500 stations, surveys on board trains covering trips to/from the remaining 1000 lesser used stations (See Appendix 11).

NRTS data was used to review and compare 13 city-regions, some with very high levels of cycling integration with rail such as Cambridge, Bristol and York, with high percentages also around Norwich, Coventry and Hereford, but smaller numbers overall. Although not very large in percentage terms, the large numbers of passengers passing through stations in Leeds and the surrounding area offered the prospect of recruiting sufficient participants in Leeds. The network of stations (14 in total) also offered good scope for encountering experiences of intra-regional journeys originating or terminating at some of the minor stations in residential areas.

The selection of Leeds also offered geographic convenience for the researcher who was resident in the city, and through established social networks and access to University bicycle user groups and local authority contacts. The inclusion of minor stations was important because the analysis of journeys centred on major stations (York and Leeds for example) revealed that the main city stations in both cases attract the largest number of cycle-rail integrated journeys as the start or end point of the rail trip. However, other journeys traverse the network between minor stations, some with an interchange point at the major city centre station.

Of those cities with a tram system, data for the Nottingham region indicated a reasonably high concentration of cycle-rail integration (levels of 2.4% of all ticketed journeys) through Nottingham's main railway station and the regional rail network comprising 9 other local stations. I was particularly interested in hearing experiences of combining Cycling-PT in Nottingham owing to that city's tram network and recent extensions to it, partly funded by the workplace parking levy, a unique policy initiative in the UK. Integration of cycle-parking provision in the form of electronically locked cages at the major tram terminals, the bus station, rail station and a number of other sites in the city, including sports centres and shopping centres, was also of relevance to this study and provided additional scope for recruitment and its publicity materials.

In sum, the study locations proposed were Nottingham and Leeds. These study locations were supported by a secondary analysis of quantitative data confirming appropriate patterns of Cycling-PT activity in the two proposed city-regions by comparison with nine others of comparable scale.

3.3 Forms and protocols

3.3.1 Interview protocol

A focus group guide / interview protocol was used during all of the group discussions and individual interviews undertaken with participants. This was designed following recommendations by Krueger and Casey (2015) on limiting the number of questions and the time given to each during discussion, and concluding with a summary question. See Appendix 1 for examples of the interview protocol.

3.3.2 Publicity materials

Publicity materials such as Flyers and posters were used to create awareness of the project and publicise incentives to attract potential participants through the different recruitment strategies. Then e-mails or text messages were sent to follow up the recruitment process until agreement to take part was obtained and until the interviews had taken place with household participants and individuals that contributed their time to this study. See Appendix 2 for examples of publicity materials and intercept recruitment forms.

3.3.3 Household demographic questionnaire

A household demographic questionnaire was issued to participants during interviews and group discussions, including interviews with family groups. Their use is described in Section 3.7.1 below. The questionnaire is shown in Appendix 5.

3.4 Detailed data collection procedures

3.4.1 Recruitment process

This section describes the different strategies used for recruiting Individuals and household participants. Among these strategies were: recruitment in train stations, using lists from local authorities and bicycle users groups, researcher networks and snowballing. These recruitment strategies are detailed as follows.

3.4.1.1 Direct intercepts at rail stations and cycle hubs

I had recruited most of the individual cycle-rail integrating participants at stations by approaching people with bicycles as they passed through the station concourses, on platforms and in the areas at stations where bicycles were normally parked. After introducing myself and my project, I checked with them that they had time to answer a few brief questions and invited them to consider taking part in a group discussion meeting at a convenient time within the fortnight following our initial encounter at the station. Using a simple recruitment prompt form, I asked people to describe the origin and destination of their journey that day, to indicate how many children (if any) were in their household, and to highlight their potential availability on a simple grid schedule. For those uncertain whether to participate, I gave them a flyer outlining my project with my contact details, and asked them to get in touch with me once they'd decided. When people seemed immediately positive about the project and participating, I recorded their contact details on the intercept form to follow up with an emailed invitation to take part, attaching the Participant Information Letter (PIL). See Appendix 3.

To those who indicated their family had children, the value to the research of interviewing them together with their whole family was emphasised. The PIL subsequently emailed to

participants was an invitation to a household discussion and additionally included a letter addressed to children with simpler wording. Early encounters had suggested that most of the people likely to be recruited at stations did not have children, so I also invited those people without children to take part in group discussions with other adults.

I had previously obtained by email, letters of authorisation to recruit from station managers for Leeds Rail station (from Network Rail), and area station managers for Northern Rail's smaller stations around Leeds, and for East Midlands Trains stations in Nottingham and the surrounding area. In this process, permission was sought from managers of individual railway stations and clusters of stations managed by a regional Train Operating Company (TOC). I complied with the health and safety protocol at the two main stations in Leeds and Nottingham where I had to 'sign in' when working at the station; there were few formalities other than notifying managers of my intended schedule of activities at the minor stations I also visited.

3.4.1.2 Household recruitment via authorities and third sector gatekeepers

I also approached a variety of organisations, largely those that promoted cycling or active travel, to alert individuals and families of the opportunity to contribute to the project. Potential gatekeepers included: cycling advocacy groups (Leeds Cycling Campaign, Pedals Nottingham), national cycling charity Cycling UK (formerly CTC – Cyclists Touring Club), Sustrans, local authority departments involved in designing cycling infrastructure or promoting active travel such as TravelSmart, cycle-rail community liaison group 'Northern Rail Cycle Forum' (now Cycle-Rail Forum for the North), and social enterprises such as 'Framework' a national housing charity, and Nottingham Bikeworks that offer cycling-related training and other activities for socially disadvantaged groups. Electronic messages inviting participation circulated by several of these organisations were not successful in recruiting additional participants, although in-person approaches were successful in a couple of instances and some University of Leeds employees did participate as a result messages sent out by the University's bicycle user group (BUG).

I also approached bicycle user groups via their representatives at the other main universities in Leeds and Nottingham, Queens Medical Centre Nottingham, and Experian in Leeds. A number of bicycle shops in Leeds and Nottingham displayed my recruitment posters and flyers as did one suburban rail station in Leeds (Cross Gates). Leaflets left at Beeston Rail station (Nottinghamshire) resulted in a couple of additional participants for discussions there and in Nottingham. I also recruited some participants when I took part in Critical Mass cycling events, in Nottingham and Leeds between September and November 2016.

During the late autumn of 2016 and through January 2017 I renewed efforts to recruit participants, and to follow-up on those unable to take part when recruited during the previous summer owing to pre-arranged holiday arrangements.

3.4.1.3 Snowballing

Participants were invited to forward details of this research to others in their networks, and although several indicated they would mention this study to others in their network, this only resulted in one additional participant within the group discussions. Participants gave the impression that although many participants had friends who were 'cyclists', those households that combined Cycling-PT were few by comparison.

3.4.1.4 Researcher networks

Family groups proved particularly difficult to recruit. Although several who took part in small group discussions did have families with children, few were able to commit their family's time to be interviewed. Three of the four households with children in Leeds were recruited via personal contacts with other cycling households, in one case I had also taken the husband's details at Leeds Rail station on his way home from work just before the family were to depart for their summer holiday. When I had displayed a poster outlining my project's objectives during the annual PGR conference during the first year of my PhD, I had talked to a University employee who later agreed to be interviewed together with her child at Shipley public library, as my fourth participating family group in the Leeds area. All other families were interviewed at their homes; the other Leeds families lived in the North of the city, one in the suburb of Headingley, two in Roundhay ward.

Of the 'Nottingham families' I interviewed, one I had recruited in summer 2016 at Nottingham Rail station when the father was in the final stages of completing his PhD and unavailable to be interviewed then. After renewing contact, I interviewed his family in West Bridgford in the following January. Three others I recruited during January 2017; one at Nottingham Rail station, one at Bulwell tram terminus/rail station, and one when I was returning to Leeds by train. The Nottingham families were more widely dispersed geographically. Although two lived in Nottinghamshire boroughs adjacent to the city of Nottingham, one family lived in Cambridge, another lived in Leicester, although in both cases a parent commuted regularly to work in Nottingham.

3.4.2 Description of fieldwork

3.4.2.1 Pilot study

The aim of this section is to summarise the pilot activities that preceded data collection and provide an account of what was learnt from these. These included a household family activity discussion, a focus group discussion, individual go-along and telephone interviews and a small group discussion to pilot the 3D modelling activity.

The study began collecting data from June – August 2016. This included pilot data gathering exercises, as well as the first series of research discussions that generated transcripts included for analysis, described as Phase 1 below.

While discussions and interviews were still being conducted, it was considered appropriate at times to introduce unscripted probes, or new forms of existing probes in response to themes emerging and relevant to the RQs.

The interview guide was piloted in a focus group with seven participants, it was used following minor alterations to the warm-up question for small group and individual interviews in phase 1. Participants were asked about local activities that they typically cycled to, as well as to describe recent or regular uses of cycling in combination with public transport. Parents responded to questions about activities and travel with their children and all participants also responded to questions about their own childhood memories of how they travelled, activities supported by cycling in childhood and adolescence, and how and why they may have changed their travel behaviour subsequently.

3.4.2.2 Phase 1: Small group interviews without activities

Following the pilot focus group and pilot family activity discussion, minor changes were made to the sequence of questions, repositioning the second question ahead of the combining Cycling-PT 'show-cards' with photos depicting 4 typical scenarios for the modal combination of cycling with rail journeys.

The interview protocol (version 18) was largely found to work well during phase 1, however one question was subsequently changed to ensure alignment with the research questions. Reflecting on the limited understanding derived from the first phase of discussions of how interactions within households shaped, or were shaped by, the decision to combine Cycling-PT, a question was added following discussions with supervisors to reflect more closely the project's focus on intra-household interactions, in particular how time may be saved enabling household members to carry out other activities.

3.4.2.3 Phase 2: Small group interviews with 3D modelling activities

Question sequencing

The interview guide (version 27, see Appendix 1.b) was as that used in the small group interviews in phase 1, but the major change was in the introduction of a mapping activity and a plasticine and Lego modelling activity. A new supplementary question was also added. Following the first phase of discussions the guide was found to lack a question related to the impact of the combining Cycling-PT behaviour of the participant on other people in their household. It was decided to insert the following question:

- (2a)** How might cycling with PT be enabling you and other people in your household to be doing things at the same time?

The discussion guide for the family activity discussions also involved the new activities and supplementary question. Considering the limit to the patience of children with the full sequence of questions not all related to their own experiences, the question sequencing was altered so that questions related to the children's activities and travel could be answered as the station model was being constructed, or just afterwards. Consequently the following questions were asked immediately after question **2a** and before question **3**:

- (11)** How are the children learning to know how to travel on their own without being accompanied by a parent or another adult known to you?
- (12)** When and where did **the children or young adults** first travel with a bicycle to, from, or on public transport? (*assuming they've already done so*)
- (13)** How did the children prepare for this journey?

This question sequence was helpful for some of the families where one or both children had already contributed to the discussion for much of the discussion, but were eager, or content to leave the discussion, that usually took place around the family dining table. The following guide was used for the adult discussions and contained the questions in their normal sequence.

3.4.2.4 Railway station model – a cultural probe activity

Considering the variety of ways in which people have been shown to make combined journeys (Martens, 2007), with each alternative enabling particular activities and relevant for distinct types of users (Krizek and Stonebraker, 2011), I proposed that a model of a railway station environment would work well as a cultural probe. The station would be a ‘common experience’ for all who had combined cycling with public transport. If a PT vehicle design had been proposed, participants who had only parked their bicycle at a station or used a bike share scheme, may not have shared their experiences of cycling to or from railway stations or other forms of public transport. As identified in Section 2.1.2. and 3.1.1. above, the quality of the multimodal travel experience for any passenger is related to places of transfer (Givoni and Rietveld, 2007; Hine and Scott, 2000; Napper *et al.*, 2007), the railway station providing a typical interface between cycling and PT for journeys that integrate these modes.

With a focus on eliciting from users memories of physical interactions within the multi-modal travel process, the station has been presented in the form of a 3D toolkit made from simple plastic foam, card, wood and metal wire elements representing stairs, platforms, train carriages, footbridges, lifts (elevators), kiosks and toilets, shops and stalls, entrance barriers and bicycle parking stands (‘Sheffield’ stands). Additional plastic brick components allowed further objects to be constructed and small plastic ‘brick people’ figurines allowed participants to depict themselves when re-enacting some of their journey experiences to support their narratives. The simplicity of the basic toolkit elements meant that they could have been used to represent a bus station, or tram terminal, however all groups of participants and individuals interviewed using this method selected railway stations that they (the group) were familiar with.

The station modelling exercise was generally introduced after the initial question about a recent journey had been answered and a Plasticine modelling ‘warm up’ activity completed. In the first household family activity discussion I invited the child already at the table to begin assembling the model while the interviewer waited for other family members to return to the table and begin the discussion proper. This and subsequent household interviews revealed the value of a physical model in maintaining the active involvement of children in the discussion, and even some of the youngest children were able through this to demonstrate their experience of transport and travel. For instance, Angela’s five year old son Tom, assisting her in constructing a model of Mansfield Rail station identified the need for seating at waiting places, and in common with several of the other young children involved in discussions, the need for food on journeys: “*We need the food, we need to make a bench.*” He and his mother then agreed where the benches were positioned at that station. Benjamin, the 8 year old son of Margaret and Dave recalled cycling round a roundabout when they had once cycled together as a family to the station early one Sunday morning, while his younger brother Clyde (5) responded to the station model by wanting to construct roads and was kept quietly amused by constructing objects with Lego that I had brought combined with his own components.

3.4.2.5 Video recording of discussions using models

The phase 2 of group discussions was recorded using video in addition to a separate audio recording, intending to use this to observe participants’ interaction with objects, particularly the model construction process to identify the key elements people remember from their interactions with the public transport environment and other people within it. It would also enable the interactions of parents and their children to be observed including their

simultaneous visual and tactile communication processes, not captured by an audio recording of a discussion. The video recording was used when transcribing the verbal discussion, either to identify which participant was speaking, or to see which cue card they were referring to when responding to question 3 about different ways in which they had experienced combining. The video is also helpful in identifying the source of the many Plasticine models created during Phase 2 of the discussions.

In only one case did the participants (a family) not wish to be recorded on video, in this unique case I used the camera to record the sound of our discussion only, as a backup for the voice-recorder used as in almost all other discussions.

3.4.2.6 Combining cards: biographic public transport cycling behaviour recall visual stimulus

From the start of the series of research discussions and including the pilot focus group, I had used a set of 4 'combining cards', cue cards that carried a photograph depicting different ways that bicycles were used in combination with public transport, see Figure 11. This related to question 3 of the discussion guide:

Can you identify the different ways you have combined a trip by/ with a bicycle with a trip by public transport?



Figure 11: Cue cards used in the research discussion.

Source: photographs taken by the author. Cards provided to participants with images as above and the following text, from left: 1. Parked bike at station; 2. Taking full-size bike on board; 3. Taking folding bike; 4. Use public bike share scheme.

This activity sometimes stimulated recall of ways of combining that participants had experienced infrequently, like using bike share schemes in London and other cities abroad, or biographical accounts, such as of using a folding-bicycle, during a commute to a previous job. I also invited participants to indicate if they had experienced any other ways of combining, initially providing blank cards for them to sketch a solution, although alternatives were described verbally in practice. Additional combinations included the use of taxis, ferries, parking near but not inside a station, private bicycle rental, and taking bicycles by bus (Jeremy's biographic use of the Dales Bus) and Nottingham University's Hopper Bus service. I used the combining cards activity to confirm the additional modal combinations the participants had often mentioned earlier in the discussion.

3.4.2.7 Mapping activities

At the start of phase 2 interviews with groups, individuals and households, participants drew routes that they used when cycling to and from activities in their neighbourhoods onto maps provided by the researcher. This stimulated discussion of the location of everyday activities,

comparison of destinations reached by cycling and those accessed by car or other modes. Stations and other places of interchange with PT were identified. Discussion of cycling routes revealed challenges related to traffic or infrastructure when cycling individually and in social or family groups. Mapping also revealed route preferences and opportunities for enjoyment of quieter routes. Examples of this activity mapping exercise are shown in Appendix 11.

3.4.2.8 Children's insights

There was heterogeneity of children's ages across households interviewed – children ranged in age from 5 to 18 when taking part in household discussions with their families. In general they contributed to the discussions through demonstrating that they recognised the practice, identifying the tools and aspects of the spaces they had experienced in their journeys, the younger children engaged well with the station model and plasticine 'warm-up' research activities and in some cases interacted playfully with the materials. Their parents also sometimes commenting on how their children had enjoyed the experience.

Children from 5 years old already demonstrated through their comments, a level of familiarity with travel by PT that reflected accounts by their parents about recent trips by PT and the family's habitual travel modes. One of these young children commented with confidence on the practice of combining Cycling-PT, affirming that the carriage of bicycles was not permitted on buses. This would have reflected a general assumption based on his personal observations as an occasional bus user. (In fact, one of the local bus companies in his area, Trent-Barton, did technically permit the carriage of bicycles, but according to other participants accounts, this was an infrequently exploited concession, sometimes contested by bus drivers).

The overall number of households with children was limited, restricting the scope for a wider variety of children's experiences. Although children were present in two of the small group discussions from Phase 1, in only one of these did the 14 year-old son of a participant contribute to the discussion with his father and another adult member of his cycling club. Neither of these discussions have been counted amongst the 'family interviews' listed in Table 6 below (see Section 3.6).

Heterogeneity in children's narratives also reflects the widely dispersed geographic locations of the homes of Cycling-PT integrators. Two of the families lived some distance from Nottingham to which one parent commuted regularly in each case, one from Cambridgeshire, another from urban Leicester. The Cambridgeshire family were residents of a village a few miles beyond the beyond reach of frequent public bus services, limiting the children's opportunities for experiencing PT. The other families were situated in residential suburbs, including one family living in a small commuter town some nine miles from the centre of Leeds to which the parents both commuted for work.

3.5 Data analysis

To recorded the amount of data generated in the qualitative interviews, NVivo was used. Videos and audios and transcripts per participants were carefully unloaded then the process of analysis started.

This section starts by outlining the thematic analysis approach, then the steps taken in the subsequent sections of data analysis are described in detail.

3.5.1 Thematic Analysis

Thematic analysis of text-based transcripts of discussions held with participants was based on extracts coded according to a priori themes identified in the literature on activity and travel behaviour, and followed by new codes based on original themes identified in the texts. Thematic analysis is considered a foundation stage in many qualitative research processes. Although not given the 'branded' status of other qualitative methods such as Content Analysis or Grounded Theory, Thematic Analysis has been argued to represent a distinct qualitative method in its own right (Braun and Clarke, 2006) capable of assisting in reporting, identifying and analysing patterns or themes within data.

The combination of cycling with public transport implies by its relative complexity the existence of strategies and constraints related to physical distance and other structural or social barriers. This study also aimed to offer a geographic interpretation of activity and related travel descriptions by collecting data on both regular and occasional journeys. To help understand how households with children organised activities and travel arrangements, the interviews with eight family groups involved family members marking on paper maps the locations of activities and public transport stops and stations they had used within the past 18-24 months.

The below six phases of the qualitative analytic method recommended by Braun and Clarke (2006) was approached in the data analysis. This method facilitates the identification, analysis and reporting of patterns within data.

Phase 1. Familiarizing with the data
Phase 2. Generating initial codes
Phase 3. Searching for themes
Phase 4. Reviewing themes
Phase 5. Defining and naming themes
Phase 6. Producing the report

Table 3. Phases of Thematic Analysis.

Source: Braun & Clarke (2006, p87)

3.5.2 Main Analysis of discussion transcripts

3.5.2.1 *A Priori* thematic coding

After some experimentation in September 2016 using 3-letter codes based on the research questions, I generated a new set of codes beginning in March 2017, starting in NVivo with descriptive codes of one word, or short phrases. Anticipating that I would be able to identify when coding saturation had occurred during the process of coding my 48 transcripts, I started to keep a Code-book and periodically updated this throughout the project. Although researchers have previously assessed saturation by the frequency that new themes have been identified, Hennink *et al.* (2017) explored what saturation means in practice. She proposed that an accurate assessment of saturation also depends on 'saturation in the *meaning* of issues'. Following Hennink's method I periodically recorded the addition of new codes in the log book, and changes in definitions of existing codes. I used a table in Word to allow me to annotate changes in coding definitions, referring to my NVivo project file

Research question addressed	Code <i>a priori</i>	Description: themes covered by coded sections
I. How does the integration of cycling with PT act as an enabler of household activities?	HH-Activity	Activities the participants may do which had some relevance, impact, or effect on others in the HH or the whole household. Includes regular, occasional/periodic, as well as one-off activities.
	Cy-PT	Combining use of the bicycle with a form of public transport.
	PT-Use	Public Transport used without reference to combining with cycling.
	Cycling	Cycling as an activity distinct from public transport use.
	On-Foot	Activities accessed on foot or a walk/running is the activity.
II. What role does cycling's integration with PT play in responding to household transitions?	HH-Transition	indicators of events, or other changes, eg. to abilities, patterns of activity or destinations, which seem permanent or that mark the end of a previous HH phase and the start of new behaviours, routines, mode choices, etc.
	Going Alone	Lone Travel by children and young people.
	Not-cycling	When cycling is not done, or is replaced by other means of travel.
III. Why do households integrate cycling with PT as part of everyday activities?	Beliefs	Participants' beliefs and values related to mobility, travel, cycling, independence.
	Image	Participants describe how they see themselves, possessions, lifestyle, or how these characteristics are perceived by others.
	GoingGroup	Travel or journeys are experienced as a group of two or more people. (Family members only, or also in groups with others?)

Table 4. Summary of Initial code generated.

Source: Author

In NVivo, the above coding scheme was applied to whole paragraphs and larger blocks of dialogue encapsulating the context of the participant's narrative within coded sections. After this I printed on paper, cut out and pasted up the extracts I had assigned to the following codes:

- Household activities
- Household transitions

Extracts coded for 'Household activities' I collated into sub-groups according to modes of travel described, then identified a series of potential sub-themes of activities. For example, this revealed that coded extracts 'Cycling-PT' (the combined use of cycling with public transport) had enabled the following activities:

- Buying and maintaining a bicycle (Angela's bicycle, Tom's bicycle)
- Visits to other family members and family groups (Denzel – to grandparents, Derek to his mother)
- Travelling with other family members (Angela + children, Derek + Gemma)
- Meetings with friends (youth - Denzel)
- Travelling with friends (youth - Denzel)
- Commuting to work (Angela, biographic – Marianne)
- Taking a child to and from childcare (nursery – Tom)

Codes for '**Household Activity**' were initially all at the same level, not arranged in hierarchical groups, this began to change while coding the third household discussion transcript. I then added new codes distinguishing between different frequencies at which household activities seemed to occur, recognising some key characteristics of activities enabled by combining cycling with public transport that were in accord with the literature.

Chronological patterns of activities were initially coded generically under **Household Activity**, as my description states: 'Includes both regular and occasional/periodic, as well as one-off activities.' To this category I soon added three further categories to annotate approximately how often activities and related travel behaviour occurred, whether sporadically or to a pre-determined schedule or pattern. The least frequent activities have been described as '**one-off**', a term also associated with actions taken in the realm of energy conservation behaviour (Whitmarsh and O'Neill, 2010), activities relating to unique events (Marsden and Docherty, 2013), purchases (Aldred, 2010), or activities related to life-cycle events. This code also identified unrepeated experiences of activities and journeys within this category.

Of relevance to the analysis of everyday activities enabled by the combination of cycling with public transport were the modes of transport used for particular journeys, the nature of the activities and who took part. These formed the basis of an initial set of thematic codes related to a potential Time-Space analysis and documentation of multimodality, namely:

HH-Activity

Car-Use / Cy-Use / Not-Cy / PT-Cycling / PT-Use / Walking

GoingAlone / GoingGroup

Journeys to work (commuting) and escorting (children) to education have been previously categorised as regular journeys and have been considered likely to reflect everyday "identities" (Murtagh *et al.*, 2012), similarly the term 'regular' has been applied to daily activity and travel (Chen *et al.*, 2011), however Axhausen *et al.* have included private, social and civic face-to-face activities in this category (Axhausen *et al.*, 2002). Distinctions have been drawn between 'regular' cycling on 4 or more days per week and 'irregular' cycling defined as taking place on 3 days per week or less (Titze *et al.*, 2007). In my study I have use the code '**regular**' to mean a repeated and relatively constant pattern and have coded references to any activity that occurs to a schedule ranging from once-per-month, to daily.

Data from the NRTS (National Rail Travel Survey) has shown that most leisure and business trips were infrequent, although some followed a regular pattern (DfT, 2010). Many of the infrequent social, leisure and recreational activities described by my participants I have coded as '**occasional**', the third code to distinguish chronological patterns grouped hierarchically below 'Household Activities'. Academic use of the term 'occasional' seems

limited to association on public transport of episodes related to the effects of weather and holidays (Yong *et al.*, 2018), and with monthly or annual bicycling as opposed to weekly or daily travel (Swiers *et al.*, 2017). Few academic studies offer detailed analyses of occasional travel behaviour, tending to concentrate on regular activities or routinised behaviours, in particular commuting to work or education, but also on regular physical exercise and activity.

As distinct types of household transition were beginning to be observed in the data, coding of the third transcript newly included additional categories of Household Transition, with '**Landscape**' situated initially under the parent code '**HH-Transition**' to refer identify participants' comments regarding changes to the socio-technical environment, including "*spatial structures (e.g. urban layouts), political ideologies, societal values, beliefs, concerns, the media landscape and macro-economic trends*" (Geels, 2012).

To the category '**HH-Transition**' was added '**Life Events**' indicating when "*windows of opportunity*" for changes in travel behaviour had occurred (Chatterjee *et al.*, 2013), particularly changes not directly related to mobility. The code '**Mobility Resources**' was also added to the '**HH-Transition**' category at this stage, partly reflecting Rau's conceptual separation of "*mobility milestones*" (Rau and Manton, 2016) both from other life events, differentiating also from Chatterjee's inclusion of actions such as the acquisition of a car as a 'Life Event'.

As well as adding new codes over time, existing coding was sometimes re-categorised. For example, near the end of the thematic analysis process we relocated 'Landscape' under the parent code 'Externalities', reflecting that the comments generally referred to factors outside the influence of the household.

How things change over time, different kinds of time (longue durée/ durée of the day), or the theme of 'timescapes' in this research project.

The code '**Timescape**' was added much later in the coding and analysis process to reflect transitions over longer time periods within households, akin to Giddens' "*irreversible time*" or "*institutional time*". Thus it was applied to changes families and individuals over longer cycles in activity and to reflect slower evolving patterns of activity. The creation of this new code involved recoding some of the sections previously coded to 'Landscape'.

Several other new codes were created, adding a record about each of them in the code book. Having used 10 main codes in March 2017 to analyse Angela's family discussion (plus 3 administration codes), a total of 21 main nodes (i.e. top level & parent nodes) and 35 second level codes were used across the main analysis of all transcripts (see Appendix 8).

3.5.2.2 Use of Memos

To 'HH-Activities', I added two codes that highlighted interpersonal activities related to the care of others, childcare, or for maintaining social or family relationships. These codes encompassed a wide range of activities considered the main purpose, or sometimes a secondary purpose. Caring for children and children travelling to childcare or other forms of supervision, I had identified already during the paper-based 'paste-up analysis' of Angela's family discussion. After coding the third transcript, Margaret and Dave's family discussion, I incorporated new codes related to the challenges the family had experienced when travelling with young children and the significant transition of the youngest to primary school. This was commented on in my contemporary Memo notes, see text box below.

Excessive coding generated.

Considerable areas of overlap in a densely coded transcript. Compare with the two previous.

InVivo codes generated this time include:

- Exclusion
- Children's understandings

Should 'Childcare' be added as a separate In Vivo code? It emerges as an important theme in facilitating adult activities, namely work/employment.

Key transitions are:

- the start of the youngest child at primary school
- change of home location (4 years previously)
- recent change of father's work

After analysing further transcripts that raised similar themes, the code '**Care Provision**' was generated and retrospectively applied to Margaret and Dave's transcript. This code primarily indicated 'childcare' – but was also applied to some narratives describing care-related activities related to an (older) adult, or where their well-being was facilitated or monitored.

Memos too, sometimes evolved after I had first created them. Memos that recorded reflections resulting from the process of coding some of the discussions remained unchanged, but many Memos that identified a new theme took on additional extracts, and some Memo titles were changed to reflect the development of themes and sometimes to align better with new coding. For example, an early Memo addressed evidence of clear differences in the enjoyment of cycling, and differences between the cycling practices and preferences of individuals within households. Later I realised the relevance of this Memo to how people in households adopt, or align with specialised roles, and renamed as indicated below:

1. **Differences within families** (original title, 34 references from 20 sources)
2. **Differences within families and Role Allocation** (final title, 38 references from 23 sources)

Although the two memos are substantially the same, realisation of the relevance of the different activity patterns to role allocation led me to rephrase a small part of my notes to read:

Adult partners may have had similar past experiences and enthusiasm for cycling (such as in the Leicester HHI), daily and historic travel behaviour (such as Headingley HHI), but these can change and the arrival of children has led to specialisation evident in people's routines. Both of the Roundhay HHIs display some similarities in commuting behaviour, with both Dave and Margaret having previously commuted by bike and train () but as Margaret took on the stresses of managing the childcare-related activities her cycling opportunities became restricted while Dave continued to travel as he had before. The different weekly schedules for D and M enabled moments of shared activity to take place without the children, both having a shared passion for climbing as their main pastime, they were able to go climbing on Thursdays when both had the afternoon free.

In this extract the roles of the two household heads diverge with recognition of the mother's specialisation on the childcare journeys. The previous version of the same paragraph in the memo had been worded as follows:

Differences are also evident in other HHIs, particularly those with children where practices and beliefs range from radically different behaviours and beliefs (as Monique differs from her husband in liking cycling in the Shipley HHI) different visions and appreciation of benefits and disadvantages (such as in the Cambridge HHI), to differences in opportunity and activities despite similar past experiences and enthusiasm for cycling (such as in the Leicester HHI), daily and historic travel behaviour (such as Headingley HHI). Both of the Roundhay HHIs display some similarities in commuting behaviour, but some nuanced differences in overall enthusiasm levels for cycling and extent of engagement with it as a pastime (Roundhay 2), and differing weekly schedules in Roundhay HHI 1 enable moments of shared activity to take place without the children, both being primarily interested in a shared passion for climbing.

Memos in NVivo offer the capability of including extracts copied from the transcripts complete with the associated coding. This enables the Memos to be mapped to clusters of codes. As Figure 13 below shows, this feature was useful in mapping the relationship of codes to two types of journeys related to childcare. Trips involving the child going part of the way with the parent who combines Cycling-PT share some codes such as 'Role Allocation' and 'Scheduling' with journeys made by a non-combining parent when the other parent combines Cycling-PT without the constraint of the childcare duties. Coding differences include references to 'Negotiation' and 'Car-Use' for those journeys where the 'childcare run' is not part of a combined Cycling-PT commute.

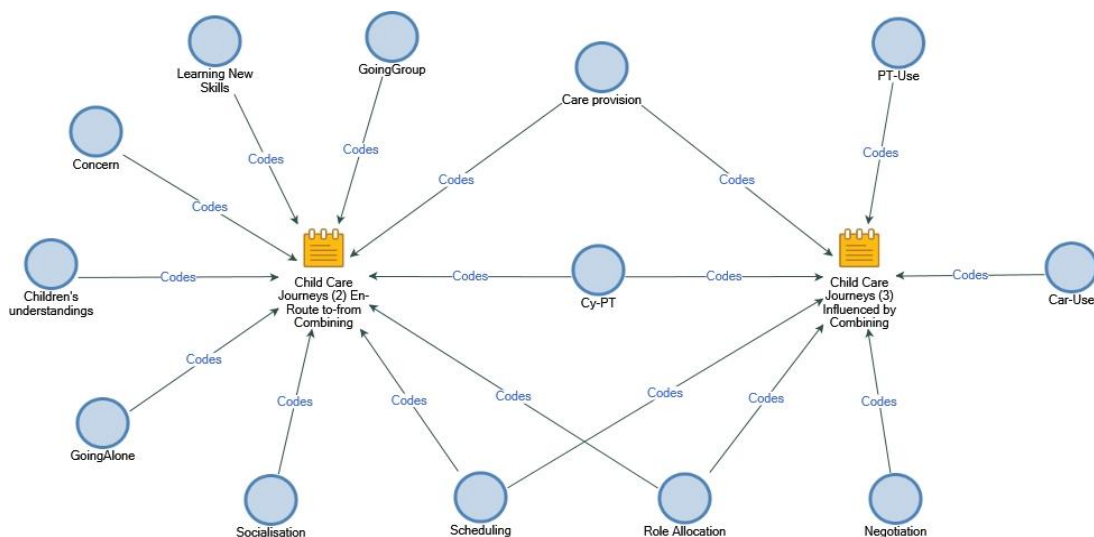


Figure 13. Nvivo Mapping relationships.

Source: Author

Where the child accompanies the parent, coding is indicative of more dynamic interactions with respect to the child's experiences, such as, 'Learning New Skills', 'Socialisation', and 'Going-Along'. Equally coding indicates some concerns were expressed; one particular linked narrative revealing that this occurred from bystanders observing the slumped posture of a sleeping child in a child-seat:

- N: *Yeah, and then i'd sort of cycle down into town getting all sorts of funny looks, because you've got a child seat on-, empty child seat on the back of your... {its a great bag carrier though} Y, erm, but you know the biggest challenge there was was just stopping him falling asleep! So, it's up quite a steep hill and he'd nod off! And they haven't got the same support as a car seat...*
- J: *it's that motion, isn't it?*
- N: *Y, and it was about his nap time at that point, 3 or 4 years, 3 years old-, so you're sort of cycling up a big hill with your arm... [bent arm??]?... behind you trying to stop him from cricking his neck... {...did he have a restraint or something?} Well he had a restraint, but he'd still sort of loll his neck over like this, you know.*
- Me: *Doesn't look comfortable...*
- N: *Doesn't look nice... a few sympathetic, and a few 'clucks' of concern from people as you go past (tuts as he says this: "Tst! Uhh...")*

3.5.2.3 Coding organic themes from the data

Table 5 shows how the *a priori* codes evolved through the use of organic codes.

Research question addressed	From Code <i>a priori</i> To Code organic	Description: themes covered by coded sections
I. How does the integration of cycling with PT act as an enabler of household activities?	HH-Activity	Activities the participants may do which had some relevance, impact, or effect on others in the HH or the whole household. Includes regular, occasional/periodic, as well as one-off activities.
	Cy-PUBLIC TRANSPORT	Combining use of the bicycle with a form of public transport.
	PT-Use	Public Transport used without reference to combining with cycling.
	Cycling	Cycling as an activity distinct from public transport use.
	On-Foot	Activities accessed on foot or a walk/running is the activity.
II. What role does cycling's integration with PT play in responding to household transitions?	HH-Transition	indicators of events, or other changes, eg. to abilities, patterns of activity or destinations, which seem permanent or that mark the end of a previous HH phase and the start of new behaviours, routines, mode choices, etc.
	Going Alone	Lone Travel by children and young people.
	Not-Cycling	When cycling is not done, or is replaced by other means of travel.
III. Why do households integrate cycling with PT as part of everyday activities?	Beliefs	Participants' beliefs and values related to mobility, travel, cycling, independence.
	Image	Participants describe how they see themselves, possessions, lifestyle, or how these characteristics are perceived by others.
	GoingGroup	Travel or journeys are experienced as a group of two or more people. (Family members only, or also in groups with others?)

Table 5. Organic themes from the data

Source: Author

3.5.2.4 Reliability, Validity and Generalisability/saturation

Interpreting this study, following the guidance of Janesick (1998) writing in Denzin and Lincoln (1998) I have attempted here to describe as clearly as possible the process of gathering the data, analysing it in a search for themes, and interpreting these themes. For qualitative research the ability to retrace the process is considered part of ensuring the results of the research have 'validity' (Janesick, 1998).

When analysing the data in the early stages, discovering themes in the discussion transcripts, I initially kept a record (see Appendix 9) of when and where I recognised new themes, attempting to replicate the approach of Guest et al., (2006) who explored the concept of 'thematic saturation'. Attempting to emulate their approach, I input new thematic codes, and modified existing codes seeking to find-, "*the point in data collection and analysis when new information produces little or no change to the codebook*" (Guest et al., 2006). Certain themes were apparent in many transcripts, but with the analysis of several newly transcribed discussions I identified new themes. Sometimes the themes were unique, but often they could also be found upon reviewing already-coded older transcripts. My initial inexperience in coding may have been a factor in overlooking certain themes, but sometimes themes only became evident to me after they had surfaced in alternative forms across a number of different narratives. In any case, I did analyse all the transcripts that I had accrued during my data collection phase, so the concept of thematic saturation seemed to be helpful mainly as a reflective tool for recognising when metathemes actually represented two or more sub-themes.

3.5.2.5 Coding consistency

When coding the data items I have tried to maintain a consistent definition for each code, applying it in an unambiguous way to ensure accurate retrieval of meaning. I did sometimes apply (the same) codes to discussion extracts identifying slightly different meanings, for example applying the 'Children's understandings' code wherever the discussion led to a report of an activity experienced by a child, whether this was reported by an adult about a child, or about their experience as a child, or a statement made by the child participant themselves. I soon added the code 'Parent's perspective' realising that the two understandings should be able to separately reflect different experiences, knowledge and attitudes. Both child's understandings and parent's perspectives, however, remained within the 'Understandings' group of codes.

Other codes with initial ambiguous application in the first semantic coding stage included:

- **Negotiation** (intended for household processes, also applied to external negotiations such as in the workplace, or with third parties while travelling)
- **Scheduling** (intended for household application, but use was extended to other contexts as above)

A Boolean NVivo query search for material coded (Negot / Sched) WITH household activity reveals data extracts related to the household processes, and the Boolean combination NOT limits extracts to those processes external to the household.

The code 'Landscape' should reveal only comments relating to changes perceived in the external environment and is closely related to the protocol Question 7. This covers both changes perceived to the external environment, as well as observations about the

surrounding environment for cycling or public transport use where no notable change has occurred.

Realising later that some participants were illustrating or comparing experiences along or across time-lines, or describing phenomena related to regular patterns in time, I added the Timescape code. Amongst other phenomena, currently this code also helps to highlight themes related to the human ageing process (for which no other discrete code exists).

3.6 Outturn sample

This section outlines the outturn sample and then details the key characteristics of participants who took part in discussions and interviews for this study. An overview of all interviews conducted is presented below in table 6 according to type of interview:

Interview type	Nott'm resident & inbound commuter			Leeds resident & inbound commuter		
	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total
Adult small group (2-4)	5	8	13	7	5	12
Family with children	-	4	4	-	4	4
Older couples no children	-	1	1	-	1	1
Individual 1:1	3	3	6	3	3	6
Total interviews	24			23		
Pilot methods						
Family Group				1		
Individual by phone	2					
Individual go-along	1					
HH with children	1					

Table 6. Type of interview and study location.

Number of each interview type conducted throughout the research, grouped by city and research phase. All household interviews involving families with children occurred in phase 2.

Out of the total of 25 adult group interviews, nineteen included individuals who had children discussing with others who had not had children, about their experiences. Six groups, however, were comprised entirely of adults without experience of being a parent. Narratives from these groups and of childless individuals contributed to the biographic accounts of cycling in childhood and early experiences of independent travel, also describing other relational experiences and commenting on system integration, social influences and interactions with PT infrastructure and external authority constraints. Common to all discussions in their sharing of experiences of multimodal travel were themes of travel resources and biographically structured and contingent narratives around car (or van) ownership.

Some people were also interviewed individually, including two parents of grown-up children, the rest being single adults and others in childless relationships.

3.6.1 Household composition of the participants

This section offers an overview of all participants based on the household demographic questionnaire (see Appendix 5), including those who also took part in the pilot focus group, household discussion, pilot go-along interview, telephone interviews, and a model-workshop discussion.

The household composition of all participants is summarised in Table 7, below.

HOUSEHOLDS RECRUITED IN LEEDS	QTY	HOUSEHOLDS RECRUITED IN NOTTINGHAM	QTY
1 adult households	10	1 adult households	12
2 adult households	14	2 adult households	21
		1 or 2 adult household (form incomplete)	1
3 adult households	5	3 adult households	1
4+ adult households	3	4+ adult households	2
1 parent family with 1 child (<21) + adult sibling	1		
		1 parent family with 2 children (<21)	1
1 parent family with 2 children + adult sibling	1		
2 parent family with 1 child (<21)	4		
2 parent family with 2 children (<21)	6	2 parent family with 2 children (<21)	6
2 parent family with 3 children (<21)	2	2 parent family with 3 children (<21)	2
		2 parent family with children + 3rd adult (form incomplete)	1
TOTAL HOUSEHOLDS	46	TOTAL HOUSEHOLDS	47

Table 7. Household composition by study location.

Note that households are counted once in this enumeration, although household interviews usually involved a second adult and children, i.e. the total of all adults interviewed in Leeds was 50, and 52 in Nottingham. The total of all children interviewed was 7 in the Leeds area and 7 in families of people who commuted into Nottingham (not counting two children of nursery age).

A brief questionnaire issued to participants at the discussions elicited demographic information including the participants' age, sex, household income level and home location. Other household context was provided, including who else lived in the household, whether they had access to a car or other motorised vehicle and whether they also resided at a second home location for part of the time. A detailed overview of the participants categorised by their demographics is included in the next subsections.

3.6.1.1 Single person households

Adults living alone took part in many of the discussion groups, but some were also interviewed individually. Single participants recruited across Leeds and Nottingham ranged in age from mid-20s to well past normal retirement age and included those with the lowest household incomes, but also people in relatively well-paid jobs. Car ownership levels

amongst participants who lived alone were not high although, some had driving licences but did not own a car. Several had recently experienced the life event of moving home, in some cases also accompanied by a transition related to the workplace.

3.6.1.2 Two-adult households

Cohabitation (including married couples) was the most widely shared household composition amongst adult participants, outnumbering all other categories of household. Most participants who lived as couples had either never had children, or as older adults themselves, did not have children living at home at the time of the discussion. A few individuals had partners with a separate residence and spent some time living at this as a second residence.

Parents (i.e. from 'couple' households) of dependent children either took part in discussions with other unrelated adults, or participated together with their children in one of the 8 separate family activity discussions. Seven of the family activity discussions involved parents who lived with a spouse or partner as a nuclear family.

One single mother who took part with her children was able to describe how the family's activities and travel had been affected during a long-term relationship with her former partner. As her older son was 18 at the time of recruitment, hers was categorised (on the form) as a 2 adult household. Some other young adults reported living as part of a household with their single mother.

3.6.1.3 Multiple-adult households

Some 3-adult households included couples who shared a flat or house with a third individual including in one case, a sibling, or more often an unrelated person or a friend. Households ranging from 3 to more than 5 people that were not members of the same family often involved several unrelated individuals house-sharing.

Those parents who took part in adult group discussions included fathers from households new to parenting with very young infants less than 2 years old, through to mothers or fathers with up to 3 children still living at home while attending school, tertiary college or university studies. Of the few households with older teenagers (16+) still living at home, this was usually reported by participating parents, although in a couple of instances, by the young participant aged 18 or over, who had combined Cycling-PT themselves.

Amongst a majority of narratives suggesting heterosexual cohabitation, a few accounts of activities and travel were also described by individuals living with someone in a same-sex relationship. These couples did not have children.

3.6.1.4 Households with grown-up children living with parents

Participants similarly recorded that young adults, some in their 20s or 30s, were living with parents sometimes having returned after a period living independently.

The experience of living with parents as a young adult was also offered by a handful of participants. Their occupation was not recorded on a number of the demographic forms, but these participants were also able to describe some of the activities of their parents or siblings. Some were parents whose child still lived at home as an adult, or had returned after a period elsewhere and was either in full-time education, or working.

Of those living alone, or in a household with other adults, some (generally in their 50s or older) had brought up children and were able to discuss their experiences as parents, however this was not captured in the household demographic form, but emerged through the discussions with participants.

3.6.1.5 Household income bands

Participants across the discussion groups and interviews declared their household income levels by income band, using the simplified bands proposed by the ONS (2015). The response range was wide, but skewed towards respondents who had indicated a higher income. Some participants seemed to have difficulty answering this question and not all indicated a household income level on the questionnaire.

One respondent indicated a zero income level that may have reflected a phase when they were neither earning an income, nor receiving a pension (not old enough to receive their pension), however I assume they had private resources, having recently bought a house and living independently. The figure 14 below shows numbers of households recruited in each region, by income bands (£).

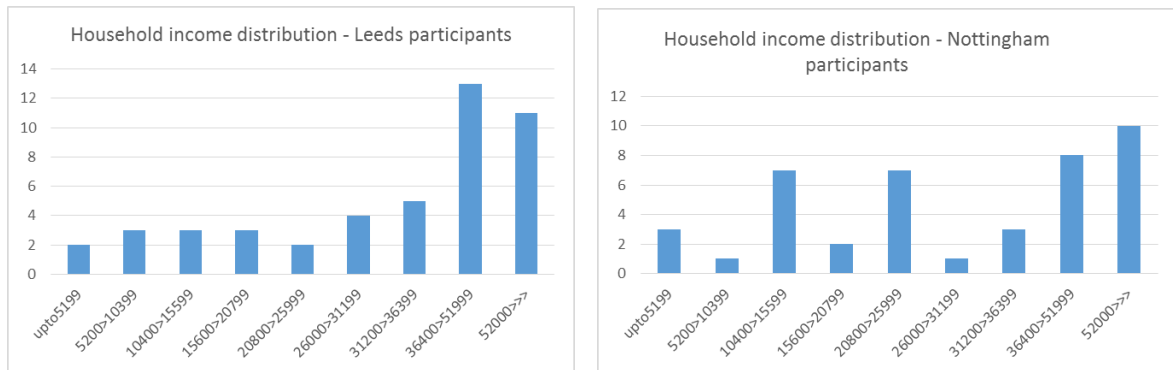


Figure 14. Household income by study location.

Source: author

3.6.1.6 Life events

Households and individuals had experienced a wide range of transitions, many of which had been associated with stages in their own life-cycle, for example changes in:

- household composition
- geographic location
- education-related relocation
- employment status or roles
- home relocation
- travel resources
- abilities, capabilities and skills
- economic situation

Some of the participants' recent life events were recorded on the household demographic form. For participants recruited in the Nottingham area, following the literature reviewed earlier, these included events related to household composition and location, changes in

skills and capabilities as well as the activities related to work or study, as shown in Table 8, below.

LEEDS ADULTS	(50 adults in 46 HHs)	(additional transitions)	NOTTINGHAM ADULTS	(52 adults in 47 HHs)	(additional transitions)
Participant had moved home	8	1	Participant had moved home	9	1
s/o (in the HH) changed jobs	6	5	s/o (in the HH) changed jobs	9	1
s/o got full driving licence	1	-	s/o got full driving licence	1	1
child moved away from home	-	2	child moved away from home	2	2
s/o else moved away from home	2	3	s/o else moved away from home	2	-
s/o moved into the HH	3	4	s/o moved into the HH	-	3
change of abilities affecting a person	1	-	change of abilities affecting a person	1	-
child at new school or college	7	2	child at new school or college	3	2
other...(<i>moved second home</i>)	1	-	other...(<i>retired from employment</i>)	1	-
TOTAL	29		TOTAL	28	
No reported HH change in past 2 years	21		No reported HH change in past 2 years	24	

Table 8. Household life events.

Source: Author

Note 1: 'additional transitions' contains those transitions noted down in a second text box on the household demographic questionnaire.

Note 2: The category 's/o moved into the HH' includes children who may have moved out, then returned within a year, it also includes the addition to one household of a newly-born child.

3.6.2 Age range of participants

Participants ranged through the life course, some matching the classical life course stages outlined in the literature review chapter. Figure 15 below shows the distribution of participants by age band for study locations. Adults in their 40s were well represented and most of the households that participated with their children also had parents in this age band. Only two 18-year-olds participated, including one in the pilot focus group (held in Leeds in June 2016).

Participating parents who had children still of school age included some with very young children (younger than 9), others with older children including some in the 16-21 category. Parents (of children up to 21 years old) were in the age range 33-53. Age gaps between children in participating households tended to be fairly narrow, usually no more than 4 years separating siblings. An age difference of approx. 13 years separated Angela's older son Denzel (18) from his younger brother Tom (5), reflected in descriptions of generally separate activities. In discussions some other adult participants recalled childhood experiences of activities having been conducted separately from those of much older siblings and characterised by their parents having been relatively old.

Children as young as 5 were involved in the family activity discussions, seeming to enjoy the modelling process and sometimes contributing their ideas. Children aged 9 and as old as 18 also discussed their activities and travel experiences, commenting also on the behaviours of other family members.

Although discussions did not dwell on personal issues of household break-up, several participants indicated that they had experienced changes in the household related to separation from a former partner or spouse. This had also occurred in families with young children several years previously, who had generally grown to be young adults by the time of the discussions, although one participant was estranged from a relatively young child at the discussion. Participants also reported experiences of having grown up in 'blended' families or with a single parent following their parents' separation.

Amongst older adults were workers and those who had retired from employment, although some were still actively involved in voluntary work. Some had retired from employment in their late 50's, also having made the decision to move home as part of this process in the case of some single individuals.

Recent transitions had been experienced by many households, predominantly changes related to employment.

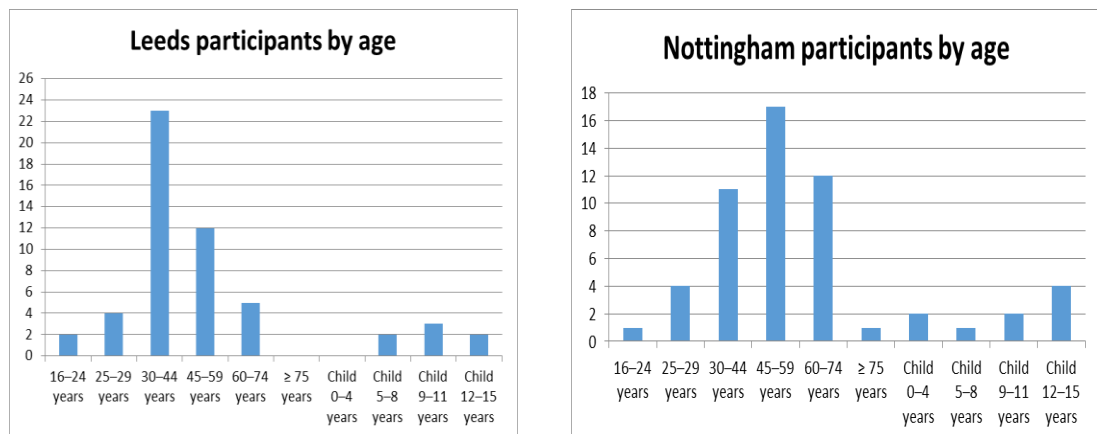


Figure 15. Age range of participants by study location.

Source: Author

3.6.3 Geographic distribution of households

The household location of participants for the study ranged from those who lived relatively central within the cities where participants were typically recruited, but a smaller number lived some distance away, these sometimes commuting periodically and remaining for several days in the (recruitment) city for the purposes of work or study.

Activity networks at both ends of the longer journey were evident for (Jacqueline) the periodic commuter with children at home. For other households activities were either based around children's needs, family activities conducted together, or around adults' regular and discretionary activities.

Several of those who commuted long distances on a daily basis to their workplace were able to work from another location on some of their working days, in some cases working from

home. This sometimes involved crossing boundaries that separated local authorities. Encountering different public transport policies and subsidy regimes was a factor experienced and commented on by some participants.

Boundaries were sometimes subverted by infrastructure, for example, Nottingham's tram system had been initiated by the Unitary Authority of Nottingham City Council in collaboration with Nottinghamshire County Council, its first line extending out from the city into outer suburbs, 'boroughs' in the county of Nottinghamshire.

For the Nottingham city region, the tram system was seen to integrate with other local public transport bus operations and complement the rail network.

3.6.3.1 Household car availability

Most adults who took part were licensed car drivers, some had also ridden motorcycles. Some individuals did not drive and had never passed a driving test, others were drivers who had given up car-ownership. Car ownership ranged from families with one car, to households who owned and used multiple cars. Car ownership within households at the time of their participation in the research has been categorised in the table 9 below. Non-car drivers in car-owning households were identified from the participant's discussion narrative; other non-participating adults represented in these households were assumed to also drive, unless otherwise described.

	Car-free households	Non-car drivers in car households	One-car owning households	Multi-car owning households
1 adult, no children	5 Nottingham 8 Leeds	n/a	5 Nottingham 2 Leeds	1 Nottingham 0 Leeds
2+ adults, no children	5 Nottingham 6 Leeds	1 (Nottingham) 3 (Leeds)	12 Nottingham 4 (Leeds)	2 Nottingham 6 (Leeds)
Families with children (0 – 21)	2 Nottingham 4 (Leeds)	1 (Nottingham) 0 Leeds	2 (Nottingham) 7 (Leeds)	3 Nottingham 2 Leeds

Table 9. Car ownership.

Source: The Author. Note that two participants who lived in shared student houses or hostels have not been included in this table.

3.7 Reflections on the approach to data generation

The Household Demographic Questionnaire had some shortcomings, in addition to some participants bypassing some questions. Participants sometimes did not count themselves amongst the number of adults (age 16 or older) – perhaps this Question should have been more explicit, i.e. "including you..." etc. Or perhaps people were wittily considering themselves as one participant put it: "the adult-child"?

Questions about recent lifecycle events related to moving home doesn't discriminate between moves within neighbourhoods or within the city, from inter-regional moves more likely to be associated with job moves, or transitions after studies, etc.

For a household interview (HHI) with two household heads (with or without children) a single form should have differentiated between the two individuals as the form was usually filled in by one, but data on the partner who didn't fill in the form was more sketchy – sometimes omitting the partner's age or ability to drive (although this was often revealed in the discussion).

Asking about whether people drove a car or motorcycle enabled them to represent how they saw themselves, some who had driving licences describing themselves as non-motorists. Some only drove vehicles for work, or occasionally hired a car for specific social trips including holidays.

Consistency across groups was attempted through adherence to the discussion guide. There were differences between discussions, both in pace and in the level of interaction between participants. This led to discussion of some questions being longer (usually) than anticipated, and to my use of different probes according to the flow of the conversation.

Engagement with the modelling activities was generally good, although many of the adults were initially apologetic about their skills in manipulating the plasticine. They were reassured when I confirmed that the use of plasticine was intended as a warm-up activity to stimulate conversation and not a test of their accuracy or manual dexterity. Several subsequently expressed some pleasure at the outcome of this activity.

Engagement with the station model varied more between groups. An initial decision was usually taken to use the station elements to create a model of the main station in the city where the discussion was taking place (Nottingham or Leeds). An exception was with Angela's family, whose children it seemed were more familiar with nearby Mansfield station from various trips to the Halfords bicycle shop there.

3.8 Conclusion of the Research Design

This chapter has explained in detail the research design process adopted by the author, including the target sample and the household as unit of analysis, the study locations concentrated in two main city regions that supplied an appropriate sample for the needs of this research study. It has explained the choice of the qualitative approach of semi-structured interviews implemented as small group discussions and the incorporation of 2D and 3D visual tools as methods for investigating the multi-dimensional nature of multimodal travel through participants' memories.

It has outlined how the pilot study has contributed to refining the interview protocol and the recruitment process, leading to the adoption of small group interviews as the primary method of data collection in both Phase 1 and Phase 2 of the fieldwork.

The consistency and rigorous methodology followed in coding and analysing the data generated by this research in the form of transcripts audio and video recorded interviews have provided this study with enough tools to understand households' experiences of combining Cycling-PT enabling the research questions (see Section 1.1) to be answered. The demographic overview of the participants who generously gave their time to join discussions also contributed to the understanding of households' composition across the study locations.

The results emerging from the study are presented in detail in Chapters 4, 5 and 6 that follow. Chapter 4 outlines the activities identified as beneficial to the household enabled by integrating Cycling-PT. Chapter 5 addresses household transitions and life course events that

have influenced activities and associated travel behaviour, then Chapter 6 examines participants' explanations and unspoken motivations behind individuals and households combining Cycling-PT.

4 How cycling with PT enables activities

The aim of this chapter is to identify and interpret themes related to the enablement of activities of people who had combined cycling with public transport PT (Cycling-PT). This chapter identifies how a selection of the household's activities in the context of a wider set of activities has been enabled through combining Cycling-PT. The interpretation of participants' experiences using these themes followed the theoretical framework to identify household processes related to reflexivity and agency, or interactions with institutions and structure. In brief, this chapter responds to the first research question generated by the gaps in knowledge identified in Chapter 2:

1. How does the integration of cycling with PT act as an enabler of household activities?

Households conducted several kinds of activities which were enabled by one or more of their members combining Cycling- PT, often on a periodic basis. Many narratives were about routine activities and the variation in journey patterns associated with commuting to work or education. This was partly the result of recruitment by intercepting passengers at stations and dissemination of flyers and posters at selected PT interchanges, universities and other institutions. Some participants had also been recruited while on non-routine journeys, their experiences and those of regular commuters helped to reveal a wide range of activities enabled by the combination of cycling with train, coach or with bus journeys.

Two main themes were revealed by thematic analysis of the discussion transcripts that have been under-researched in previous research on the integration of Cycling- PT. Two categories of activity enabled by Cycling-PT are addressed here:

- the integration of childcare repertoires through the combination of Cycling-PT;
- the maintenance of health and wellbeing through particular forms of Cycling-PT;

The following sections examine these themes in greater detail.

4.1 Integrating childcare repertoires

For families with children, childcare forms a significant responsibility while children's organised discretionary activities place additional demands on parents' time with cost implications especially for families without a car. However childcare is provided, it forms a constraint on household activity patterns and often anchors the scheduling of at least one adult through escorting a child to participation in formal organised activities, such as attending a nursery, visiting a childminder or going to school or a holiday activity. Informal childcare, perhaps delivered through relatives or friends, similarly has scheduling constraints but may have more scope for negotiated flexibility around pick-up and drop-off times and locations.

Eight participating families were accessing, or had used childcare for their young children within recent years. The contexts behind their differing experiences of children's travel to school, nursery or other childcare facilities and activities are presented below. This analysis draws on the experiences of other adults who, during the research discussions, described their family's journeys to and from childcare and their children's other activities. Some adults also shared their own memories of travelling as children themselves. Together these

narratives contributed to the analysis of childcare journeys and help to illustrate stages of the development of children's independence in the lifecycle of households. The analysis of childcare journeys in relation to household transitions is discussed in more detail in Chapter 5.

Cases where children had directly experienced combined Cycling-PT journeys revealed how the productive, social and recreational activities of the participating families had been enabled by combining Cycling-PT with or by the child, sometimes enabling others in the household to carry on with other activities, at home or elsewhere. Discussion of these cases is compared with more typical examples of journeys where accompanying a child to childcare was integrated with the commuting trip by bicycle of an adult who subsequently also used PT. Finally, I discuss examples of other journeys to childcare, education and children's extra-curricular activities to offer an analysis of how and when various modes have been selected in households where an individual has combined Cycling-PT.

Descriptions of journeys to nursery and school by children of 'primary' school age and younger, indicated they were generally quite short and were often walked. Exceptions where children were taken by car either reflected rural households' geographies, or had sometimes resulted from a recent relocation of the home, or a change of school attended by the child resulting in increased travel distances and other perceived barriers to the child's independent travel. Recent journeys by younger children (below 10 years old) to primary school generally involved being escorted in the parents' narratives, but sometimes this would be by an older sibling who shared the same journey on foot or by PT. When young children cycled to nursery or primary school they were invariably accompanied by a parent, some on a regular basis, others on occasions when a parent who enjoyed cycling was able to work from home. While nursery and school focused on the child's learning and offered care during part of the working day, childcare provision was also sought for children still too young for nursery, and to look after the children of working parents at the start of the day and after school or nursery finished.

Childcare was also required for children of parents who continued to work full-time during school holidays, this sometimes involved trips to a child-minder or a relative who might be based some distance away. In a few circumstances children had used bicycles to visit grandparents, or had been accompanied by grandparents on bicycle rides during holidays. Parents' work patterns were sometimes able to be adjusted with the changes in children's activities during school holidays, even allowing holiday activities to be accessed by bicycle, but other parents had to find solutions for care for their children during holidays. Examples were given of where the bus, tram, or the train had been used to bring children to childcare, or to be cared for by relatives.

As children had grown older, the commute to school had tended to involve more independent travel, a few children at around 10 years old had started to walk the short distance to school or would return at the end of the school day by themselves. Parents and other adults sometimes contrasted their contemporary practices of escorting children to activities, with their own more independent mobility when they had been the age of their children. Some parents also contrasted the constrained nature of their children's cycling with their own relatively liberal use of bicycles as children themselves.

A contrasting picture of higher levels of chauffeuring or accompaniment for journeys to discretionary, cultural and recreational activities emerged from the discussions. Journeys to or from organised after-school sports or cultural activities involved children being given lifts

in cars or by taxi. There were, however, examples of children being carried by bicycle, using a scooter or riding their own bike in some cases, children aged 12 or under were usually accompanied by their parent or a friend's parent. Older children often chose to accept lifts, or asked to be taken by car.

4.1.1 Cost and time savings of integrating Cycling-PT for the childcare trip

Children in two of the families that took part in discussions had directly experienced combining Cycling-PT as part of their own journeys to childcare, a behaviour that in both cases, appeared to have been of value to the household. In Doug and Winnie's Leicester family the two older children, Bart (aged 14 when participating) and Thalia (11), had when much younger, both been carried in a child seat on the back of their father's bicycle, and then by train and bicycle, to nursery in Nottingham on two days each week enabling Winnie to work part-time. The youngest daughter Suki (9) had not commuted to nursery in Nottingham with her father, but had occasionally accompanied him there to his work on weekends. The family had saved on childcare costs by accessing the subsidised nursery place at Doug's workplace, when Winnie had been working part-time. Taking the child on Doug's commuting journey had incurred no additional cost other than his own rail ticket, facilitated by the free rail travel offered in the UK for children under five years old:

Me: did they travel free on the train at that age?

W: yeah... Till they're five. So when they were little, they-, er Suki didn't go, but Bart went for, three years, to nursery... And then.....On the back of a bike...

I worked part-time so it was sort of two days, wasn't it really?

The children's age differences also seemed to be a factor enabling two children in succession to experience this for a period of 2-3 years, Bart travelling for the period until Thalia had grown sufficiently to be carried on the child seat and could also benefit from Doug's workplace nursery provision:

Me: and tell us about the time when you used to carry the children...

D: wellthe reason behind it was that my work was offeringsubsidised nursery places, and because I was going anyway, it wasn't actually that much of a hardship to take them with me, on the train it didn't cost any extra, erm-

W: so Bart went from when he was one until he was three?

D: yeah.

W: ...And Thalia when from when she was one, until she was about 2½Actually maybe three as well...

Winnie and Doug's narrative as a married couple centred on accessing subsidised formal childcare for a young child, low additional transport costs in the context of the mother's working part time. This family also discussed other cost-related factors affecting life-course decisions, these including the circumstances surrounding Doug and Winnie's move to Leicester are discussed in Chapter 5.

The age gap between Doug and Winnie's children appeared to be a factor that made it possible to take each of the two eldest children in succession to nursery by combining Cycling-PT. Another participant, Lawrence, reflected that an age gap of approximately 3 years between the ages of his three children meant that they had only gone to the same school for short periods:

Me: ...So you mentioned there were some changes in your family's activity patterns as well, at the time when you were riding a fixed bike...

L: that was mainly, probably the transition from junior school to secondary, for the younger two.

Me: So that had different time routines did they?

L: yeah, so my, my daughter the middle child goes to different school to the one the boys go to, and she used to get a school bus from a different place, basically, for a while they've only ever been at the same school very briefly, cause they're three years apart.

Lawrence also indicated his current repertoire changed when the children were on holiday meaning he took the train on the 4 days he worked in Leeds. During school term-time he got a lift to the station, synchronised on some days with the morning departure for school of his younger son and his daughter. His eldest son had changed school from one in the local town to start attending a school in Ripon when his younger son made the transition to secondary from primary school, although their sister continued to attend a local secondary school. For a year before his elder brother left school, the two brothers had been able to share a car journey to school, later the younger brother would either take the bus from the town nearby, or get a lift from parents of a school-friend.

The supervision and care of older children was also enabled through combining Cycling-PT in the case of Angela, a single mother in Nottingham with two sons of very different ages, Denzil (18) and Tom (5). Angela had in the past been able to work full-time throughout the year including during school holidays, by making informal arrangements for the care and supervision of her older child, with friends and family members. Living in proximity to rail and tram stations had enabled mobility for her as a parent with a young family, and had also made it easy to arrange for her older son Denzel to travel and stay at his grandparents before the birth of her second son. Originally accompanying Denzel aged 10 on the train to meet his father's parents, she had a few years later become confident enough in his abilities and familiarity with the terrain to allow him to leave the house and travel unaccompanied by train as a young adolescent during the school holidays to spend the day with her own mother:

A: and then, you used to take that when, you used to go see grandma when she lived in the Meadows, do you remember? Used to go Nottingham station, he used to take his bike on... ..and He used to meet my mum the other side erm, especially when he was younger and I was going to work six weeks holidays etc, but he was old enough to get himself up and get ready and then I wouldn't make him get up early, but he would have to get up and meet mum for about 10 o'clock or something, and he go spend the day with my mum, so we had breakfast--, well not breakfast, well sometimes, breakfast probably knowing you! Erm, he'd spend the day with my mum 'cause obviously he's too young to be at home all day on his own.

Me: How old were you?

D: er, I've been about...

A: I'd say about 13, 13-14 {okay} so it was just...

MeME: And you were quite happy for him to do that bit on his own, going on his bike and getting on the train...

A: Yeah cause literally, obviously we've never been far from the tram station my mum met him off, at the train station, so it's not as if he had to really go anywhere he didn't know--, erm...

MeME: Did your mum meet him by bike as well? Did she cycle?

A: Yeah mum had a bike yeah they used to go --, did mum used to take you out on bike rides or...?

D: Yeah, we used to go out on bike rides we'll get food somewhere then we'd go back to their, place...

Already familiar as a child with combining Cycling-PT for family visits, Denzel had also independently sometimes taken his BMX bicycle by train with friends for social activities. Denzel's understanding of the social value to him of combining Cy-PT with his peers as an adolescent contrasts with Angela's appreciation of how the same basic combining of modes

helped reassure her when faced with childcare worries during the school holidays when Denzel was a young adolescent:

- Me: *Is there anything else you want to throw in about how, erm, combining cycling-PT has been helpful to you, or Denzel?*
- D: *...I suppose it has in a way, like, going out with mates and stuff, it's been convenient.*
- A: *... it is really good like obviously six weeks holidays when, especially when he was younger, being able to go to my mum's --, or to his nan's or something. Obviously it helped me out massively*

Angela continued to cycle to the nearby train station and combined tram stop as part of her daily commute to work, still integrating a bicycle trip with the train journey. As part of her routine she would typically first take her younger son Tom to his nursery, then either detour to exercise at a local gym, or would go home directly to collect the bag she had already prepared to take to work, before cycling onwards to the train station. She described the journey homeward as being the reverse of this sequence and commented that her younger son Tom did have relatively long days at school and nursery.

4.1.2 Alignment of children's independence with parents' beliefs

Angela's contemporary daily journey to work involved taking Tom (5), her younger son, to his nursery that offered a Breakfast Club and received children from as early as 7:15am. She did not detail Denzel's childcare arrangements as a younger child, but indicated her belief in children being able to travel actively from as young as possible. Before the boys could accompany their mother by scooting or bicycling alongside her, Angela had carried them in a child seat on her own bicycle, something she had found helpful, but she had encouraged them to propel themselves once they were able using scooters, pedal-cars and bicycles, from around 2 years old:

- A: *But yeah, so he's, he's, gone to nursery on his bike for a long time now, hasn't he? Denzel how many years is that?... Think since he's been about two, I think he's been, taking himself...*
- Me: *Since he was two?*
- A: *Yeah, he went on a balance bike so he's going a mile there and a mile back. It's not, a mile any more because we live a lot closer now but, we used to live further away...*
- D: *Mmm, I used to go through that pathway...*
- A: *Yeah, he's always loved it, thinks that it's great, and I think with a balance bike, it's erm a bit of independence for them, {Tom: Mmm} because, I know you can buy those bikes that are attached to the back and it's like--, it's a bike for a child to sit on, but it's also, is attached to yours and, I never really liked them I didn't find them very, I didn't think they was very safe, but with him on a balance bike it gives them a little bit of erm, independence himself and I think it, -- helps them grow! And he's always been...*

Angela's observations on the value to her of the boys being able to move through their own efforts may reflect the challenges she would have faced as a single parent tackling a regular childcare journey, comments echoed by Dorothy, a participant in a small group discussion who had also brought her daughter up alone.

In Dorothy's case, the belief in the encouragement of independent mobility capabilities in the child was also interwoven with valuing the flexibility this could give the parent against a background of financial and scheduling constraints. As a single parent from Nottingham, Dorothy described how she had not been enthusiastic about needing to accompany her daughter, then aged around 8 years old to school, as a result of changing school policies that required parents to escort their young children. The apparent delaying effect of social encounters with others as she accompanied her child to school as part of her own journey to work being the challenge:

- Me: ... So, can you remember how, how you allowed, how you, help them develop some I don't know, ability to travel on their own?
- D: I was lucky where I live that we had a patch behind us where she could go to the shops without too many busy roads and things, erm. It was very difficult actually because, when they go into primary school, you never go far without bumping into somebody...
- D: ... and because they started, wanting more parents to go, so even if I let her go on her own, she'd always within, a short distance have bumped into some other people, there's always so many people going so it was actually very difficult.
- Me: how old was she then?
- D: well primary age...8 I think ..., and I, walked but the trouble was I actually was using that route to go to work, so we were kind of going down together... And secondary school she had to go on her own because she had quite a distance to travel in,...

Dorothy had balanced maintaining an income through work, while managing her parental role and the household, by fitting a pattern of working in part time jobs around her childcare responsibilities. Concerned at the prospect of her daughter being left alone throughout the day during the school holidays, working part time during the mornings gave her daughter the space to get up and make her own breakfast, but having reduced her working hours, Dorothy found a second part time job during the evenings as a response to the inflexibility of her original employer when her daughter was growing up, the time together in the afternoons enabling them to regularly share a meal together. Dorothy who had recently combined cycling with the train to visit friends in London and her grown-up daughter in South Wales, had combined Cycling-PT for occasional longer leisure and social trips since the time she had bought a second-hand bicycle in her twenties to replace a long walk to and from work each day. Using a bicycle as her main form of personal transport continued to provide her with adequate travel flexibility across the city. Cycling saved on travel costs and had also proved useful when preparing her daughter to become self-confident about returning home from school alone:

- D: And when she was learning to go home on her own I used to sometimes-, because I changed jobs, because of lack of flexibility, and, end up doing several part-time jobs, - I used to literally go round the block and hide, to let her, let herself in, because at one stage I was leaving work, to get home around the same time, because it was the bit of time she needed me. I could go out to an evening job later on but, that little bit post-school, have a... {B: yeah!} ...have a natter, have a bite to eat then, - that's it, that's the communication for the day done! {Sure.} But having a bike enabled me to do that because I could surreptitiously, tootle around the way. ...Which was really good.

For other participants who had combined the use of Cycling-PT only for occasional discretionary trips, accompanying children to and from formal childcare provision or school was often facilitated by journeys on foot, bicycle, bus or tram, and sometimes by car. These parents had also encouraged their children to develop independent travel skills, and were content for them to walk to school alone, or accompanied by another child or sibling from a relatively young age. In these cases parents recognised the temporal constraints of escorting children and believed in encouraging the independence of their children as a principle.

At the time of her involvement in the discussion with Dorothy, Bridget had cycled to work twice each week as a result of sharing her recently acquired car with a friend. She too remembered allowing her girls the opportunity to walk unaccompanied to primary school once they'd got to 8 or 9 years old. Generally, however, Bridget had gone with them to school, daily pushing her bicycle while the girls walked, then cycling to her workplace. As Bridget's and her partner's working patterns and travel needs had changed when their jobs had changed, they had had to agree on schedules to determine which parent would collect the children, or return home in time to meet them after school, schedules that had sometimes been flawed:

- B: *I found that erm,... Once they could travel by themselves, to school, erm, particularly secondary school because it starts earlier it meant that I could start {earlier}, I used to have an arrangement where I could start work at 9:30, so that I could drop the kids at school and ...*
- Me: *By car?*
- B: *no, no, that was, usually I'd walk down with my bike actually and then cycle into work... I was in a different job then, and once they were going to secondary school I was able to, erm, - not that I wanted to but I could've started work earlier! And so it meant that like now my job is that, starts at 8:30, that's okay, because the kids are self-sufficient. And then they () could come home and let themselves into the house, once they were able to do that, that made things easier because I didn't have to be home at three.*
- Me: *Huge benefit then?*
- B: *Yeah, so me and my partner would do a lot of juggling, all that kind of stuff, and then when they got to kind of 13 probably around that age? They started to be at home on their own and...*
- Me: *... And that worked?*
- D: *Yeah, yeah. We had a couple of, moments when they were younger and we, got confused about who was doing it and, they were found on our doorstep!*
- B: *(chuckling as she speaks) ... one of us had to race home!*

Bridget had been able to make arrangements to arrive at her workplace at 9:30am to allow for taking her daughters to school, but for Dorothy as a single mother, the need to maintain several part time jobs and the inflexibility of her employer had been a constraint. She had at one point changed jobs to ensure her daughter was not left alone at home at key times of the day as a young adolescent. While the mornings for these families either involved scheduling tensions around accompaniment of children to school, or more relaxed start times at the parent's workplace, different social obligations and norms appeared to govern the reuniting of parents with children at the end of the school day. The afternoon childcare procedures offered scope for development of a child's independence – by accident or design, when mornings were structured by institutional expectations and coincident start times of school and workplace.

4.1.3 Reproducing travel skills, comporment and mental maps

Bridget and Dorothy, both occasional users of Cycling-PT, also discussed how they had encouraged their daughters to travel into town on the bus in preparation for the change to secondary school, as well as to support other recreational activities. Awareness of the children's impending need to be able to travel independently to school had prompted these parents to guide them through the first few journeys, but also to seek other opportunities for experiencing PT. This had been achieved partly through activating as resources the families' and children's social networks to make trips to discretionary activities with the children. If accompanied by a parent to secondary school on PT, the children had rapidly adopted the travel practice and preferred the company of trusted peers or siblings to that of parents:

- B: *...I am quite proud of that, erm! (Laughs) and then er, when they went to secondary school my oldest daughter I did take on the bus to show her the route, it was just a short bus ride from, down the road to the secondary school and then after the first day she did it by herself and I met her, or walked her to the bus stop and by the end of the first week she didn't want me to be anywhere near her! (Dorothy laughs and Bridget also briefly laughs...) ...Going to school, and...*
- Me: *that's how it goes, isn't it?*
- B: *and my youngest didn't –, wouldn't have me go with her at all, ... she just went with her sister and, then...*
- Me: *what age was she then?*

- B: ...when she went to secondary school she was 11, so. So I did it with Fiona, but I didn't with Geraldine.
- D: I must admit the summer before she went the, they were starting to meet each other in town, because, a lot of the friends were little bit -, slightly in different bus routes and things so, they learned -, the idea was that they practiced, go -, travelling inde -, properly independently and using PT independently.
- Me: Was that a conscious thing that they did, or their parents let them do, or was it just something that they...?
- D: Oh we, we kind of thought... it would be a good idea and let them, cause they'd been asking, "Can I go to..." you know, town on their own and... They want to go to the cinema or, out for a, for a, coke or coffee, or some-, tea or something. But the thing is they had to be competent on PT...
- Me: this is as 11-year-olds?
- D: my daughter's -, yes she was only just 11, because, she was a late-, end of June baby; but she also had to get to dancing class! ... which was in town... { }...so we had a complex journey so we just talked about it, once your confident... So you know, it was a case of, "I'll meet you there, with your dancing stuff, we'll swap bags and..."
- B: I remember sitting on a different seat in the bus {D: Oh yes...} and, going with friends and, sort of sitting for a while me and a friend would erm, go with our kids to town and then me and her'd sit in a cafe, and they'd go off and do, - you know they'd go to "Claire's" basically! (Laughs)
- D: Yes, yes! Bridget (also laughs)
- B: ...And then they'd meet us at a set time but we were on hand if they was any difficulty, and, we just er, did it that way really.
- Me: and what age were they?
- D: they were about, 10? { 10 - 11, around that age... (Nodding)
- D: It's kind of preparing for secondary school, where they have to travel on their own, because they'd be mortified of mum taking them.
- B: well yeah, they'd get ribbed to death, wouldn't they, it would be awful...

In discussions with the families, children confirmed their confidence and preference for travelling with peers to school, although it seemed from many discussions that children were generally happy to accept the offer of a lift to school or other activities, or if a parent could be persuaded to take them.

Formal guidance for children using PT exists in the UK through rules and regulations, and legalistic codes of conduct typically associated with the issuing of children's travel permits and identity cards. Structured formal training or induction activities for using PT are scarce, primarily designed for training people with disabilities to travel independently, although some case studies of training programmes intended for children have been identified as part of recent EU Mobility Research projects.

Travelling with a parent on a regular journey had given some very young children direct experience of combining Cycling-PT, and seemed to have already started to developed their understanding of procedures and comportment. Their memories of travel at such a young age, however, were imprecise. Bart could only remember having gone on the back of the bicycle as an infant, and had forgotten the details of the train journey. Winnie and Doug recalled that the stage on board the train had involved activities in which the father had sometimes occupied and entertained the child for the relatively short journey from Leicester to Nottingham:

- Me: what did you do on the train?
- B(14): ...I don't know. (Shakes his head).
- W: he used to have... dad used to take board books, and things to play with so...

D: *sometimes we had books, sometimes we had snacks, sometimes we played games we just looked at stuff that was out the window, just amused ourselves.*

Some of the behaviours embedded in the routine journey of parent and child had become associated with the young child's developing spatial sense and mental map of the trip. The experience of combining had enabled the infant Thalia to observe her father's gestures and emulate his signals, having learned to recognise places along the route they regularly took on the bike:

W: *well you Thalia was really funny because, Doug discovered that when he was riding along that she learnt all the places to signal, so she used to put her hand out to signal where they were going ago you discovered...*

D: *I've turned, as I turn my head one day I saw her... (Doug gesticulates by placing his arm out in the right-hand right turn hand signal)*

W: *could see that, she knew the route so you used to stick your hand out when it was time to turn, which is quite funny.*

T(12): *well it's better to signal than not signal.*

D: *and we did that for erm, yeah good few years ...*

W: *but the people on the train like, other commuters on the train that weren't always impressed were both with, children being...W: ...At rush-hour on, on the train.*

As Winnie suggested above, some other passengers would have expressed disapproval at bringing such a young child on board a busy commuter train service, it would have been unusual at any rate. Experienced regularly, it could be that the children also acquired an understanding of the comportment expected of them on this typical commuting journey when on PT.

For this family however, the practice of combining Cycling--PT to travel with children and bicycles was associated with Doug's specialised mode of travel to and from work. More recently, Doug had taken his daughters Suki and Thalia on occasions when he had to combine going to work with looking after his children. On these occasions the daughters had accompanied him riding and taking their own bicycles on the train to Nottingham. The girls were able to recall a recent journey to their father's work and the challenges as they had experienced them:

Me: *so you cycled on your own bikes, and... (Looking at Doug) you went on your bike?... (Doug nods and says "hmm") ... and you all got to the station then and tell me... What was that journey like then?*

S(9): *long.*

T(12): *my legs hurt!*

That journey had involved both children and Doug cycling uphill along Maid Marion Way, a major road that connects the railway station with Nottingham's city centre and the Nottingham Trent University district. These journeys were clearly not a frequent occurrence and related to Doug's occasional need to work on the weekend or during the children's holidays (as memorable perhaps for the meal enjoyed, as for the journey itself):

S(9): *actually, I think the last time is, when I went... Erm, work with just me and dad and we went to like a burger place...*

T(12): *when did that happen?*

D: *oh yes, - that was when I had to work on that Saturday wasn't it?*

Winnie worked part time for much of the year, but during the summer holidays she increased her working hours, when Doug's job at an education institution meant he could generally supervise the children at home, however the children's holidays had not always coincided with those of their parents.

4.1.4 Managing resources, schedules and roles by the season

For much of the year Doug's regular commute by bicycle and train to Nottingham from Leicester meant that Winnie's role had encompassed most of the childcare routines. At the time of discussion she would take Suki to and from her primary school as the two eldest children were by then using a dedicated school bus service to travel to and from their secondary school. During the warmer months of the year Winnie would often attempt to cycle with her daughter to and from her primary school, integrating this with exercising their dog 'Tipper':

W: *erm, I tend to work three days, generally ...It depends a bit on the time, I work, because I do like, a whole weeks in summer holidays and things like that. Erm, but I will tend to... like if I'm-, if I finish work at say 2 o'clock I'll come back, do a couple of jobs and then hop on my bike, and get Suki, so I have to pla(n), like I have to know in advance most of the time, erm, whether I'm going to, where I'm going to be and whether I can take her to school, cause what I don't tend to do is, - No, that's not true actually, I was going to say that I don't tend to go, there and come back but but actually I nearly always do that, and usually-, and then, get, jumping in the car, but the other thing that I'll do is I'll sometimes cycle to school with Suki and Tipper, cycle back, then get in the car and do what I've got to do and pick her up in the car and just bung her bike in the back, if I can't get home to get my bike, so at least we'll have done one, - way... {Mmm hmm?} but usually in the depths of winter because it's cold and it's wet and it's dark, erm...*

...

Me: *so what happens in winter?*

W: *I just tend to go in the car {okay?} and take Suki in the car...*

Me: *... When do you tend to make more effort to use the bike?*

W: *usually, once... It's not, either it's not too cold or if it's not too wet, and basically we just, we go through phases where we do it quite a lot, and then we fall out of the habit...*

Cycling with the children to school required additional effort and organisation, as this involved negotiating access to the bicycles which were mostly stored in a dedicated cycle storage facility in the back garden and bringing them through the house onto the street at the front. Doug's bike, used to commute daily throughout the year was stored inside the house near to the front door. In the winter months the charm of cycling faded in comparison to the additional organisation and negotiation that cycling with Suki to school would entail as Winnie indicated in this description of her role as mother and carer for the family:

W: *... But, usually at some points..., like we cycled in September, and probably to the beginning of October and then ... somewhere around then, once you get a few miserable days, so things like, - our bikes are in our shed in our back garden, so in the morning you've got to go out there unlock the shed, unlock the back door, bring them through the house, because we can't get round, the other side, and get all the kit together and the helmets and it's just like an extra load of things to do, erm... Like so for example if we had a house with a garage where you could just open your garage door and take your bike out and pick your helmet off it would be a lot easier but, every time that any bike is going out this house, it involves going out unlocking several locks, taking a bike down off a rack, bringing it through and whilst that doesn't sound like much, when you've got to get everyone out and you've got to get their lunches out and you... {D: Mmm}... Everyone's got to have breakfast and, it's just, - it's fine for Doug because he just has his bike here, does his thing, off he goes, but it's like a whole other world of pain really.*

(1:20:01)

D: *well sometimes like you might say the night before, I quite often say I'm riding tomorrow "can you get my bike, can you get our bikes out?"... And I'll do that. (Winnie was talking at the same time, we now hear what she just said).*

W: *you get my bike out, yeah -, I say "get my bike out..." Yeah. (Nodding).*

And... *again, once we're in the habit of it but it's like at the moment the idea of doing it on a cold, wet morning, it's just like... (Winnie exhales a breath of exhaustion.)*

Doug and Winnie had considered allowing Bart and Thalia to cycle to school, but had reservations about their children's safety in the dense traffic and at particular 'pinch points' along the route, as well as their personal safety with respect to strangers. Discussing this with Doug, Winnie contrasted the constraints on her children's cycling with her own childhood experience of cycling from a very young age:

- W: *my main issue, erm –, is again, the traffic and there are cycle lanes of the Aylestone Road but car drivers are really not...*
- D: *those are painted on cycle lanes but they are the painted on cycle lanes, they're not segregated.*
- W: *...They are not, and drivers are not thoughtful or considerate and, ..., it's really the behaviour of drivers erm, that would make me less happy about it I think probably like, if Thalia and Bart, this, I think Thalia and Bart this summer this summer should be able to cycle to school together I wouldn't probably want Thalia to ride on her own {Mmm hmm} because I think, I think actually because, erm... Not very many people do like walk or cycle, those sorts of routes I think it, it feels like children are more vulnerable erm...*
- Me: *from traffic, for traffic, or for other 'stranger danger' type things...?*
- W: *...I think with Thalia being the age she is I would be a bit worried and, because there have been incidents, locally of sort of stranger danger issues, I know that she'd probably be fine, but I would say that I'm probably-, I'm not like really laid-back and chilled about these things I am, not completely-, neurotic about it but...*
- D: *I... I must say I worry more about the behaviour of drivers, erm.*
- W: *yeah... It would really be the road tra-, but things like, like when I was a child I cycle to school all the time on my own from when I was 7-8,...*

To the deterrent factors impeding the opportunity for the children to cycle regularly to school could also be added the constrained space for storing the children's bicycles at home highlighted by Winnie.

Compared with the previous example of Doug and Winnie's Leicester household, Dave and Margaret's Leeds family home setting provided more convenient bicycle storage and closer proximity to the mother's workplace. Roles were similarly allocated in both households, husband Dave normally cycling from the suburb of Oakwood to Leeds railway station and commuting by train to his workplace in Guiseley, a small town outside Leeds. This household's narratives illustrated Dave and Margaret's shared values of resilience, independence and enjoyment of sports and outdoor activities.

Margaret who had commuted by Cycling-PT before her children were born, worked part time a short bicycle ride from her children's primary school. She used the family's car to take their two young boys to school on the one day each week when attending a regular early-morning meeting. The rest of the time she had endeavoured to cycle with the boys to school since her youngest child became able to ride his own bicycle, journeys she described as a 'mission'. Amongst the challenges she and her small children faced as they cycled along footpaths were vehicles emerging in reverse from driveways with drivers unable to see her children on their bicycles, and the perilous crossing of busy road junctions with motorists frustrated at having been stuck in traffic, underlining the road safety concerns of Winnie and other participants.

Margaret emphasised having to be '*organised and structured*' to safely manage their children's active commute that involved interactions with motorised traffic. She and Dave also described the complex preparations necessary before their children would set off for school in a Leeds suburb, some relating to the journey by bicycle, others to those extra-curricular activities wrapped around the school day that also bought her extra time:

- M: *...I mean we don't go on as many, fun rides in the winter...because it's, you know cold and dark, but we, when he started school this year we made a family commitment that we would*

ride to school as close as we could four days a week. There's one day a week when I have an early meeting and so it's easier just to drive in the morning, but –, and we've mostly done that and that's been, "come rain or shine". There's been the odd day, when, things have changed or, they've been ill or, it's been really disgusting wet, but generally we've done it but it did take a commitment, I bought a new bike and ...

D: I, I commute to the station in whatever weather. I would prefer to... I've ridden in deep snow, cos I just, erm, I value the experience of riding far and above sitting in traffic in a car.

M: The kids are-, I mean yeah we, pretty much done it this year and that's including after-school club, but as a –, it's taken, you know I've had to get panniers so that the kids book bags don't get wet and I've got enough space for the swimming kits and my stuff, I've had to –, I've got a new bike because my old bike was, knackered, they've got really nice bikes so that they can ride, without moaning and whingeing or anything, they've all got waterproofs they've got coats, they've got hats, gloves, two sets of gloves...

D: And then you've got to take the swimming gear, the karate gear, the... Their music, the piano!...

M: Oh today the food for the party...

M: ...the piano kit... So I have everything, but we made a commitment and... we've pretty much stuck to it, since he's started school which-, cause I haven't been able to ride much because he's been at my childminders' and-, but this is at, this is what we've made this year, but we also moved here, with the idea that we would-, he would always commute, that means we have one car. Which has a { } downside sometimes as well.

In the families of both Doug and Dave, as regular cycle-rail combiners, their regular travel patterns required their partners to take on the majority of childcare-related trips, but also made the household's car available if needed. Cycling regularly to the station by one parent had enabled the household to manage other activities and tasks with one car, liberating the car's use for regular journeys to bring and collect children to and from childcare.

Haziq and Ishrat in Nottingham's West Bridgford neighbourhood had also managed with one car for all the family's activities during the period that Haziq had studied for his PhD. To economise Haziq had cycled to take the train to Sheffield on 4 days per week enabling Ishrat to take her son to pre-school by car on those days. During this time, Ishrat had given birth to Jasir, their second son. One day each week Haziq had travelled to work in a hospital in Mansfield, but after experiencing racial abuse during one particular train journey on the Robin Hood Line, Haziq reverted to using the car to that destination. The couple described the more complex scheduling processes and constraints associated with PT that had eventually led to her using taxis when Haziq had needed to use the car:

I: no I'd take him to preschool, in the car, on Friday morning because his session was on a Friday afternoon.

Me: oh I see, so you then handed the car keys effectively... {yeah...} at midday?

I: yeah, yeah, we're sort of working in tandem, and then I think you would do the pick up, you'd pick him up... and then go to work, erm...

H: so I pick him up, drop him off home and then go to work.

I: yeah. But, on the day when he needed the car all day, I would take the bus, and buses here run erm, up to, up to his preschool they run every half an hour-, there's only two buses and they both run every half an hour, and it's not like they come every 15 minutes, the schedule is really strange it's like, they'll come within five minutes of each other, and then they'll come 25 minutes later if that makes sense? {yeah.} And that was very irritating for me because-, and they have specific times for the bus so if I missed it and especially when I was pregnant, erm so I just used to take a taxi, when I was heavily pregnant because, I couldn't do it it just wasn't possible for me to always get there, erm on time...

Me: at a specific moment when the bus...

I: yeah, and there were times when I was walking along and I could see in the distance that the bus was coming and it's coming early, so it just became...

As full-time carer for her younger son at home, Ishrat had consequently had to change her elder son's pre-school session time in response to Haziq's need for the car to commute on one day each week to Mansfield.

4.1.5 Time-saving spatial patterns of commuter's childcare trip-chains

Two patterns emerged for the incorporation of childcare or school-run stages in workers' regular trip chains, journeys that continued from nurseries or schools directly to railway stations, and others that involved a return to home before continuing onward to PT. Angela had usually integrated taking Tom to his nursery with going to the gym on most days, then returning home and swapping bags before continuing to the train station by bicycle. The detour via her house resulted from the combination of activities, as well as the geographic distribution of home, nursery, sports centre and train station. Leaving her bicycle parked at her local train station enabled her to return swiftly to collect Tom from nursery at the end of her working day, then both cycling home together. The main potential risk to this arrangement would have been delays to her normal afternoon train service, or its cancellation.

For other families that integrated the childcare journey with the journey to work, a detour via the home could also be related to travel resources and the working pattern or schedule of the two household heads, as well as the geographic locations of activities. Nicholas commutes into Leeds from York, where he and his family (i.e. his wife and two children) live without a car, cycling to most of their everyday activities. Using a specialised Bakfiets cargo-bike adapted with seats to carry young children in the relatively flat terrain of York, he, or more typically his wife rode with the children to school, the family also assisting another local parent by giving their daughter a lift in the cargo-bike. Their children attended a school that encouraged active transport by walking or cycling and provided secure and covered cycle parking for the children's bicycles, as well as cycle training for children:

N: ... two kids sit in the box long-wheelbase bike, we cycle to and from the er, school with them, it's got a cover, we sometimes take erm, another girl as well, her mother's disabled and uses a wheelchair so, , she'll meet us up at a particular point on the journey we'll take her daughter as well, so there's three of them on the bike... which is great fun! And my youngest son is five so he's cycling himself, so on kind of quiet days in good weather, he'll cycle alongside me on the Bakfiets for instance, so I do the school runs some mornings, my wife does it mainly though.

The use of a specialised type of bicycle adapted for children required it to be capable of being used by both parents at different times. Nicholas explained how this necessitated its return to the home, and a change of bicycle for his onward commute to the station:

N: yeah, yeah, so I'd erm, because the school is erm, in the exact opposite direction to the train station, I'd bring the Bakfiets bicycle back to the house, Park it there, pick up my Brompton then go to the station erm, generally because then the wife's back and she needs to, she needs the Bakfiets to pick up the kids then later in the day, so am there's that. Erm -, the odd time I'll have a bad cold or flu, I just don't feel like it! And the weather's bad, I mean mostly...

Where the homes of Nicholas and Angela were both situated geographically between the location of childcare and the train station, another participant, Nick described to Justin and Sarah in a group discussion how he had previously cycled with his young son (aged 3-4) to nursery before continuing by bicycle into Leeds to catch a train to one of his two regular workplaces in Dewsbury and Huddersfield. His words suggested that there could be both negative perceptions related to the comfort of a very young child being carried by bicycle, perceptions that were translated as safety risk concerns by some participants in other discussions:

- N: *Past 18 months? My son's er, just turned six, so he's just finished year one, so he's been at school for 2 years now, I know before he started school, he, was at nursery, we used to cycle up to nursery with him on the seat, {Child seat?} Yeah, and then i'd sort of cycle down into town getting all sorts of funny looks, because you've got a child seat on-, empty child seat on the back of your... but you know the biggest challenge there was just stopping him falling asleep! So, it's up quite a steep hill and he'd nod off! And they haven't got the same support as a car seat...*
- J: *it's that motion, isn't it?*
- N: *Y, and it was about his nap time at that point, 3 or 4 years, 3 years old-, so you're sort of cycling up a big hill with your arm... [bent arm??]?... behind you trying to stop him from cricking his neck... {...did he have a restraint or something?} Well he had a restraint, but he'd still sort of loll his neck over like this, you know.*
- Me: *Doesn't look comfortable...*
- N: *Doesn't look nice... a few sympathetic, and a few 'clucks' of concern from people as you go past (tuts as he says this: "Tst! Uhh...")*

With his youngest then aged 6 and living in hilly terrain, on some occasions when faced with taking two children to primary school he preferred to leave his bicycle at home and would take a bus with the children before going on foot directly to the railway station to catch the train to work. At that stage in the family life-course the youngest child was already too large to be carried in a seat attached to his father's conventional bicycle, but not yet able to ride his own bicycle up a hill that would also have been difficult for his 8 year old daughter.

- Me: *... Why would you take the bus? Because of the, fact that you're doing work trip, for example?*
- N: *... for example yesterday would be a really good example actually where I needed to be at work at a particular time, but it also needed to do the school run, so-, and because the children aren't quite there for kind of cycling up to school yet, and taking the taxi we bussed up to school, {yeah?} took the bus up to school and then ran across to the railway station, erm, because and there just wasn't the time to come up home pick up the bike and then sort of get off again. {sure.} Erm, I did tr-, I was toying with all sorts of ideas you know, take the dog for a walk up to the school at 5 in the morning and, lock the bike up and then walk the dog back down-, I felt- thought I'll just take the train! {laughter} Just the complexity of it.*
- J: *So do you have to go into the school then? Is- is that why you can't take your bike to-, the school?*
- N: *The chil-, its about a mile and a half to the school and the children are at primary still so they're not qui-, and its uphill, so they're not, the bike-, they're not quite independent enough to manage that journey,...*
- Me: *So you just accompany them on foot effectively?*
- N: *So we walk round the corner and catch a bus... for it, and then they walk the rest of the way so its, just takes that hill out, there's a big steep hill in the middle, just use the bus to knock that out of it...*
- Me: *So the hill puts you off, or puts the kids off?*
- N: *puts the kids off {right} erm, 'got a six-year old who just becomes, mister-, "I'm tired!", you know...*

The 'school run' was a duty shared between Nick and his partner at different times of the week, a pattern confirmed as he later described their different exercise preferences and acknowledged her role involved in the childcare - often doing the 'school run' when Nick cannot:

- N: *... her exercise of choice is running, but-, erm... I think she's, we talked earlier about the envy thing? I think she's quite jealous that I have that, sort of freedom and flexibility in terms of, I don't need a car for work, erm, and I know that she does for a lot of-, for aspects of her job so if she can't even, kind of-, and she... also does lots of the school run as well, at the times that I can't, so that-, managing that process is much easier with a car I think?*

Families with two parents sometimes vary their childcare journey routines, with either parent contributing when necessary or for convenience. Accompanying children on trips or from childcare, however, typically remained a responsibility associated with one parent in

particular, and with particular temporal arrangements and differences in work schedule flexibility. Negotiation between household partners across the long-term may have enabled the establishment of a main 'script' for childcare journeys with a bicycle that could later be used to access PT.

In the same discussion another participant, Justin, described his long-established routine that integrated accompanying his younger son to school before he cycled to the station to catch his train to Leeds:

J: Yeah... I, I drop my son off at school {Ok} and then, it's a lot easier to catch the train if I've got my bike, cos, I get there, quickly, erm, {or} and now I've done it for the last 13 years so I, I cycle to the train station in Burley-in-Wharfedale then train to Leeds, then cycle to work in Leeds...

Me: ... how old is your son now?

J: He's 11?

Me: Ok, {yeah} and he takes his own bike, presume...?

J: He has a scooter, {oh right, OK} yeah. But we don't have to bike to school, it's near enough to walk to ... it just gives you...

Me: You just go straight from there?

J: it just makes it easier to catch the train because-, you don't have to run up the hill.

His wife regularly accompanied their son in the afternoons, walking home with him from school. Justin estimated that by using his bicycle at both ends of his own commute instead of walking he had saved almost 50 minutes each day.

4.1.6 Challenges and ad-hoc tactics when collecting a child from care

Being prevented from boarding a train when travelling to work can result in a late arrival, something which participants felt concerned about especially as they were sometimes in receipt of concessions or particular provision at the workplace. When travelling homewards with a bicycle, however, not catching a train as planned can threaten arrangements for collecting children from childcare, once experienced this results in the development of strategies to ensure collection of children is ensured. There had been times when Justin had needed to collect their child from school after work, but he had sometimes experienced difficulties when attempting to board the train at Leeds with his bicycle.

J: One, one thing I've had a problem with, there's a ticket inspector on the train, there's only one, who if there's more than two bikes on the train, he won't let anyone else on so he'll chuck people off, and then you're like, if you've got to get home to pick your son up from s-, from after school club or something you're like-, what can you do so, I'd started taking my bike lock to th-', with me, so I could quickly lock it up at the station and get on the train...

Me: Which station would that apply to?

J: Erm Leeds... cos it doesn't matter coming in, really...

Me: Ah, because you take one of the easy platforms don't you, 1 to 5 which are all on the same level so you just have that...

J: So you quite near the bike lock-up bit, but that always-, it's a bit inconsistent and its, it kind of was worrying for a bit cos he was quite often on the train and just...

For Justin, the possibility of not getting a place for the bicycle on a busy evening rush hour train had resulted in formulating the contingency plan to quickly lock the bicycle up at his destination station, Leeds. His journey into work was usually after the busiest peak hour services and he always found space for his bicycle, except when travelling on an earlier train than usual when he would sometimes not bring the bicycle.

In a different group discussion in Nottingham, Kenton described how having only one car in the household, commuting from Sheffield by bike and train was his only option to get to work on the 3 days each week that he worked at an office in Nottingham. On those days his wife collected the children:

K: ...when I'm cycling my wife, has the car even though she works very, much closer in Sheffield, and she will-, does cycle when she can, er, she does the childcare and, coming across town and she has the child pick up duties so she has the car, {okay?} so I'm pretty much forced to cycle whether, rain, shine, hail and shine! Erm, you mentioned bicycle maintenance, you're missing a trick, two bikes!

Discussing the varying approaches taken by train guards to allowing more than the official limit of two bicycles per train, Kenton described the challenge this could pose for arriving punctually at work. While this could affect his relationship with his employer and work colleagues, it had other implications for the household if this occurred on the return journey. On one occasion when using the train he had needed to return punctually to collect his children, however a train guard had refused him access to the train with his bicycle owing to insufficient bicycle space on board. Kenton had then been obliged to make last minute changes to the childcare arrangements for that evening to allow for his own delay in returning to Sheffield to collect the boys:

K: ...So they're quite chatty about it, but there is one known individual, who causes fear, strikes fear into everyone's hearts that he stands by the door, that the entrance, for the bikes, and he, they are the rules: "two bikes on the train", if there's two bikes he just, loves to say "sorry there are two bikes, you're not coming on, its health and safety... I'm in trouble, if the train crashes it'll be your fault but I'll get into trouble!" And that's the law, and there's no, no persuading him, no sweet talking around, and the impact is an hour delay, the route that I take, it's an hour, train er, or a train every hour. And in the morning you get in an hour late, okay you're now an hour late for work, it has a knock-on effect erm, for making up hours which, I've hinted, quite restricted, but sort of coming back home as well and, and there was one occasion where I had, on Friday evening stopped, on the train, couldn't get home I had to make up, other arrangements for childcare, and it's just a real-, not the way you want to end the week and it's just because, it feels like it's someone's subjective opinion whether you can be on or off the train, you want some sort of certainty in being able to, do this sustainable-, or this, this journey...

Where Justin had had the option of abandoning his bicycle at Leeds station in an on-platform storage area and returning by train to meet his son at school on foot if necessary, Kenton's family had established working arrangements to enable him to continue commuting by bicycle and train. Over the preceding 18 months his wife had changed to a full-time job from part time, and Kenton had negotiated flexible working arrangements with his employer so that he could collect the children on two days a week. A childminder normally took the children to school. Kenton worked one half-day each week from home then accompanying the children to and from school on foot. On another day he drove to work by car to an office in Mansfield from where he would go directly to collect his children from an after-school 'wraparound' care facility at a local nursery in Sheffield, to take them to swimming lessons, then home.

Kenton's and Justin's narratives revealed that combining Cycling- PT when incorporating collection duties from childcare at the end of a combined journey could expose the household to risk from scheduling uncertainties. As bicycle provision was not guaranteed on board the trains they took, taking the bicycle with them brought the additional risk of delays to the collection of the children if obliged to wait for a later service.

Where childcare had been provided at the workplace, as in Doug's case, children could be collected by a parent straight after work and prior to the scheduling uncertainties of the PT

stage of the journey, however, the risk of delay could then become one of fatigue, or discomfort to the child and parent. [See Challenges section]

4.1.7 Combining Cycling-PT with shared rides and travel resources

Living in the countryside 4 miles outside the neighbouring market town with a railway station offering regular connections to Leeds, Lawrence's family faced journeys considerable distances from home to most activities. His younger son's recent change from primary to secondary school meant he subsequently travelled further, either getting the bus, a lift with a friend's parents, or more recently sharing a car journey with his older brother who had recently passed his driving test. Lawrence himself commuted regularly into Leeds mixing use of the train and folding-bike on two days with going by car on another two days each week, normally working from home one day each week. Describing it as "a bit of, a weak excuse..." Lawrence justified driving to Leeds by arguing that this enabled him to drop his daughter off at school and pick her up on the way home after her out-of-school activities, also saving his wife the task of collecting her. For Lawrence the shared sections of journeys by car offered an additional point of contact with other family members that could be put to practical use, even when using the train with his folding-bicycle:

L: *...the other two days when I'm coming to Leeds, either we will, - three of us will get in the car together, with the Brompton on the back, I get dropped off in town, ride the short way to the station. Very rarely I'll get dropped off at the station, take the bike on the train, and then cycle from Leeds station to the University. er, and then usually, when I get back, erm to Northallerton I will ride the 4 miles home, so it's quite a mixture. And, and that's more about convenience you know the extra, 10 or 15 minutes in the car in the morning with, with my wife and at least one of the kids, it's just--, you know I have long days out... at work, so it does actually add up to a little bit more contact. {Okay}. I don't mean that in terms of quality time with the children but just, you know, it can be a time when we, sort out logistics of, the rest of the week or... so quite mixed really..*

Lawrence's journey home from the station in the evening could be made independently of the family's other activities that were supported by his wife's use of the car. The folding-bicycle also saved him a few minutes each day in Leeds when commuting between the station and his office just outside the city centre.

Cycling-PT was a mode of travel Lawrence had experienced periodically since, as a 16 year-old, he had gone to sixth form college, a journey that had required him to combine cycling-PT until he had passed his driving test and was given a car. Lawrence encouraged the children to take PT in principle, but foresaw them combining it with cycling only as late adolescents, concerned about their safety as this implied cycling in unfamiliar terrain:

L: *...I would encourage-, as soon as they're old enough to be confident, to take PT it's-, I would encourage them that the natural next step I think almost goes hand-in-hand is that, you know "take a bike with you if that's going to make it easier!", erm so, that's part of the reason for investing in a Brompton obviously any of them can use it. ... I think there's, probably more safety concerns there, around, arriving in a strange station, - strange town or city and then expecting them to get on a bike and set going. I have no problem with that and love it, but I would, I would probably not expect, them to be able to do that, or put themselves in that situation until, you know 16, 17, and only... if I'm happy they've got that road sense.*

The semi-rural location that contributed to Lawrence's family's travel behaviour was also a factor that had led to Jacqueline's children needing to travel often by car, as well as taxi and bus. Since she could no longer drive herself owing to impaired eyesight, and with limited bus services connecting their village to the neighbouring city of Cambridge, her children relied on Jacqueline's husband Colin to take them to some of their activities. The older son Robert (14) took the bus to school and also from school to some of his activities in Cambridge, but relied on his father, or sometimes the parents of friends to take him to some of the several other

musical and sports activities he participated in after school and at weekends. His younger sister Felicity (11) was taken to school by her father, where he also sometimes dropped off Jacqueline and her Brompton folding-bicycle, from where she cycled into Cambridge, either for activities in the city, or to take a train to her work in Nottingham. On one day each week Felicity was taken by taxi direct from school to have tennis lessons at another venue, normally driven by 'Emil'. Felicity's school had insisted on the service being provided by a named driver. I asked how the parents felt about their young daughter's lone taxi journeys:

J: so the school feels really anxious about it -, we are okay, we're quite used to Emil now aren't we? We have to have a named driver, the school has insisted... erm, and... on one occasion the school, er, were freaking out because they haven't had the driver's name or they had lost it, or something and they tried to ring me and they couldn't get through and they tried to ring Colin and they couldn't get through and eventually Robert authorised Felicity coming home in a taxi ha ha (the mother laughs) they got through to Robert and they say it's "is it okay?" and Robert said "yeah, it's fine..."

C: ...it's just Felicity!

Me: is it because you know the drivers anyway?

F: I do get regular...

J: Erm, I feel okay about it because I know that all the drivers are in fact DBS checked properly, and they're all...

Me: is that a particular company?

J: yeah, we use 'Spires', they're okay they are not always brilliant, but they're okay... and I also know that Felicity is responsible and sensible, and that...

In this example, Felicity's journey from primary school had been informed by the systemic safeguarding expectations of primary schools that play a role in the shaping of children's regular journeys, a factor also referred to by Dorothy earlier in this section.

4.1.8 Residential relocation effect

In the case of some of the younger children, chauffeured journeys to school or childcare were the result of a residential move from a locality that had previously encompassed both home and the child's school, nursery, or childminder. In the case of Doug and Winnie's daughter Suki, the child had changed to a different primary school from the one she had previously attended with her older sister Thalia before she had started to attend secondary school.

In the case of Margaret and Dave, their home move intentionally enabled the continuation of Dave's commute by bicycle and train to work, and the children's bicycle ride to school with their mother who could also cycle to her work nearby. Their retention of their Woodhouse based child-minder with whom they had built-up a good relationship, had meant an unpleasant cross-town journey for the three years until their youngest boy could start at primary school and they were able to cycle there together on 4 days per week.

For Jacqueline's Cambridgeshire family, moving home from another nearby village had resulted in Felicity needing to be taken to school by car, whereas before she had been able to walk. She continued to attend the same primary school in their former village as they were happy with it and Felicity could retain her established network of friends.

Monique's Shipley family had also moved home, previously Dinah had been able to walk to school more easily with a friend, and had sometimes been looked after at a friend's house after school.

4.1.9 The voice of children on travel to their activities

Children's perceptions of the benefits of different travel mode combinations highlighted some confusion over the relative benefits of different modes. Some considered cycling to be preferable to bus use, but children were also happy to be offered lifts, and in several instances indicated that this was their preferred way to travel.

Children often identified that their parent's travel by cycling in combination with PT had benefits, Dinah perceived that cycling offered environmental benefits by comparison with the PT with which her mother regularly combined her bicycle ride to work:

D: *I think it's a good thing to do... It's a nice way of transport, {yeah} it's good for the environment... It's much better than taking a bus, or a train...*

Me: *but she takes the train back in the evening?*

D: *yeah.*

Me: *so is that good as well?*

D: *erm... I suppose it can get a bit dark, in the evenings so it's fair enough.*

Perhaps reflecting a combination of her learning about environmental issues from school with her mother's values, beliefs and related experiences, Dinah here reflected her mother's concerns at the perceived risks of cycling along the unlit and isolated canal towpath at night in darkness.

For the Cambridgeshire family's children, their mother Jacqueline's need to combine Cycling-PT seemed to of practical value, but her son Robert (14) observed it be a complex form of behaviour:

Me: *and erm, children, what do you think, - sorry, I've called you children! Robert and Felicity - ? Well what d'you think erm, what do you think of mum's combining the bike, the Brompton and her trips to Nottingham when she does that?*

F: *I think, it's a useful idea...*

R: *I think it's quite complicated, but it works quite well.*

Felicity expressed the wish that she could go home from her school by herself, when asked about the destinations that Jacqueline's Cambridgeshire family would like to travel to...

Me: *so if there were places you wanted to get to but at the moment were a bit difficult or that Colin has to take you or, or Jacqueline has to accompany you on the bike or by bus or whatever, are there places that you would like to get to that's, if you'd like to get to on your own sometimes, or you'd like to be able to travel on your own so that you don't perhaps, require your parents to take some time out from their own to get somewhere? Are there destinations that you'd quite like to get to?*

F: *Home!*

C: *Tah hah hah! Home?*

Felicity echoes this

F: *home. (Nodding)*

Me: *home? From where?*

F: *erm, gym, tennis...*

C: *school?*

F: *(unclear word - 'swimming?'), school.*

Me: *so you'd like to be able to get back, by yourself would you?*

F: *yeah.*

J: *she'd like not to have to go to after school club all the time...*

F: *...and breakfast club, at school...*

Me: *you'd like not to go to breakfast club?*

F: *yeah and I'd like to like, go there by myself, and then go back again by myself and then wouldn't have to bother about...*

In this discussion with her parents, Felicity appeared to express some frustration at the constraints imposed on her ability to travel independently. Constraints that were the result of the geographical relationship of her school and other activities that lay outside their rural home village, distanced by 'hazardous' roads with high-speed traffic but without contiguous cycle-paths, or safe crossing points. The recent withdrawal of a convenient local bus service had also compounded the mobility restrictions on the three non-driving members of the family, since they had ceased to have an au-pair who had previously cared for the children and chauffeured them and their mother to and from activities and school.

This section has analysed how combining Cycling-PT has enabled the regular and scheduled activities of households with younger children, highlighting in particular the value of Cycling-PT to parents who go out to work. The activities of parents and children within the household have, I have argued, been supported in some circumstances by interaction with other agents, institutions and the family's social network. In the next section I will examine how the occasional and infrequent combination of Cycling-PT for leisure and recreation has supported people's health and wellbeing.

4.2 Health and wellbeing

A major theme in the literature on cycling and walking, health and wellbeing is becoming more important as a key argument in support of investment in cycling infrastructure in towns and cities, and facilities for cycling in workplaces, as is seen in the emerging literature that models these effects (Davis, 2014; Ogilvie *et al.*, 2004; Woodcock *et al.*, 2013).

Health and wellbeing themes were touched upon in many of the discussions, with exercise mentioned as a predominant theme, in some cases a by-product of combining, in others a factor that stimulated people to combine Cycling-PT. Participants reported some of specific health conditions they had experienced that acted as challenges to cycling, either related to the exercise, or coincidental. Age-related health issues were discussed, participants (who currently all cycle) sometimes anticipating changes to their capabilities that would require changes in approach to their mobility. Concerns were also raised about the health risks people might face through exposure to traffic, injury or through misadventure.

Most ordinary members of the public who participated were well informed about aspects of cycling affecting their regular cycling and PT activities. Some had a more detailed interest or voluntary involvement in mobility or health projects and activities in their regions or had experienced quite serious health issues themselves. The discussions also included some medical professionals and a Public Health official, Sustrans employees and volunteers, an "environmental professional", people working in the training of cyclists, and current and former planners who would all be aware of health implications of their activities. Others had health issues in mind through their interest or participation in particular sporting activities.

Narratives that illuminated beliefs and perceptions about the health and wellbeing impact of the cyclist's behaviour on others, both within the household and other people, are explored in the following section. Health was also a factor in some other narratives about occasional journeys that people made for leisure and recreation.

4.2.1 Cycling vs Cycling-PT

The activity of cycling was considered to offer the main health and well-being benefits, some considered that carrying their bicycles up and down the stairs was also exercise. Opinions on use of stairs rather than lifts varied between those who made occasional long-distance journeys with their bicycle as part of a cycle-touring or visiting a remote location for some time, and those who commuted daily, usually lightly-laden. The ability to take PT was considered important in facilitating cycling as exercise, by contrast, PT use was reported as stressful by those who took their bicycles on board (trains), whether occasionally or every week.

Participants who rarely combined Cycling-PT, also reported on the benefits they considered cycling offered them but usually without direct reference to the opportunity for health outcomes arising from the combination with PT.

4.2.2 Health benefits of cycling

Participants often used cycling as transport in their daily lives. Whether also car users or not, they commented on the health benefits of cycling to them. Some who combined cycling only very occasionally, described their perceptions of cycling not combined with PT. Bridget – having agreed to share her car with a friend for part of the week, now needs to cycle to work on two days and observed that “*the exercise thing*” was associated with cycling to or from PT. She has occasionally taken her bicycle on the train to cycle in the Peak District with friends, and being aware of motivation within her social circle to keep fit, she sees cycling as part of a toolkit to combat her own ageing process...

B: *... I think the other thing though is you were saying about friends. I'm sort of erm, conscious I have a lot of friends who cycle and do stuff and are quite erm, some of whom are quite, er, political and they go off and do things and erm, I think that influences me a bit and makes me think ... I'm 51 and I, I think I'm very conscious that I don't want to become erm, – really sedentary. And my job unfortunately, there is a fair amount of sedentariness in that, so I kind of feel like, there's a health thing and then I look at my peers and I think, well they're all still doing stuff so, I want to be the same, I don't want to be-. So it's a kind of mixture of, influence by, other people and, fear of ageing, and, - not such difficult kids anymore-, well they are difficult! But they're not... (Laughter) I don't have to be around so much!*

Having cycled to work, Bridget often took the bus locally, or the tram from her office in the suburbs of Nottingham to attend meetings in the city centre, returning to base to collect her bicycle and cycle home again, thus the two modes were combined with some time-separation, every week.

Vincent commented that he had, “*lost a stone in weight since starting to cycle regularly*”, he had been using the bike to get to Leeds station when commuting to work in York, but alternated this with using the car for some weeks according to his activity schedule. He was a keen football player, although when cycling had “*no particular training objectives, cycling is a practical measure for commuting*”.

Ivan, a father of 3 children from Leeds, became a more serious cyclist as a result of cycling to work, frustrated at the slowness of buses and dissatisfied with driving to the other side of the city centre in heavy traffic. Transferring his previous involvement in running to cycling due to a chronic hip problem prior to an operation that would resolve it, had enabled Ivan to satisfy his need for regular exercise. His enthusiasm for cycling was shared by his younger son and daughter with whom he also cycled for recreation. He combined Cycling- PT a few times a year, either to attend professional training events or travelling to sporting events with his

children. He also once brought a bicycle intended for his son, back by train that he had bought on e-bay. He outlined the benefits in relation to his own health:

I: I normally do a backpack but I'd save the me certainly the cycling thing is more, you know fun, it's for my sort of physical and, mental health, it's huge, you know, and I enjoy my food and things like that and I can find, because I'm cycling I, you know I don't put on quite so much weight, erm, you know, but I don't have to think about joining a gym either, but yes as I'd say mentally if I'm not cycling I get very lethargic. I had quite a nasty crash about a year ago, and after that one of the key things for me was, - I had a few issues afterwards and one of the big things was that I'd go for a bike ride or a walk and I didn't feel good, and those things would always make me feel good and that was when I thought "hang on, there's something, something wrong here!" so erm, as I say that was about a year ago but, it's not stopped me riding, erm...

Here Ivan also referred to a recent cycling accident and indicated that this incident and his resulting injuries and health condition subsequently acted as a challenge to his enjoyment of cycling.

4.2.3 'Commutercise'¹: exercise en-route to or from work

For many, the ability to incorporate exercise into the regular commute was a valued by-product of making a longer journey by bus or train with a bicycle. For others, the bicycle ride to or from work was the main motivation for making the combined journey. Exercise benefits were claimed for both short and longer rides over 5 miles, although particularly short commutes to a train or bus stop were also normally motivated by another factor, such as saving time over walking or the additional expense of an connecting bus service.

4.2.4 Light exercise, short trips

Simon had retired from a career in planning, he now does voluntary work for a charity with an office in the city centre. He often uses the Brompton folding-bike to cycle downhill from his home in North Leeds, returning at the end of the day by bus. Questioned about the health value of this kind of use of the bicycle, his partner Pamela commented that although the exercise value was limited it had some value:

P: And, the other reason would be will be how much exercise you should be doing!
S: that's the other reason yes, so I suppose so, yeah.
Me: but the exercise is going downhill, then bussing it back?
P: Ah! But it's better than nothing! It's all relative...
Me: it's movement...
P: it's movement yeah.

¹ 'Commutercise' can be found as an established vernacular term, see (accessed 18 January, 2018):

<https://twitter.com/hashtag/commutercise> <https://wtbikes.com/commutercise/>

<http://www.commutercise.com/>

<https://www.urbandictionary.com/define.php?term=commutercise>

For those who cycled even quite short distances and considered it exercise, it sometimes replaced other forms of intentional exercise, even offering some financial economies in replacing the need for other formal exercise facilities, as Damon described:

Me: Yeah, yeah, sure. So how does it help you particularly to take your ... to be able to do that, to cycle, either parking at the station or cycling all the way? What's the main advantage for you?

D: To do part of it, either, any part of it. ...because the time saving, you know, and the fitness, you know. You know, I've dropped the gym membership. You're going, "Well, I don't need to cycle on a stationary bike", you know. I'm there 365, you know, whatever the weather, apart from maybe, you know, the deepest snow or whatever, you're there and you tend to push it so, it's a-... it's about a mile and a half from my house to the station.

Damon works part-time in Leicester, travelling there by cycling and parking his bicycle at his local station, train, then walking to his destination.

D: Yeah. No, I mean the university has, it has showering facilities, but ... for me, that's a different, it's a different sort of cyclist ... that is, those that want to put the Gore-Tex, you know, the bodysuits and leggings and all the rest of it on, and-, they change, and I don't. All I do is I take the Hi-Vis off and I take the trouser Hi-Vis bands off and I go to work... I don't feel the need to shower, you know. ... I carry antiperspirant, you know, because as a cyclist you do, because you know that sometimes you're going to arrive somewhere and go, "I just need to freshen up a little bit here", you know, but those facilities are, you know ... I think that if you're going to get really serious about it and go well everything's yellow and everything's high-end expensive Gore-Tex and it's, you know, all seriously waterproof ... What I do is I carry Berghaus waterproofs, black ones, and if it's ... if the weather's really bad, I'll put the bottoms on as well as the top, and I've got waterproof gloves and all the rest of it and then they come off and at the other end, I'm like, well, you know, I'm just a normal walker, so straight to work.

Damon also described walking to the station, his alternative on days when he chose not to cycle, in terms that implied the potential exercise value of walking:

D: ...a good 20 minute walk and that's ... I mean, you know, that's a sweaty walk, that's not a leisurely, kind of, you know ... I can do that in six minutes on a bike and get a good workout, some cardiovascular high intensity stuff, but it's just a long slog as a walk-up, so-

Most participants did not comment that walking could also constitute a form of exercise of equivalent value to cycling, the time saving that cycling was considered to offer, however small, was often claimed as the main factor in their choice of mode.

4.2.5 Change of mode, changing mood

A number of participants emphasised their perception that cycling was a useful way of managing their mental, as well as physical health. Expressions like "meditative", "clears the mind", and "a meditation", "uplifting", "blows away the cobwebs" were often used to describe the way participants felt when or after cycling. Some described in more detail the value to their health of cycling as an activity.

Rosamund and Shelley travelled daily to a distant Nottingham University campus from the main site, cycling to the university where they parked their bicycles and take the free Hopper bus, a service contracted by the university. Shelley would also cycle the whole distance from home to the distant campus and back during the summer months on 3 or 4 days a week, but Rosamund had only attempted cycling the whole distance on two occasions and had never taken her bicycle on the bus. The Hopper bus has capacity for carrying 2 bicycles on a rack at the rear, but generally these students don't use this facility, Shelley recalled using it once when her bicycle had a breakdown, and another time to take her commuter bicycle to have it serviced by the visiting 'Doctor Bike' mechanics at the campus. The bus journey is quite a long one and the cycle ride from home to main campus is short, usually no more than 10

minutes, however they value the opportunity for some fresh air, physical activity and the warming effect (on cold days) this short ride offers:

- Me: *and, are there any other benefits for you, about combining cycling- PT? What personally do you get out of it?*
- R: *I like to be like, waking up in the morning, and being outside, even though I grumble about the cold and stuff, and in summer that it's too warm but I do enjoy just having a bit of like movement before getting into work, and just waking up a bit and getting some fresh air.*
- Me: *MH, on the bike?*
- R: *yeah.*
- Me: *and the bus part of it, how does that help?*
- S: *Earth, I don't know, I quite like the overall commute, so I used to live in London, and so I used to commute in London, like I used to cycle in London... And, it's just kind of nice, you get the fresh air like you say,...When you cycle in, like it's not very far, it's enough to wake you up/it's enough to kind of wake you up, especially if you're cold. And you've kind of warmed yourself up, you get on the bus, and then you can then, you know read,...*
- R: *yeah, I usually read.*
- S: *...Or you can catch up with friends or you, you can do something else, and by the time you've got into uni, it's only, might be 40 minutes, over -, all round or 50 minutes...*

The combination of the bus with cycling for the journey home also seems to provide a positive end to the preoccupations of their working day:

- S: *...Also what I find nice about it, a little bit is that just a cycle, especially the cycle home, clears your head as well, erm, so as well when you get on the bus after...*
- R: *yeah.*
- S: *erm, so, when you get on the bus after, work or uni, you are still thinking about uni, but then when you get off the bus and you have to cycle home, you have to think about other things as opposed to-, and so by the time you get home,...*
- R: *it's just clear! (Chuckles)*
- S: *yeah, it's cleared, you don't go home and have a big grumble about...*
- R: *no, you really leave work!, – Away...!*
- S: *...Yeah, you leave work on the bus!*
- R: *yeah...Definitely!*
- S: *yeah, so I find if I cycle all the way, by the time I get home, I've got it all out of the system.*

The ability of a regular short commute by bicycle followed by PT to help clear the mind was also commented by others, including Veronica, a regular commuter from Nottingham to another regional city who observed:

- V: *...I quite enjoy the train rides, good as I say I can do lots of things, like it's, it's just 20 minutes but, I can think about my work I can read, er I can just, yeah write a bit so it gives me that time to wake up as well. And it is like, 20 minutes of cycling every day which, I mean to go, and then other 20 minutes to come back, which is good for health purpose.*

In discussion with Bridget and Dorothy who commented on the meditative properties of cycling, Chester also raised the theme of enjoyment of a multi-modal journey through avoidance of the constraints of additional PT connections:

- C: *yeah. I really love the, arriving at a place, and then going, you are you a, – your journeys "on"... I'm not now arriving at a place, going to stand at another place, and, – purely talking of PT, you know I've never driven, so you know I'm not talking about cars, don't know about them. Erm, arriving at a place, going to stand at another place maybe a bus stop or something, waiting there, it's like a real joy for me to, arrive at a place get off the train,*

whatever, unfold the bike if it's a Brompton let's just keep on that theme, let's run it, then "go"! Right, I'm "on it...", I have -, you know, and it's that kind of beautiful thing of... sort of independent mobility, you know, that's really lovely. Yeah.

Chester here outlined a similar benefit to those Marianne had outlined in her comments on Derek's improved mood compared with when he'd had to take the bus back from the station.

Monique cycled the 8 or 9 miles into Leeds from home outside the city on 2 or 3 days a week and usually took the train home in the evening. She had a different schedule on one day and on another she worked from home. She described how she felt these cycling trips supported her health:

Me: yeah, so how might... Cycling- PT be enabling you and the others in your... Family to achieve things at the same time, I mean is it in some way a benefit for Dinah and for your husband that you do cycle and catch the train? In what way might that... Help?

M: erm, that I'm happier! (Laughs)

Me: you're happier?

M: my mental health, yes! (Laughs)

Me: so have you had a period of time when you've just driven, is that what you did before?

M: no I've always taken the train to work, yeah, well when I've been working where I work.

Me: Mmm hmm, so how does the cycling, in that sense contribute...?

M: it means that I can get exercise in whilst I'm commuting to work erm, and it just gives me a natural high, the endorphins and that sort of sense of mindfulness so when I'm travelling in I just arrive at work I'm in a really really good mood, erm, and I just find... Just doing it two or three times a week, is just enough, and I do other exercise at the weekend, but it's just enough to keep me, happy. I really notice it when I don't cycle, I don't feel happy, it really, definitely specially on a Monday I'll ride to work feeling really flat if I haven't cycled in, and I just feel it does change how I see the week, so as long as I'm getting at least, two cycles in a week I feel like yeah I'm going to be in a good place, ... I had stress a couple of years ago because I've been doing three postgrad qualifications and working, for like 10-11 years and I think it just all sort of caught up on me... I never used to, think I had time to fit exercise in now it's a priority so cycling is a really important (part?) my life.

Me: so it actually fits into your routine then,... And therefore doesn't...?

M: yeah, and... my husband would rather I didn't cycle, to be honest with you, because he's worried about me, but I just told him you know "I've got to do it!"... It's like, it's not really an option, really.

Monique's self-perception of her happier state of mind when cycling benefitting her family appears paradoxical given her husband's apparent reservations about her safety. Differences between participants own enthusiasm for cycling and their partners' views were often evident, although most seemed to receive support within the household in pursuit of their chosen form of travel. In a conversation involving another participant, Nicole, Marcus who regularly cycles and parks his bicycle at a suburban station in Leeds to travel through to another adjacent city, also thought that the exercise his cycling provided him with might also benefit his partner. Marcus recognised that his partner might not share his appreciation of the health benefits in the same way:

Me: well, how does it help, how does it help your wife? For example, the fact that, you cycle, often to the station but sometimes you just cycle... What's in it for her shall we say?

M: yeah, erm I don't...

Me: this is where it's useful to have people's partners there... So I'm also been looking for people to do household discussions as well, so we can get it from the others...

N: yeah, their side.

M: yeah, erm, I don't know if... she'd say there was much in it for her actually, I don't know she'd say that erm, I "should be so tight and I should get a car!" (Chuckles) it's like erm... Because I think she's, er, horrified by the fact that I'm lugging this big heavy thing about and coming in sweaty and then wet from the rain... I think she gets a better deal out of me because I've had

a bit of exercise ... and cycled away some of the daily stress before I get home but, erm that might be more my perception, but erm. Yeah, so I don't know if I've got a very good answer, for that one but...

Me: yeah. But it's interesting that you mentioned that... you know, you cycled away some of the stress...

M: yeah...

Me: So how how... how do you feel then when you get home after you've done your bike rides?

M: Yeah, I suppose you've er, just got a bit of adrenaline up and you've erm... got those whatever scientific process goes on with Earth, happy hormones that exercise generates or whatever...

N: endorphins...

M: yeah... That's and I suppose... breaks the gap between the... (Marcus agitates his fingers as if typing on the keyboard) furiously typing emails on the train and Earth, er getting home and 15 minutes later having, had a little bit of exercise.

Not all participants used the term 'exercise' or 'sport', but instead described specific benefits related to their wellbeing, in that the regular bicycle ride to and from PT complemented or compensated for other aspects of activities within their working day. In the example above, Marcus had framed the cycling stage of the journey as a way of transitioning from thoughts of the day's work that for him still involved work related activities during the train journey, mimicking the action with his fingers of typing on a laptop during his description of the train stage of his journey.

4.2.6 Intentional exercise routines

The term 'routines' is used here because several participants had incorporated cycling into patterns of commuting as a deliberate form of exercise, some who also participated in cycling as a sport, or other competitive sports describing it as 'training'. Some like Damon regarded the cycle ride as moderate exercise and managed to cycle in work clothing, taking anti-perspirant or other perfume with them. They acknowledged that even relatively moderate exercise can cause the body to perspire but did not shower at work. Others wanting to avoid arriving at work 'sweaty' would use the train to go to work, but had the flexibility to cycle home, like Bartholomew who took his Brompton on the train the few miles from Nottingham to his workplace in Beeston.

Dominique, a young medic, incorporated a bicycle trip on the return journey home from her monthly practice in a Nottingham suburb, using the train to travel out in the morning. In the extracts below her motivation is apparent; cycling home is a solution that suits her preference for travelling actively yet appearing presentable and ready for work at the start of her day, without needing to leave home too early. The incorporation of exercise was a deliberate choice for this relatively short monthly journey. 18 months earlier, having researched how to get to this periodic activity she discovered it to be an opportunity to incorporate some exercise, she had started combining Cycling- PT for the first time. Dominique also usually cycles to her main workplace near the University of Nottingham, but sometimes pushes her bicycle when walking home along the canal with her boyfriend whose workplace is near hers.

D: yeah. Erm, the last time... was a few weeks ago and I gets the train to Bulwell station with my bike... Erm, then walk from Bulwell station to, erm the [medical practice], and then I'll cycle back home.... Erm it's just, the reason I get the train is cause I can't be bothered to wake up, erm earlier to cycle that way and turn up sweaty, erm (chuckles) so I'll get the train, and then I don't mind cycling home and, being sweaty when I get back.

Me: okay. And, how often would you be doing that?

D: once a month.

...

- Me: *how did you start, how did you begin to erm, think about taking the bike on the train with you?*
- D: *erm, I guess... Knowing what time I had to be there so I thought about all the different routes, and looked online whether, cycling all the way would be feasible, so that I, didn't have to wake up to early, erm, or going on the bus, but I never go on a bus anywhere, erm...*
- Me: *why not?*
- D: *I just would rather, actively go somewhere, erm... And actually, the train is cheaper to go to Bulwell, it's only –, I can't remember, the last time. It's only about three,..., 3 – 4 pound or something like that. So it's actually approximately the same –, no it's £2.80! That's it, So it's actually cheaper than what the train –, er the tram or the bus would be.*
- Me: *because you'd be-, why would the bus be more expensive?*
- D: *because I wouldn't be able to take my bike on it, as well, would I? I've never tried!*
- Me: *so, erm, if you... take the train, you're cycling back? But if you're taking the bus, what do you do?*
- D: *I wouldn't take the bus.*
- Me: *but if you were taking the bus?*
- D: *I'd probably walk back.*
- Me: *right, okay, that's quite a walk so isn't it!*
- D: *I'm, a bit of a walker! (Chuckles)*
- Me: *wouldn't mind that?*
- D: *oh no... I like walking, and yeah. It wouldn't bother me, and it's only, it's infrequent that, to do it. It wouldn't bother me. No.*
- Me: *okay. Have you ever cycled all the way to Bulwell?*
- D: *I have done, yeah.*

The intentional asymmetry in Dominique's journey is echoed in the travel patterns of several other participants who made one-way cycling trips as part of a day's commute involving a train (or bus) journey in the opposite direction.

In Leeds the cycling trip tended to be done in the morning, taking advantage of the gradual downhill gradient towards the city centre, some participants sometimes took the train back towards their homes in neighbourhoods and small towns to the North and West in the evening, as Monique usually did. Jessica explained the complex rationale for this giving consideration to travel time, personal energy levels and availability of a space for her bicycle on the trains she might use:

- Me: *How often do you do this, so you mentioned that your journey tomorrow potentially is, asymmetric in the sense that you will cycle in, but you'll come home on bike –, I mean by train.*
- J: *Yeah.*
- Me: *... what's the reason for that?*
- J: *Erm, for fitness, so it's a greater distance...*
- Me: *MH. So the cycling bit, extend the distance, so it's exercise.*
- J: *It's exercise, it will technically be quicker, so by cycling, it would be 46 minutes, whereas to get me, to bike to the station, wait for the train, get on a train, then ride from the train station, to St James's, probably taking the same if not slightly longer.*
- Me: *And on the way home? You're going back by train, so what's your deciding factor in that?*
- J: *It's, well it's uphill all the way home, pretty much so, it's an extra 10 minutes erm, I sometimes don't feel like it, erm, I can get a bike on the train home, I can't get a full sized bike on the way in, the train's too full. Erm, but there are four trains an hour between five and six, so I can... There will probably be, four or five bikes on each of those trains, so a lot of people, obviously taking their bikes, home, but bike in, or, or get in, a different way cause it's not, – you can't physically get on the train with a full sized bike at Guiseley.... The train is too full. You have to bike to a, the earlier station, to get a full sized bike on.*
- Me: *what's the main advantage for you personally, for doing this?*

J: I think it's the, fitness but then knowing, that if I don't want to cycle home, erm, I can get on a train. So I can cycle in and get the train home whereas, I will be too knackered, if I was cycling both ways, four times a week, because that would be nearly, that be 20 miles a day, four days a week which is just, – with working full-time, and time it –, the length of time it takes to do that, it'd just be too, too much. So I can cycle in and back out twice a week quite happily without it, knacking me out, but four days a week it's, it's too much.

Some participants used shower facilities where these were provided at work. In this way, the presence of showers provided the opportunity to incorporate cycling as deliberate exercise into the routine of travelling to work. This enabled Dominique to cycle into Leeds, though she usually took the train home in the evening. Elton too could cycle from home to work where he used the showers and secure cycle parking facilities, for which he had previously advocated with his employer. When taking the train, he used a Brompton folding-bike and wore his office clothes, and to avoid arriving 'in a sweat' he took it 'relatively gently'.

Angela's incorporation of a gym session into her work-day routine, reveals the complexity of her responsibilities towards her children (one is now 18 and gets himself ready for college in the mornings) and how the bicycle allows several activities to be fitted in between waking and catching the train for a short journey to work:

A: Erm, if it's really really bad rain erm, because I've got to actually go to work I, he's got full waterproofs er...

T: yeah.

A: and you bike sometimes when it's raining don't you? {T: yeah} erm, if I'm going to the gym it doesn't matter, it doesn't bother me, I'll just write in the rain and because I go to the gym and then I shower after, and then I'm fine ME: ...and then it's not far from the leisure centre to the train...

Me: is that in the morning? {A: yes!} So that's a really early start!

A: yeah cause nursery starts at quarter past seven, doesn't it? So he does breakfast club there, {right.} and then they take him to school --, and you love doing that don't you?

T: yeah.

Angela's routine is not maintained every day she goes to work, considering the tiring effect her gym visits have on her young son:

A: erm, but that's... if he doesn't-, because obviously he's little, he's only five, even though he's been doing it --, since he's been nine months he's been going to nursery, so, he's been doing it-, he's always done erm, early mornings like late, late evenings kind of thing, sometimes just gets a bit much if I go to the gym all the time--, so I'll let him sleep in, and I'll just take him, for about eight-ish won't I...?

Me: straight to school or, to the nursery?

A: no I, I'll still take him breakfast club erm, but we just go later he has breakfast at home, and then he just goes to breakfast club and, they just take him...

Me: and then he's taken to the school...?

A: Yeah.

Occasionally longer cycle rides were incorporated within commuting repertoires. Kenton sometimes got off the train at intermediate stations on his journey towards Nottingham, using the showers at his workplace after a 20 mile cycle ride. On his homeward commute from Nottingham, Doug too, sometimes got off the train early at Loughborough station to cycle to Leicester after work. Doug's wife, Winnie compared the family dog's need for exercise with that of her husband:

W: ... whereas Tipper can run all day, following a mountain bike round a trail... Erm, so he requires, a bit like Doug, requires a lot of exercise to keep him in check! Don't you? (Winnie looks at her husband closely)

D: Do I? Okay. Erm...

In some instances other forms of exercise were included in a commute. Asked about cycling and hills, she commented that she and her boys didn't really travel far by bicycle. Angela regarded her use of cycling as simply a way to get to and from PT and other local destinations, she tended "...to do my workouts at the gym" on several mornings each week.

Dave and Margaret enjoy other sports, they both run regularly. Dave usually cycles to the station and takes the train to a small town just outside Leeds, but sometimes runs all the way home from work. However, their main sport is climbing and the car was considered a necessity for reaching areas suitable for climbing in the countryside, although they had also occasionally cycled to climbing walls in the city.

4.2.7 Recreational combining for health & wellbeing

Combining Cycling-PT allows people with varying levels of fitness or capability to take part with others in cycle touring or other cycling related activities. People of all ages were able to benefit from combining Cycling-PT for recreation, generally preferring to take and use the same bicycle at both ends of a journey. Both fixed-frame bicycles and folding-bicycles were combined mainly for recreational and leisure purposes and the bicycle's suitability for the terrain, ability to carry luggage, as well as how it fitted the physique and capabilities of the owner were considered important.

Wayne – sometimes cycled alone or with a friend around the outer Nottingham boroughs, previously had done so with his sister and her son. He described a recent trip where he deliberately bought a one-way ticket to Burton-on-Trent, from where, after exploring the town, he cycled back to Nottingham:

Me: All the way from Burton?

W: Yeah. Yeah, yeah. I had more my thing –, I only bought a single railway ticket from Burton on Trent so I. It was kind of like, purposeful, but I was going to do, Earth, that distance on the bike that day, because I was that way inclined. Er, but nature of my job, as as well, we're taking it with, my lorry driving, er, if I have a short shift, then I can do other things once my lorry's parked up, but if I have a really long shift I'm just, that exhausted and, for all the safety reasons, I can't go out on the bike because it might jeopardise, er my concentration levels the next day, fatigue levels and everything else so, ultimately it's er, in general people's safety that I'm thinking of before solely my pleasure, of riding my bike.

Jeremy cycled for exercise and the enjoyment of cycling. He had previously been a walk leader for an adult social care group. He had used the bicycle to get to Leeds city centre, parking at the train station where he felt the bicycle would be more secure, then meeting the group at the bus station to take a bus into the countryside for a day's walking.

These include the very young and people getting older and recognising their own capability limitations. Cycling to PT also enables people to get to places where walking is the main exercise and recreational activity, (see Appendix 5).

4.2.8 Exercise on the pathway to combining

Wayne was concerned at the health risk he was aware that lorry drivers like him often faced, that of diabetes. He wanted to take his bicycle with him on the lorry when away from Nottingham for several days to enable him to make use of some longer breaks between driving shifts for cycling for exercise and to do a little food shopping. Following a change of

job to a more regular pattern of 5 day shifts away from base, he had negotiated permission from his employer and explored ways of getting the bicycle to his work depot. Integrating a bicycle journey with the train allowed him to address other issues he had previously faced related to limitations on car parking near his home and heavy traffic on the congested roads he would have to drive during the afternoon peak hours.

Dominique enjoys incorporating exercise into her daily activities, started cycling back from Bulwell once a month after exploring the options. Jessica had previously alternated cycling to work in the city centre from her previous residential area in North Leeds with taking the bus in the opposite direction in the same day to prevent her from becoming exhausted.

Ambrose had started cycling to the station six weeks prior to the discussion, he had noticed the transformation in his own level of physical fitness over this period. In this extract he also related some of the perceived instrumental benefits for him and comments on how he found the infrastructure helpful:

A: *No, I'm not, you know, I work over in Wakefield. So I was on my way to work one morning, and Peter kind of grabbed me in the train station! That would have been the week before last, so... I've just started cycling, as well, this is like fourth week. I'm absolutely loving it, so I'm quite pleased to come in to here. I'll come and say something, because I just think, it's just like a revelation for me... it's just like-, firstly I feel so-, I save a lot of time. I've been saving a lot of time probably like, probably save about an hour and a half a day by cycling and when I-, cause I used to just use PT, so it saves me a lot of time, and it's just the, the kind of freedom I feel like, I'm not, tied to, to buses and what-have-you, but, I think one of the main things is that, the level of fitness it fits, so it's been very... (speech obscured) ...after three weeks, - Oh, thank you! So I think well after-, after three months, I don't think I feel like getting 'Tarzan'!*

Ambrose had also been contemplating attempting the longer ride all the way to Wakefield within 6 months, though not as part of a commute to work:

A: *Well, so you reckon I should give myself six months then? (laughing) I was hoping to do it in three months, but (laughing) I'll give myself a bit longer then.*

E: *Well, that'd be about 15, 20 miles, so yeah...*

A: *Yeah. I think it's about 19 miles, they say. I'm going to try it one Saturday, or go one Sunday, just to have a go, and see how far I can –*

E: *It'd be interesting working out a route for that.*

A: *Yeah, well I know the route, because I used to go the route by bus. As I said, I've done it, but I used to travel by bus, as well, sometimes, to Wakefield, and it's the bus route that I would cycle, directly from mine. It's not a bad route. There's a couple of pretty steep inclines; I can always walk. That's why they call it a push-bike, you can get off and push it! (laughing) You know what I mean? So you can always push in those bits, but hopefully one day I'll be able to manage it all the way.*

4.2.9 How Cycling-PT affects the health and well-being of others

Dorothy and Bridget discussing how their cycling at times might be helping others, contemplated some wider societal benefits that their cycling was likely to be having, including generating less pollution associated with car use. Both also car users, they argued that it enabled other people to drive more easily by not contributing to the congestion caused by cars, even providing more capacity for others to use buses and other forms of PT when they cycled:

D: *it's a social thing as well and people speak to each other and say "hello!" on the bike. It's surprisingly friendly!*

B: *I think erm, other road users benefit because of course we're, we're not using the car. So, with possibly one less car user, one less erm, you know, pollution and, wear and tear and stuff like*

that and also erm, if we not using, you know a bus or something because we using a bike it's, it's space on PT for other people.

Me: MH?

D: ...So I... Always think people should be more, er, grateful and respectful of cyclists really because they are,... If I'm going my car, I'd, I'd be helping a traffic jam.

Similar ideas were mentioned in other discussions, notably the reduction in pollution participants associated with cycling, and to some degree also with their use of PT. Children sometimes expressed their parent's cycling or combining with PT as being good for "the environment".

Perceptions of the health and wellbeing benefits to others in the household were related to positive effects on the mood of the person combining Cycling-PT. Asked what the benefit to the rest of the family might be when, on evenings when it was not dark and raining, Derek used his folding-bike with the train to go ice-skating in Sheffield, Marianne observed that this seemed to have a more positive effect on his mood than if having had to take a connecting bus service:

D: They get to use the car when I'm not there.

Me: Ok, is that the main... advantage?

M: erm, that may be the main advantage, although if he comes back in a better mood than he would have done if he'd taken PT then that's also an {laughingly} advantage!

Wendy had borrowed a folding-bike from the bike hub at her workplace for the past 5 weeks as she contemplated buying a Brompton. The added exercise of cycling as part of her commute had helped her to go off-road mountain-biking at weekends with her partner who uses a mountain bike as part of his job:

W: And I just think, "oh well, I've only been doing this commute just in the last five weeks and I've been great with it, I'm fitter and fitter at the weekends to keep up with you!"

4.2.10 Health related challenges

The discomforting effect of road traffic pollution for cyclists, particularly if combined with the effort required to cycle up hills was addressed as a challenge during conversation with Ida, who regularly cycled a short distance at each end of her daily commute to Leeds by train, and Faith who sporadically combined Cycling-PT to get to training sessions that she delivered around West Yorkshire:

Me: but do you enjoy the hills? Do you regard the hills as a challenge in some way or just part of the exercise that you might get? Is there a benefit...?

I: I do on a club run, but not for when I'm trying to get to work, yeah.

Me: no. So you have a difference...

F: but because I'm often running late for things so, I'd be happy to do the hill if I had more time but I hate having to rush up hills. And another thing with hills, not just like the physical challenge, but the-, if it's, a busy time of day then the pollution is loads worse cause there are loads of like idling cars... {Mmm!} ...I mean air-pollution in general I think is a, kind of-, not necessarily loads of people identify it but, I'd say it's a challenge to cycling, I think. You ride-, you're right, involved in it.

Monique had once tried to cycle along the Leeds-Bradford cycle superhighway, but found it an unpleasant experience. Disliking the traffic on the highway she prefers to cycle along the cycle route which mainly uses the nearby canal towpath:

M: I tried that once, it was just awful, it took so much longer, I was breathing in loads of pollution, and there was cars parked in there..., To be fair it wasn't fully open but it was nearly open it was about two months off... And there was like breaks in it we have to go on the main roads, over it was just horrible I was so stressed out by the time I arrived home I was like "I'm never doing that again!". So I suppose it's great, sections of it you know, but to do the whole journey, (draws in breath) just, yeah! Just really not nice compared to the, tranquillity and being in nature of the towpath it was just like that is not what of journeys that I would want to take every day! (Chuckles slightly)

Teresa and Ken cycling in Nottingham also identified some routes adjacent to the ring road and intended for cycling as being blighted by particularly high levels of traffic fumes.

4.2.11 Injuries

Participants also expressed concerns about the safety of cycling, often from personal experience of accidents. Haziq, a medic who could remember twice having fallen off his bicycle, contemplating why others from his South Asian cultural background were wary of cycling commented: "...there's this, perception, there is some truth to it that it's a death trap cycling." Although he had escaped injury, a few other participants had not been so fortunate and had been prevented from cycling for some time. In Ivan's case a cycling accident had prevented him from working for around 5 months.

Economic implications of being injured for cycling could be a reduction or loss of income, but could also imply the imposition of additional travel expenses for someone ordinarily dependent on their bicycle for everyday transport. Asked about changes to her activities within the past 18 months, Faith outlined how an accident had resulted in additional costs to her, and the effect on her confidence when after six weeks she felt able to return to cycling:

F: I think in terms of comparison to when I don't have access to my bike either because it, needs fixing or because I'm injured, in the amounts I spend getting around within Leeds... ...Using either PT or if I have to, taxis, you know I can be without my bike on one day and spend over £10 on transport...

...

F: Earth, for me I had a, injury that meant that I couldn't cycle for about six weeks. Erm, and when I did I was, started off as not cycling again as much, partly for nervousness cause it was a, cycling injury. Erm, and... Also, - like when I'm doing cycle instructor work, then I'll be commuting more like, you know my other job was very local it was like a five minutes cycle but, that cycle instructor work could be anywhere up to about, 6-7 miles out so, that will just change week by week... Erm, and that would mean sometimes if it was particularly far and I was particularly lazy I would be getting a train, with my bike to, - to do that.

Elton, Noel and Pamela had also experienced serious cycling accidents, Damon had broken his leg when he slipped on ice, attempting to ride his bicycle to work on a winter's day, but found cycling easier than walking as he recovered from the resulting surgery. Darius had injured his knee playing football with his grandson, forcing him to temporarily give up cycling and take buses instead.

4.2.12 Disabling conditions, temporary or worsening.

Other conditions brought on by less dramatic circumstances also prevented cycling. When participants were ill or were suffered from back pain, as Stuart done within the preceding 18 months, they also reported having cycled less and used the bus more often.

Doreen described how suffering from Sciatica and a recovering from a recent operation for an eye condition had impacted on her ability to cycle and walk:

- Me: *...And what about over a longer period of time do you have erm, over the past 18 months what kind of things have affected your, erm ability to cycle ...?*
- D: *yeah, I had sciatica earlier in the year which wasn't brilliant, but I did find out I could actually cycle, in some way better than I can walk, so my trip around south Wales, I'd got some sciatica, but I did do, quite a lot of cycling.*
- Me: *you could cycle better than you could walk?*
- D: *I could, some of the time yeah, yeah. Erm, unfortunately I had an problem and had an eye operation so I'm not cycling now because I don't think it's, particularly safe cause I erm-, my vision -, although I can see, I don't think it's good enough to be, erm - dealing with obstacles and people and... cars and things so I'm giving it a break until my eyes have settled down.*
- Me: *okay. And have you been on the back of a tandem at all?*
- D: *not, not at the moment... I just think...*
- H: *you're slightly worried about the sciatica aren't you, because the different position on each cycle and, Doreen has found with the sciatica that it varies depending on what bike it's on.*
- D: *I've just... Sort of toned down over the last, last few weeks really, just walking to places, well that's quite okay, or just getting the trams and PT... But I tend to walk if possible, because I don't really-, I like to be kept active, so I walk, whenever I can.*

Doreen's partner Harold, now retired, saw how PT could come to play an increasing useful role as he and others of his generation grew older and their capabilities became more limited:

- H: *well obviously, ageing will reduce our physical capacities, er so, in general people's horizons draw in. But, they don't have to draw in as much if, they can be supported by PT, so, there might be -, for us, increased uses of PT, to go to places that formerly we might've been able to go to 100% under our own steam, and what a shame that er, full sized bikes on aren't allowed on trams in Nottingham, whereas they are on some, er Western European tram network systems.*

Impaired vision can affect personal mobility and a worsening eyesight condition can cause significant changes in someone's arrangements for travel. Although Jacqueline's eyesight caused her to lose her ability to drive a car, she was still able to cycle and with support from her husband and friends and neighbours, she continued to commute to Nottingham, no longer driving, but taking the train. A bicycle borrowed from a friend reinforced her to decision to buy a Brompton folding-bike for use on public transport, and when given lifts to the station. Challenging conditions of darkness and unlit paths were deterrents to cycling along quieter routes in Nottingham, and the recent opening of the tram link to Toton has made her journey from the train station easier, but the Brompton had proved to be a useful travel tool that enabled her to keep her job and commute weekly to Nottingham, and is also useful when she needs to travel near to her home and no one is able to take her, since recent cuts to rural bus services in her county. In Jacqueline's case she is able to cycle, but can no longer drive.

- Me: *so, Jacqueline you know all about the difficulties and challenges of cycling, {J: yeah.} So, can you tell us a little bit about... you think the difficulties are when you take your bike on a long journey?... the cycling bit to start with...*
- J: *the cycling bit? So, er-, gosh --, erm... the mental energy, the weather, er, the traffic?...*
- Me: *what do you mean by the mental energy, that's an interesting one...?*
- J: *erm, it's just takes me somehow, more mental energy to cycle than it does to walk, so, it requires, I think-, probably it requires more visual acuity and, erm, accuracy, so I need to concentrate quite hard when I'm cycling whereas when I'm walking I can just sort of meander...*
- Me: *is that something that's always been the case or is it something that's more recent?*

- J: *erm, it's probably always been the case when I first came to Cambridge-, well I used to enjoy cycling as a child. When I first came to Cambridge I didn't cycle because I was too freaked out by all the traffic, it was just too much for me; I lived in a very small village when I grew up, and, and I had-, for a while I couldn't cross roads when I got to Cambridge (laughs) ha ha! Erm, so -, yes, so I'm quite careful; I don't like to go to places that I don't already know where I'm going...*
- Me: *yeah?*
- J: *...erm -, and that's partly because of my visual impairment so I have retinitis pigmentosa, {yeah?} which means that my visual field is-, has bits missing round the edge, erm, and it doesn't mean that I, erm, I'm prob-, my brain is probably doing a lot of extra work processing and filling in bits all the time, so it's quite tiring, when I used to drive it was very exhausting...*
- Me: *Are there any conditions then that make that, - that combine with that make it really quite difficult?*
- J: *yeah and night-time's bad, and bad lighting is a problem, so, in Nottingham I normally cycle from the station to Beeston... erm, along the canal, and, I can't do that at night because there's no lighting on the path and there are very strong bright lights beside it which means that I'm quite likely to cycle into the canal, - which seems like a bad idea! (Smiling) So I don't do that one. Yeah. But now I can get the Tram in Nottingham, and that helps, so if I'm not feeling up to it I can get the Tram; yeah, the weather is erm, not too bad actually I've got used to that, that's just a matter of having decent clothing, no such thing as bad weather only bad clothing! Erm, and that's pretty much true, so as long as you have good, good waterproofs and, so-on, it's never as much fun when it's raining but it's perfectly fine. Erm, and, and traffic, particularly on the 603 it's quite scary, (the children are comparing notes on their plasticine model) and, I tried to avoid cycling on the 603, if I can {yeah?} because it's a lot of people going 80, erm-, and-, erm. And I do get tired as well, so, there are times when I just sort of don't feel, physically up to it. And, er...*

Pregnancy also has the effect of reducing cycling, Kris commented that for his partner who lived in London and did not combine Cycling-PT, pregnancy had meant that she used PT more. This also meant that Kris who took his bicycle on the train for a weekly commute from London to Leeds walked and used PT more when accompanying his partner about town.

4.2.13 Car sickness avoided by combining Cycling- PT for travel

Both Jacqueline and her daughter Felicity are prone to car sickness when travelling, but not when going by train. Similarly Una, who commuted into Nottingham daily, was comfortable using the train and used to get car sick when travelling distances of around 30-40 minutes by car. Although she has had a driving for some years, she didn't want to buy a car, something her work colleagues could not understand. Una had been using the same inexpensive second-hand bicycle at both ends of her journey on most days. Bought the year before with the intention of the commute and for some independence from her mother with whom she was living, taking it with her on the train thus saved being subject to inconvenient bus connection times near home and the cost of separate bus passes at both ends of the journey.

4.3 Chapter summary

Based on narratives from the discussion transcripts, this chapter presents evidence that will help to answer the first research question, i.e. to:

Identify how the integration of Cycling- PT acts as an enabler of household activities

It is argued that for families, integrating Cycling-PT for the childcare trip offers a range of both instrumental benefits and alignment with affective benefits and household values.

Combining Cycling- PT for a regular journey provided adults with the opportunity to incorporate regular exercise into a daily routine. Short trips by bicycle that replace walking trips are also considered as exercise, though the motivation for cycling in these situations is usually time-saving. Time-saving may incentivise people to replace using a bus feeder service, however the perceived exercise value seems to be more emphasised with slightly greater distances cycled.

4.3.1 Summary of the instrumental benefits:

Benefits of combining Cycling-PT for trips to or from childcare included:

- Incorporating the childcare run into a trip chain that starts or ends with a PT trip and integrates the bicycle, offered time-savings relative to combining walking and PT use;
- Enabled a wider choice of nursery facilities & access to alternative childcare provision, benefitting the household financially through access to subsidised childcare;
- Enabled parents who did not drive to access childcare that fitted with their work patterns, particularly early starts or late finishes;
- Enabled a parent who had had to work at a weekend to take their children to the workplace at weekends;
- Supervision of children during the school holidays was a particular concern of parents, that had been addressed by Cycling-PT in the case of one parent and child who did not have access to a car;
- Taking children to social, cultural or sporting activities or events was sometimes enabled by Cycling-PT, particularly for families with several children where each parent could separately support an activity with a child;
- Used for the journey to work by one parent, Cycling-PT can reduce overhead costs of family car ownership, even if (as in Margaret's case) the car is not used daily for taking children to childcare or school. This is offset however, by the costs of bicycle ownership and additional related equipment for cycling;
- Cycling or walking acclimatises the child to the concept of active mobility, in alignment with the values of at least one adult in the household;
- Experiencing combined Cycling-PT trips from a young age is likely to support development of a range of travel skills, compoment and mental maps relevant to the development of multimodal and intermodal travel skills in the future;
- Enabled trips with child to childcare at weekends and during holidays;
- Children of people who combined Cycling-PT recognised its usefulness and value in their household context, and associated the behaviour as beneficial to the environment.

Health and well-being benefits included:

- for children, the avoidance of excessive 'screen-time' who accompanied a parent to go cycling as an activity
- feeling fitter and happier through the incorporation of cycling as exercise
- Participants reported weight-loss after a period of cycling to and from PT, if they had not been cycling at other times
- Exercise to counteract the potential unhealthy effects of a sedentary job like lorry-driving
- Enabled some to cope with stress caused by workplace, study, or other factors

- some spouses identified positive outcomes for wellbeing, such as their partner's 'better mood'
- Participants argued that their decision to combine Cycling-PT was beneficial to the environment and resulted in reduced pollution and congestion compared to driving by car
- For some physiological or health conditions, people found it easier to cycle than walk and had used cycling to maintain exercise in their routines

4.3.2 Summary of facilitating factors

Facilitating factors for childcare journeys included:

- Competencies and skills that enable the parent to confidently contemplate combining Cycling-PT when travelling with a child;
- Flexibility in the 'combining' parent's work arrangements or pattern;
- Provision of pre-school and after-school wrap-around care;
- Free carriage on-board PT for under-5 year old children, combined with the ability to take the adult's bicycle with child seat on board the train;
- Secure storage facility at places of childcare, nursery or school for children's bicycles and cycling paraphernalia;
- Availability of secure storage for a child's bicycle at, or very close to the boarding point for a PT journey stage;
- Mobile communication devices enabling dynamic rescheduling of collection from childcare or school.

For Health and wellbeing, facilitating factors were:

- availability of rail transport capable of carrying cyclists with their bicycles that enabled some people to incorporate a longer bicycle ride in one direction, using the train in the opposite direction
- availability of shower facilities at the workplace and lockers or somewhere to leave a change of clothes, this supported and encouraged people to treat the journey to work as an opportunity for more strenuous exercise
- cycling routes perceived as safe that encouraged people who had not cycled for many years to return to cycling as part of the combined journey
- off-road cycling routes, such as canal towpaths and other quiet routes, were often preferred to highways
- the 'Cycle To Work' tax-efficient salary sacrifice scheme had enabled those who had not owned a bicycle in recent years to purchase a bicycle and related equipment in readiness for commuting to or from work via PT
- Ability to work from home on some days, or having working patterns that resulted in some activities in different locations on fewer than 5 days per week

4.3.3 Challenges to Cycling-PT for childcare trips and health and well-being

Challenges of various kinds to combining Cycling-PT were exposed, including institutional constraints arising from schools' safeguarding principles and uncertainties within the PT system. Others included the capabilities of family members, complexity of planned activities, as well as household structure and resources.

Identified challenges to combining for childcare trips are summarised below:

- Institutional constraints – safeguarding policies that place an obligation on parents to make arrangements for collecting and escorting children home from school or nursery.
- Unpredictability of rule interpretation by staff in PT leading to enforced changes to itinerary or preventing availability of the bicycle;
- Inflexible-, or non-availability of the other parent in the household could prevent combining Cycling-PT where there is a risk of delay to the combiner collecting children after work;
- Children's cycling range and enthusiasm when young, is restricted by hilly terrain;
- When young children have outgrown a child seat and are able to cycle by themselves, they could become more difficult to take on PT with their bicycles, before they have acquired the physical strength to manipulate their bicycles independently;
- With two or more children of different ages, sites of childcare, schools or other activities may multiply, or become more complex than can be incorporated into a combined Cycling-PT trip;
- School, nursery, or childcare location may not be well-situated for Cycling-PT trip-chain;
- Parents were concerned at the perceived risk to children below about 15 years old cycling alone on highways with heavy or fast-moving traffic in the absence of an adequate network of separated cycle paths;
- For social reasons, children themselves often walked to school or use PT, in preference to the more lonely or 'sweaty' experience of cycling once permitted to travel independently.

Health and well-being challenges included:

- Participants' perceptions of positive effects on others in the household might not be shared by their partners or spouses
- Cycling adjacent to major roads with heavy traffic was associated with noticeable levels of air-pollution, a factor made worse when cycling uphill
- the lack of lighting, isolation, and sometimes uneven surfaces of canal towpaths and other off-highway routes, combined with poor maintenance meant that cycling was either reduced or avoided in winter, or that people switched to cycling on highways
- Certain health conditions or physical impairments can make cycling more difficult and in these circumstances people may revert to walking or make more use of PT if they are not able to go by car

4.3.4 Processes in Cycling-PT for childcare trips or health and well-being

To the tactics and strategies employed by parents who combined Cycling-PT to ensure the collection of younger children childcare at the end of the working day, could be added other processes within these households in the context of trips to and from childcare. There were also processes evident between households and external agents or institutions such as employers.

- Scheduling – that critically takes place around the pattern of children's activities and childcare or schooling for the parent with the main childcare role, who typically works part time, or can start work, or leave work to coincide with escorting children to or from their education or childcare facility;

- Resource optimisation – regular working patterns between fixed home and workplace locations had enabled households to make some travel cost savings through investing in season tickets for full-time workers;
- Managing resources including bicycles and protective clothing, luggage, etc. This process could be burdensome and had combined with other seasonal factors to reduce family cycling in winter in some households;
- Resources were also necessary to ensure day-to-day cycling with children, this included weatherproof luggage for carrying children's materials, waterproof clothing and safety helmets, lighting, replacement and maintenance of bicycles;
- Role allocation – in some households, particularly those with one car, parents had established relatively specialised roles that attached the childcare routines to one parent, avoiding the additional burden of negotiating with the other parent whose working pattern was more time-constrained (i.e. whose 'time-budget' was exhausted);
- Negotiating alterations to childcare could result from changes to working patterns. A decision to cease combining Cycling-PT in a family with one car had resulted in the car being used by the father on one day each week, requiring the rescheduling of formal childcare provision to adapt to the altered availability of the car normally used by the mother who did not work.
- In other households there was evidence that parents negotiated changes to activity schedules related to collecting children more frequently, for example when one parent was self-employed this had enabled a journey to school by bicycle accompanied by the flexible parent;
- Travelling together for parts of journeys had given parents an opportunity to discuss and negotiate activity schedules and plans;
- External negotiations with employers to set up working patterns that fitted the activity routines of families and the availability schedule of other adults for collecting and dropping off children.
- Negotiations with nursery or after-school care providers if changes were needed to scheduled childcare;
- Contingency planning, creating alternative 'scripts' eg. taking a lock to enable a bicycle to be abandoned at a departure station at short notice to avoid a delay to collecting a child from school or childcare provision;
- Ad-hoc negotiations by mobile phone or text in case of delays arriving to collect children;
- Attachment / bonding / trust (i.e. to childminder, reliable taxi driver / au-pair / grandparent / a good school or one where friendships have formed, etc.)
- Travel behaviour reproduction – several children had, with their parents' collusion or direct support, developed the ability to use PT. Younger siblings' first trips to secondary school had been made under the guidance of an older, more experienced sibling. Encouragement to use buses or the tram often contrasted with parental caution over children's cycling alone.
- Cycling capabilities - Some children had received Bikeability training, but despite this, parents interviewed were generally cautious about letting their children cycle alone. There seemed to be thresholds of competence not directly related to age nor to gender, but to the experience and comportment of the child in the opinion of the parent, and against the context of the cycling environment between the neighbourhoods surrounding the home and school;

- Risk management – parents associated children's contemporary cycling with risks, in particular of injury from traffic accidents, but were also concerned about 'stranger danger'. These risks seemed to be tolerated when the parent could accompany the child;
- Innovation - Having experienced combining Cycling-PT under a parent's guidance, one youth had subsequently employed this behaviour with friends to expand his social network. There was evidence that some other children were combining cycling with the tram from around 14, and one biographic account of an adolescent who had independently initiated a routine of cycling to a train station on his commute to school.

To conclude, this chapter makes a contribution towards identifying how the integration of Cycling -PT acts as an enabler of household activities through enablement of household activities related to childcare journeys and to the health and well-being of household members. I now turn to the transitions that occur in households as children grow older, and people's activities, resources and capabilities change.

5 Transitions over time – combining biographies and contemporary tales

In this chapter, participants' experiences of mobility over time are revealed and situated within individual and household biographies. Changing roles of cycling and PT in combination and separately are demonstrated here to be associated with transitions in households over time. The analysis of transitions focuses on the development of skills and identity, and the exercise of agency against a background context of an evolving landscape of structures and institutions. Reflexivity is evident in the household processes that have shaped roles and influenced schedules in response to changes over time in membership, capabilities, activities and geographies. This chapter addresses the second research question arising from the review of literature:

II. What role does cycling's integration with PT play in responding to household transitions?

The role that Cycling-PT had played in responding to transitions in households was examined in the discussions using biographic questions, and questions about more recent changes in activities and travel over the past 18-months to two years. Participants described how they had travelled as children themselves and their recollections of first experiencing combining Cycling-PT. The topic guide included a question about changes in the external environment and probes for factors affecting travel that were related to the household's activities. In the small group discussions and individual interviews, adults that were also parents were asked about how their children had developed, or were developing independent travel abilities and skills. In their responses participants recalled patterns of travel behaviour at earlier stages of their household's life cycle, particularly in response to the 2D and 3D visual memory elicitation research tools.

Following a Mobility Biography approach, this chapter is structured to enable discussion of biographical transitions within households with the focus on the combining of Cycling-PT. The first section highlights the varied nature of the participating households, families and individuals.

The second section mirrors the 'combining' lifecycle of the family, through the formation of partnerships and for some, families with children from the anticipation of birth to growth through stages of childhood and the development of skills and capabilities for independent mobility. Changes in activity and behaviour as children transitioned between primary and secondary school and in late adolescence and beginning of adulthood are explored here.

The third section explores transitions that occur in adulthood, from experiences of attending university and beyond graduation as people emerged from full-time education into employment and associated changes in resources and residential location. Transitions occurring mid-career after children had grown up and left home, followed by the transition to retirement are detailed. External structural and institutional changes mentioned in the discussions related to household transitions complete this section. This chapter concludes with a summary of the findings related to household transitions.

5.1 The varied nature of participating households

Transitions associated with the growth of children revealed how the activities and travel behaviour of family members were affected by changing temporal and spatial constraints as children grew, particularly those related to childcare, education and parental employment. Although the 'nuclear family' was still the prevalent form amongst the eight family groups interviewed, other family forms were revealed, including experiences of step-parenting and single parenting that revealed household configuration changes over time. The traditional role associated with responsibility for childcare, strongly associated in the literature (and many participants' households) with a mother's activities and part time employment (Best and Lanzendorf, 2005; Ettema *et al.*, 2007; Scheiner, 2014a; Schwanen and Dijst, 2003; Schwanen *et al.*, 2008), had been reversed in a few situations, according to the participants' descriptions. For example Monique's husband who worked part time, had evidently adopted the leading role for childcare for their daughter Dinah, generally taking or collecting the child to or from school and other activities, as well as providing many of the meals.

M: no, he's the main –, he does the main childcare, {okay} unless it's the school holidays, then it's a bit different.

Me: okay, and in the school holidays what happens then because he also works doesn't he?

M: he works part-time, so we're quite lucky in a sense that between us there is generally only two days a week that aren't covered... cause either he's at home or I'm at home, erm and if I'm not teaching I can always take her to work in the office, obviously one of us will take some time off work to look after her, erm yeah, but otherwise there isn't really much of a change.

Monique would each day make sure that daughter's start to the school day had been prepared for by preparing her clothing and breakfast materials. She clearly valued the opportunity to spend time with her daughter and had breakfast with Dinah on the two days she did not cycle to work, departing later on Wednesdays to travel to work by train. Working from home on Fridays, Monique would then take Dinah to school, sometimes walking or, "if I've got a lot on..." by car. In this family the obligations surrounding the care of their daughter were shared according to the time availability of each parent, Dinah's father's part-time work enabled him to do the 'school run' on most days, but Monique assisted throughout the week with the daily preparations for school.

Other families had seen roles and behaviours fluctuate according to parents' employment status or working patterns over time. Derek typically accompanied his daughter to her primary school, both walking or Gemma sometimes using her scooter or riding her bicycle, while her mother Marianne usually cycled to her university workplace. Prior to the family's move to Leeds, Marianne had commuted daily from their Derby home by bicycle and train to her workplace in Beeston (Notts), then later they had moved to Nottingham and Derek had been a student commuting to university in Derby. In this household the mother had developed her career and was employed full-time at a university, while the father worked flexibly, running his own business from an office near home and generally prepared the family's evening meals.

In Jacqueline's case, her contribution to the care of her children had been affected by both her weekly residential trip to work in Nottingham, and the loss of her ability to drive. Like Monique, her working pattern reflected her career as a university academic. She was able to accompany her children to several of their activities during the summer holidays, volunteering at the children's school swimming pool to which she had cycled with her children at times. She commented on the cessation of her role as chauffeur for the children, however:

J: Me being here or not, has the biggest, the big-, er, because I don't drive, I'm not actually that useful here anyway... so I'm useful primarily to cook food. Yes!

Jacqueline's circumstances had combined with the distance and routinised schedule of her working pattern, altering how and when she would accompany the children. Following the parents' decision that they no longer wanted an 'au-pair' to assist them with childcare needs, her husband Colin was responsible for the day-to-day school drop-off of the youngest child and collected both from their schools and their many after-school activities. When Jacqueline was away in Nottingham, Colin prepared the meals for himself and the children.

Angela, the single parent with two boys at home, was also managing to maintain her office job, and did so with the support of the 'wraparound' care offered by a local nursery, as well as careful scheduling and resource-management. She had received informal child-minding support from friends in the neighbourhood when her older son Denzel had been younger. As observed in other research that found that single mothers made more child-serving trips than men (Taylor *et al.*, 2015), Angela's travel patterns, despite the long hours she worked, still reflected her role as primary carer for her children.

Amongst the wider range of household contexts, previously described in Chapter 3, section 3.9, narratives were encountered of recent experiences related to changes in both behaviour and lifecycle transitions, as well as biographic descriptions of particular journeys and the establishment of Cycling-PT combining routines. Cross-generational effects were also evident with grandparents providing opportunities for socialisation and for widening geographical horizons, also supporting childcare in some cases. Some participants in group discussions were themselves grandparents.

5.2 Combining as children change

5.2.1 Anticipation of the arrival of children and starting a family

Participants with children sometimes described how they had set up home together before having children, initially seeking employment and an affordable accommodation. One or both of the adult partners had experienced cycling, usually as a child, but may not have cycled throughout their life. In some families both partners had been keen cyclists prior to the birth of the first child and maintained some cycling through parenthood. At least one adult had some experience of combining cycling with PT prior to the birth of children, or, as two of the participants described, becoming step-parents.

Growing up in London as a young girl, Ishrat had been taught to cycle by her father. She was not a regular cyclist, whereas her husband Haziq had cycled enthusiastically since his mid-20s, influenced by senior colleagues at the hospital where he had worked in Nottingham, the city where the young couple had made their home. Before Ishrat became a mother, Haziq and Ishrat had been able to take advantage of her fortnight's residential work induction programme to spend time together. Having brought his bicycle up to Darlington by train, Haziq would spend part of the day cycling for up to 40 miles around the region before meeting with his wife at the end of her training sessions in the afternoons:

I: he cycled all day and back by about two in the afternoon, and I was done by about four ... so, he would just like have like day of just cycling... you know, it was quite leisurely for him, {yeah.} in fact I was quite nice wasn't it? Now that I think about it... You've done your 40 mile bike rides and you done...

This young couple had also once hired bicycles on a visit to Oxford, as well as for recreational rides in the Derbyshire Peak District, however cycling remained an occasional leisure activity

for Ishrat. Haziq later used cycling in combination with train journeys as described in Chapter 4 (section 4.1.4), with the understanding of his wife based on her own positive memories of these cycling activities.

Before having children, Bartholomew and his wife had been on holiday to Ireland with bikes, something he considered a more complex activity with children, although he had once taken his Brompton folding bike to the South of France with his children, it being easy to take on trains without the restrictions applied to fixed-frame bicycles.

Winnie who had cycled confidently in Oxford as a girl aged 8, and later as a cycle courier in London, established a household with Doug who she had befriended through their shared interest in cycling. Doug's cycling had only reduced during the period when he had been at university in Leicester and lived nearby. Financial considerations had influenced their move from the capital to set up home in Leicester shortly before their first child, Bart, was born:

W: I, I was working in London after university, and you moved to London, from Leicester after university, and then we lived in London together for a bit and then when we wanted to get a house, it, we knew that we wouldn't be able to buy a house in Oxford or London, and so we just came here didn't we really? And I thought we come here for a couple of years and we been here, nearly 15 years.

D: nearly 15 years...

Evidently the arrival of children in the family had resulted in some refocusing of activities around the development and needs of the children, and the establishment of routines that exploited opportunities and were shaped by constraints and the interests and values of the parents. As a mother, Winnie had initially commuted by bus to her part time job in the city centre. Although she had a bicycle, she learned to drive and got her driving licence aged 30 when her son was 2 years old and her working pattern changed:

W: so, I only learned to drive because I need it for work before that I've never needed to because I'd always cycled in Oxford, and then cycled in London and used PTPT...

Winnie and Doug went on to have two more children, meanwhile Doug had found work as a lecturer in Nottingham, a job to which he commuted by combining bicycle and train. All three of their children would go on to experience the same multi-modal journey during their childhoods, as described later in this chapter.

Other participants revealed how families' everyday travel had changed in response to pregnancy and altered activity patterns after the birth of a baby. Living in London, Kris' partner had replaced cycling with taking PT and walking, as the couple were expecting the birth of their first child. When travelling together both were using PT more often than before, however Kris continued to combine Cycling-PT for his weekly individual commute between two different workplaces in London and Leeds.

K: She's, not up for cycling at the moment... so, that's meant that normally that would be our primary form of transport, and now it's become bus and walking... Nothing to do with cycling and PT, it's just cycling around.

Me: no. Sure, but... that means that sometimes you're using PT a bit more than normal?

K: yeah.

In Leeds, before the birth of her children, Margaret had previously combined Cycling-PT to commute in the same way as her husband, Dave. After her son Benjamin was born, Dave still continued to combine Cycling-PT to commute to his full-time job, however Margaret's role as primary carer for the children had restricted her opportunity to cycle:

M: ... in fact when we lived in Headingley I used to ride and catch the train in fact we... both commuted, I went to Huddersfield and you went to -, Shipley, wherever it was called...

D: *Saltaire.*

M: *so, when we met, we used to commute, and then obviously then with the kids it's been much harder for me so this was like "right that's back to..." But-, so it's partly financial, like a car is a very expensive thing,...*

Margaret had been eager to be able to resume cycling and initially did so for recreational rides, her sons had at various times been carried in a child seat attached to her bicycle. In other families, parents had cycled together for leisure as well as for transport. Lawrence whose wife had much earlier in their life together, cycled to the local station and commuted by train to work in York, recalled that he and his wife: *"...had fairly significant cycling holidays, well before the kids came along ... and, look forward to cycling more I think when the kids are older and when-, as the kids leave, yeah."*

A temporary break in combining Cycling-PT was a theme echoed by Nicholas who had continued to commute to Leeds using bicycle and train from York, from where his wife had also previously commuted to work in Durham. Nicholas could foresee his wife returning to commuting by bicycle and train as both of his family's children grew capable of cycling to school and no longer needed to be carried on the Bakfiets cargo-bike the family currently used for the school run:

N: *Although that being said before we'd kids so like going back five years, my wife was working in Durham University, so we were actually both cycling to the station, I was then getting the train to Leeds she was getting the train to, to Durham and both of us were bringing Bromptons on the trains, and she would cycle then from Durham train station to the University, so, you know it's not, beyond the bounds of possibility you know in a few years time, when they're both on bikes and a bit older, we, we'll do that again... Yeah.*

At the age of five, children could be expected to pedal their own bicycle as confirmed in discussions with Angela's family and with Margaret and Dave's family. In both cases a young child of 5 had become capable of cycling along pavements and off-road paths by themselves, accompanied by their parent, but enabling their mothers in both cases to go to work, supported by wraparound care facilities and after-school activities. Angela had integrated Cycling-PT as part of the childcare journeys en-route to her local station, whereas Margaret had cycled with the children to school and then to her part-time job nearby, while her husband Dave cycled to Leeds station for his commute by train to his full-time work in Guiseley.

5.2.2 Early capabilities and constraints

Cycling with a young child can be relatively uncomplicated, particularly if for leisure or away from busy streets. There are several options for taking a young child not yet capable of riding a bicycle, including a child seat on the bike for which several designs and configurations exist, or using a trailer. In a discussion with two adult participants in Beeston (Nottinghamshire), India, a keen cycling club member, revealed that her sister was living in the Netherlands. Together with Fraser whose 14-year-old son Scott was also present, we discussed the stage at which a child could start to be carried by bicycle:

I: *...just in Amsterdam but, as a child grows up there, ... they know the months at which a child should be able to sit up in bike seat and hold their head up... Yeah so they know that when they get to a certain age they can do that.*

Me: *did you used to carry Scott around on your bike?*

F: *yeah.*

Me: *what sort of age did you, put him on your bike?*

F: *pretty much as soon as he could sort of support his own head.*

By 5 years old children have typically outgrown the child seat attached parents' bikes, prior to this stage the child can be transported almost like a kind of cargo when in the child seat. The ability to carry his infant son Bart by bicycle had enabled Doug to take advantage of a crèche at his new workplace in Nottingham on the two days when his wife was working in Leicester. This arrangement had enabled Winnie to return to work after the birth of her first two children, she indicated the age at which the children had outgrown the journey Doug's bicycle to the crèche in Nottingham:

W: *yeah, so they went on a, on a bike seat and actually, three is about as heavy as you can get really on one of those that, they were sort of getting to the, high end of it, really.*

When not asleep on the back of a parent's bicycle, children could already at this young age become familiar with routes regularly experienced, and develop some understanding of comportment in public spaces, for example Thalia had mimicked her father's arm signals while he cycled to and from the railway station as aged under three, she had sat behind him on his bicycle. Suki, their third child had not attended Doug's workplace crèche, perhaps resulting from a consolidation of childcare locally for the two youngest children, after Bart had started to attend primary school.

Participants' narratives suggested that as children developed greater physical strength, they began to use scooters or small 'balance bikes' without pedals, developing skills in balancing, steering and braking. Present-day children were often described as able to cycle properly from around the age of five or six, although Doug and Winnie's son Bart had apparently already learned to ride a bicycle at three years old. Biographic narratives of adults revealed that some people had only learned to bicycle as young adults.

Young children required greater alertness and supervision when they were travelling actively and playing, participants sometimes recalled this stage through memories of incidents or accidents. Angela recalled her older son in his younger years using a scooter without precaution:

A: *er, he, on a scooter --, he's actually head-butted erm, a wall at the end, {gosh!} he wouldn't listen and he put both feet on, and it was a hill like that (Angela is gesturing to indicate steepness of the hill) and it was just, he just went 'ccchhh'--, and then smacks, straight into the wall!*

Me: *what age were you then?*

D: *I don't remember...*

A: *he was about three... yeah, so we --, I think he had a black eye, but luckily that's all he had just, I'm sure it was it was a black eye he got erm, yeah, but...*

D: *I've hit quite a few things in my life haven't I?*

A: *yeah, you have, yeah.*

D: *... goalposts...*

Ishrat and Haziq had gone cycling with their first child as a toddler, on traffic-free and relatively safe paths for leisure in the Derbyshire Peak District. Cycling on Derbyshire's off-road former railway trails. With the arrival of their second child, it seemed that the family's cycling had become restricted to the father cycling alone, or sometimes the oldest child on his balance bike accompanied by his father walking. Haziq's concern at the potential to encounter traffic at high speeds even within the bounds of the city and the suburb where they live led him to conclude:

H: *Mmm? I think, I mean I may consider it on on, Tissington Trail or something... I might consider it over there... But I certainly wouldn't consider it if I ride here in Nottingham. If... I'm*

in a place that is –, where there's no cars at all and it's designed as a cycling trail, I'd consider it.

Although the terrain of West Bridgford is relatively flat and there are designated cycle routes, they frequently cross busy roads in this popular neighbourhood to the south of the city. After reflecting on his own experience of having taken the cycling proficiency test as an 11 year-old boy, Haziq was more positive about his son's future independent cycling, even contemplating allowing him to cycle to the local secondary school in the years ahead after appropriate training:

H: ...But like I said, yeah, with Kaleem once he's done his Bikeability thing... me personally I'd be very happy for him to cycle to school.

Me: ...Okay, as long as he's presumably not too far or...?

H: yeah, I mean... If it's like an 8 mile commute I wouldn't be expecting him like that, because if he was in any of the secondaries in West Bridgford, whether that be erm, you know Bridgford Comprehensive or any of the others I'd be very happy for him to do that.

These two perspectives by Haziq may seem contradictory, for instance, he considers cycling with a young child on a seat attached to his own bicycle as potentially hazardous, on the other he would permit his son in the future to cycle independently to school, provided he had received appropriate training. Contemplating the licence that he might grant to their child to cycle may simply be an idealistic statement of preference, it appears to be at odds with his own current reported behaviour and concerns about infrastructure that may not subside.

5.2.3 The ages of children and combining Cycling-PT

In the hilly eastern Nottingham suburb of Mapperley, Dominic's family had ceased to own a car almost two years before our discussion and before the youngest child had started school. Dominic's employer provided him with a Brompton folding-bicycle which he used to commute (downhill) to his office in the city centre, as well as for work-related visits to various sites around the region. He regularly took the folding-bicycle onto buses and had occasionally taken his full-sized bicycle on train journeys for recreational rides by himself. His wife also worked in the city, taking the bus daily. Although they did not yet travel independently, Dominic's children were accustomed to using buses and less frequently, trains. The children's school was 10 minutes distance from home, walking or using a scooter accompanied by their parents. Age-related differences in the capabilities of Dominic's children aged 5 and 8, and the external effects of the challenging terrain and a lack of adequate cycling infrastructure led Dominic to speculate on the potential value to the family of combining cycling with buses:

D: Well erm-, cars, {slight laugh} traffic, heavy traffic makes cycling challenging, very challenging, erm-, and inconsiderate road users, erm, bus drivers who won't let you take your bike on the bus when it says on their website that they do actually accept bikes, which I've mentioned before. I mean in terms of bikes and PT, what would actually make my life a lot better would be if, the local busses accepted bikes...

C: absolutely!

D: ...because where I live, we live erm-, there's no traffic-free routes that I can take the boys on direct from the house, if we want to go somewhere that's traffic-free we have to, you know it's, it's a bike ride either on the pavement of busy roads or, walking pushing, pushing the bike, if we... could take the bikes on the bus that would be so much-, it would be- it opens so many-, it would open the world...

Without the facility to take the children and bicycles on the bus their ability to cycle from home as a family was limited to occasional recreational rides, a limitation that also

constrained their ability to go by bicycle to the station to take a train as a family group. It seemed that although taking just the youngest child on his bicycle by train was a possibility, an opportunity had not yet occurred with either child:

Me: So what would be the situation where, which persuades you not to take the bike then for that trip down Woodborough Road and on to the railway station...?

D: If, if erm, travelling with the kids with the family. {Ok?} Because er, well, he can't cycle yet, actually, I would take him cos I've got a bike seat I'd put him on the bike seat, and if it's just me and him getting the train somewhere that'd be fine, {Mmm hmm?} but erm, he can cycle, but he erm, he's not really-, I wouldn't like to take him on...

Me: He's not 'road-friendly' yet?

D: He's not, no, I can't take him on busy roads.

Other parents living closer to rail stations had been able to combine cycling with train journeys. Kenton had taken his children (aged 5 and 9) on rare occasions with bicycles by train from their local station on the outskirts of Sheffield to cycle in the Derbyshire countryside, the youngest in a seat on the back of his father's bicycle while the older child rode his own bicycle. Kearney, a keen cyclist who worked in Leeds and had observed, "...recreational cycling can be pretty car dependent..." had once ridden with his wife and two small children (aged 2 and 5) to Knaresborough and returned by train to their home in Harrogate. He commented on the excitement the journey had caused the youngest child while describing the co-operative process of boarding the train and the understanding of others on board the train:

K: yeah, they thought it was quite exciting. Riley's two, and is just learning to talk and he's very excited -, if it's a train or a dinosaur - that makes it very exciting!

Me: did he have to come out of the bike seat in order to get up onto the train?

K: yeah so we, we lifted him, we took out of the bike seat erm, so I think when I when it came to getting on the train, Juliette did the kids, I did the bikes... ... so we just tag teamed it that way.

Me: and the conductor was, compliant?

K: yeah, they were pretty cool about it that day actually, and other passengers as well. Erm, having really small kids, the cuteness factor helps you to get away with quite a lot of things!

Kearney's observations about the positive reactions of other passengers when making a leisure trip, contrasted with Winnie's observations (see Chapter 4, section 4.1.3) about other commuters' not always having been impressed by Doug's regular trip to work with childcare on the train. The characteristics of the route, train type and time of travel making a difference to the experience of travel with young children. Episodes of combining Cycling-PT as family groups seemed to fit better with some stages of children's growth than with others, the ages of children and the gap between children's ages seeming to orchestrate these episodes.

Children as young as one-year-olds had travelled on seats attached to parents' bicycles on journeys that had combined with rail, but bringing a young child with their own bicycle was more problematic. The challenge of loading and unloading bicycles onto/from PT required physical strength and dexterity that was not yet sufficiently developed in children below about nine years of age and was influenced also by the weight (and thereby cost) of the bicycles used. An age-gap between siblings sufficient to allow one child to be carried in a seat, another to cycle independently, had facilitated combining Cycling-PT for recreation. Such journeys either required another adult to supervise the second child, or the child to be capable of manoeuvring their own bicycle around a station and boarding trains. A family group of 2 children and 1 parent could combine Cycling-PT for leisure trips. The child's ability to cycle safely on the highway (from around 8-9 years) was also required for cycling to or from stations where bicycles would remain parked and the trip continued by PT alone.

5.2.4 Changes in children's activities between 7 – 12

While Kearney's very young children were content to cycle with parents on trips, Kenton observed that his slightly older children wanted the company of friends to avoid boredom even for recreational cycling:

Me: and you take your kids with you on, with their bikes as well?

K: yes.

Me: Do you do that quite frequently...?

K: I wouldn't say frequently, summer, fair weather, and it needs a bit of planning and coordination with other families as well, to get some engagement: the kids get a bit bored, they like to be with their friends...

Justin, a father to boys aged 11 and 13 in a discussion in Leeds, described how taking one of his sons by train could usefully fit around the scheduling constraints of the rest of the household to enable activities aligned around the interests of parent and child:

Me: Have you ever taken your kids, on, PT with the bikes at all?

J: Yeah yeah, it's quite useful when-, if someone's doing something else and I, I need to take one to a football match or something its quite useful if, if you can get there by train and then cycle to the match, erm, its quite useful for that.

Me: and what d'you do, do you take both bikes on the train?

J: Yeah, both bikes on the train, yeah.

In the same discussion Nick, another parent of two slightly younger children responded by describing a bicycle journey he had recently made along the canal towpath to take part in the Leeds Skyride event with his eight-year-old daughter, returning by train as she had been tired after having already ridden about 9 miles. Both fathers agreed that these journey experiences with their children were in a way preparing for their children to replicate this form of travel behaviour:

Me: Fabulous, so in some ways would you say that that's a way of preparing your kids to kind of do the same thing that you've been doing?

J: I'd say so.

N: They, they don't see it as-, she doesn't see it as unusual or strange, you know, we'll do things like, they'll all come in in the car, no, they'll come in on the train, and we'll meet and we'll go for a pizza after work, or something-, and then they'll go back on the train, and I'll bring my bike onto the train with them, you know and-, and they just think that's what, that's what you do...

Me: Its normal?

N: Its normal, yeah, its not wierd or...

Similar experiences of cycling and taking trains with children aged around 9 or 10 years old were shared by several other participants, Ingrid recalling having used trains when going cycling along the Leeds-Liverpool canal with her son and a friend. Darius had taken his grandson by train to Shipley and cycled with him back to Leeds. Other parents had cycled with children to stations where they had parked and taken trains to various activities, this had also happened in Ivan's family when Tris had been around 9-10 years old around the same age as Dinah, Monique's daughter when they had cycled to Shipley station to take a train to go to the cinema in Leeds. Scott recalled having cycled to bus stops in the countryside when on holiday with his family to take the bus into a neighbouring town or to a nearby attraction. Accompanied journeys that involved cycling and PT journeys were thus often occurring before children had changed from primary to secondary schools, generally as part of leisure activities with their parents, but not always with the whole family group.

Some adult participants (for example Dawn, Bridget and Dorothy) commented on their own behaviour as being potentially influential for their growing, or grown up children. Children interviewed recognised the positive values related to environmental sustainability and were able to express some respect for their parents' travel behaviour, but did not necessarily share their parent's enthusiasm. For example, when asked if he was aware of his occasional combination of Cycling-PT, Derek's son Brandon was positive, "*I think it's good the element-, ... erm, better for the environment and stuff...*", however this did not alter his own preference for getting lifts to places. Implicit in his response is that now at secondary school, itself a bus ride away, his friendship circle also lived some distance away from his home:

- Me: *So when you travel, how do you prefer to travel?*
- B: *Er, well, if I can, erm, get a lift in the car but if I can't, I'd just get the bus.*
- Me: *okay. And going round to friends who might live locally, how would you get there? Do you have any friends who live close enough to-, get to easily?*
- B: *Mmm-, not really. Erm --, well it depends which friends I'm going to, if they're like near a bus route then I can get the bus, but if not, I probably, try and get a lift.*

In this respect, children appeared to have adopted roles themselves, arguing the case for getting a lift when they may have been capable, permitted and even encouraged, to cycle to their activities. Bridget's younger daughter had greater expectations of being given lifts by her parents than her older sister. Bridget believed this to be related to the two girls' different experiences of active travel, the older daughter having walked more when younger. Some parents, however, resisted pressures to chauffeur their children needlessly. Ingrid reported that she had refused to give the '*young people in my life*', including her son, a lift to places.

Many of the children whose experiences of combining Cycling-PT are described above seemed to have enjoyed cycling or at least engaged with it as a form of transport. But some other children had already started to reject cycling as both a pastime and a form of transport before leaving primary school. Brandon (13) who hardly ever cycled by the time of my discussion with his family, had received cycle training in his final year of primary school, but had lost interest in cycling as an activity long before:

- B: *Erm-, well, I used to enjoy it a bit more than I do now and I guess just, dad doing it and we have like a Bikeability thing at school...*
- Me: *... when was that? Was that in Junior school?*
- B: *yeah, that was in year six. Erm-, but I... never-, really liked it that much I never actually used it as an actual form of transport.*
- Me: *Okay. Did you used to ever go cycling with your friends or-, {No.} go round to your mates or anything?*
- B: *no.*
- Me: *Mmm hmm, and did you go to the park maybe and do any kind of, I don't know do you have a BMX bike or anything which, you could use, just for mucking around on?*
- B: *not really-, hardly, really.*
- Me: *So when you travel, how do you prefer to travel?*
- B: *Er, well, if I can, erm, get a lift in the car but if I can't, I'd just get the bus.*

Brandon's father Derek tried to identify what it was that had led to his son's disinclination to cycle, whereas Derek cycled for leisure and recreation, and also serviced bicycles and delivered cycle training as an occupation:

- D: *...Yeah, I've been riding in the woods with him, and, on occasion that's been good, on other occasions..., I don't know what it is because he is very active I think he, he doesn't like getting puffed out and stru-, he doesn't like struggling, erm, and he doesn't like getting muddy, and he... seems very sensitive to cold and wet.*
- Me: *Was there an age at which, the cycling was more enjoyable for him would you say?*

D: *oh yeah... when he was much younger it was, I think...*

Me: *what sort of age...?*

D: *Erm, seven-ish?*

Amongst siblings, some children enjoyed cycling as Brandon's sister Gemma did, but others like Dom, Tris' older brother, preferred to get to activities in other ways. Preferences for or against cycling have thus been established by the time children begin to attend secondary school, helping to establish routines and sometimes family sub-groups related to travel mode choices.

Adults recalling periods from their own adolescence when their enthusiasm for cycling had ceased often associated it with social influence from their peer group. As a child Faye had cycled regularly until aged around 13 when it had become 'uncool' to cycle amongst her peer group, a sentiment echoed by several participants. Jessica associated the changed attitudes to cycling with the altered activities and interests of children entering their adolescence. She had walked to primary school, and it had also been a 15 minute walk for her to secondary school, but had cycled then for leisure, once riding alone several miles from home to Warwick as a 13-14 year-old and had at 17, had a part-time job that involved her cycling within 4-5 miles to the homes of people for whom she had been, "*doing, sort of home care stuff for people*". She observed that her friends had become less engaged with cycling as they grew up:

J: *...cause it went from people playing out to then, going to people's houses or to the Park or something, it wasn't -, whereas before it was very active...*

These transitions do not seem to have occurred because of the crossing of the structural boundary of moving from primary to secondary school, but also as a result of accumulated experiences and altered preferences, changed social and recreational activities. Transitions in behaviours were also sometimes in opposition to prevailing household beliefs.

For present-day children who were keen cyclists, one parent would usually accompany a child on a cycling holiday, sometimes bringing a friend, as Lawrence's wife was preparing to do with their twelve-year-old son. In a biographical narrative from Simon's partner Pamela, she similarly recalled a journey at that same age with her father when they had taken a tandem by train to cycle around Norfolk, her first experience of combining Cycling- PT.

Activities could be complex and require equipment, sports activities were evident in both a single parent household, and in the others with two parents. Other activities included cultural and social skills based activities, some had been accessed by cycling or PT, but many depended on lifts being given by parents. No-one described children going to take part in a sports or cultural event by combining cycling- PT, although a few children had gone to spectate at events, and a few had been on a bike ride as part of the combined trip – with parents and typically below the age of 14.

5.2.5 Changing schools

The change of school to secondary that typically occurred around 11 years old often involved a change of geographical destination. In both present-day and biographic narratives, secondary school journeys were mainly enabled by walking or taking the bus for greater distances, or the tram in Nottingham. Although several adult participants recalled being given lifts to school by car with a parent in their own youth, these journeys had often coincided with the parent's own journey to work. In anticipation of the transition to secondary school, several parents had trained their children to use PT. Dorothy and Bridget had prepared their

daughters for taking the bus to school before the start of secondary school as discussed in Chapter 4 (4.1.3).

The change of school for one child in a family had also precipitated a change of school for a sibling as the family sought to optimise travel arrangements amongst other factors. In Leicester for example, Suki changed between primary schools when her older sister Thalia started to attend secondary school much further from home.

Changes also occurred at around 16 years old when several teenagers changed school or started to attend a 6th form colleges prior to beginning their A-level studies. Lawrence's older child had changed from a local school to attend the sixth-form at the school to which his younger brother had progressed directly from primary school. Lawrence had himself changed school at 16 to attend a college in Darlington, a daily journey that had been his first experience of combining Cycling-PT as part of a regular commute. Lawrence had previously used a school bus service, but remembered starting to combine cycling 4 miles to Allens West station for the short rail trip for the journey to Sixth Form college in Darlington, from the time that he had bought himself a bicycle until he passed his driving test and inherited a car. *"I seem to set a pattern there for gruelling long train-bike commutes, cause, obviously I come a long way now!"*. Lawrence also recalled having previously taken his bicycle on the train aged 14 or 15 for a long-distance bike ride back home from visiting his grandmother in Peterborough.

Children may deliberately be kept at a school to benefit from their established social networks, or because of the perceived educational benefit derived from attending a specific school compared with others closer to home. Felicity, Jacqueline's daughter had continued to attend her primary school after the family had moved to another village, although it was no longer the closest school. The family had not wanted to disrupt Felicity's education nor her circle of friends and had been able to chauffeur her to school, at first with the family's au pair, then integrating her trip to school with her father's commute to work in nearby Royston by car. The change of home location in this case had resulted in an extended journey length to the school in a way similar to the effect of transition between primary and secondary schools for many other children.

Jacqueline sometimes accompanied them to Felicity's school from where she would ride into Cambridge to catch her train to Nottingham, the route to Cambridge from the school being easier to cycle along than the route from their new home. Through this short trip and others that she shared with her mother travelling with her Brompton bicycle, Felicity was aware of her mother's *"useful"* travel behaviour. She also wished that she could travel to school and back home independently (see Chapter 4, section 4.1.9). Unlike older children that could travel independently by bus, bicycle, or walking, Felicity's young age, busy parental schedules in term-time, the barrier of a major highway and the lack of convenient PT in the area had resulted in the need to chauffeur her to and from school.

5.2.6 Adolescents with bicycles on PT

Denzel's train trips to Mansfield with friends and BMX bikes at 13-15 years old began around the time he had started to experience travelling to visit his grandmother alone and after a few years of doing so accompanied by his mother or another relative. It also followed an incident when aged 12 he had cycled out beyond his neighbourhood in Hucknall to Newstead Abbey with a friend Daryl, stretching their own boundaries and without parental permission from Angela or Daryl's mother Kerry, a neighbour and friend of the family who had usually kept an eye on Denzel on Angela's behalf when she had been at work:

- D: *no, well, it, -- to be fair we wasn't going to Newstead Abbey we went, to go to Papplewick Park...*
- A: *and I'm sure Kerry wouldn't have known anything about that.*
- D: *Kerry didn't I know, Daryl said we were taking a shortcut, and after about an hour and a half of riding...*
- ... we ended up at Newstead Abbey, went the long way around then came down, and they had a, bypass, coming from Mansfield...*
- A: *Mmm hmm? Oh right! 'Safe' bit – Yeah?*
- D: *yeah, no, we (were) on the pavement, like don't get twisted - but, we just come down there and then fly back up to Hucknall.*
- A: *I think I found out when I came home from work!*
- D: *yeah --, I got a bollocking but, I went back out.*

Marcus had also combined Cycling-PT for exploring the Yorkshire countryside, cycling out from his Bradford home aged 13-14 and sometimes taking trains home at the end of the ride. Shaun had also cycled, with a friend in the Yorkshire Dales, having taken the train from Newark to Leeds and had stayed with his grandparents in Yorkshire as 15 year-olds. In a biographic narrative, Tim had described taking the train to school in Glasgow for a while, having cycled to the local station where he had left his bicycle, with the agreement of the local station master. Lawrence had also cycled as a teenager to a local station and taken his bicycle on the train to the town where his sixth form college was based, until he had been able to drive there by himself.

Bartholomew, a participant with older teenage children, had cycled as a child to get around to his activities after having passed the Cycling Proficiency test, although his mother drove him to primary school. Secondary school was reached either by 107 bus, or by cycling. His father had always commuted by bus and tube, walking to the bus stop, neither of his parents cycled. At 11 Bartholomew was given a Raleigh racing bike and he had later cycled to Barnet Underground station from home when travelling on the tube into London since his early teenage years, when going on leisure trips there: "*just for, for fun.*".

With the exception of Denzel (18), other adolescent participants in my study were at most 14 when interviewed with their parents. This gave some insight into the licence or otherwise they'd been given to cycle, some offered comments about their friends who combined cycling and using PT. Anecdotes by parents about their older adolescent and recently grown-up children suggested disinterest in cycling generally, but some use when necessary or convenient for them.

Narratives about cycling as a youth from older and younger adults revealed how it had been used for commuting to and from college or school and to support cycling for leisure and recreation, sometimes in combination with social activities or visits to relatives. In several biographic accounts, participants described their early explorations of independent travel by combining cycling and train journeys. These sometimes seemed to result in interactions with official rules, societal norms and established practices and involved various types of external cooperation.

Tim, now retired, recalled how as a schoolboy living on a council estate outside Glasgow in the early 1960s, after getting a bicycle, he had combined cycling over a mile to a nearby station and taking a train, thereby saving himself considerable time over the more convenient but much slower bus journey. Through the cooperation of the local station master, he had been able to store the bicycle securely while he took the train to go to school in the centre of Glasgow. An informal arrangement, it had come to an end, Tim believed,

after the stationmaster had received instructions from “*somebody on high*” not to look after the boy’s bicycle.

Gerald who had recently retired when I interviewed him, had as a child living in rural Norfolk, cycled to take the school bus from a stop in a nearby village (as had all his siblings). His journey had also involved an informal arrangement for storing his bicycle, in this case with a friendly shopkeeper, a facility that Gerald had involved reciprocity and negotiation:

- Me: *...So you knew the people in the shop and they, they allowed you this concession?*
- G: *yeah... Yeah... Yes, that's right, not least because we did all, - or my mother did all the grocery shopping there so, there was some sort of unspoken deal I suspect! (Chuckles) but, that's how that worked I think...*
- Me: *and what about, who else cycled in the family, then, as a child when you were...?*
- G: *We all did, in the same way...*
- Me: *How many brothers and sisters have you got?*
- G: *I've got, an older brother, I've got two brothers and a sister. We all went to the same grammar school, and we all did the very same thing, for the entire time.*

Gerald and his two siblings had parked their bicycles in the shop’s yard for several years while they caught the bus the ten miles to school each day.

Lawrence had also cycled to catch a train to his 6th form school in his youth. Enjoying cycling for leisure, as well as a practical form of transport to visit friends and get to a part time job from his rural North Yorkshire home. He had also cycled back from his grandmother’s home aged 15, having taken train out to stay with her on one occasion. At around 15 years old, Shaun and a friend had once taken their bicycles on the train from Newark up to Yorkshire to stay at his grandparents and go cycling in the Dales. Returning from Leeds, an encounter with an obstructive train guard who had disapproved of the two teenagers travelling with bicycles without an adult had required the intervention of Shaun’s grandfather to allow the boys to board the train.

Until 3 years previously Miles, then around 17-19 years old had attended a motorcycle mechanic’s course at a college in Wakefield. Originally he had walked to his local station in Leeds, Crossgates Rail travelling by train via Leeds station, but ended up taking a skateboard, and then his bicycle with him, to reduce the time taken to get to Glasshoughton Rail station from where there was an hourly train service back to Leeds. He only had some 5-10 minutes to get to the station and cross over a bridge to the opposite platform for his train, departure from courses sometimes delayed by unruly behaviour amongst his student colleagues or other reasons: “*if you're running behind in college, and you miss that train I have to wait an entire hour.*” Later he had tended to cycle to and from Leeds station, as changing trains there was often affected by the late arrival of the first service he would take.

5.3 Adulthood and altered time and space

5.3.1 Combining Cycling-PT and transitions through university

The transition to study at a university or polytechnic in the 1970s and 1980s described by participants, as well as in more recent narratives, had generally involved a move to another city or town. Visiting friends and maintaining contact with family or other people after moving from the parental home to university, or later, from university to another city for work at the start of a career was a factor mentioned several times in the discussions.

Doreen who had found work in Nottingham after studying at Hull University, had used bike-rail to visit her friends who had either stayed in Hull, or had moved to Manchester, Preston and other places after uni. She commented on the changes that had occurred in the design of trains as she had experienced them: *"It was a big blow to me when they, did away with guards vans and all these restrictions"*. The newer trains introduced in the early 1980s had much reduced space for bicycles, a factor often mentioned by older adults who remembered combining Cycling-PT before that time.

In 1981 Stuart had bought a bike in Oxford, using it to cycle round the city and he used enjoy cycling there along the River - *"it was nice"*, also cycling in the dark late at night from his digs to a job in a bar. He recalled the cycling culture of the city from his perspective as a student there:

S: *Yeah, especially in a place like Oxford. A lot of people cycled. And a lot of people would take the bikes home and, to and from...? ...and it's, it's quite flat, flattish city... Apart from where I was, Headington which is, on a Hill, but, the rest of the city's flat.... So it's, good.*

Stuart had not used the trains much as a child or adolescent, but had travelled between Sandling, the closest rail station to Hythe, and Oxford via Reading and Tonbridge, bringing his bicycle home by train at the end of term as his first experience of combining Cycling-PT:

S: *"They had guard's vans in those days! They were great, wasn't it, there was no problem."*

Financial considerations had encouraged Vincent and Doreen to cycle when at university and travelling between friends and cities afterwards by train. Wendy, Marianne and others had brought their bicycles from home by train to cities where they had studied, although some like Simon had only cycled around their university town, not combining Cycling-PT until much later in their lives.

Of those who had cycled at university, some were returning to cycling after having become licensed car drivers. Having cycled from the age of six near his Hertfordshire home and used his bicycle for a part time 'paper round' job aged 14, Nathan had passed his driving test at 18 and reduced his cycling finding it *"handy having a car"* but not using it every day. He had returned to using the bicycle after taking his bicycle up to Newcastle when studying there when not wanting to walk, or pay bus fares. Students also contributed to the relatively high levels of cycling in some other university cities such as Hull, Oxford and Cambridge. Dustin who grew up in Wakefield and currently lived in Nottingham, remembered only learning to ride his mother's old bicycle, aged 18 at his family home in anticipation of moving to study in Cambridge. Having fallen off a bicycle with stabilisers at a cousin's house had dissuaded him from cycling as a child and had learned to drive a car before he could cycle.

In addition to the largely flat terrain, policies in Cambridge also meant that students tended to cycle there, and students also adapted their travel skills in readiness for going to university. Bruce, a much younger participant in Leeds, had started to drive aged 17 to participate in out-of-school social activities as a sixth former around his hometown of Hereford, although he took the bus to school each day for his studies. He had cycled with his parents as part of family activities in Herefordshire, including occasional quite long rides of around 50 miles around the Black Mountains. Bruce's first experiences of combining Cycling-PT however, were when he had been a student visiting a friend in Oxford. Then he had travelled by coach from his university in Cambridge fairly regularly, putting his bike in the bottom of the coach aged around 19, he recalled that Cambridge University had not permitted students to keep cars in the city.

Having recently arrived in Leeds to work in a new job, Bruce was still combining Cycling-PT at weekends, but had started to contemplate buying a car to facilitate travel both to visit his girlfriend in Cambridge, and to visit his sister's family in Hereford as she had recently given birth. He also thought a car would be useful when renovating a house he had recently bought.

5.3.2 Young adults experiencing Cycling-PT combining for the first time

Brian, a lorry-driver in his fifties had first experienced combining Cycling-PT in his mid-20s, after cycling to Wales with a friend to go camping. Running out of time on the return cycling journey and with work starting the following day, a Monday, he thought they had taken the train from Wrexham, putting the bikes and camping gear on the train. Brian had typically been using a Brompton folding-bicycle in recent times when combining Cycling-PT. Chester, another Brompton-owning Nottingham resident, had earlier in his career been living in Derby. There he had regularly cycled to the bus station to catch a bus out to his workplace near Bakewell, until the theft of his bicycle had forced him to walk instead of cycle to the bus.

Elton's first experience of combining Cycling-PT had been when travelling to an archaeological site in Northamptonshire, using the bike and train to take his camping gear and other items, in the 1980s. After that using bike-rail occasionally: "*That would be long-distance journeys; in those days you could generally put your bike in the guard's van.*".

5.3.3 Integrating influence of the workplace

For the person who cycles for everyday journeys, starting a new job at a workplace a greater distance from home can result in the adoption of a new repertoire of combining cycling with the PT stage of a commuting trip. Kenton had previously been cycling a lot including to commute to work in his home city of Sheffield. He had then started commuting by bike-rail when he got a job in Leeds, cycling to save time compared to walking to his local station. Kenton's combining of Cycling-PT was an extension of the cycling he already used for his daily commute.

Christian too had started to combine Cycling-PT after a change of job meant that he added use of the train to the short bicycle journey he previously made to his job when he'd worked more locally. He had originally been motivated to start cycling to work when a manager at his previous workplace had told him to get to work "*a bit quicker*"!

A transition between roles as an employee and the consequent altered geography of the workplace had also initiated the combining of Cycling-PT. Fraser had first combined Cycling-PT for work after he had started to work in London in a management role, whereas before he had worked locally in the Nottingham area and cycled directly between home and work. In the management role he had worked in different locations, leading him to start using "*multimodal transport if you like...*".

The transition to the world of work initially involving a cycling journey was described by a few. Wayne remembered cycling to his first job in Nottingham from the outlying suburb of Clifton keeping time with the speed of the bus journey. Larry, a recently retired college lecturer had been a professional footballer in his youth and had then combined Cycling-PT for transport. One of his first experiences of combining both modes had been to go to Matlock Spa from Langley Mill by train, taking the bike. He remembered combining Cycling-PT between the ages of 15-18.

Gerald's work experience in the Netherlands while studying at Coventry's polytechnic was followed by starting his first job in Nottingham, staying in a house full of bikes, travelling then in the early 1980s, as now, with his bicycle by train to Norwich to visit his family periodically. He had at some point bought a house in Nottingham. After a period working in London he had moved to Norwich to work, but he did not remain long in that job. While still living in Norwich for a period of 2½ years he had used a folding-bike and the train to commute to work in London on alternate weeks. Initially he had used the Underground to commute from Mill Hill where he had stayed with friends during the week. He subsequently purchased a folding-bike, using this to ride into central London and to get to and from the train for his journeys from and to Norwich. At the time of the discussion, Gerald had returned to live in Nottingham where he had bought a house with the intention of retiring there from his career in industry. Without the constraints of children or other immediate family, Gerald had been able to move wherever it had seemed expedient for progression in his career and his mobility needs had been fulfilled by cycling, using PT, or by combining the two modes.

Some participants commented that they had combined Cycling-PT on journeys during work time, for instance when visiting another company office, as Randolph had done when travelling to the Doncaster office of his employers. India, interviewed in Beeston, Nottinghamshire had recently taken her bicycle on the train to Leeds for a meeting related to her work. Elton had contemplated using the bicycle when making business trips to other cities, but had been deterred by the risk assessment paperwork required by his employer. Other individuals working in academia or voluntary sector organisations had combined Cycling-PT to go to conferences, (Jacqueline, Nick) training events (Derek, Ivan) and when visiting another university as an external examiner (Tim).

Clothing lockers, showers, changing facilities, the Cycle-to-Work scheme and other affordances and support for cyclists were amongst the employer-provided features appreciated by some of those who combined Cycling-PT for commuting (Monique, Elton, Ambrose, Wendy). Nicholas the medic who cycled around Leeds on an electric bicycle between different hospitals did keep a change of clothes appropriate to his role in some of the offices he was based at. As a recently qualified doctor in Dublin, Nicholas had been able to make use of facilities available at work for cycling, whereas before as a trainee doctor he had used PT. Many others who combined Cycling-PT did not appear to require special facilities to support their travel behaviour. Una had been aware of the provision of facilities for cyclists at a previous larger employer when she had not cycled, but did not bemoan the lack of provision at her present workplace in a much smaller company. She kept her exercise moderate but did comment that some of her colleagues did not understand why she would wish to cycle and use the train, her reasons and motivation for combining Cycling-PT are explored in more depth in Chapter 6 (6.2.8).

Dave in Leeds (Margaret's husband) also worked for a relatively small business with colleagues who did not understand why he would choose to cycle and catch the train, thinking it was related to his lack of financial resources. Although Dave had changed the trajectory of his career, he had always chosen jobs that were accessible by train from Leeds. He had worked first as an engineer in Saltaire, then retrained as an optometrist at University of Bradford, subsequently working for an employer with sites across several locations across West Yorkshire. Dave's most recent change of workplace to Guiseley made it worthwhile using a Metrocard for his commutes, previously he'd bought day return tickets for his work in three different sites across West Yorkshire, but regardless, he still combined cycling with PT.

The narrative around Dave's travel was unusual in suggesting that Cycling-PT was a kind of regional time-space behaviour that he sought to maintain through his choice of employment.

Changes in the location of home or regular activities had often resulted in changes in the way that cycling was combined with PT, for instance adjusting from taking a bicycle on board the train to more often parking it at a station, or purchasing a folding-bicycle after having used a full-size bicycle for a long time.

Jason's narrative illustrated the role that combining Cycling-PT had played in following a change of job and altered tasks and activities. It revealed that Cycling-PT had been adopted following reflection and a period of evaluation, it had involved additional household decision-making. Jason had worked for 10 years in the family's bakery business in London when he had driven to and from work by car due to distances and the very early start to the day. He had studied and changed career but continued to drive when working at Nottingham University where he had needed to travel often to other sites by car, carrying colleagues and tools. Aged nearly forty and having settled into a new job in Leicester that offered periods when he was located in an office, he had bought a bike and for the first time in nearly twenty years, had started to cycle to Beeston station in place of using the car. His journey was synchronised for a while with that of his wife:

J: I would say I've only been cycling for about the last 12 years perhaps. My wife and I bought a bike and we thought...because we were both travelling to Leicester at the time. I think it was really when I got a job in Leicester I decided that because I used to work at Nottingham Uni and I just used to...well driving because I very often used to have to then drive out from there so I used to go in with my car and pick up people or get picked up and then it was a minibus out to site or whatever. And then when I went to Leicester I used to go on the train a lot more and so I thought it's ridiculous driving two miles I'll get a bike and so just got myself a very cheap bike and then got to quite like cycling and so I bought myself a more expensive one but that's probably I would only say about 10 or 12 years ago.

Jason's contemporary job also sometimes required him to drive to work at other sites, but he combined Cycling-PT whenever he was based for the day at his Leicester office.

Evidence in these narratives suggests the key influence of external organisations and ability to negotiate with them. There are examples of negotiation with workplace and examples of negotiation with individual guards on trains. These examples demonstrate the agency of minor transgressions in behaviour, resulting in change.

5.3.4 Starting to combine cycling with PT in middle-age

Jeremy started combining cycling with bus and train for outdoor activities in the late 1990s, early 2000s. He had always cycled and had encouraged his son to cycle from the age of four, even cycling along the Scarborough to Ravenscar route with him and visiting relatives in Scarborough. He had separated from his wife when his son was ten years old (Ca. 1996), but only after the separation did Jeremy start to combine Cycling-PT when travelling with other friends and acquaintances. Using PT became "*quite a new, new phenomena*" for Jeremy in his late thirties and early forties, using it in particular to go walking with an adult social care group, also sometimes going cycling with the same client group. In the early 2000s, Jeremy had sometimes used the Dales Bus, a service that carried bicycles in a trailer, with the adult social care group to go cycling in the Dales, sometimes catching the train back to Leeds. When going walking, he had often left his bicycle at Leeds station, whether taking the train, or a bus from the nearby bus station. With other friends he would go cycling to the CTC York

Rally, annually each year since the late 1990s, and also cycle-touring on the continent with a group of mutual friends.

Three years before our discussion he had used trains to meet up with a friend to do a ride from Malton towards Pickering, both then taking trains to different destinations. He had also combined cycling with train journeys for other recreational rides, such as once for a ride from Hull to Spurn Point. Jeremy currently also had a car that he used in the city and also sometimes to go walking with friends in the countryside.

Middle-aged working adults, such as Wayne (detailed in Chapter 4, section 4.2.8) and Jason (section 5.3.3) had also started to combine Cycling-PT after their careers had become established as a result in a change of working patterns or location.

Some 22 years previously, Trevor had lived with his young family in Sherwood in North Nottingham, then both he and his wife each had a car, he was unable to recall cycling into the city because the bus service had been better there. Then for six years he had lived in London, then in Norwich, then they returned to Nottingham, this time living in West Bridgford, and as his children were becoming teenagers they had decided to give up one car, because Trevor could then cycle to his workplace. Living relatively close to a job that was more "deskbound" than it had been in his previous Nottingham role. It had also become difficult to run two cars, so they became a "one car family". Now that his daughters have left school only one still lives at home, Trevor's wife uses her car to commute across the city to her workplace. Based mainly at an office near to Nottingham rail station, Trevor travels to London from Nottingham for work on one day each week, using the bicycle for the short trip to the station and back in the evening, a journey he particularly enjoys in the summer months.

Hire cars were used by those households that did not have a car but did have a driving licence, for example Bridget's family had used one for holidays, to go camping, as had Nicholas' family, and Darius also sometimes hired a car having the, "*£2000 to dip into...*" that he saved by no longer owning a car.

5.3.5 Geographic relocation and combining behaviour

In some cases, participants had studied or previously lived in 'cycling friendly' cities, i.e. Cambridge, Hull, Oxford, Eindhoven, Helsinki, Barcelona, Bremen, Bristol, Edinburgh, Munich and Seville (though others had also lived in cities with less favourable conditions for cycling). There they had generally cycled, and started combining with PT after their move to the Leeds or Nottingham regions. Some, like Efi who had lived in Barcelona and Seville before coming to Leeds, had extensively used bike-share schemes and PT, but had started taking bicycles onto trains here owing to the combination of a longer regional commute and the more challenging terrain for cycling.

Others, such as Alberico, had moved into circumstances which mitigated against car ownership or which offered very good PT links. Alberico had grown up in Rome, cycling with his grandfather when on holiday in the countryside as a child. As an adolescent he had used buses and the Metro to travel around in Rome, but after getting his driver's licence he would drive to the nearest Metro station and get the underground to his destination. After moving to Manchester from Rome some 5-6 years previously, he had found his new home city more suited to cycling than Rome. He had not cycled for the first 6 months, as he had acclimatised to the city and the traffic culture:

A: *...So there were a number of small things and I wanted to become familiar with the environment before starting cycle but then after six months I got the bike and yeah...*

In Manchester Alberico had been glad to realise that he could cycle everywhere and had never really contemplated other options since.

Living again with parents came up in Dawn's narrative about her son (30), and Una who had moved back to live with her mother in Mansfield as she worked in Nottingham. Damon's stepson, now a builder still lives with his mother and stepfather in Beeston, he also cycles and sometimes "*commutes to his gigs by train*".

The city of Nottingham had drawn some people to live there, not just for people such as Gerald and Stuart entering the retirement stage of their life-trajectories, but also some younger adults (including Veronica) had found the city more appealing than smaller towns such as Loughborough.

5.3.6 Anticipating empty nests and early retirement

Some adults had decided to retire from their careers in employment early, from their late 50s in a few cases. This had led some, such as Darius and Tim in Leeds, and Stuart who had moved to Nottingham to buy a house for his retirement, to reconsider the need to retain car ownership, in Stuart's case driven by financial constraints.

Doreen had recently been made redundant, but was not seeking further employment and her husband Harold had also retired from work in his late fifties, although they had not owned a car in the time they had lived together. Following retirement, Simon had with his partner Pamela decided to reduce their car ownership to a single car.

Others whose children had left or could anticipate their children no longer requiring supervision at home were able to envisage opportunities for combining Cycling-PT, or at least for cycling more often, reducing the car size and fleet size.

A number of adults had considered electric bikes, not just retired people but some in their 40s or 50s. Older participants saw maintaining their physical capability to cycle as a personal goal, one not wanting to give in to using an e-bike just yet, another wanting to emulate a 92 years old cyclist he knew used to cycle around Sheffield, but they realised their capabilities would gradually diminish and seemed to know their limits.

5.3.7 Free bus pass and car no longer needed

The free bus pass was mentioned by participants including Tim and Edith who had reached that age threshold, though this had not necessarily coincided with their own retirement from the workplace. Being of an age to get a senior railcard was mentioned by a couple of participants, for example Dorothy, who was still working, commented that it made the great expense of rail travel more tolerable. That combined with the ability to travel more flexibly made long or more frequent rail journeys more attractive. Arthur, who combined Cycling-PT regularly for recreational bicycle rides throughout the North of England, had a rail-pass giving him free travel on all services of one operator through his involvement in the local community rail partnership group. He had scheduled his recreational rides to coincide with activities that occupied his wife outside the home on the same days.

5.3.8 Timescape / generational differences

Narratives of many of the older participants included comments on changes that they believed had occurred within their lifetime. They commented on the recent developments of cycling infrastructure that they often compared with their own memories of arriving in the cities of Leeds or Nottingham during the 1970s or 1980s when there had been little infrastructure. Those who had cycled throughout those early years believed that fewer people had cycled in the past than nowadays and were often encouraged by the changes they had seen in recent years. Alongside these positive narratives, were unanimous expressions of regret at the disappearance of “guard’s vans” from trains. This facility had in their minds, had greater capacity for carrying bicycles for small groups of people, including tandems and had not needed to be booked in advance. The fact that bicycles could be stowed there without the risk of encountering other obstructive passengers was not mentioned, but may have also contributed to this positive view of Cycling-PT integration in the past.

Parents who had not driven, and the comparatively light traffic on highways were amongst the other generational differences mentioned by participants.

Adults’ descriptions of their own childhood experiences of beginning to travel independently revealed differences with more recent accounts of travel by children. Parents often contrasted their own relative liberty to walk and cycle locally, extending cycling independently as teenagers after having taken the Cycling Proficiency Test, with present-day concerns over the safety of their own children when cycling. Although few participants lived in rural locations outside a neighbouring city, many more had experienced growing up in small towns or villages and had cycled along country roads to get to and from school, meet friends, and for part-time jobs as adolescents and teenagers. This gradual shift towards urban centres was also reflected upon by some participants contrasting their own rural experiences of childhood with that of their urban children.

Marianne’s comparison of her relative freedom to cycle independently as a sixteen-year-old living in rural Dorset with the practices of her own children’s generation in contemporary Leeds typifies the perceptions of many participants:

M: ...when I was Sonya’s age I had, a friend who lived quite a long way away and we would meet halfway on our bikes, {Mmm hmm} travelling, you know for a, really quite a fair distance, probably about 45 minutes ride each, you know-, to meet in the middle and that was what we would do, so there was quite a lot of time when you’re out using your bike routinely, {Mmm} erm, and I just see it, it was all so you just went and hang ou-, hung out on your bike and you’d be sort of, grouped all sort of standing there with your bikes or whatever, and it’s just stuff that the kids don’t do at all here-, {yeah} they wouldn’t go out, you would have, you’d go out on a specific, bike ride as opposed to just having it as an extension of your body going out, erm, and, round the place really, {Mmm} so I think that’s the, that’s, that’s quite a shame I think. {Mmm} But I don’t know whether if I went back there now I would f-, well I would, mmm-, I think it’s just about still, practical, that you would do it but, probably it would be less of a-, less of an option than it was because of the amount of traffic now.

The increase in traffic compared with traffic in participants’ own childhoods, was the most common concern mentioned in this context by present-day parents of children and young adults. Road accidents had been experienced by several participants, or had occurred to other people known to them, including other family members. The death of a neighbour’s child was recalled in the relatively recent family biographical narrative of Angela’s family that had raised the theme of transgressive motorists behaviour identified in the literature by Christie et al. (2011). Adult participants also remembered parental warnings about the

potential dangers of cycling when they were children. Darius recalled hearing about another child's death on a country road in his own youth:

D: *I learned to cycle when I was a young child and, erm, I lived in a remote, village 3 miles from the nearest town, erm, where my school was erm, but I-, you know learned to ride a bike and from I guess about 10, onwards my parents would let me cycle 3 miles down country lanes to school, erm, which I think was probably a bit wild! And there was one death during my school -, erm, during my, sort of... ..15 years, erm, there was one death on that road...*

Me: *of a cyclist?*

D: *of a... of a child, -, young person... on their bike, yeah. So it wasn't without risk.*

Me: *which part of the country was that in?*

D: *erm, rural, West – Gloucestershire.... Really remote, wild bit of -, nowhere place! (Chuckles) but we all got around, we all went on our bikes cause there's one bus a day, to the town. {Yeah} one in the morning, one at night so, yeah...*

The danger from traffic of cycling on the highway had clearly been apparent to parents of previous generations who had not all been in favour of their children cycling, while others had set rules or boundaries to roaming. Some had even been forbidden to cycle in the past, or had not been given a bicycle as a child, however many had been actively encouraged through accompaniment, or by parents' and other relatives' tales of past cycling achievements. Attitudes to children's cycling as described by participants, had changed, parents having become more protective and inhibiting independent cycling in general until late-teens, whereas children had often previously cycled from 12-13 years old. This study echoes findings by Jones (2013) that contrasted the limited activities accessed by cycling in adolescence of young adult respondents with that of adults born in the 'Baby Boom' era (1945-1955), for whom cycling had provided a means to extend individual mobility range in childhood and adolescence.

5.4 Household processes involved in transitions

5.4.1 Roles in transitions

Jacqueline's role as driver and chauffeur for her children had changed with the cessation of driving, as was observed in section 5.1. Similar readjustments to the role of those accompanying children will occur in other households where an adult is injured or unwell. This may be a temporary alteration in role, or a more permanent situation, as Elton had described himself as having taken his son to school, and later to the train station for his commute to college, describing his wife as 'quite disabled'. In families experiencing the separation of parents, roles related to the development of skills and capabilities in children, or simply their accompaniment to or from school or other regular activities could also change.

More subtle changes to family roles were also discernible, related to work-related activities of parents. For instance, Gemma (10) challenged her mother's self-perception as a dutiful parent regularly collecting her daughter from her violin lessons, revealing a change in the temporal rhythm in the mother's accompaniment home from this activity that had changed almost imperceptibly over time:

M: *...What else do I do? I obviously do that same thing of going to Woodhouse to pick, Gemma up from Violin, and, so-on...*

G: *you used to; not any more!*

M: *I do, from time to time!*

G: *you used to do it every time and now you, hardly ever go there.*

Me: *was that on the bike, or is that, er...?*

M: *that'd be on the bike, on the (way) back from work and then Gemma and I will, probably walk back from there after that.*

Derek, Gemma's father would usually drop her off for her lesson, but had started to collect her more often, whether due to the conflicting demands on Marianne's time as a senior administrator at her work, or worsening weather as the discussion took place in late Autumn and Derek was perhaps using the family car more often for comfort. Alliances in the family were shifting as Gemma had more opportunities to align her activities with her father's availability than her mother's. Marianne's role seemed to be changing during a period of apparent stability in the pattern of Gemma's everyday activities.

Carlos as an adult lived in Manchester and combined cycling with the train on some days to study in Leeds. As a child of older parents growing up in the outskirts of Budapest, he had noticed a change in the support he had been receiving for cycling from his father, something he attributed to the level of capability he had attained, as well as to his father's age and condition of fitness:

C: *I remember once we, we had like erm, a cycle, a cycle trip with with a group, in a small island in Budapest, and, all the other people, no, they take their car to bring their bicycle there, on top of a car, but we don't have a car, but we don't have a car, and neither my parents can drive, so, we cycled actually to that island, and made sure the trip to go to that island is much longer than the trip itself on the island but I was really enjoying it, and I just remembered because I live in a Hill, so when we finish all the trip and we arrive at the bottom of the hill then, my father says okay let's, take the bus to, to go back in fact, you're not allowed to take bicycle on the back in Budapest, but but the driver said okay no problem, you know the driver, so and that time I was a little bit disappointed – I wanted to cycle from home to home is fully, - I don't want to make this last bit but, er... then at that time I, obey my parents and, but later... After I am 12... he is not, not coming anymore to bicycle I think from the time that I could, could cycle alone he didn't come because he was not enjoying as much as I do, he just come with me and maybe like, inside like, difficult or suffering but he, he come with me to make me happy but later on I, I could do it alone... yeah.*

Having enabled the bicycling activity of his son, but finding the extended experience tiring owing to his age and physical condition, Carlos' father no-longer accompanied his son on bicycling trips. Carlos would later cycle alone, or from the age of 13-14, with his friends. This had been one of the first times that Carlos had directly experienced the combination of Cycling-PT through the informal negotiation of his father with the bus-driving neighbour. This is also an example of parental support for the development of independent mobility skills, a theme evident in several other discussions. Carlos confirmed that he had not cycled to school until aged thirteen, when his mother who had previously forbidden him to cycle relented.

Other participants who had been brought up by older parents generally remembered that when they were children, their parents had no-longer cycled, if they had done so previously.

5.4.2 Assimilation, initiation and coercion

Narratives related to the formation of adult partnerships and the blending of households suggested that where combining Cycling-PT had been an established behaviour in one of the adults, an attempt would be made to encourage the new partner to experience or adopt the same behaviour. This was not a universal experience and seemed to require a predisposition towards cycling, or the use of PT.

Simon had bought his first 'proper' bicycle when a student in Chichester years ago, but had not combined Cycling-PT until he had met Pamela. He had either taken the bus when employed in the centre of Leeds, or, when he had his own business in the suburb of Horsforth, he had driven by car as no buses ran directly between his home neighbourhood

and Horsforth. He described the influence that Pamela had on his activities when moving into his home a few years previously:

- Me: okay, anything else happened? Anybody left the household? Do you have children?*
- P:/S: no/no.*
- S: ...Well you've arrived I suppose?*
- P: yeah I've arrived that's... (Laughs)*
- S: carrying -, bearing bikes!*
- Me: yeah, so, does that mean you're recently a couple then?*
- P: is it your six years now...?*
- S: five years, five – six years...*
- P: ...And moved in, four years ago, yeah, yes, so there's been a lot more cycling in Simon's life whether he wanted it or not, really!*
- Me: Okay. Did you have a bike before that?*
- S: yes, yeah I had a bike.*
- P: he did cycling but not really...*
- S: yeah, I would..... When did I used to go cycling,? I haven't been for a long time actually...? No I was reintroduced, by Pamela really.*

Pamela remembered first going on a cycle-touring trip as a 12-yo with her father in Norfolk on a tandem, taking the bike there by train from Leeds, she had many years' experience of combining Cycling-PT and had still gone on a bike-rail holiday to and from Carlisle after they had first met but were, "*doing separate holidays then still.*" Now that Simon had retired, but Pamela was still worked near Harrogate, they shared a car and the use of a Brompton folding-bicycle that he rode down to the city centre when working as a volunteer at a charity there, taking the bicycle on the bus when returning uphill to Moortown.

Three years before participating in this study, Simon had been co-opted by Pamela into a cycle-touring trip along the Danube, where they also used PT to travel between European cities, however they had used rented bikes, and the train and ferry. He had helped Pamela to plan the cycling journey she would make with her father between Land's End and John o' Groats and the stages of the journey by rail from Leeds to the start of the ride and for the return from Scotland. His first direct experience of taking a bike on a train was a cycling trip in the "Black Isle" in Scotland.

Dustin, a Nottingham resident, had also persuaded his partner to cycle more over time to the extent that she had started to cycle to work and the couple used bicycles when going into the city to socialise. They regularly cycled at weekends in the surrounding countryside, often returning with their bicycles by train. In Leeds, Ivan's wife Jemima had also started to cycle regularly to her workplace through the influence of her husband.

Damien's attempts at bonding with his then adolescent stepson during an annual Nottingham cycling event, the "Big Wheel", had involved trying to instil some of the etiquette of cycling in the social context of an organised cycling event rather than in the PT environment. As an adult the stepson had still cycled and combined Cycling-PT for work.

Attempts at engaging with members of a newly-blended family through the combination of Cycling-PT had not always been successful, as Harold recalled. He gave a biographic account of taking his first wife and her own daughter by train to go cycling along the coast, this was, "*an attempt to compromise...*" with their preference for resort holidays in Spain. This experience had not been appreciated by the mother and daughter and he thought it had contributed to the eventual dissolution of their brief marriage.

5.4.3 Habituation

The process (and code) of “habituation” for example, was applied to several situations in which participants described periods in which they had either established new routines, or adopted new practices and behaviours as the result of a change in the household.

Habituation was in my view, generally applicable to several kinds of life-course events. I asked Dave’s wife Margaret about her first experience of combining Cycling-PT. She recalled that she had got used to this form of travel through experiences on several occasions, first as a child and as a student, then later using it to commute to work after moving to Leeds:

M: Don't know, I think some of our journeys we must've caught, trains, with the bikes because we used to go and come back so was probably about, roundabout year, six, seven...

Me: with your parents...?

M: yeah, yeah with my parents so we went quite a lot of journeys and you know, they'll still do that stuff themselves now so, yeah and we used to put bikes on, trains then, I think. And then... when I went to college I went to college in Bristol and I didn't drive so I rode everywhere, in Bristol. And then I didn't drive until I was 25 so I just rode, and then, erm, when I lived here I combined bike, and train. So I think, once you get used to it, you-, that's what you do isn't it, so I think I was probably, I was probably older than them, but still, a child.

Both Ivan and Ambrose had started to cycle to work as a result of encouragement from colleagues, Ambrose’s journey involving taking his bicycle on the train to Wakefield, whereas Ivan had ridden directly from home to his workplace to the south of Leeds city centre. Both had found the first few days challenging, a period in which they became habituated to the journey, developing stamina and confidence. After Ivan started to commute by bicycle to work in his 40s, he had also encouraged his wife Jemima to do so, they described the processes by which they had become acclimatised:

I: ...The only reason I started riding my bike was cause I was, frustrated with PT and how long it took, and it was somebody else, - I'd not even thought about riding my bike to work until, you know a colleague said "oh I ride a bike..." and I realised he lived very close to me, {Mmm}... So then it's, and that was, you know, try it, a couple of times a week... With stopping for a drink and snack and, and everything like that to, - to now like I say, you just do it every day and find it as a normal thing but erm, but yeah... And I think probably with, with you, (looks at his wife) initially you were-, you didn't like being on the road at all did you?

J: no, not at first, so, but then the more I did it, the more I got used to it and-, become more confident really so.

Me: Me: so how did you travel before that?

J: car.

This process also seemed to apply to phases of recuperation after injury through health-related events or critical incidents, for example as participants recovered after a cycling accident and wanted to reactivate their skills and capabilities as cyclists. In Leeds, Ivan had returned to cycling to help him recover after an accident that had affected him both physically and psychologically. He had also been able to cycle more easily than walk during the period leading up to his hip-replacement operation.

Following a serious mountain-biking accident resulting in a Pulmonary Embolism, Leicester resident Doug had been unable to work for several months and cycling on the highway was part of his process for regaining fitness:

D: ...and then I was back on the bike again...

- W: *...But erm, really you getting your road bike and doing that was sort of you trying to get sort of a lot fitter again wasn't it?*
- D: *yeah.*
- W: *...cause you felt like you hadn't really... gained back the fitness that you lost because he couldn't-, he had to be on Warfarin for a period of time so he couldn't mountain bike or, or do anything that might cause him to have a... an accident.*
- D: *or any sort of bleed, yeah.*

5.4.4 Evaluation as evidence of reflexivity

Evaluation as a reflexive household process related to transitions is apparent when participants reveal their contemplation of possible future alterations, for example to household composition or the need for resources.

This process was strongly evident in the narratives of older participants who had recently given up owning a car and who implied a staged and gradual process. Both Tim, and more recently Darius, had sold their cars and gradually come to terms with being without a car:

- Me: *so you don't have a car at the moment? {No} have you ever had a car?*
- D: *erm, I haven't had one for four, four years now. Five years! Five years I haven't had a -, since I retired, as I had to have one for work, and, it just felt like real liberation, not having to have one I shared one to begin with but, circumstances have changed, and I've had various people, who I've you know, shared with, you know they had an "any driver" policy, so I've had access to a car erm, and now I hire if I need to. Use taxis if I have to, erm, but it's just the way I get around.*
- Me: *so, are there any savings that this brings in?*
- D: *Massive! Massive...*
- Me: *what kind of savings?*
- D: *well, just the car -, my car expenses... If I didn't have a bike, yeah, and, I don't know whether I will get too old to cycle! (Chuckles) I did know a 92-year-old who used to just cycle all over Sheffield! And you used to see him around and, so that's me! - I hope.... Erm, but if not, then I'd buy a car, but at the moment, my savings are... phenomenal!*

Darius' concluding remark here reveals that his current abilities as an independent and healthy cycling senior citizen could change, leading him to want to have regular access to a car again at some point. It should also be considered that for individual travel, using a car may be financially comparable with the costs of PT, but that for a family making combined trips with several people the car may offer financial savings over the cost of several tickets or passes for PT.

Sometimes participants were explicit about their process, as Simon stated how they were evaluating their ability to cope with having reduced their two cars to just one serving the needs of both Simon who had recently retired from work, and his partner of 5 years, Pamela, who still commuted daily to work in Harrogate. The use of the terms, "experiment" and, "let's give it a try", highlight this as a period of evaluation:

- S: *and the Brompton, linking to the bus really, I mean we've done an experiment having done it a couple of times experimentally to check that it works, because, but it's only two weeks ago that we lost the use of the second car, so up until then...*
- P: *she went to the scrapyards sky...*
- S: *...Up to then, Pamela went in her little MX 5 to work, and I had this, but it's good, most of the time doing nothing... Outside. And we thought, well, let's give it a try, and see if we can manage with one car, and all the savings that that brings out obviously, you know no insurance, no tax, erm all that sort of stuff. We've got a hybrid so we don't pay any tax on it, it's very fuel-efficient we don't pay a lot for petrol, erm, so it's -, really it's a test and see this winter, as to how it'll work, but it's worked all right for the last three weeks or so, there's not*

been an issue, because most of my time I'm going into town so I can use the bus, and even if I need to go to Waitrose or Sainsbury's or something, I can in good weather use the bike, other times, I can walk... Or get the bus.

There were several examples, where there had been contemplation of the disposal of a vehicle or alteration of the fleet in response to changed household composition, activities and mobility needs, there could be several possible outcomes apparent to the household. Options considered included: continuation with the established activity pattern, for example to keep repairing the existing car, or trade it in for a similar model; dissatisfaction and replacement with an updated solution such as Jemima's future preference for a smaller, less polluting car; substitution with an alternative option, e.g. access to car share as part of a co-housing scheme.

Some mature participants contemplated future lives in which the combination of Cycling-PT would continue to support their activities and mobility. Marianne in Leeds foresaw the possibility that she and Derek would be able to travel for leisure by combining Cycling-PT more often after their children had grown up and as she gradually came to dislike driving:

M: ...also we would be able to go out and, you know, oh: "okay let's go to York, we'll take the bikes off and we'll go to York" or whatever {Mmm hmm} I increasingly don't enjoy, driving {Mmm hmm} I've got to-, I know I've got to try and kind of, cope with that but actually... I would prefer PT so, it's, it's definitely an option, to be thinking about, doing more, cycling and PT from that point of view.

In Nottingham where the tram system complemented the bus network and some local rail services, Harold believed that combining Cycling-PT would extend their mobility as their physical capabilities began to decline:

Me: so how do you see, as... Your future years, you know if you look at them now and assuming you can get your vision... {D: 'sorted'} a hundred percent back, what do you see as being kind of, development of your cycling, erm, interests and how will, in the future, you want to be able to use PT to make that fit, with what you... hope to do?

H: well obviously, ageing will reduce our physical capacities, er so, in general people's horizons draw in. But, they don't have to draw in as much if, they can be supported by PT, so, there might be -, for us, increased uses of PT, to go to places that formally we might've been able to go to 100% under our own steam, and what a shame that er, full sized bikes on aren't allowed on trams in Nottingham, whereas they are on some, er Western European tram network systems.

5.4.5 Passing the key to the next generation (replication of beliefs and values)

Some grandparents had taken their grandchildren by PT, Scott remembered his grandparents taking the bus with him, they being much more familiar with the complexities of timetables and routes, someone else mentioned their older parent using an app to whiz around on the buses...? Margaret's parents took her children on the bus when they came to Leeds to visit them.

Darius had taken his grandson (9) on a trip by bike and train for a cycle ride along the canal from Saltaire. Like Brian, they had asymmetrically taken the train out and rode back.

Dawn anticipated her daughter's children coming to visit her in Nottingham one day in the near future bringing their bikes on the train.

Biographic narratives often revealed participants had as children experienced their parent's encouragement or professed historical aptitude for cycling. Most parents having supported

their children's bicycle skills learning when young, but quite a few had learned on sibling's bikes, or a parent's old bike.

Parents passed on their own cycling skills and PT know-how, by combinations of advice and guidance, as well as by leading by example. In some cases, parents had developed scenarios to enable their children to develop independent travel skills, Bridget and Dorothy each managing activities to allow their daughters to experience taking the bus by themselves. Wayne's father had given his son challenges in the form of route maps for him to follow and occupy himself as a young child, advising him to always cycle with a friend, not alone. Bernard's mother had encouraged him to cycle through a park in North London on his way to school. In a previous decade, Dorothy had encouraged her daughter, aged 5, to walk the short distance to the local corner shop:

D: ...Little bit we lived in, everybody knew everyone and the people knew them in the shops and they'd go in and, get you a loaf of bread or, pint of milk just, you do it just to get it, - just give them the chance to do that because of the sense of responsibility and, erm yeah there was a newsagent, there was a corner shop, and...

In a more contemporary account, Fraser's son Scott had in his final year of primary school been sometimes tasked with short errands on foot to the local supermarket near their home in Beeston. A couple of years later and shortly before our discussion, Scott (14) had taken his younger sister on a practice journey by tram to prepare her for her transition after the holidays to the same secondary school he already attended.

5.5 Summary of chapter

Based on narratives from the discussion transcripts, this chapter presents evidence that will help to answer the second research question, i.e. to:

II. What role does cycling's integration with PT play in responding to household transitions?

People were generally pragmatic and many had changed how they travelled according to changes in constraints that occurred as a result of transitions. The narratives described periods of relative stability in households, but changes in travel behaviours were often associated with events, such as changes related to the workplace, and in families, to the arrival and growth of children. Changes in resources too had occurred and in some instances had resulted from other household or capability changes, but resources had also changed through reflexive evaluation of changed needs, or enactment of value- or belief-driven household decisions. The transitions observed in the data are listed below, in categories informed by the key literature on mobility biographies (see Table 2, Section 2.2.4).

5.5.1 Transitions in household composition

In households with children, an adult with a parental role leaving the family changed the resources available to the household, particularly regarding time, but sometimes also travel tools.

- For a single-parent who did not drive a car but had cycled previously, combining households with a car-driving partner had led to a period when cycling had ceased to be everyday transport. During this period the child had learned ride a bicycle and it became a device for the child's recreation. After separation from the partner, cycling became integrated into commuting and childcare repertoires for the parent, single once more.

- Other reported experiences of separation revealed that the children had continued to reside with the mother and that the constrained time-space encounters for cycling with their fathers, and altered access to resources had reduced children's everyday bicycling opportunities. Cases were reported where the mother could not drive, and others where the departed father had not driven.
- Visiting estranged parents had for some children involved travelling by PT, sometimes accompanied. Children had, in at least the case of one brother and sister, travelled by train together without adult accompaniment to be met by the separated father when visiting him.
- Where parents had formed blended households, the existence of other children had enabled bonds to be formed through cycling where this had been an activity shared.
- Integration of a new adult partner into an existing parent-child family had resulted in attempts to bond and share personal enthusiasms for cycling with the child. In one case this had involved combining Cycling-PT, although the attempted assimilation had failed.

Other reported household transitions related to people were the arrival of a new baby in the family, and the departure of a young adult to study at university.

- The combination of Cycling-PT had been used sometimes for visiting friends from the parental home who had gone to other universities.
- Combining Cycling-PT was used to maintain contact with people after moving from one location to another, i.e. home to university, or from university at the start of a career was a factor in a number of the discussions. (Winnie, Doreen, Bruce, Vincent)

5.5.2 Residential transitions and the role of Cycling-PT

The move from a childhood home locale to university or college studies in another city or town involved several transitions in addition to some reconfiguration of activities and schedules of those left in the parental home. Going to university involved a spatial move and the need to travel independently of shared family resources, it additionally established new social connections that could be maintained through combining Cycling-PT.

- Moving home to a new locale with similar characteristics to the previous address led to few changes to routines. Moving to one with different characteristics led to reconsideration of existing Cycling-PT behaviour.
- Where the journey combining Cycling-PT led to a misalignment of the location of PT interchange, so that combining cycling with PT would involve a journey that was conceived by the individual as lengthier than the route if cycled or driven directly by car, the PT stage was eliminated.
- When moving home households had considered a household member's established travel behaviour, for example intending to remain within cycling distance of a convenient PT corridor providing access to employment opportunities.
- For people used to cycling in regions with flatter terrain and more ample provision for cycling, moving to live in Leeds and commuting to other destinations in West Yorkshire had resulted in the adoption of combining Cycling with rail journeys for some, or to cycling and using PT on alternate days for others, according to how people felt.

- Other narratives of household residential moves were complicated by concurrent changes of career, or changes to the other people in the household. Although cycling for transport appeared to have resumed for some on moving to locales with flatter terrain, changes in how people combined Cycling-PT may have been related to other influences.

5.5.3 Employment transitions biography

Changes in people's employment through starting a new job, revealed reconfiguration of Cycling-PT and an association with mental models in the following ways:

- Geographic changes in the location of a workplace had led to adaptation of existing habitual cycling behaviour. Having previously cycled to work, PT had been incorporated where this appeared in the user's mental model to be in-line with an extended spatial path between the workplace and the home location.
- Where the PT interchange no-longer seemed to be within a logical spatial path between home and work in the user's perception, the combination of Cycling-PT was replaced by monomodal transport, either cycling or driving by car.
- Regional connectivity by PT had been a factor in career decisions involving retraining and seeking new employment.
- Changes of jobs had precipitated the acquisition of a bicycle and resumption of cycling through the innovative realisation of its potential for integration with an intermodal journey.

Changes within the workplace, in the role at work or in the geographic distribution of work activities had outcomes related to the combination of Cycling-PT:

- Career progression with an employer and a change of job role and related activities leading to extension of space-time patterns for an employer had also led to the adoption of multimodal combination of PT for work purposes, supplementing an established previous pattern of cycling between home and work.
- Changing to a more stable pattern of shift start and finish times that synchronised with the availability of PT had resulted in the adoption of Cycling-PT as a commute mode.

5.5.4 Activities (Accessibility / employment / spatial changes)

Activities of children change between early years when children require constant supervision and adolescence when they start to become independent travellers:

- Activities of children and adolescents reflect the enthusiasms and values shared with parents or siblings, particularly in younger years;
- Engagement in physical activities may reduce as children enter adolescence;
- Activities change during weekends and school holidays. In the absence of local support for childcare, a parent is often obliged to take time off work to go on holiday or undertake activities with the child or children. A parent with employment in education or otherwise able to take holidays flexibly typically oversaw the children's activities during holiday periods;
- Children may have multiple activities during the week, many require them to travel or to be transported, thus parents activities are synchronised to many of their children's activities.

- Adolescents had started using Cycling-PT independently to get to leisure activities in adolescence from about 13-14 years old. Activities described by participants included going to meet people in Mansfield, visiting central London, visiting railway locomotive sheds in the Bristol area, cycling back from a grandparent's house and going cycling in the Yorkshire dales.

Other than commuting, adults of working age had combined Cycling-PT for various activities that reflected the stage of their career and relational trajectories, including:

- travelling alone for recreational cycling trips, to visit or meet up with their spouse or partner, parents or other relatives, or, when meeting friends to go cycling or walking in the countryside;
- travelling alone to attend meetings related to their work, attend conferences, or to take part in training courses in other regions of the UK;
- travelling with a spouse, partner, grown-up daughter, or friend for recreational cycling holidays in the countryside, for day-long trips or short-stay city-breaks;
- travelling with children to attend a social, cultural or sporting event as spectators or participants, when attending a cycling festival, or when going on, or returning from a bicycle ride or tour.

Transitions were also observed to affect the activities of adults later in life, without the presence of children:

- Adults who acquired debilitating health conditions sometimes changed the sports they took part in. For example, replacing running with cycling, either because of the pain experienced, or because the activity became in some way less enjoyable in older age;
- Older-aged families and couples had experienced periods when one partner had entered retirement, but the other continued in employment;
- Many of those who had retired and no-longer worked as employees, but also some still in employment were involved in voluntary activities, sometimes related to their former professions;
- Beyond retirement people's activity patterns did not immediately lose the structure imposed by the weekday - weekend dichotomy, retired people had synchronised some of their activities with younger people, including relatives with young families;

5.5.5 Spatial mobility biography

- Families interviewed with children had moved either shortly before their birth, or prior to starting secondary school. Some had moved between regions, others had changed home within the same locale and retained connections through their children's schooling or childcare arrangements for a few years. Car-using families relied more on the use of the car after such moves to maintain their children's social connections;
- None of the families interviewed mentioned having moved home since children had started to attend secondary school, although a number of adult participants could remember having done so;
- Some adult participants without children, particularly the foreign nationals, had moved several times during the course of their careers. Many others, however, mentioned only one significant change of region since leaving university;

- Some had moved between regions as they retired from paid employment, either financially motivated, or due to existing social connections and familiarity with the locale;
- The few adults who did not indicate participation in higher education had mainly remained within the county or region where they had grown up, although they had mostly moved a few miles from their childhood neighbourhood.

5.5.6 Mobility tools, resources and milestones

- Cycling Proficiency and more recently, Bikeability training courses for children had enabled some parents to give their children licence to cycle independently for everyday transport;
- Some parents who had withheld permission to prevent their children from receiving cycle training, were suspected by their grown-up children of having wanted to prevent their children from cycling independently on the highway;
- Some participants had never taken a driving test, they ranged from experienced middle-aged and older cyclists, to younger people unsure how to interact with traffic;
- Some participants had obtained their driver's licence young, but had never driven since that time, either content to use PT or having found cycling to be a convenient mode of transport from their early twenties onwards;
- Several parents with young children had not started driving until their mid-twenties or early thirties, although the reasons given for starting to use a car were sometimes related to their work, rather than specifically linked to activities with children;
- The donation or gift, or inheritance of a car was mentioned by some participants, usually from a parent and at a time when there had been very young children in the family, in one case a car had been inherited from a grandparent;
- Families with young children that had either given up car-ownership, or had not owned a car, but where there was an adult who could drive, had used hire-cars for family holidays, to get to places near the city that were hard to access in other ways, to transport large items and to take the family with their bicycles to places suitable for cycling with the children;
- Motorcycles had been used by a few participants and the kinaesthetic similarity between the experience of cycling and motorcycling was mentioned by one participant. In all-but-one case the participant no-longer rode the motorcycle but continued to cycle and combined this periodically with PT;
- Several participants indicated their emotional attachment to their bicycle, some had been inherited from a close relative but other as mature adults had retained a bicycle that had been in their possession since adolescence;
- Folding-bicycles had been adopted by many participants, especially those who had anticipated combining cycling with PT on a regular basis as part of a commute to work. They had also been bought as vehicles for leisure journeys and were often being used both for recreational and commuting trips as everyday mobility tools;
- The ownership of several bicycles was commonplace, with participants identifying certain bicycles used for commuting when combining with PT;
- The Santander ('Boris Bikes') BSS in London had been used by a few participants, one or two had used it on a regular basis when visiting the capital, people had sometimes used the scheme or considered using it when travelling in a small group, often a parent with an adolescent or grown-up child;

- Other bike-share schemes had been experienced by a few participants while living overseas, but the Nottingham 'CityCard Cycle Scheme' had not been tried by participants, nor had the 'Bike n Go' scheme that operated from some of the stations in the Leeds region – participants had no need to use them when their own bicycles were available;
- Domestic storage facilities had varied and people had often needed to identify or create new solutions for the safekeeping of their bicycles when moving to a new home, folding-bicycles presented less of a storage problem at home or at the workplace;
- Not all participants had owned bicycles in their adult lives until they had started to combine cycling with PT. A few had obtained a bicycle and returned to cycling when they had decided to start to commute by combining Cycling-PT;
- Many parents had used child-seats attached to a bicycle to carry a young child. Some participants had used the seat to carry their child as part of trip-chains involving a regular PT journey, some had also carried a child in a seat when integrating a recreational cycling trip with a stage by train. The child-seat had in a couple of instances enabled two children to travel with one or both parents, one child using their own bicycle;
- Children as young as nine years old had taken their own bicycles on board trains accompanied by a parent or grandparent;
- Children as young as seven had cycled with their parents on the highway when parking their bicycle at a station and take a train together to an event;
- Others had started cycling in adulthood as their main commuting mode, only combining cycling with PT for leisure and recreational journeys;
- Reaching the age of 60, whether retired or not, meant eligibility for the Senior Railcard offering discounts of 30% on train travel. This and other concessionary travel options made Cycling-PT become a cost-effective for older travellers;
- Free bus travel for those of state pension age both encouraged the use of buses (and trams in Nottingham) when combined with a folding-bicycle, and sometimes replaced cycling to destinations with relatively frequent PT services, particularly in the presence of disincentives to cycling, such as the closure of a convenient parallel cycling route.

Having examined the role that cycling's integration with PT plays in responding to HH transitions, it was found to have become a travel solution for people at several stages in the trajectories of individuals, couples and families. The next chapter addresses the question of why, despite the challenges associated with both cycling and the use of PT, people have chosen to combine cycling with PT.

6 Why people combine Cycling-PT

Having identified in the preceding chapters how activities such as accessing childcare have been enabled and exercise, working, relaxing and other uses over time through the combination of cycling with public transport, and how this behaviour has changed over time as households and families have experienced transitions in several biographical domains, particularly in response to the presence of children, and following changes in employment, this chapter addresses the third Research Question to complete the analysis of the qualitative research data:

III. Why do households integrate cycling with PT as part of everyday activities?

Here, the purposes of, and reasons for combining cycling with public transport are identified as stated by participants that provide glimpses of themes they did not articulate directly. This analysis is developed further through analytical interpretation of motives apparent within the discussion narratives, identifying connections with meanings for the individuals, households and families involved. Using concepts from the Literature Review, I explore further how individual activities, behaviours and beliefs, interact inside the family, and with other institutions (i.e. other households, schools, employers, transport authorities and providers) to reveal why households combine Cycling-PT. My analysis considers the importance of household values, mobilisation of resources, financial efficiency and beliefs around time, cost savings and perceptions of risk as households conduct their activities and try to fulfil their minor and major projects.

Complementing the cross-sectional descriptions of factors, is a biographic interpretation of participants' narratives aligned with the three 'life domains' identified in the literature on Mobility Biographies (Lanzendorf, 2003; Lanzendorf, 2010; Rau and Manton, 2016; Salomon and Ben-Akiva, 1983; Scheiner, 2007). The domains have a temporal dimension and are related to travel behaviour, for simplicity these can be described as: 'household'; 'accessibility'; and 'mobility' trajectories. Each domain reflects changes throughout the longer-term trajectory of families and households. People's responses to my questions about travel behaviour in childhood, household transitions, lifecycle events and variations in modal choices and combinations revealed processes that have helped to shape travel behaviour over longer timescales of months or years. A biographic interpretation also considers prior formative experiences to be contributing to the explanation of combining Cycling-PT as a behaviour. Some processes were recognised by participants who also reflected on changes in external contexts through contrasting experiences at different stages in their biographies.

It is worth underlining some assumptions implicit within the interpretation of the data in this chapter. These originate from the literature, were expressed variously as beliefs by the participants in their discussion narratives at times and are also beliefs shared by the researcher:

- The assumption that physical activity is beneficial to the individual underpins a body of the literature on physical activity (Brown *et al.*, 2017; Laverty *et al.*, 2013; Sallis *et al.*, 2016; Woodcock *et al.*, 2014), and on the role of physical activity in the development of children, for example (Chillon *et al.*, 2012; Cooper *et al.*, 2008; Copperman and Bhat, 2007; Emond and Handy, 2012; Henne *et al.*, 2014; Pont *et al.*, 2011).

- Reducing car use is beneficial from policymakers' perspectives, urban planners attempting to deal with traffic congestion (Banister, 2011), urban sprawl and pollution impacts of motor vehicle emissions.
- Public transport use = good from policy perspective, enables mobility for those not able to drive, benefits derived include health (Rissel *et al.*, 2012), and social factors (Goodman *et al.*, 2014).
- Children able to travel independently = good from both traffic congestions perspective, active mobility, enablement of activities and engagement in communities and social cohesion contexts, benefits society by establishing public transport user routines and behavioural patterns (Barker *et al.*, 2009; Fyhri *et al.*, 2011; Goodman *et al.*, 2014; Hamar *et al.*, 2010; Hillman *et al.*, 1990; Hjorthol and Fyhri, 2009; Johansson, 2006; Kyttä *et al.*, 2015; Mackett *et al.*, 2007; Waygood and Friman, 2015; Westman *et al.*, 2013).

This chapter continues by examining the following beliefs articulated by participants: the cost savings to be attained by combining Cycling-PT; time savings, flexibility and the sense of control of one's journey; optimisation of household resources. Further interpretive analysis of behaviours and personal and household beliefs suggested that household and family identities related to physical activity and exercise were important, as was managing risk. Additionally, biographic processes related to mobility, residential and employment had influenced activities and travel.

6.1 The shape and times of journeys:

6.1.1 Managing commuting stress and motoring frustrations

Regular journeys, those that occurred according to a pre-determined schedule or pattern of days, appeared to demonstrate a high level of familiarisation with constraints and strategies or tactics for dealing with known forms of variation. The ability to do something useful, productive or relaxing on the train journey lay behind some participants' motivation for combining Cycling-PT as part of a regular commute. Frustration with driving stemming from the stresses caused by slow journeys by car supported this choice. Although familiar with driving in traffic from his profession as a truck driver, Wayne had taken to combining Cycling-PT to travel from Nottingham to his workplace near Mansfield having evaluated a number of factors that included the need otherwise to experience congestion on the main route he would need to take during the early evening peak 'homebound' traffic:

Me: ...So, is there anything else that you want to add about your, -, you know, what for you the benefits are. What other key benefits for you, in erm, summing up?

W: me?... If I -, erm, my journey time from leaving home, minute for minute,... er, at the same time, as, going in the car, I can actually beat myself, coming from home, to the station, get the ticket, get on the train, get off, and get to work, than, driving in my car...

Me: That's amazing!

W: ...rush-hour times.

Me: Is that because of the times of day that you're travelling?

W: Yeah. Yeah, if, everybody else is going home... So, Mansfield road, the A60 is, horrendous at Ravenshead, because of, sheer volume of traffic, traffic lights, stop starting, everything else and it's, just an absolute nightmare! Mansfield town centre can be a bit, of a nightmare going through as well because that's, town traffic and... there's no, other sort of major route, that, gets me to, where I need to be. That I can do, so, like I say, minute-for-minute, I can beat myself on the train.

In a different group discussion in Nottingham, Alan who had retired a year earlier, had previously combined Cycling-PT for the daily journey to Chesterfield. Alan commented that although he owned a car, he had disliked driving to work owing to the frustrations associated with traffic congestion and parking, and preferred using the train:

A: *quicker....*

Me: *yeah.*

A: *can leave the house later, bit of exercise...*

Me: *Yeah.*

A: *Erm, cost; saving money on the bus fares, they're the main things. I wouldn't -, I'd never drive into Nottingham anyway, so...*

Me: *but you have a car?*

A: *I have a car, but I would never use -, I, absolutely disliked using it to go to work because of the tediousness of it all the traffic jams and the difficulty in parking in Chesterfield, so...*

Me: *okay.*

A: *I always preferred to use the train anyway.*

Alan also stated that in his final year at work, the number of days that he had gone to work each week had reduced.

6.1.2 Temporal variation

Although some participants did combine Cycling-PT on most of their working days, others varied their travel modes. Varied patterns included travelling on some days and not on others when they would work from home, or interchanging combining Cycling-PT with just cycling, or walking and using public transport. Some participants with access to a car also drove on some days. In this respect their behaviour reflected the increasing trends observed in travel-to-work patterns over recent years of people who occasionally worked from home on some days (Le Vine *et al.*, 2017), and of the 69% of the British population who are multimodal across a typical week's travel (Heinen and Chatterjee, 2015).

As part of a pattern of commuting, cycling is in many cases combined with public transport on 2, 3 or 4 days per week, (e.g. Elton, Harry, Kenton, Monique and others) and sometimes on a periodic, monthly, or weekly or other multi-day cycle, (an 8-day pattern in Wayne's case). Those who did not combine Cycling-PT each weekday often worked full-time, but were able to work from home on some days, or worked from different sites either as needed, or to a regular schedule.

Some who work full-time may need to go to work on Saturdays or, as revealed by Le Vine *et al.* (2017) on Sundays. Days worked at weekends may be sporadic, such as Doug covering a Saturday Open Day, for example, or to a more regular pattern like Monique or Dave who both worked on Saturdays. Young people might also work on weekends, fitting this around their full-time studies that are generally focused on weekday attendances in educational institutions.

Comments about public transport were generally positive, although the perceived unreliability and slowness of bus travel, relative to rail services, was often mentioned. In most cases people were positive, sometimes enthusiastic about cycling as a form of transport.

Faith, who does not drive, highlighted the 'door-to-door' characteristic of combining cycling with public transport use, in discussion with Heather:

- Me: ...And so why's it-, why is it important to combine it with public transport you think?
- F: Cause it enables people to do like a whole journey, it means you don't have to think like, "How will I be able to do that bit of my journey?" You know like, you can go, from your door to wherever it is you need to be, ideally, you know you might want to cycle to the station, take your bike, you might want to cycle at the other end but, a lot of the time –, well that's another thing we didn't really talk about that much is, - cycling at both ends of your journey know, so sometimes I might be going somewhere where I don't know the area that well at the other end, so I might, even though, I would you know, usually I'd cycle around but, I might decide not to take my bike because I don't, - you know, I'm not familiar with the roads we're going and it will be more hassle.
- H: your point there about the uncertainty... "Will I be able to, - complete this journey? I want my bike on these two ends, will I be able to do the bit in the middle?"

Their comments also reflected uncertainties that, as Heather pointed out, may start within the public transport system, or as Faith suggested, with the unknown terrain in the locale surrounding the destination.

6.1.3 Asymmetry – why people use it in particular orientation to journeys...

Jessica regularly cycled into Leeds from home in Guiseley on her fixed-frame commuter bicycle using the ride as exercise to maintain her fitness, but she often returned by train in the evening. When combining Cycling-PT on the journey towards Leeds, she sometimes took her folding-bicycle bicycle on the train from Guiseley, but on the rare occasions when she needed some guarantee of being able to take her fixed-frame bicycle with her in the morning, she would cycle to board the train at Menston, the stop before Guiseley.

- Me: Right. And erm,... How often do you do this, so you mentioned that your journey tomorrow potentially is, asymmetric in the sense that you will cycle in, but you'll come home on bike –, I mean by train.
- J: Yeah.
- Me: So, what would be the –, what's the reason for that?
- J: Erm, for fitness, so it's a greater distance...
- Me: MH. So so the cycling bit, extend the distance, so it's exercise.
- J: It's exercise, it will technically be quicker, so by cycling, it would be 46 minutes, whereas to get me, to bike to the station, wait for the train, get on a train, then ride from the train station, to St James's, probably talking the same if not slightly longer.
- Me: And on the way home? You're going back by train, so what's, what's the, what's your deciding factor in that?
- J: It's, well it's uphill all the way home, pretty much so, it's an extra 10 minutes erm, I sometimes don't feel like it, erm, I can get a bike on the train home, I can't get a full sized bike on the way in, the train's too full. Erm, but there are four trains an hour between five and six, so I can... There will probably be, four or five bikes on each of those trains, so a lot of people, obviously taking their bikes, home, but bike in, or, or get in, a different way cause it's not, – you can't physically get on the train with a full sized bike at Guiseley.... The train is too full. You have to bike to a, the earlier station, to get a full sized bike on.

Jessica had calculated that cycling into Leeds along the main highway was taking about the same amount of time as the combined journey by bicycle and train, but her decisions regarding the return journey homewards was partly shaped by the greater ease of being able to board the train with her bicycle at Leeds station, the terminus:

- J: ... Which is why it's better coming back, cause you can get there before the train gets in, before anyone's got on the train cause Leeds is like the starting, point of the train and you can actually put bikes, where it's best to put the bikes as opposed to trying to fit round other people...

Jessica's frequency of combining Cycling-PT had also increased for a time in response to her own changing energy levels and state of health, and her reduced enjoyment of the journey along the route she was taking at the time:

- J: *Erm, I had a very low iron count, which was only picked up over the summer which made me more, tired. {Okay?} And it wasn't until I –, it was discovered and then I started iron, that I actually was then... I think that affected how much, I did because I was getting really very, very tired very quickly. {Yeah?} I couldn't quite understand why my fitness didn't feel like it was-, right.*
- Me: *How did that affect the way you travel or...?*
- J: *I think it probably meant I was using the train more, because I couldn't, I was just knackered. Cause coming home from Leeds, you basically go from, it's 150 m climb which doesn't sound like much but basically once you get out of the city is just like this constant grind all the way out. Erm, so it's a bit...*
- Me: *HMM... So potentially against a West wind as well?*
- J: *yeah, so and so it's a bit, – soul destroying when you've got cars going past at 40 miles an hour, erm...*

Monique had similarly cycled into Leeds during the 2 mornings each week that she combined cycling with taking the train back home in the evenings. For some like Dominique, or Bartholomew in Nottingham the asymmetrical combination with a trip on public transport had been in the opposite direction, taking the train into work to arrive composed for work, then cycling occasionally towards home for exercise. Dominique rationalised taking the train out from Nottingham to avoid arriving at work sweaty and to arrive appropriately dressed for work, but she wanted to cycle back home for exercise.

Others who had longer commutes by train and bicycle had sometimes also cycled part, or all of the way home after work for exercise, or to visit friends.

6.1.4 Flexibility – ability to respond to changing situations

For people like Marcus, working in a city-centre office in Leeds where he normally commuted by bicycle, a last-minute requirement to attend a meeting in Halifax, his employer's other main site, was enabled by train. Taking his bicycle with him allowed him to return direct to his local suburban station of Crossgates and ride home after the meeting in Halifax. Marcus did not drive to and from work when at the Leeds office as he would have had to negotiate with his partner for the use of her car, or buy one for his own use. The ability to take through trains direct from Crossgates to Halifax without changing in Leeds enables him to travel easily without needing a car for most of his work related trips and commuting:

- M: *...but yesterday are, sort of needed to be there at short notice that, towards the end of the day, so I jumped on a train from Leeds, erm, and then came all the way back from Halifax straight to Crossgates, erm, at the end of the day without having to stop back in, in Leeds. Erm,... That was part..... I'd hoped to avoid that meeting, but, but I needed to in the end it was fine, it would've been much more complicated by car, going on the motorway and Er, and don't have... access to a car very often anyway, so erm...*

Bartholomew identified that flexibility was related to the choice of how to travel home, offering him the option of a short journey time and exercise appropriate to the home-bound trip, whereas exercising during the morning commute would add the unwanted procedure of having to take a shower on his arrival at work:

- Me: *and, Bartholomew, can you describe your most recent journey?*
- B: *Well it's er, it's cycle train, then a very short scooter up from the station to the office erm,... And motivation is, partly it's cheaper, otherwise I'd either have to get the bus or a tram to the train,... That's cheaper, then it saves me using the car, and it also gives me flexibility so I can if I want to, cycle all the way home. I could cycle all the way, I choose not to cycle on the way to work because, I choose not to do the, dressing in cycle gear and turn up sweaty and have a shower and all that sort of stuff, I have done that when I've gone further, but... Where I'm currently based, it's easier to turn up like this, on the bike not sweaty, and then I have the*

flexibility of coming home and I can either cycle all the way it takes less than half an hour or I can... (Very difficult to hear what he's saying).

Me: *okay, so it's...*

B: *... Flexibility I think.*

Flexibility offered by combining Cycling-PT was a salient theme, mentioned in several other narratives as seen in further examples below exploring themes of managing fatigue and tiredness, controlling time and beliefs about resilience to the unreliability of public transport.

6.1.5 Control of your own journey

The combination of Cycling-PT seemed to offer participants the option of varying their journey plans in the face of difficulties or impedances with the public transport being used for the journey. Contemplating the challenges of taking a bicycle on board busy trains, Ida had mentioned her anxiety sensing that other commuters had looked at her with her bicycle disapprovingly, Grace responded by outlining a potential benefit of taking the bicycle on board public transport in a hypothetical scenario, rather than a situation she had experienced:

G: *what you really need is the train to break down one day, and so like "oh yeah it's going to be half an hour..." (Unclear words) so just take your bike off the train and use that, you cycle into work and go "okay, bye! See you later..." (Chuckles)*

Later in the same group discussion Ida identified how having the bicycle with her enabled her to travel more flexibly as she didn't need to return to the same station she had started out from in the morning, but another nearby accessed by a different train.

I: *...I like the variety it gives me in that, if I get down to the station, if I, if I've missed the Skipton four, I can jump on the Bradford train, and get off in Shipley, and still do the journey, so I'm not actually tied to one train, whereas if I was driving, and I've left my car at cross flats, I'm stuck.*

Ida commented on the satisfying sense of keeping moving, compared with the frustration of being stuck in traffic in a car during a commuting journey.

I: *I like your idea about saying this, being in charge, of you-, own thing because actually even if, the bike ride took me an hour and 20 minutes, which is the same as the car, I'm always moving, whereas, half of that hundred and 20 erm, one hour-twenty is, sort of sick sitting in stationary traffic, at least with the bike you're always,...*

G: *...Yeah.*

I: *yeah, you're always on your way somewhere, yeah.*

Una commuted on most weekdays by bicycle and train between the home she shared with her mother in Mansfield and her work in Nottingham. Asked to describe the benefits of combining Cycling-PT in the context of her work colleagues' lack of understanding of her adoption of this practice, Una invoked beliefs about the efficiency of her behaviour within a more complex motivation context. This involved the longer term project of getting her own flat, as well as contentment with travel by public transport, Una had also mentioned elsewhere in the discussion suffering from car travel-sickness:

U: *Yeah, they can't even get their heads round it, it's just, it's like an alien idea to them that you wouldn't want to own a car, and do it some other way, it's quite weird. Erm, I've had to kind of convince them that, the reason I haven't bought a car is because I'm saving up to get a flat, which is kind of true but, it's also just because I don't want a car. But I find it easier to just say that it's as simple like financial choice than actually saying, well "maybe I don't need a car..." Because they just can't even-, you know it's weird. Erm, I find that it saves time, it saves, erm, bus and train being part of my daily, thing and relying on two different sets of timetables, two different passes, two different you know, it just seems simpler, it's like, it's just the train and I'm using the bike as an-, as a tool to get to the train... Erm, I didn't want to have... a bus pass for Mansfield, a train pass, and then another bus pass from Nottingham, erm, so it does seem*

simpler, erm. I guess there's like a fitness aspect to it as well, although I feel as though, because my commute isn't, that taxing, that's not a massive part of it, on a daily basis it's more likely, well it-, you're a bit fitter if using the bike but that's probably not the main thing, it's more, just to keep things simple and to be more in control of my own, speed of the commute or, yeah. So that's probably the main reason.

Una described the benefit she derived from requiring only a monthly rail season ticket for the journey between Mansfield Woodhouse and Nottingham as related to simplicity, but it would also have contributed to the financial saving she gave as a rationale to her colleagues. Una liked the ability to control aspects of the journey that would otherwise be subject to the timetabling discrepancies between bus and train services. Using the bicycle to get to the station also allows her to argue against accepting lifts from her mother – a form of independence as a young adult:

U: erm... I think, yeah for my mum, because she, you know since I've moved home she, she's quite happy to... She's quite happy to sort of offer me a lift all the time and, you know, Er and I don't really want her to do that erm, so it's a way of, taking some pressure off her because she's just of that nature well she'll she'll be like: "oh, I'll just come and pick you up! I'll just, and..." You know,: "oh you don't want to wait for the bus!" You know, and I, I like being more in control of my own, you know, "it's all right, I can get home on my on the bike, don't worry about me!". I guess, because I've, because I've moved home I want to regain a bit of independence, it's it's a little bit like yeah, we are staying slightly independent of her. Er, there are still times when I'm not on the bike and she might come and pick me up, but it's, yeah, it feels like I'm more in control of my own, destiny, on the bike, I guess. Yeah, so that's part of it I guess.

The exercise of autonomy as an adult was also mentioned in another discussion by a participant, Jarvis who was living in the same neighbourhood in Durham as his mother but regularly commuted to Leeds. Whenever the weather was bad she would offer Jarvis a lift to the station, but Jarvis would generally refuse, excusing her from the obligation he felt she was under to “do the escort trips”.

6.2 Optimisation of household travel resources

6.2.1 Optimising travel time and enabling other activities

A benefit of having a bicycle readily available when completing a trip stage by public transport was the absence of waiting time. This applied to most of the participants, regardless of their age or occupation. For Edith, returning from her daily visits to see her father in his care home just outside Nottingham, the possibility of a 15 minute wait for a connecting bus service was time wasted and led to her preferring to cycle part of the way, using the bus for the trip out beyond the city's boundary:

E: the last time I did it was going to Radcliffe on Saturday,... And erm,. I take the bus cause, it's er, less effort at times. Erm, so I, if I want to get back quickly-, going I can always judge the buses, so I get down to Central Avenue, swap to the Radcliffe bus and there's not much of a wait, but coming back it never seems to work. And so if I'm in a hurry, I have my bike, I cycle down, leave my bike on Central Avenue, and then just erm, cycle back after I get back off the bus.

Me: okay. So on the way back, if you are doing the bus all the way, it's, it's more awkward is it?

*E: it can be longer, sometimes I'll I'm lucky I get back just in time to catch a five or a six but otherwise it's a, perhaps a quarter of an hour wait and,... I don't like waiting that long!
(Laughs)*

Generally Edith tended to avoid cycling the whole way to save (physical) effort, and sometimes in response to poor weather she preferred, “just to do the short bit on the bike”. As the buses ran less frequently on Sundays, Edith would sometimes cycle all the way to

Radcliffe, and being the weekend and having fewer domestic activities, she felt more relaxed about taking the time to cycle all the way there and back:

Me: what kind of... What would make you choose to cycle all the way?

E: Sunday. Because the bike –, the buses aren't so regular.

Me: right.

E: and, also it's, I don't know, just seems more like, free time doesn't it? Less chores to do.

Although Edith and her husband were both retired, she still valued the additional time she gained by cycling on her return journey. She also had use of a car, but used it mainly when shopping at a supermarket, and occasionally for visiting her son who lived part-way to Radcliffe from her home although she generally cycled there, finding it sometimes difficult to park her car near her son's home.

Although Haziq had found some aspects of cycling uncomfortable, he had generally preferred combining Cycling-PT to driving to Sheffield. His narrative indicated his sensitivity to slow motorway traffic...

H: ...Er because I have found that quite scary doing the cycling in windy conditions, rain isn't too bad actually, you just have to be a bit more sensible with your braking, {hmm} the main thing was, it was convenience to be honest with you, because –, driving to Sheffield from here, {yup} is a nightmare because if... Even if I left here at six in the morning, by the time I got to junction 33 in Sheffield, all the, Rotherham to Sheffield commuter traffic starts so, in order for me to get to work, traffic free I basically have to leave at five in the morning. {Yup}... So the train actually offered me an, er... Sensible commute time where I'm not stuck in traffic, I've got time to read on the train as well and reading time is very important when you're doing a Ph.D., Er...

Me: you just reminded me!

H: (chuckles) erm, so, you know I used to use that time to study, as well, so it's mainly those were the benefits really,... It would take me an hour and, an hour and a half door-to-door, so, about 10 to 15 minutes to cycle from here to the station, Er get onto the train, it's a 50 minute train ride and then it's a 15 minute cycle up to the University ...

Me: what did you used to take with you to the station?

H: so used to take my laptop, {Mmm hmm} Er, waterproofs I had my puncture repair kit, erm, basically all were cycling tools essentially, Er...

Doug also outlined his conception of the convenience of the journey by train for doing some work, or relaxing, while indicating that flexibility included the ability to occasionally cycle further at one end of the trip by train for exercise.

D: I think in terms of... I think it's really, in many ways, I was thinking about it today it's really convenience and you can, that having that flexibility... {Mmm hmm}... Can be really convenience in terms of, time, you know it's a bit of time where I can do some marking I can do some reading, I can do you know sit and listen to music I can do whatever, it doesn't take me all that long... So it's good from that point of view, I've got that flexibility to sometimes ride a little further and that's really good for my fitness, the big problem is, expense. {Right.} And I just... just sent two job applications off, to try and really deal with that because that's the January price rises have come through...

Identifying issues faced by drivers that could cause stress or frustration, Doug's wife Winnie also believed that Doug's journey home to Leicester would have been disrupted more often had he driven by car, than the rare occasions when he had encountered difficulties returning in the late evening by train. Aware of the financial cost of Doug's commute by rail, Winnie recognised that for many other people, the cost of commuting would make them consider obtaining a car for the same regular journey (a weekly Leicester-Nottingham season ticket costs £49.)

- W: *I think it helps, it has always helped,... It would be best for us if Doug didn't work in Nottingham, but what it has meant is that, if he had been... had spent the last 14 years going by car, the amount of times he... had been stuck behind because he hasn't been able to get back, probably would have been massively outweighed by sitting in traffic, by accidents on the roads, by that sort of thing so I think the fact that Doug's cycled and got the train for all these years, has meant that it's the most efficient, way for him to get home, the only thing that I have issue with is that, obviously it's always been expensive to travel by train and the, every year the costs go up massively {D: yeah}... So if Doug didn't work in Nottingham it would save us a huge amount of money...*
- D: *yeah that's true...*
- W: *...And I think it's a shame really because most people probably, or a lot more people would probably look at, the amounts, that way you spend monthly on, travelling and plus, maintaining the bike and, all those sort of things and just say I'll just get a little car for that money and, erm and I think it's a shame that, things like the guards on the trains making a fuss, and making it difficult...*

While Winnie's narrative focuses on the perceived expense of travelling by train, she also illustrates that maintaining a bicycle in a condition suitable for everyday use also involves expenditure, whether in time or financial.

6.2.2 Combining Cycling-PT Saves Money

Opinions were divided about the financial savings offered by combining cycling with public transport. Participants' mental models ranged from picturing cycling as almost cost-free, to calculations of the comparative costs of investing in a bicycle. For those without cars at home, there was the belief that cycling offered financial savings and the cost of using public transport was mentioned with respect to period fare rises. People gave estimates of the savings they had made by not owning a car, or limiting their household to owning just one car. Darius had proposed a value of approx. £2000 per year saved through no-longer owning a car, and Ambrose argued that the cost of his occasional flights to visit relatives in the Caribbean were enabled by not owning a car. Haziq and Ishrat had sold one of their two cars to make financial savings when Haziq had started to study for his PhD, and two other families interviewed had also dispensed with second cars they had been loaned or given.

Charity, who commuted with her folding-bicycle from Attenborough a few miles into Nottingham or drove her car, compared the cost of her return ticket for the train at £2.70 with the cost of driving that would include parking costs of £6.00 per day. In another discussion in the suburb of Beeston, Nottinghamshire, participants Dawn, Christian and Rolf typified the diversity of views expressed by others when prompted to comment on the financial costs of combining:

- D: *I suppose if I didn't do what I do I'd have a car and leave it at the station, which just strikes me as bonkers, so obviously, it would cost loads more if I did anything like that.*
- C: *Yes, I'm fairly tight. If I didn't cycle the bit I'd walk it, so it's more of a timesaving. If I were to get the bus it would cost more than having the bike, so I did kind of factor that in when deciding to get the bike, kind of how long would I have to stay in this job using a fold-up bike to make it viable over other options.*
- R: *I've never been – it's never been a concern for me. I don't get on the bicycle because I'm saving money. I get on the bike because I like it.*
- D: *I bought my fold-up because I took a job for nine months – it was a maternity cover – at Leicestershire County Council, and I did about two weeks of driving to Leicestershire County Council from Beeston and I thought I can't stand it. I absolutely can't stand it. So, I bought the fold-up even though it was £600 and it was only – I'd only got eight and a half months left. It was about quality of life and, you know, the fact you can read on the train and actually talk to people and then do the cycling. So, yeah, it was a major factor for me, so it was actually in a sense probably more costly to actually do that but it was so much more pleasurable.*

C: *I find I do make journeys not – I've replaced public transport with cycling, so I would have got the bus into town and I will cycle because that's cheaper, so I guess it, – (Coughing sound) ...combining going into town, bus, and like it's one or the other? But it's definitely kind of the financial reason has changed, has made me more likely to cycle for some journeys.*

This exchange of perspectives revealed that people did calculate the financial impact of their behaviour and made decisions that compared their available travel resources and alternative options for regular commuter journeys over time. Christian's motive for combining Cycling-PT was thrift and the ability to save time. By contrast, Rolf's comment that he got on the bike because he liked cycling indicated an alternative motivation shared by others who combined Cycling-PT for exercise or recreation. That Rolf was, "*not a regular cycle public transporter*", may suggest a different array of motivating factors for him, than for others who had a more routinized commuting repertoire. Dawn's motivation was to avoid having to commute to work by car, she had clearly found the opportunities to do other activities while travelling by rail more enjoyable than driving.

The additional cost of cycling and using public transport together was more noticeable to some participants than others. Vincent who commuted between Leeds and York tended to combine Cycling-PT when it was cost-effective to buy a week's season ticket for the train, but when he anticipated only commuting between the two cities on 4 days per week or less, he usually drove by car. The young, non-car-driver Faith argues in response to Ida's comment about the expense of cycling clothing, lights and batteries, that as she doesn't have a car the expense of cycling is not such a great disadvantage, compared with the alternative if she relied entirely on public transport:

F: *I think in terms of comparison to when I don't have access to my bike either because it's, needs fixing or because I'm injured, in the amounts I spend getting around within Leeds... ...Using either public transport or if I have to, taxis, you know I can be without my bike on one day and spend over £10 on transport...*

I: *yeah, that's true!*

F: *...And you add them up for like... (Unclear)*

I: *I don't think it's ex-, I suppose for me it's a bit weird cost, because I pay for the, train fare anywhere and I've got a car that I pay for anyway so,...*

F: *Okay?... I don't drive, so... (Unclear words)... You know it's like 'bike' or, something that you have to pay for, like...*

I: *yeah from that perspective definitely, yeah... Yeah.*

F: *yeah, and the other we tend to go out sort of different places like, I guess you can always take the most direct routes when you're cycling often-, I live, kind of in Woodhouse and there's a lot of, you know like, there's quite a lot of Woods basically that you can go through to shortcuts to places yeah, it's just really satisfying basically you know you can shortcuts to places...*

Regular commuters had in many cases invested in monthly or annual passes for public transport and were often very aware of the overall travel costs, whereas those who paid for occasional journeys may have had a different mental model of the financial costs involved. Angela, who used an annual rail pass for her daily commute into the centre of Nottingham, also invested annually in a bicycle maintenance scheme with Halfords, the shop conveniently near to the train station in Mansfield where she had purchased her bicycle and that of her younger son Tom.

Several participants suggested that by paying for a multi-day public transport permit or season ticket, they did not save money compared with using public transport for all stages of their journey. Although travel passes did not always save the participants' money, they could offer convenience, or avoid further inconvenience during a journey. Jessica observed that having a pass reduced the risk of delays and the sense of stigma that she had experienced

when it had been impossible to buy a ticket before boarding the train and had to queue to pay for travel at the excess fares ticket counter on arrival in Leeds:

Me: So what kind of tickets, d'you end up using for that, when you take the bike on the train?

J: Erm, I've got a, annual Metro card. {Okay?} Which just about, breaks even. Part of the, issue is the way they issue train tickets up here, so erm, – they have-, it used to be get on a train, get the ticket off the train, Inspector or get them, when you get to Leeds but they've now, they're rigorously enforcing that you have to have a ticket before you getting on the train. Erm, and, – if you get off the train without a ticket, and the ticket inspectors are there, they won't let you buy tickets, they will erm, make you fill in a form for travelling without a ticket, they will treat you like a criminal basically. Then you have to phone up, you can't, sort it out then, you have to phone up and pay for the ticket so, so it got to the point where I was having to arrive at the train station more than 10 minutes, – 10-15 minutes before the train was due to arrive because, I needed to make sure I bought the tickets before I got on the train, because if you didn't, they treated you like a criminal. Erm, which caused no end of stress for a lot of people actually, erm, and actually I'm probably spending more on my train ticket than I would if I was buying individual trains –, erm tickets, but it's less stressful, than having to, erm get to a train station, there'd be a queue of people in in front of a ticket machine then you're like "am I gonna get the a ticket, am I can get a ticket before my train comes?" So it's sort of, interesting!

As Jessica sometimes cycled all the way, or occasionally used her car, she would not have used her travel pass each day she that she travelled to work and back.

Although for some cycling enthusiasts, the cost of their equipment could be high, or of sentimental or personal value, Justin's description of his bike as 'not nice' and Una's purchase of a second-hand bicycle and repaired by a neighbour, indicated that low cost bicycles were being used. Others such as Gerald and Stuart also described the additional costs of maintaining their bicycles as negligible.

For people like Una (see section 6.1.5 above) who chose to use public transport between Mansfield and Nottingham, an advantage of cycling at one end of a journey offered cost savings for regular journeys that crossed an administrative boundary between different unitary authorities.

6.2.3 One-car households

At the time of participating in the discussions, most of the 8 families involved had one car, only Angela did not drive. Derek had additional access to a van through his work and owned another 'classic' car that he was restoring as a personal project. Haziq and Ishrat had, as a family, returned to owning two cars as he had finished his PhD, was then working across various hospital sites in Leicestershire and was 'on-call' at times in case of emergencies. These examples and the experiences of many others interviewed revealed that the household's relationship to car ownership as a travel resource had fluctuated over time, responding to the additional demands of children's activities and alterations to working patterns. A car as a travel resource had also been given or loaned to families by other relatives and friends in several cases, or had been inherited from a grandparent. When families had recognised their underutilisation of the additional vehicles, they had been disposed of. Brian, a bicycling truck driver, had not commuted by car to his workplace in seven years and had loaned his car to his grown-up daughter, although his partner drove daily to work in her own car. He used his car primarily to tow a caravan during holidays.

Trevor in a discussion that also involved Kenton and Bartholomew, explained how his cycling fitted in, at the time, with the household's activities and work-related repertoires. These had changed over time and as the job had become one with a fixed office base, he had no-longer required a car of his own:

Me: okay. Erm, and so... Why, why do you choose to cycle to the station at this end, what's the motivation for you?

T: erm, well it's two reasons, one is, we're a one-car family, and my wife needs the car, Er, for her work, she works on the other side of Nottingham and Er, she has Er, on occasion used public transport, used the buses. For her it would take Er, two bus journeys, and a fairly long walk at the other end. And Er, it's just miserable! So she preferred not to do that so erm, I'm-, I'm happy to do, if you like, the cycling and the legwork, erm for when I-, I work in London. And if I'm working, as I mentioned my office is just up the road from here, at the top end of London Road and Canal Street and Er it takes about 20 minutes to cycle in, and I enjoy cycling, even in the winter.

(07:17)

Me: so how long have you been doing this, this particular trip down to London with the bike? To the station here?

T: erm, since, well since erm, since the return to Nottingham, erm which would have been at the tail end of the 1990s so that's what, 16 years, 16 – 17. Before that I worked erm, in London and... I worked in Norwich for, for about six years erm, previously I've lived and worked in Nottingham, but lived on the north side of the city, at that stage and, predominantly used the car. Because at that stage we were of two-car family and I needed the car, more for work, than I did when I came back, erm 16-17 years ago, when I had a more deskbound job.

6.2.4 Bicycles

Ownership of a bicycle did not inherently imply that somebody would combine Cycling-PT, but in most cases people used bicycles that they had purchased, or that some had inherited. A few had borrowed bicycles from a friend or through a bicycle loan scheme at a workplace. Nicholas had tried an electric bicycle through a short-term loan scheme at his employers and had subsequently bought his own 'Pedelec' electrically assisted bicycle that he used regularly in Leeds. The bike had been stored at the secure cycle storage facility at Leeds station when he returned home to York each evening, he had used a Brompton folding-bicycle when commuting to York station from home.

Folding-bicycles had been seen, admired, tested and many had purchased them, using them either sporadically or regularly as a tool to combine with public transport. The Brompton was the most widely used amongst participants in the study, although some people had owned other models. A Brompton owned by the employer for commuting to the office and for the business in the case of Dominic who worked for a sustainable travel organisation. Another participant, Charles, had persuaded his employer to acquire a bicycle for him to use for his work which required considerable local travel, although he also had access to a pool-car when needed.

6.3 Personal and household beliefs and values

Predominant associations of Cycling-PT were with beliefs around health & well-being, time savings, control over time, adventure and the ability to explore new locales including engagement with the surroundings, travelling with or meeting friends, shopping opportunities and cycling as a pastime, among others.

Asked about whether people drove, participants sometimes described regular use of a car or van as part of a job, but sometimes reported on demographic form as 'not driving', reporting about their domestic use of a vehicle. While this was partly the result of the way the questions were asked and usually made clearer through discussion, children's views and behaviours were sometimes unclear, or contradictory. Children often commented that it was good that their parent cycled, but sometimes asked for, and were often given lifts by car. At

other times participants used expressions indicating that they had recognised the contradictions in their own behaviour.

Jacqueline's description, reveals the way beliefs about the flexibility of her travel behaviour both underlie the form of travel, and shape the perception of the mental health benefits that she associates with her combination of Cycling-PT:

- Me: *so, I've come to the end of our, my main set of questions, so is there anything else important you feel that I've missed during our discussion today that relates either to your household contexts, or, to, erm, the travel by bike by public transport and combining the two? I mean what's the key value for you to be able to do this would you say?*
- J: *erm --, **it just gives that extra flexibility, that allows me, to do all the complicated things that I do**, so, erm, to be able to go to conferences and, erm--, to get lifts to one place or another, or, to go and-, to visit a friend or something... I mean it's -.*
- C: *come on self driving cars though, I'm sure you won't cycle as much.*
- J: *I don't know. I mean I have been a bit lazy, recently, getting the tram, but actually I prefer cycling. {Mmm hmm?} I like-, and certainly it has a big, erm, - I think since I stopped driving, I've-, **generally my mental health has improved**, erm, I'm more open around other people, erm and I found that sort of there was a nice community on the bus when it still existed, that was-, that was good and, and I think I'm less defensive, and **the exercise has made me feel better**... so I think on the whole, it's better not to drive, but every now and again I have a bit of a wobble when I just want to go somewhere and I can't.*

Kenton similarly refers health benefits, but adds the conscious intention to reduce his car use to his complex set of reasons:

- Kenton: *well I use it as my regular commute,... Well, it's my, I choose to cycle and use the train as part of my commute. Why do I do that? Erm because I can, I'm not too far from either end, also try consciously to reduce use of a car, if I can*
- Me: *yeah... Okay. And what kind of distances are you cycling to and from, the public transport bit of the journey?*
- K: *the -, two legs, getting there, and then when I get off the train, getting to work it's, about... 5 km in the morning, to the station then, it's about five again from, station to work. {Okay} I can lengthen it if I get off the, if I get off the train, stop earlier, there's a 15, 20 km ride, fair weathered and doesn't happen very often, forgiving wife as well!*
- Me: *okay. That's interesting...*
- K: *so there's an element of health and enjoyment, in that.*

There was a similar motive behind several people who worked in the Environmental sector, in planning, training, or promotion and public engagement, or other roles, that helped explain their awareness of the personal benefits of combining cycling with PT. This was most clearly expressed by Elton, but echoed by other participants:

- E: *Well the-, well for me, I-, I've got a couple of things that I gain from it. Where I live I'm a little distance from my nearest railway station and, parking at the railway stations awkward, and the car park's actually some distance from the railway station, so, again 2 things, one is I don't need to use the car, so I save money, erm, - I save my conscience - I'm an environmental professional so that I, don't actually like to drive my car, I think about the carbon emissions and pollution that are coming out of it...*
- A: *Mmm.*
- E: *...and I erm... at the same time when I use my bike to go to the station, I save time because I don't need to go and park my car and then walk back to the station, so I can actually get to the train station quicker and get onto the train more easily... and then at the Leeds end I can get to my office more quickly, so er, - I'm saving money, I'm saving time and I'm feeling good about myself at the same time. And I enjoy it. I love cycling!*

6.3.1 Integration of physical activity into daily life

Most people commented that their practice of cycling offered the benefit of being able to do some exercise, even when combining Cycling-PT. Some participants, however, stated explicitly that this was an aim, or that they enjoyed the exercise. For Dominique, the almost daily walk or bicycle ride to work at her local hospital, and the monthly trip to her clinic outside the city centre by train and bicycle ride back along a river provided enjoyable exercise: *"I like, incorporating exercise into my day"*.

Chester also described the physicality of travelling with his Brompton to work and its use when carried as a 'work-out' opportunity:

C: *it can be a real personal thing isn't it you know, specially with the Brompton, I, like... Okay so it's not quite this is it, it's, I like building fitness in my day-to-day, I will not join the gym. I'm not enjoying the gym, I've never joined the gym I've not going to do that you know, what I do is I, you know at the office always take the stairs with the, carrying the Brompton up the stairs even to the fourth floor, to have that it... Exercise you know erm, I... I will pick up the bikes to carry it's down the stairs cause actually that's, (Chester gestures kind of weightlifting stance...), You you know do those things I enjoy it's... And it's sort of part of my joy of, sort of cycling around the city whatever I do you know going from A to B it's like "right okay! Now is the time to..." You know, be physical, I guess you know, erm... So it's often not at time think it's actually, my personal thing is, I like using my body in that way.*

...

D: *possibly quite common in cyclists because I feel the same. Its, I don't go out to take exercise, it's integrated into the day, particularly if you're quite busy as people.*

These were sentiments shared by participants in several other discussions.

6.3.2 Exploration of cityscapes and countryside

Denzel's trips to stay with his paternal grandparents in a village near Grantham as a young child had given him opportunities to explore the countryside on his bicycle and experience a very different locale from that where he had normally lived. There Denzel had the opportunity to compare life with his home locale of Hucknall on the urban fringes of Nottingham:

D: *Well Grantham it's more, 'country' so you don't get, as much thefts and stuff...*

A: *well not Grantham as such it's [Village Name] more, wasn't it when you visited your dad...*

D: *yeah, it's all countryside so like you could leave your bike outside the shop all day and no one would touch it.*

Me: *Mmm. Different to Hucknall?*

A: *is definitely yeah, a little village, it is a typical little village and then and then...*

D: *... everyone knows each other.*

A: *and then was --, was Douglas in the next village?*

D: *oh, he is, a good 5 mile off, but I could bike it...*

A: *...but you could ride their yeah then it, from his Nan's he could go and visit his, his dad.*

Denzel had in principle been able to meet his estranged father when staying nearby with his father's parents, this contact had been sporadic and had required negotiation by Angela but in recent years Denzel had lost touch with his father.

Cycling for leisure or recreation in the company of others was often mentioned in discussions (for example, see section: 6.4.4 Bonding through shared adventures and stories...), but cycling by oneself as a pastime was mentioned less often in participant's narratives. Sarah discussed with participants Nick and Justin how she had used her bicycle extensively to cycle around and to get to know the different places she visited:

S: *Er, the last time I combined the two, was, going to-, take the train to Wakefield, erm to go to the Hepworth Gallery, and I then, Cycled back, so-, I suppose most of the journeys I do are, that I take my bike to wherever I go to pretty much, and then I'll cycle around, wherever that is, so I'm living in between Glasgow and Leeds at the moment so I tend to take my bike a lot on the train and then I'll then cycle, you know, wherever I am, but I would also take my bike to London as well, erm, when I'm visiting-, mostly visiting my sister, or you know sometimes I visit other places for work and I sometimes take my bike, there, too, so, er, because I feel that my bike changes-, or being on my bike sort of opens up the city in a way, so, it really enables me, erm, to get a better sense of the place that I'm in somehow, or explore it in more detail maybe, {ok} Yeah. So...*

Me: *And why is that useful to you?*

S: *Erm, I just think-, I think it's-, well it's partly a physical thing... I enjoy the feeling, but I feel that when I-, for example I used to-, not take my bike to London and I used to feel that it was really erm, a bit un-navigable in a way, and, I would take the underground and then I wouldn't really understand where I was I would pop out in different places, and so being on the bike helped me to connect up different areas of the city {Ok} but also physically that would feel more, alive, I guess, erm. And that was, so that would change how I felt when I was in the place, so I often find that-, I was away in the States last year for example when I was in Pittsburgh, and that was one of the- I'd been in various cities, but that was one of the bits that I enjoyed the most and it think it was because I hired a bike, and then I sort of went off-, certain prescribed routes I s'pose, you know, so-, it enables you to do that in a way I think, that other forms of transport can be quite restrictive. {Ok} Yeah. {Sure} So, I guess, so most of the time, I'm, I'm not doing what you're doing like travel to work, erm, and using a combined form of transport, but rather I'm going to a place and then using my bike. {Yeah?} Yeah.*

J: *It's the best way to explore a city, on a bike, isn't it? –*

N: *I was at a conference in Nottingham...*

J: *...especially London.*

S: *Yeah, yeah it's great, because things aren't as far as you think...*

J: *No, no, not as far as you think... because when I lived there you'd just go, you'd go to Hyde Park and then, Notting Hill and it'd all be quite close.*

Nick later commented on how taking a bicycle around a newly visited city locale allowed the generation of a mental model of the geography specific to the mode being used:

N: *... you got to see kind of bits of the city on the way across, that maybe you wouldn't have seen if you'd driven, or been on a bus or taken a taxi. You got a sort of feeling for the shape of the place which, you know in a very very short amount of time which you don't get when you're, in a car or-, a bus...*

The combination of Cycling-PT was used by participants to explore the countryside in two ways, either cycling was the main recreational activity, or it supported walking in the countryside. It enabled people who did not have cars to access the countryside economically, and provided older single people with scope for engagement in activities together with others as part of a social group. It had provided opportunities for the exploration of rural regions of the UK as a form of tourism and allowed people to experience novelty through the discovery of unfamiliar places.

6.3.3 Undemanding expectations

In the concluding stages of a discussion with Kirin and Jason in Beeston (Notts), Jason raised the issue of expectations of infrastructure. Both agreed that more investment was needed to improve the experience of combining Cycling-PT, as well as for cycling in the city, but both he and Kirin would make use of the facilities as they found them, tolerating the limitations and finding strategies that still enabled Cycling-PT to support their activities:

J: *My main thing I would say is the fact that over the years of cycling on the trai-, and taking the bike to the train is that I've become...what's the word...I've fitted into a habit of doing-, it could be a lot better, it could be a lot, lot better {K: Yeah.} but I've kind of just-. It'd be great to take the bike on the train because I have got a little journey at the other end, it'd get me in*

for work earlier and things but I don't because it's just, you know, inconvenient, I can't do it because you're going to get turned away...

K: *You might get turned away.*

J: *...or you'd potentially get turned away and if it's very busy you're in the way so... you know, I think that's the thing, I've fitted myself round what, - public transport will allow me to do rather than the other way around if you see what I mean, but I'm alright with it, but it could be a lot better.*

Jason and Kirin continued to reflect on how they were prepared to limit their expectations according to their budgets, by comparison with wealthier individuals:

J: *No, not to do with cycling, other things, you know, but that's what I'm saying, you say the cycling is your life is that-, you know, there are some people that expect a lot if you like and because of their personal circumstances...*

K: *They can do it.*

J: *...can actually achieve it whereas I don't expect a lot because I know that I can't and I think that's almost like my...that's what I'm like isn't it? That's why I will not make a fuss about... Some people make a real fuss about this and I don't because I think oh well, I can't take my bike on the train so I don't.*

Jason was content to lock his bicycle at the local station, carrying 3 locks to ensure that enough of the bicycle remained for his journey homewards on the four evenings or so that he combined Cycling-PT to go to his Leicester workplace, when he was not working elsewhere on excavation sites.

Here Shelley and Rosamond summarise at the end of their discussion at the Sutton Bonington campus, reinforcing the notion that combining is a process that people get used to over time, providing expectations are not set too high:

Me: *...is there anything important that you feel we've missed in our discussion today about, how the combination of cycling with public transport is, is important to you? You both responded to my invitation to take part so, is there something about that combination that you feel is, is useful or particularly valuable?*

R: *Hmm. I think we've covered most of it... Yeah.*

S: *to be honest I probably catch the -, I probably use my bike and the train, more often now, but I've done it a couple of times, erm, than I would've, because before if I went to London, I'd just walk to the station I get on and I'd use the tube when I'm there. Erm, but now I'm more likely now to, after you...*

R: *once you've got to try it...*

S: *once you've tried it, yeah, once you've tried it a few times, you think actually it's all right and so...*

R: *it's easy. (Nodding)*

S: *yes, it is quite easy, and so you're more likely to.*

Me: *that's great!*

6.4 Cycling and multi-modal biographies

A biographic approach to the analysis of travel behaviour has helped to illustrate the dynamic changes in travel that took place in response to changes similar to those described by Rau and Manton (2016) through the life course. Changes to the activities, location, composition and capabilities of the household and the individual involved transitions within pathways related to social and domestic roles, as described by Li *et al.* (2009). Biographical narratives (see Appendix 6. for individual biographic summaries of each discussion) and details indicated that behaviours, practices and values had been shared within households, within families across households or different generations. Interviews and discussions with people from a variety of household types, some with children and others without, revealed both

common patterns as well as how the presence and growth of children had led to differences in travel behaviour compared to households without children.

The combination of Cycling-PT was often reported as unique to the individual and not directly replicated by others in their household or wider family context, particularly so in households with children. Some people had been or were unique within their families or households in cycling, even as children or adolescents, but more often parents had encouraged their young children to learn to ride a bicycle. Parents had also prepared children for new journeys and regular travel by public transport and had devised activities and instigated practice journeys, typically prior to commencement of secondary school. As children, some adults had already been allowed to walk or cycle short distances independently at a younger age. Some participants had been introduced to the combination of cycling with public transport by their parents as part of a recreational cycling excursion or tour. Sometimes the whole family group had been involved, though often one parent had travelled with the child or children.

In both biographic recollections, and contemporary narratives reference was made to other relatives: uncles, cousins and grandparents, people who had either served as bicycling family role models, or who had accompanied children on memorable journeys. Grandparents and other older adults had also travelled with children using public transport for leisure activities or as part of childcare, younger participants sometimes comparing their own lack of expertise with the competence and knowledgeability with which grandparents used buses. Visits to grandparents had also provided a rationale for some people to have combined cycling with rail journeys as adolescents.

6.4.1 School journeys in the past – on foot or by bicycle, bus car, train

Asked about their memories of independent travel, adults often recalled walking alone to primary school or to local shops as a typical early experience. Some had cycled to school alone, a few to primary school, but at secondary school many had used the bus. Use of rail by children was less common, but had been used both for school journeys as well as to visit friends and for recreational journeys and in combination with bike rides in mid and late adolescence. The use of trams for school journeys was only mentioned in a limited number of narratives about present-day children and adolescent's journeys in Nottingham, the system having only been inaugurated in 2004 and the extension to Beeston and Clifton in 2015. As children, some participants had been given lifts by a parent, for whom the drop-off at school by car had typically been combined with their parent's journey to work, although Dominique thought that her mother might have made a detour via the school on her way to work, "*she was just a kind mum*".

Some adults had, during their adolescence, used the combination of Cycling-PT for school journeys, for instance Tim had established an arrangement for a while with a local station-master allowing him to cycle to the station where he could leave his bicycle, then take the train to go to his Catholic school in the centre of Glasgow. Gerald and his siblings had combined cycling to a village shop with taking the bus to school and Lawrence had cycled to a station from where he caught the train to sixth form college before he had passed his driving test and been given a car to use.

6.4.2 Household cycling with and by children

Enjoyment of cycling as an activity to share with children was mentioned by a group of older cyclists who recalled having returned to cycling when their children had been young and

learning to ride bicycles. Although not all participants had parents who had themselves cycled, they had mostly been given bicycles as children and taught to ride by a parent. Margaret's father had learned to cycle and became a keen cyclist when she was young, she remembered that as an adolescent, they had sometimes combined Cycling-PT for trips together as a family.

Parents were often described (or described themselves) as having cycled with their children, sometimes in order to motivate them to cycle, or simply because it had provided the basis for a shared family activity, enjoyed when children were young. A parent had often accompanied their child to go cycling, even (in Maggie's case) learning to ride a bike for the first time, others returning to cycling after a long pause, subsequently becoming enthusiastic cyclists, at least for recreation as the three retired participants Hucknall described, or in a short-lived revival of a previous pastime while their children were young as Carlos, amongst others, had described. Experiences of the youngest child in their families with relatively elderly parents suggested that the enthusiasm of their parent for cycling had been limited to sharing this experience with their young child. These shared cycling activities varied from being very rare instances in some families during the short period when their children had started to cycle, to a more regular activity, sustained over a longer time period in others. Children had not always been keen or confident riders, and some present day parents ascribed the quality (and expense) of the bicycle available to the child's liking for cycling. Many adults had cycled as children on bicycles ranging from those designed for children (e.g. the Raleigh Chopper) to old-fashioned adult bicycles and second hand 'shopping' bikes.

6.4.3 Skills for independent travel

Adult participants in their biographic narratives did not dwell on the competencies and skills required for combining Cycling-PT, as a combined mode. For cycling, however, they identified that the Cycling Proficiency test had been one of the first demonstrations of skill and competence, common to many experiences of cycling in childhood. According to their recollections, parents had then placed some confidence in this basic, primary school playground-delivered training programme, subsequently permitting their own children to cycle independently on the highway. This in turn had enabled some children to combine cycling with public transport to make occasional as well as regular journeys, for example to school, as well as for social, recreational and economic activities as several participants had also used their bicycle for a part time job as a child or teenager, such as paper-round.

Comparing bicycle training for children in participants' narratives over time suggested that it had once had a transformative power supporting young people's activities that had weakened over time. When asked about his son's likely future cycling to school after receiving Bikeability training, Haziq described how his own Cycling Proficiency course experience as a junior-school child had enabled him later in life to cycle confidently as an adult on the road. Haziq thought that his parents had allowed him to undertake the training despite them not intending him to cycle independently. Other participants revealed how passing the Cycling Proficiency test had enabled them as children to obtain licence from their parents to cycle independently on the road. This was evident in narratives from Bernard and Lawrence about their own youthful experiences, as well as in Jason's belief that his parents had not put him through the training hoping to deter him from cycling on the highway. Despite the present day Bikeability courses offering enhanced training for children compared to the older Cycling Proficiency test, including some 'on-highway' riding experience, several parents, even keen cyclists expressed unwillingness to allow their younger children (i.e. those

aged below 12) to cycle independently, citing concerns over the density of traffic and the potential danger posed by some motorists' careless behaviour. This perception of risk from traffic by some parents supports the findings of Christie et al. (2011) that parent's concerns about their children's vulnerability to accidents caused by dangerous driving limited the freedom of children to cycle.

By contrast, parents had been confident to allow children of secondary school age (i.e. from 11 years or older) to take buses and more recently, trams. In both contemporary and biographic accounts, children had either been introduced to public transport use by parents, or by an older sibling. In Nottingham living in proximity to the tram had clearly provided some parents with a public transport system they entrusted with carrying their children from approx. 11-12 years old. Adults who had grown up in that city before the advent of the tram network, however, remembered using buses, and typically more so than the trains that they had considered to have been more expensive. Adults sometimes remembered having taken buses or trains at younger ages, but generally accompanied by an older sibling.

6.4.4 Bonding through shared adventures and stories...

The term 'bonding' was introduced by several participants who had referred to the value of cycling as a way of maintaining a relationship, or rapport, between two or more family members. For an adult couple household, the shared adventures and physical challenges experienced while on cycle-rail holidays around the UK had been valuable for the health of their relationship. Several narratives described situations when children had travelled with their parent, or a grandparent. Ingrid and Darius compared notes about journeys they had made with children, had taken his grandson on the train from Leeds to Bingley, returning by cycling most of the way along the canal:

I: *yeah yeah, we've cycled as -, we' -, we've done long dist-, you know, I cycled with my son and a friend we cycled to, along one of the canals to Manchester from Leeds, stayed overnight a couple times and took trains to get to the starting point, and came back on the train from Manchester so, we've done quite a bit of that when he was younger, yeah.*

Me: *okay.*

D: *I took my grandson on the train to, Bingley and we, cycled back. He's nine! (Chuckles) couple of weeks ago. It was good! We had a good time, it was quite hard for him (still chuckling)*

Darius described how the child and his parents had been prepared for the trip:

D: *are, yeah... It was erm, er yeah I mean it was quite a... It was a half day trip, erm, and we went through all the stuff that you go through when you're doing a bit more of a -,*

Me: *such as?*

D: *erm, in terms of sort of cycle safety, in terms of, you know cause we cycled from his house in Meanwood down to the station... Which was... Which actually, I did a lot on the pavements, you know because I think, I just thought that, well I,, had to promise my daughter (chuckling) that I wouldn't take him on the roads! Which I think was quite reasonable,... Erm, and so I just -, you know instructions like "follow me exactly exactly exactly", and, but he was up for it and and it was exciting and,... It was a nice trip...*

Darius added that his own first experiences of combining Cycling-PT had been when going on holiday cycling with his young family:

D: *I, I can't remember doing it till -, probably, in my 40s, the type combined the public transport trip.*

Me: *do you remember an occasion...?*

D: *no, not particularly.*

Me: *where would you think that might have been...?*

D: *I mean... We went on holiday, sometimes with bikes, went on holiday to Belgium with children when they were young, took the bikes on the train to to -, Hull, from Sheffield, and back again. Yeah, that's probably the first time.*

For a child capable of cycling and manoeuvring their bicycle onto and off a public transport vehicle, or parking it themselves, the experience of cycling and combining with public transport is different to being a passenger in a car, an active process as opposed to passive. It enables the child to feel engaged in the mobility process and reduces the hierarchical divide between adult and child. By contrast, most details of the public transport system appear to not have been designed with children in mind, beyond those affordances for children carried in prams and pushchairs that have resulted from equality legislation requiring public transport to be accessible to disabled users of wheelchairs.

Typically in recollections of childhood experiences – parents were often depicted, or portrayed themselves, as attempting to encourage their children to cycle, or teaching them to cycle. Although the cycling experience of the journeys had been memorable, for others who had combined Cycling-PT, the journey by train had also been part of the experience. Incidents experienced on a journey, even just a parent's brief commute along the canal, had resulted in anecdotes about rescuing farm animals in distress, and photos of ducks to share with a child later at home. In some instances, however, the experience had not proved positive for all participants, and cycling had not been a successful 'glue' for all relationships.

6.4.5 The social side of early travel experiences

Biographies revealed some of the activities when the participant or another close family member had first experienced combining Cycling-PT, these encompassed journeys for leisure or recreation, visits to family (especially grandparents) or friends, going cycle-touring, or moving a bicycle from one location to another. Combining Cycling-PT for the first time had often been part of a social activity, involving other people in negotiation with the participant or accompanying them. Other participants had taken individual initiatives and discovered independently how to combine Cycling-PT for the first time, as adolescents or as adults.

Combining Cycling-PT was part of a few adolescents' lives, particularly from about 13-15 some children had started to travel independently by combining Cycling-PT. This was usually with the permission of the parent and sometimes involved a visit to stay with a grandparent and cycling as the main activity, it had enabled the young and older family members to maintain contact and, to some extent, share in the young person's adventure. For Marcus as an adolescent, who had enjoyed roaming the countryside by bicycle, the train offered a convenient way to return home after a day's cycling exploration of the Yorkshire Dales, terrain that he still traversed later as an adult by train with his bicycle occasionally when visiting relations, or attending rugby matches across the region.

6.4.6 Parenthood and pauses in multi-modal cycling

In several households (Nicholas in York, Lawrence from Northallerton, Margaret when in Headingley, Jason in Beeston, Jessica in Guiseley), both heads had at various times in the past combined Cycling-PT when the nature of journey and freedom from intra-household childcare obligations had made combining cycling with rail journeys a viable travel option. The onset of parenthood in some families and the consequent obligation on the parent with the 'carer' role to alter their place of work or working hours, had sometimes resulted in one of the partners narrowing their daily geographic and temporal range to manage the childcare. This interruption to the travel pattern of one of the heads of households had

affected the mother in each case – who had since ceased commuting by Cycling-PT, although the fathers had continued to do so, their pattern sometimes altered to reflect other changes, either to their workplace or perhaps resulting from their involvement in childcare obligations. For example, Nicholas' wife had commuted by combining Cycling-PT to Durham from York before the children were born, but currently worked closer to home as she did most of the childcare. Margaret and Dave had both combined Cycling-PT for their respective commutes before they had children, now only Dave did so.

Both partners combining Cycling-PT was also evident in other households without children, for example Jason and his wife had both started to combine a 2-mile bicycle ride to the local station 10 years previously, after he had got a job in Leicester where his wife had also worked. Jessica's partner had also combined Cycling-PT for the commute to Leeds before she had taken a job on the outskirts of a more distant city, requiring her to commute by car.

6.4.7 Dispersed geographies of school and university

Several patterns in behaviour changes emerged during late childhood, early adolescence and through periods of study at university or college. An uptake of cycling had often followed a 'gap' in late adolescence when cycling had been abandoned, to be replaced by other modes such as driving after obtaining a driving licence, greater use of public transport for longer school journeys, or where the proximity between home and a regular place of study had meant that walking was convenient. Social pressures had also acted on adolescents to limit opportunities for cycling; enjoyment of going to or from school in the company of others was most easily achieved when walking or taking the bus, sometimes also when travelling by car with friends or family. Cycling to school was additionally commented on by some as having projecting an 'uncool' image in their friendship circles.

University life had been the stimulus for using cycling for transport in other cases. Geographic narratives of studying and living in Cambridge, Oxford, Hull and other regional cities with traditionally high levels of cycling were prevalent within the discussions. Although many commented on the numbers of people cycling in London, the extensive public transport network there had also served people's transport needs during stages of their lives while studying or working in London. Where cycling had been a recreational hobby in late adolescence, it had tended to remain so through university life and beyond. Narratives of life as a student or young graduate revealed that bicycles had been taken by coach and on rail journeys between home and university, or when visiting friends who had become more widely geographically dispersed since childhood.

6.4.8 Overseas experiences and post-migration adaptation

Several people who had lived overseas before coming to live in England had experienced combining Cycling-PT more in the UK than when they had cycled (often extensively) in other countries. They cited the more challenging terrain here and lack of safe or comfortable routes for cycling, the inter-urban distances for regular journeys between home and work, and the opportunity afforded by rail here to carry bicycles without charge, whereas in other countries a purchased ticket was often required for taking a bicycle on board a train or other public transport. Taking bicycles on buses had been experienced when participants had as young adults lived overseas in "touristy and hilly" places, such as Switzerland (Kearney) and in the USA. Heather recalled (then in her mid-20s) going to work in the morning by bicycle in San Francisco, but returning home by bus, because, *"what happens in San Francisco is the fog*

comes in in the afternoon, and the temperature will drop 15°, and it gets, wet and chill and windy, and so it's reasonable to, bring your bike home, via the bus over the Hill."

Familiarisation with a new environment was a process that took place over time, usually a few months, sometimes years. The familiarisation process involved evaluation and manipulation of several factors, related to infrastructure, traffic behaviour and culture, topography (identifying a suitable route), and resources.

- Alberico had taken his time to get used to cycling on the left and to know the city of Manchester where he lived after he arrived there, contrasting it with his home city of Rome where cycling was unusual;
- Jacqueline took time to get used to the much higher density of traffic when first arriving in Cambridge as a student from her Dorset home village;
- Gerald had initially used the Tube, later getting himself a folding-bicycle that he had used in London and when commuting once-a-fortnight between Norwich and London.

Comparisons of quieter roads and less intensive car use by parents in childhood with present-day traffic levels were sometimes accompanied by British participants descriptions of growing up in rural areas followed by migration in adulthood to more urban and suburban areas and cities. These revealed how cycling had been widely used to enable social activities in adolescence in the past, whereas parents' concerns in the present day about traffic safety risks appeared to have led to greater restrictions on young children and adolescents travelling by bicycle independently.

6.4.9 Impacts of the geographic relocation of the household

People had moved, often for reasons of promotion or career advancement, these sometimes involving shifts in regional focus and from one city to another. Moves for personal relationship changes or reflecting altered household demographics may have involved much smaller geographical shifts in position, but had also affected how people travelled. For India, moving home just a few miles closer to her workplace diminished the perceived value of combining public transport as she had sometimes done, into a journey that could be most quickly undertaken by car, but could also be achieved by bicycle if considered as part of her fitness training. Although she still sporadically combined cycling with other journeys, she no longer considered it as an option for commuting to and from work. It is conceivable that a similar move that would introduce an opportunity for combining Cycling-PT into the perceived rational route alignment of someone already accustomed to cycling would lead to the incorporation of Cycling-PT as an alternative means of regular travel. Jessica had earlier in her career lived in an outlying suburb of Leeds from where she alternated bus with bicycle for her commute to and from the city centre. Now living in a different satellite town meant that her combining pattern changed as it had brought her close to a railway route offering scope for combining in a more flexible way, sometimes bringing her bicycle home with her on the train, at other times taking a folding-bicycle on the train in both directions.

In many instances, the moves resulted in attempts to integrate cycling into activities and the commute to work where this was again feasible, and had been a characteristic behaviour in the previous locale. The combination with public transport was sometimes a way of enabling the continuation of cycling, public transport or walking sometimes replacing cycling for a period before people readjusted and established new patterns of cycling.

6.4.10 Combining in a timescape of household and cultural change

The code 'Timescape' when analysing biographic narratives became defined as the context of household experiences and expectations with regard to changes over time. Notions of natural seasonal rhythms and calendar cycles, also reflecting wider social, cultural and technological changes over years and decades were integrated in timescapes.

Narratives revealed several stages in people's initiation into cycling and its use or cessation over time, reflecting the 'asymmetric churn' observed to underlie trends in the changes in people's travel behaviour at an aggregate level (Sunitiyoso *et al.*, 2013). For several participants, most of whom had cycled throughout their lives, Cycling-PT was a modal combination that had only recently been experienced. Where people described combinations of Cycling-PT over the longer term, their biographical narratives revealed both its sporadic use for social activities or as part of leisure and recreation, and for some, a means of commuting to a place of work or other regular activity during periods in their lives.

Narratives depicting periods of regular multi-modal travel suggested that Cycling-PT had been a combination that reflected a timescape. It had suited both the individual's occupational schedule, or their household's activities and set of obligations at a particular point in time. It also reflected an appropriate geographic relationship between home and regular activity, the prevailing conditions imposed by topography, geography and infrastructure for cycling, driving or parking, the availability of public transport and even on the ability to keep a car or bicycle at the residential location.

6.4.11 Concluding remarks on the biographic analysis

Combining Cycling-PT was represented by people as being a rational choice, not just on basis of time-saved or monetary cost, but also on their beliefs in the ways in which their journey contributed to their affective state. People combined when other factors coincided to make it the rational choice in their view, taking into account their enjoyment of cycling as an activity, the utility obtained from travelling by public transport, their dislike of driving in heavy traffic or inability to drive. The enjoyment of cycling has been described as specifically linked to the physical exercise, both of the immediate experience and other, longer-term benefits. It can also relate to the opportunity to travel by quieter or more scenic routes. The public transport section of the journey enables people to engage in a number of other activities ranging from forms of relaxation (listening to music, reading, etc.) to productive tasks. When travelling with younger children it can also enable bonding and integrate into travel a learning experience through play, observation or mimicry.

These beliefs altered, or were given different priorities according to people's individual and household circumstances, and to their household biographies in particular.

The presence of children in discussions contributed in the construction of household biographies and narratives, through the identification of changes in attitudes and needs of both children and parents over time, anticipation of future transitions and freedoms. The methodology involving children's contributions, combined with interviews and small group discussions, supported my interpretation that Cycling-PT contributes to the bonding that can take place between parent and child, or with grandparents. It also helped to reveal that the changing relationship between child and adult over time interacts with changing interests and activities of both parties to reveal particular phases when Cycling-PT can be useful in maintaining family bonds.

The biographic analysis of households through narratives captured in this study has helped in a number of ways:

- Mapping of stages in the household life-course when people have found combining Cycling-PT to be useful to them and their families
- Revealing some of the processes by which people have made transitions towards multi-modality, as well as away from it
- Reveals that household identities are complex, often involving values related to personal development and physical activity.
- Demonstrates that combining Cycling-PT as a concept has been 'seeded' in many cases in the participant's experiences of combining cycling with public transport in travel experiences during childhood with other family members, or for social and recreational activities, including visits to family in adulthood. Observation of the behaviour of others who combine Cycling-PT, and the stimulus of needing or wanting to make new kind of journeys across and within the regions of the UK have also stimulated people to adopt the behaviour in some cases.

6.5 Household Identities

Families expressed divergent views, preferences and interests, but as Saraceno (1989) observed, appeared to share common interests as 'collectives', for example active participation in music, or sports. Families appeared to subscribe to some shared beliefs, reflecting the 'family paradigm' concept proposed by Day *et al.* (2009), parents in particular expressing some common perspectives that were sometimes challenged by their own children and adolescents. While an individual's 'family oriented' or 'family member' social identity has been associated with travel behaviour and mode choice (Heinen, 2016; Murtagh *et al.*, 2012), the mobility-related identities of the family as a collectivity, have not been previously explored. The travel behaviour of households has been more typically characterised by lifestyles (Horton, 2006; Jean, 2016; Van Acker *et al.*, 2011).

6.5.1 Multi-modal and 'altermobile' households

Some households described themselves through their narratives as multi-modal, in Derek and Marianne's case, they had various travel resources including the family car and primarily used personal transport, but integrating cycling with other vehicles, and public transport when this proved convenient or was needed to fit around other activities for which the car was needed. The family car had recently developed a fault, Derek outlined how this had affected their everyday travel:

D: yeah, we did more journeys by bike, than we otherwise would, erm...

Me: Is that because the car was sitting there and you weren't quite sure of it? Or because you'd given it into a garage for a...

D: mostly because it was in the garage, for a while. Erm... yeah... and by public transport, and by borrowing the works van, on occasion as well. I tend to, erm-, quite often I haven't got any spare time so I've got to, I've got to be there, I've got to take the quickest method of getting there, er, and sometimes that's the bike, like, today, I took Gemma down to her violin class on the back of the bike, and that's by far the quickest way of getting there, erm, but often it isn't, and I think outside of peak times Leeds is actually a very quick city to, to get across, or get in-, get into by car, erm, certainly... I can drop Brandon at Northern Ballet, in seven minutes from my house here, erm, if there's no traffic, by bike it would take, 15 minutes one way, maybe 20, 25 minutes the other way. Er, so yeah, it's often more convenient but then but then you

know, if you factor in finding a parking space and paying for a parking space, it's quite quickly becomes a less attractive option.

M: Mmm, because I think we do do that sort of 'mixing around' with bikes and so-on, but it's not necessarily, doesn't necessarily involve public transport as well or it might be, I can think of-, I can think of a time when I might split a journey and I might cycle into work, {Mmm hmm} and then if I've got to go out for some reason to the children's school in the middle of the day then I'll take the bus up there then I'll come back and then I'll cycle back again, in the evening, so you're sort of so you're looking at, all those factors of who've you got with you, what t'-, you know, erm..., and how long will it take?

Others revealed their multi-modal behaviour through their descriptions of travel and activities, having used various forms of both private and public transport over time and across the family membership. The mothers who did not combine Cycling-PT in families with children were often able to reveal an understanding of their partners combining behaviour through their own past experiences of this practice. Marianne, Margaret and Wendy had all, before having started their respective families and having children, experienced combining Cycling-PT themselves. Jacqueline's husband Colin also thought he had probably cycled to Cambridge station to take a train in his time as a student there, although he could not recall any specific instance.

The activity-travel behaviour of some families fitted the definition given by McLaren (2016) of 'altermobility', parents that relied on public transport, walking and cycling, or use of car share schemes. Angela who had lived in various parts of Nottingham since childhood did not drive, but had for a time lived with a partner who drove a car and a van, during which time she had almost ceased using her bicycle. For some of this time they had lived in Bulwell, a neighbourhood with regular bus and tram services adjacent to a local rail station that offered quick access by train to the centre of Nottingham. This period in her biography had also coincided with her older son's progression through primary school and starting at secondary school. Angela's travel behaviours appeared to have related to the resources available to her and her family, through synchronisation with her partner and his extended family, and the geographic proximity of her locale to a range of public transport options throughout her biography. The family of Miles who in his early twenties, lived with his single mother and younger brother in an outer Leeds suburb, had similarities with the previous life cycle stage of Angela, in that his mother had a partner with a car who lived separately, but was able to give Miles' mother a lift to the supermarket for shopping.

Where Angela's activities and relatively recent return to altermodality had been contingent on a complex range of personal and household factors, two other families (those of Dominic in Nottingham and Nicholas in York) lived without a car at home and their mobility practices were described by these fathers in a way that suggested their opposition to car ownership. Dominic and Nicholas were both able to drive but only used cars occasionally, hiring them for work or family trips or holidays, their life without car ownership was by choice although Dominic also stated that his wife did not drive. Working as a health professional, or for an environmental charity may also be a reflection of the values held by these two participants, values that may have also been shared by their wives.

Car-free 'altermobile' households were also sometimes described in other ways ranging from implicit suggestions of household values to more explicit self-descriptions by participants of themselves as idealistic parents. Dawn had contrasted her own daughters' disinterest in cycling as related to their friends' not cycling, with her grandchildren's excitement at their grandmother's unusual behaviour, relating this to her and her partner's "kind of hippy" identity in the past:

D: ... so that was something that they associated with me going to see them, that granny's bike would come and they could go on it. And they do cycle quite well. And one of them sometimes cycles to school and she's only seven. Yay! So, she's really good. It's not very far to school, but she does do it. But I think what we were trying to do, because we're quite kind of hippy, I suppose, we were trying to be a little bit non-conventional, so we would always try and use trains or buses and bikes and walk. It didn't always work, but we did used to try and do that. We didn't have a car for quite a few years, which is quite difficult with a young kid. And then eventually we succumbed and got a car but, yeah, we did try to kind of live that greener lifestyle.

An environmentally-friendly outlook was a common theme across several of the participating households, most often portrayed by discussion of the type and number of cars owned, and of particular stages in their lifecycle trajectory. More typically fragments of the household's identity were drawn from the participants' narratives, such as Bridget and her partner who had at one stage been, "trying to live without a car". Participants also embedded some environmental reflexivity in anticipating the replacement of the car in the future as households foresaw their needs changing over time, as is evident in this dialogue between Ivan and his wife Jemima in Leeds.:

J: I just think yeah, if we didn't need a car, I wouldn't have one really, and, we keep saying when the kids have gone we can get one of those nice little electric cars you know, we don't have to think about and just-, it's a practical thing for us really more than any more than anything.

I: I think there's an environmental factor that we wouldn't want to be... You know... I see two cars as a bit unnecessary and a bit wasteful, I think both of us do, erm...

J: Mmm...

Me: you say the cars's pract-, the car is a practical thing?

J: the car is a practical thing really for us.

Me: so you have it because it's really it for some types of journeys?

J: yeah, because we need it's really, for things, {okay} and it's convenient, you can't deny that, it's convenient, so...

Me: do you have the car largely because you have children? Do you think, do you think, do you think if your kids have grown up...?

J: no I think we'd have one...

Me: ...Would you would you still have a car?

J: we'd have a car, we'd definitely have a smaller more, cost efficient and more environmentally friendly car, definitely. So...

Description of the activity-travel behaviour of other families sometimes reflected behaviours they considered representative of their social networks and of the locale. Other family values were implied, such as the medic, Nicholas, whose strong belief in physical activity was reflected in his family's car-free lifestyle and extensive use of bicycles after briefly describing an impromptu bicycle race his five-year-old child had been involved in during a recent trip together by bicycle to the local park:

Me: and would you say that that's growing up in a, in a cycling friendly environment?

N: absolutely yeah, yeah. So the children are being encouraged to cycle from a very early age, they see cycling as the default mode of transport, {okay} or... Active transport is, is the way people get around, and it's great cause -, there are some quite nice recently pedestrianised part of York particularly along by the side by the River, so you know, you sit there on a park bench, just taking the time, the people, cycling up and down there people walking up and down pushing prams, there's people rowing on the River. It's just really nice people out doing things which the human body should be doing. {MH, yeah} yeah.

Just as the enthusiasm for cycling had not been shared by Dawn's own daughters, but was evident in her grandchildren's activities, Nicholas also commented that his own parents had

never been seen to cycle in his youth, however, cycling was an enthusiasm shared with his brothers:

N: ...well funny enough, neither of my parents cycled, so my father never cycled and my mother, did cycle when she first, left school and went to work, Er and her bicycle was always hanging up in the shed but, I... Not in my lifetime she cycled! (Chuckles) {sure.} Erm, and I'm the eldest of three brothers and, yes, both of my younger brothers do cycle as well, erm, and my... Middle brother he still lives in Dublin, and he still cycles his children to school, or nursery, yeah, so erm yeah, we've... Cycling's skipped a generation there!

Nicholas' reference to York and specific 'regions' within its landscape suggests a complex interrelationship of behaviours, beliefs and identity with the residential locale and, in this case, its affordances. Lawrence described his family as, "country bumpkins", invoking an inter-generational family identity detailed elsewhere in his narrative. He explained the travel behaviour of his children as linked to their rural locale and through contrast with the scale and unfamiliarity of a nearby city:

Me: Okay, and... in terms of developing their other skills, are they all confident public transport users from the, what kind of age did they... start to travel on their own?

L: erm... No, because because they kind of, we're quite country bumpkins erm, they, - so, Susie -, Roderick is, inter-railing now, he's finished his A-levels, he's got no problem with public transport and we kind of, -, classic thing where the eldest was forced into it, sooner than perhaps the others. He, - I think he was making journeys on his own, - 13. Susie is less self confident, probably only in the last, well maybe yeah, 13 - 14, and that's going on the train to Newcastle. Erm and Bob is just about now, is ready to, make train journeys on his own, if they don't involve too-, you know a change perhaps, that don't involve crossing the city, and there's someone to meet him at the end. As an example my daughter's just... spent time in Newcastle with friends, she got the train there okay but, was put on the train and, wasn't comfortable about getting a bus at the other end so got a taxi...

In this example, Lawrence had labelled his family's rural identity in a way reminiscent of Roberts and Henwood's (2018) identification of narratives about identity through emphasis on, "attachments to family, community and place..." (Roberts and Henwood, 2018) (see section 1.2.7.1). Earlier in his discussion with two other participants Wendy and Noel, Lawrence had described how he had grown up in a small relatively rural village stimulating his need to cycle as an adolescent to meet friends and attend school, eventually leading to his combining cycling with the train to get to college before he had been able to drive. He outlined an ongoing family paradigm while contrasting the freedom he had enjoyed compared with his own contemporary caution about his own children's mobility:

Me: and how about us, erm, using public transport? What, what was that like when you were young, did you, did you also use public transport?

L: er, there wasn't any from my village at all, so your question about parental encouragement, it was more about they, they wanted-, they moved to a village because they wanted a kind of rural upbringing that they'd had, but they were conscious that, that came with a price of possible isolation and, them having to taxi us around and stuff if we wanted to do things, and, whilst it was never said I think the fact that,... We, cause it was me me and my brother, but mainly me I think, got on our bikes, obviously saved them, trailing out all the time, with that caveat of, of... some kind of safety qualification. And also they are fairly erm, they were reasonably relaxed about letting us, go off, probably different to a lot of parents now but...

N: Mmm...

W: what parents know... my mum turned round and she said: "how did I let you do that?" {L: yeah...} Just, you know, we just disappeared and, didn't-, weren't seen again I think in the summer holidays, whether it was down and swimming in the sea or... off on a...

L: When I think about some of the things that I did now, so I got on my bike at 14 and rode down, the A19, which is, then as now, a fairly busy dual carriageway, to go and ask for a job at the hotel down the road. Absolutely nuts! Yeah, no way I'd get my kids do that! I wouldn't do it.

Lawrence also described his family as all being competent cyclists, the two boys both having good quality 'road bikes' although only the younger son shared the same interest in cycling as his father and mother and their 15 years old daughter did not enjoy cycling at the time. Lawrence's wife was planning to take their younger son and a friend of his by train to go bicycle touring in Northumbria during the following few days of the summer holidays.

Identities were sometimes suggested in narratives that contrasted behaviours with that of acquaintances and friends. Winnie recalled a shopping trip with another family for whom this activity was considered more of a recreational activity:

- W: well... We're not, as a family, we're not recreatio-, we don't go shopping together like...*
- Me: oh, Suki, are you a keen shopper?*
- S(9): no mum's a keen shopper.*
- W: er, I don't go into the -, I'm not! I don't go into the city centre, we don't go looking at clothes and looking at things.....*
- T(12): we went there last weekend!*
- W: we went -, no...*
- D: that's pretty unusual although.*
- W: but two weekends ago you went with a friend's mum didn't you? And I came along as well, but erm-, their friends' erm, mum said that she would take them for a mooch-about to go wherever they liked whereas if they go with me, we go for a purpose and then leave again! But, I... I'm probably go in to the city centre, less than once a month.*

6.5.2 Cyclists and cycling families

Where parents had been keen cyclists, several of the families had involved their children in one-off or occasional journeys combining Cycling-PT. In households with members who identified themselves as cyclists, this identity did not necessarily extend to all individuals but was more focused on those who regarded cycling as one of their primary sporting interests. Darius had moved to Leeds from Sheffield in the previous year and had previously commuted to Leeds one-day-a-week to care for his grandchildren. When his own children had been young they had been on a cycling holiday in Belgium, having taken their bicycles on the train to Hull. He described a bicycling family identity that he applied to himself as much as to his extended family including his grown-up children and their families:

- D: I just remember one terrible day in Sheffield, when it was raining and wind and, terrible, and I still went on my bike into town, and the only people I met on bicycles were members of my family! And, I met my brother, I met my brother-in-law and I met one of my children (chuckling) and those were the only other cyclists I saw... on my trip into town, we're a bit geeky, headbanger lot, this next-generation, both my son and my daughter cycle, and their families all cycle.*

A "cyclist" identity was not always so clearly labelled in biographic narratives, there were other families where several members had cycled for transport and leisure, including both parents at times. In these, the activity of cycling was described as having been applied to specific purposes, including commuting to work or going shopping, as well as to family group leisure rides. A cyclist's identity could also be part of a broader set of household interests and identities, some shared, others individually held.

Children had thus been involved in several families in the experience of combining Cycling-PT through the household's interest and involvement in cycling as a pastime, both historically and in present-day narratives. This contrasted with the discovery of Cycling-PT as a more independent activity among some adolescent children of families where cycling had been either a practical form of everyday transport for a parent, a family leisure activity involving

young children, or even where the participant had no recollection from childhood of any adult having cycled.

6.5.3 Sports and fitness fans

A focus on cycling as one of several sporting interests, had been either transferred from another sporting activity (running, in Ivan's case, and for Gerald), or was a secondary pastime (after climbing, in Margaret and Dave's family). Ivan and Jemima's whole family clearly valued participation in sports, and engaged in several keep-fit activities and sports. Running had been a shared family activity, until Ivan started to feel pain that had eventually resulted in him having a hip operation:

I: You know I was, mid, 40s the first time I ride a bike with, you know erm, drop handlebars and, I often joke I'm the classic you know, middle-aged man getting into cycling, erm, but it, it was very much a progression from... just seeing cycling something I did to get to work and back and that was it, and it was only then, when, I had the problems with my hip, and we were at Valley Striders which is a, a family running club thing that we go to, and a couple, a couple who were at the running club, - I couldn't run anymore and they were saying I should try the cycling, and that's how I sort of got into it really...

Me: so has cycling now replaced running for you?

I: yeah yeah, although I wouldn't say that... I think it's just become-, I mean I wasn't a big runner, it was just something we did as a family, but I would say the cycling has become, - I think there was like a first time I rode 100 miles I couldn't quite believe it, you know...

Although all the family were physically active and engaged in various sports and forms of exercise, cycling was not an enthusiasm shared by all members of this family to the same extent. This was clear in a part of the discussion when Ivan and Jemima reflected on why they did not tend to go cycling when on family holidays together:

Me: cycling doesn't work for everybody?

I: I think that, if we go out on a bike rides as as I, as five it would... Tris would get frustrated because we weren't going too far...

J: or going fast enough!

I: and weren't going fast enough and we're not going fast enough and, etc etc, I think it's just one of those things...

J: yeah, Dom doesn't particularly enjoy it, I think is the...

Me: so he would hang around the campsite with some of the teenagers and kids sort of thing or...?

I: yeah, and when we are away we want to do it as a family.

J: M.

Family harmony and shared enjoyment was preferred when on holiday to the individual pastime of cycling that was enjoyed most by their son Tris and his father Ivan.

6.5.4 Children's extra-curricular activities

Activities in present-day families with children were often quite complex and parents like Ivan and Jemima were keen to instil their own cultural and developmental values through exploiting opportunities for sports and cultural activities available both within the locality and wider city region. Ivan described how the scheduling of the children's sports activities and the distances involved had often led to them being chauffeured by car:

Me: oh right. So the kids' sports things are quite late then aren't they?

I: they are quite late some of them, and I mean... that's where the whole-, we couldn't, - you know sometimes you almost feel like curtailing some of the activities because you do need the car and you are, going round but, - I think they've got... such great opportunities for them to do these things, that I want them to do those and you know we are happy to encourage them and where they can do it themselves, {Yeah?} you know I think it, if there was a bus to Scott

Hall Sport-, you know if-, it-, we would do that but you would literally have to get the bus down to Chapel Allerton and then... it's, a bit of a walk from Chapel Allerton round there especially like I say when you're finishing-, when it's something late at night, or if it's early in the morning... you can't really do it.

J: *yeah.*

Families revealed that children's activities, shopping and family outings had generated car trips, often to a greater extent than the adults' journey to work in some families, as several parents had regularly commuted by bicycle, if not combining Cycling-PT. In the past, children's activities had also motivated parents to use the car more. Car use for shopping and for family cultural, recreational and social activities was also evident in the biographical narratives with individuals and groups. Several participants had experienced being given a lift to school with a parent, although only a few parents of present day children reportedly took their children to or from school by car. Lift-giving to children for their social activities seemed to have been less commonplace in the past with a more noticeable distinction between discretionary and essential journeys. Some parents had consciously avoided giving lifts to their children, even in more recent times, expecting them to be able to make their own travel arrangements. In biographic narratives, parents had evidently expected their children to be able to travel independently, whether by bus, bicycle, or on foot, but would offer lifts if convenient to them, contrasting with a greater present-day expectation by children of receiving lifts and parents of offering lifts.

Comparisons and similarities in experiences were drawn by parents between their own childhoods with events in the lives of their own children, Jacqueline for example comparing how quickly she and her daughter had learned to cycle, and Marianne contrasted her own rural upbringing and independent social use of the bicycle as an adolescent with her children's urban environment and much more restricted cycling.

The next three subsections address participants' use of Cycling-PT for managing perceived risks and their multi-modal expectations. The subject of 'risk' can be viewed from both a quantitative, statistical approach, as well as a vernacular perspective. In academic literature the term is used in both framings. All journeys and travel involve risk of various kinds of negative outcomes, late arrival, discomfort, damage or loss of property, or injury to the traveller amongst others. The concept of risk is also embedded in expressions such as 'risk takers' implying attitudes that characterise a particular group of people in the eyes of another social group, even by other people who may cycle for leisure, for example. Perceived traffic risk has been associated with near misses, i.e. instances when what seemed to be a potential crash was avoided at the last moment.

6.5.5 Managing exhaustion and fatigue

Commuters managed their cycling repertoires in a way that was intended to balance the benefits of exercise and exertion, with the avoidance of exhaustion. Tiredness could affect a decision over which station to board a train service, taking into consideration the affordances of the infrastructure of the station, as well as its relative geographic location. Jacqueline who usually cycled or took her folding-bicycle between Nottingham rail station and her workplace, but had occasionally cycled to Beeston station more often in the past:

J: *...I used to change at Leicester for a while, because it was-, before the trams came, it was easier to get to Beeston station, on a Thursday evening when I was really tired, { yeah?} and if I went to Leicester, I didn't have to go over the-, no no, that was it... for a while, for a while I*

was trying to work out how not to have to go to the railway bridge because I was really tired (okay) at the end of the day

Me: *at Leicester was this?*

J: *Leicester I --,...*

Me: *Sorry which railway bridge was this?*

J: *This is at Beeston. They don't-, the stairs at Beeston... are actually the railway bridge so you have to go up and over the bridge in order to go from one side of the bridge to the other...*

Those who combined Cycling-PT occasionally for recreation or social reasons would also sometimes resort to continuing a journey by public transport when they, or someone travelling with them, felt tired. Both adults and children could experience tiredness or exhaustion, and being able to return home, or travel onwards to one's next destination when on holiday, for example, required being able to take the bicycle on board public transport.

Children were particularly susceptible to feeling tired during long cycle rides or cycling in hilly terrain. Here Nick, in conversation with Justin and Sarah remembers a recent occasion when he had taken the train with his eight-year-old daughter after such a ride:

N: *Think we did that on-, we came into Leeds for the Skyride on, Sunday, and we-, cycled in cos we were, came down the canal towpath that's quite nice, but my daughter was really really tired for the journey back and to be fair she'd done, nine-ten miles by that point, 'bout nine miles I think so, we, went down to the station and got a train home, erm, and that was, that was alright, that, wasn't...*

Me: *Just the two of you?*

N: *Just the two of us, and it was very much a case of throw her bike on quickly "Now you get on and I'll just come on with my bike behind..." you know, the logistics of managing that, but...*

Parents were also aware of the capabilities of their children for cycling on extended trips, and their limitations. Despite their confidence in their children's cycling abilities and skills, Doug and Winnie contemplated the kind of excursion from home by bicycle that would be made feasible it were possible to return by public transport with their bicycles:

W: *people do things like go to ride Bradgate Park or Swithy Wood and get, some sort of trans-, know that you could get out there, cycle round and get some transport back if you were tired, that would be nice, I mean you do it without thinking about it but, I think for the kids, that they, if they were going to cycle out to Swithy Wood, I don't think that... They'd be unhappy children on the way back.*

D: *No no no no no. Yeah, oh yeah it's too far for them to cycle out and back...*

Me: *how far is that from here?*

D: *it is... It's probably about -, 8 to 10 miles. Erm, thereabouts.*

In the discussions with families, several children who did enjoy cycling confirmed that they did find long journeys by bicycle tiring.

In this discussion involving two participants who live in the same neighbourhood of Nottingham, Chester describes his recent use of the tram when with his folding-bicycle and Emilia expresses her own wish to be able to make the same journey with her fixed-frame bicycle. Both participants relate this combination of Cycling-PT with degrees of tiredness and Emilia adds the case for doing so particularly when the weather is poor:

C: *...That's because, I've been up since 8:30 in the morning, and arrived back from Derby at sort of like, eleven half past at night, and it's like a, yeah! It's just like why not treat yourself! And get back quicker. And it's a good thing, it's right there, you know actually it's a really good service the tram it's, every few minutes, every three, five minutes you know whatever, and obviously it's electric, which counts, you know in terms of the fact that it's in terms of the fact*

that it doesn't give out pollutants such as diesel, well er pollutants that exist in diesel or petrol, so...

E: and I wish it was possible to take non-folding bike on the tram as well because sometimes, I've got a similar problem maybe I come back from work I'm really tired, still, I don't want to leave the, erm bike at the station because, I would need it the day after, but I can't take the tram because of my bike, and, it makes life a lot more complicated! (Chuckles)

Me: yeah. And which kind of a distance would you be using the tram for, then with your bike if you were to take it on there?

D: well I live, erm, more or less in the same area, Forest Fields, erm, so from the, train station to there is, what, 10 – 15 minutes erm, by bike but, it's, really hilly. So, when I'm tired, even if it's not a long ride, I would be happy to take the tram and, just, go, go home without any effort! (Chuckles)

Me: and what sort of time of day would that be?

D: erm, it depends. Sometimes it's around six – seven, some other times is, around, two – three in the afternoon.

Me: Mmm. So what do you do currently, given that you can't take your bike on the tram?...

(21:34)

me: ...So you arrive... at the station, you're very tired – at the station, yeah?

E: Mmm hmm. (Nodding) yeah, I arrive at the station, I cycle a bit, and then when I really really steep hill I just walk and push the bike.... If I'm really tired and, – can't be bothered.

Me: and are you doing that even now in winter?

E: yeah. And especially in winter when, it's raining, or it's really cold, it would be really useful, having the option of erm, taking your bike on a bus or a tram I think.

Tiredness could have a rhythmic, temporal characteristic related to work routines, or the frequency of other regular activities. Jacqueline was tired on Thursday evenings after three days working in Nottingham each week in term-time. Emilia's aspiration to take her bicycle on the tram was related to a daily commute homewards from her job, but Chester had been returning by train with his folding-bicycle from an occasional social activity in Derby after a day's work in Nottingham.

Grace had mentioned tiredness as a reason for combining Cycling-PT to return home to Leeds, when once she had combined recreation with a familial visit. Having cycled from home to visit her mother in East Yorkshire, she had shortened the cycling part of her journey, that had nevertheless still required a fairly long cycle-ride to get to York station:

G: I only live 3 miles away so, when I cycle I don't, mix with public transport. Er, the last time I mixed would have been, August bank holiday week, erm, - cycled up to see my mum over in Driffield erm, did the full 60 miles out, but, with the number of rides during the week, I was being rather lazy, so I just cycled the 40 miles to York and then took the train back from there.... To Leeds, erm, yeah, it really was just... I've been debating whether to do the sort of, whole cycle back and with the number of rides I'd done in the week me legs were tired and I just decided I do the short ride to York...

Differences in capability and scheduling constraints were also described as reasons why one partner might cycle to or from an activity, while the other travelled by public transport with their bicycle, as in Harold and Doreen's discussion:

D: well it means we can get to places can't we?

H: ...At different times, like the example I gave of, going to York rally when I road all the way and Doreen did, train assisted part way, and then we are both train assisted back, it was that flexibility and versatility to accommodate Doreen being, less fit than me wanting a hard 92 mile ride at the start of the weekend...

D: or not having time cause I was working full-time....

Doreen in this narrative offered the alternative explanation that she was constrained by work, for not cycling to York from Nottingham on that occasion, but she also described a recent holiday when she had cycled alone in the Welsh countryside. Then she had resorted to taking her folding-bicycle on the train during a period when it had rained too heavily for cycling to be enjoyable, and been transported by bus when she had found cycling to be difficult:

D: well for me it was a leisure trip, erm... Over the years, eventually cycle round the coast of Britain, but in stages... several months or a year apart or something, and I was going round South Wales from er, Chepstow all round up up towards Aberystwyth with my Brompton, er, took the train down to Chepstow with me Brompton, and then used me Brompton down to cycle most days, although, one day, it absolutely poured and I must admit I got the train, between, between places and er, I also found that it was a bit hard going at' time, and I must admit I had to get the bus, which was useful I'd got me Brompton because obviously I would have been, a bit -, there bit stuck otherwise.

6.5.6 Scheduling risks of public transport and Cycling-public transport Resilience

Harold, who mainly cycled around Nottingham for his everyday needs and for enjoyment on holidays, identified the advantage of combining Cycling-PT at times of the year when public transport provision was unavailable. He made an implicit comparison with the year-round public transport provision in other countries:

H: well it -, my main combining is, for holidays because, er... most of my everyday life is, cycling only. Erm, or it's... for example tram only, taxi only because living so near, er various public transport resources... Erm but erm... Last Christmas for example we went to, er, for four days,... on a city break which are, is when we both took our Bromptons... Which we cycled to the station and put them on the trains, and because they're Bromptons on fold up we don't have to er, find out whether you need to book your bike in advance on it or whether there's a chance that there won't be room because it's unbookable and only three spaces, and then while away, being able to do recreational cycle rides because after all over Christmas, the trains stop for over Christmas, both Christmas Day and Boxing Day stupid idea! Because Boxing Day is like any other bank holiday and, erm, there's at least as much demand for public transport on Boxing Day as for, as there is any other bank holiday with er, football and the erm, start of the... After-Christmas sales, er, but with next to no public transport you can still get out and about either into the countryside or to, neighbouring villages or towns, erm, so a trip to Cheltenham from Gloucester is the sort of thing that you can do, even if the trains aren't running, because you got your bike with you. So it's really good for coping with the, er deficiencies of er, the British public transport system as it is now.

People who cycle have also been found to be particularly averse to the risk of delays while travelling. Risk of delay through missed or poor connection timings was an argument used by some as a rationale for combining Cycling-PT. Una had found the bus connections in Mansfield complex, and in the example below, Leeds resident Derek gave an estimate of the amount of time by which he could be delayed if an evening bus connection from the station failed to materialise:

D: It's also... if I get to the station, erm, at eight to clock, I'm going to be back here at eight-twenty, on the bike, whereas if I'm on the bus, it might be 8:20, it might be nine o'clock, depending on how long I have to wait for a bus, {Mmm hmm} so it's a lot more reliable, the time- timing myself on the bike...

Me: Is it consistent?

D: Yeah, cos it always takes twenty minutes,

Me: Punctures permitting, presumably... or pedals permitting!

D: Yeah,... but you know, the level of traffic doesn't affect it, and... having to hang around for the next bus, train or tram doesn't affect it.

Derek's belief in the consistency of his journey by bicycle parallels findings by Schwanen and Ettema (2009), that cyclists tended to underestimate the variability in the length of their journey times. The unreliability of the local bus service was also invoked in a different discussion by Randolph who also associated the flexibility of the bicycle in combination with the train as a benefit for both personal trips and when travelling to his employer's other office as part of his work:

R: so, yeah so if I'm going to London say, where all my family are, I would usually try and take a bike, er, because I just feel I've got a lot more flexibility when I arrive.... Yeah, it has shifted at times, cause there's decent public transport at that end, but what happens if I'm coming back, when I get back to Leeds, the difference between London and Leeds is that Leeds public transport is really poor later in the evening, so if I'm coming back on a Sunday night and I get in at 10, I might have to wait another, half an hour to get a bus home, whereas if I'm on the bike, I could be home in within that time. So that's one significant difference, and certainly for those long journeys, I increasingly like to take a bike, cause I kind of feel that it gives me a lot more flexibility. There are some drawbacks, and there are definitely times when I've felt quite encumbered by being at a railway station with a bike, especially if it's heavily laden, whereby you want to like pop into a shop and get something to eat, for you need to use the toilet and, as a station,, and you've got a big bike and at Leeds station there is very limited places to lock it, particularly if you're on your own and you don't have anyone else to watch it. Erm, but, yeah the flipside, in terms of, so-, the head office where I work is in Doncaster I can ride to Leeds, get on a train, ride at the other end, it just takes a similar amount of time probably to driving there, and in the morning rushing time rush-hour times it may be quicker, that means I'm not just at the wheel of a car, but I can actually do something else on the way, so that's a definite benefit.

Randolph acknowledged the sense of encumbrance that other people had also identified when travelling with the bicycle, indicating one of the limitations of this practice. Being encumbered with a bicycle could also limit options, for example, should it be necessary to change the route of a planned public transport journey, accept a lift from somebody, or take a taxi, a point identified by Charles in another discussion.

The ability in principle to cycle back home or onwards to a destination (distance permitting) should there be no other transport option was more of a theoretical symbol of resilience and flexibility. In Grant's case, as a student returning occasionally to his parent's rural home, then he would have the means to cycle some 12 miles home along a major road with fast traffic through the countryside, if no-one from his family could take him and his bicycle, but as he made clear, this would be an option of last resort:

G: Erm, well, if they were available at home they pick me up, yeah.

Me: So... Is it an advantage or is it-, is it balanced too much by the, let's say the anxiety, the fact that you can get yourself home from the station while they,...

G: It's just something that-, if I had had to do it in a dire emergency I know I could do. But I've got, two siblings it can drive, both my parents you can drive and I've got grandparents also they'll pick me up so, it's not normally a problem.

Me: so how do you normally get then from the station, to your home, in the...

G: I'd normally get a lift.... I'm picked up.

6.5.7 Road safety risks of cycling alleviated by combining Cycling-PT

Concern about safety of cycling on highways was a theme heard repeatedly in discussions, and in some cases a connection was made with the capability that combining with public transport offered to avoid the need to cycle in potentially hazardous conditions. Although cyclists were aware of the risk of accidents and injuries that could occur through cycling,

several had experienced accidents, some of a very serious nature involving long periods of convalescence and recovery.

Partners and spouses of those who cycled as part of regular journeys commuting to work were also concerned for their safety. The stages travelled by public transport seemed to be of considerably less concern for others in the cyclist's household than the cycling stages of journeys and related to the distances involved. For example, Ishrat indicated that for her, as a mother with two young children to care for, Haziq's use of the train and the short distances he cycled at either end of his regular journey were of less concern than if he had regularly cycled greater distances:

I: ...So basically, I think with him, taking taking a bike is... there'd be, I was-, worried, but then I suppose because then he would take the train {Mmm hmm?} I wasn't that worried, cause his train station isn't that far from here...

However, Ishrat also acknowledged that she had been relatively unconcerned about Haziq's safety when he had gone on longer recreational rides in the countryside at weekends.

As a young adult regularly attending a course at a college in the neighbouring city of Wakefield, Miles commented that his mother worried about him cycling, but that her concerns were also lessened by the fact that much of his journey had been by train:

Me ...How has that been helpful to your family over the last couple of years when you were doing that still?

M: Erm, well they knew that I wasn't getting, stuck in really dangerous traffic situations, they knew that I was getting to College on time, and that I was safe, so to speak.

Me: Mmm?

M: 'Cause I guess cycling is, erm, somehow getting a bit dangerous...

Me: okay?

M: ...Oh well I say, getting a bit dangerous I mean, the casualties seem to be rising. And she -, me mum fears for that.

Me: okay...

M: cause it keeps happening more and more locally, so Armley, er, Kirkstall, Easterly Road, and I'm in the Seacroft, so it seems to be getting, nearer and nearer.

India, a keen member of a cycling club in the suburbs of Nottingham, had lived in an area conveniently close to a station from which she could commute to and from Loughborough where she worked. Echoing the reasons given by Pamela, a sporting cyclist in Leeds – for combining using a Brompton on the bus in winter, India observed that by combining with the train during the winter evenings on the way home, she had been able previously to avoid cycling along country roads surrounded by cars in the dark:

I: well there's everything in cycling really because, most-, most cycle routes aren't planned for winter cycling, {yeah?} so if I cycle over in the winter, I can't cycle home safely because it's on unlit, A-roads, {yeah.} so the only way I could get Loughborough and back would be to cycle there in the daylight, and get the train home, but it's so expensive to do that, which I would like to do, but it's expensive, so when I cycle to Loughborough I wanted to come home on the train it would still cost me about 7 or 8 pounds a day, and I can't afford to do that, but from a training point of view it would be really advantageous to do that, so the weather and the cost of trains dictates everything. In the summer it's easy because you can just get on your bike and get home again safely, but when-, as soon as it gets dark again, this country isn't built for cycling it's built for people bobbin' round the city centre in a car, not on a bike. Even the bike routes in the city centres, the Sustrans route, and other routes, they're down canal paths and down unlit roads so, as a female cyclist I'm very reluctant to cycle some of-, some of the urban routes, in the dark.

Jessica's partner had herself been involved in a serious cycling accident within the past few years and this had heightened her concern about Jessica's safety when cycling:

J: *Mmm... Well she got knocked off commuting home, erm, a couple of years back, and after that she was more concerned, and I had to text her when I got in, but that seems to have faded. And also, because I, wear cameras... {right?} when I, in general when I'm commuting so-. {okay?} ...Not on the Brompton actually because I might use the backs, yeah! Maybe I should but...*

In this case Jessica's partner's concern had diminished over time, but also perhaps resulting from some adaptations Jessica had made to her behaviour. Being seen to be wearing a camera has been shown to have some effect on the behaviour of motorists when passing cyclists (Walker *et al.*, 2014). Jessica preferred to cycle into Leeds at around 7am when the traffic flowed better, finding it safer than in the congested traffic later in the morning:

J: *Depending on what time of day you do it, I normally leave my house at 7 AM because the traffic flows, better. And that's safer, whereas when you've got queueing cars... {Mmm?} You tend to find the drivers do silly things... {Okay?} And are more likely to take you out. Erm, it's got, protected cycle Lane at various points erm, the best bit's coming through Kirkstall here, it's got basically a bus Lane... which cyclists go in as well so you –, which is, the cars can't go in...*

Me: *Yeah? ...are the cameras as well to make sure the cars don't go in there?*

J: *so you've actually got the..... (Cameras or something...)... Not to make sure the cars don't go in, erm, but they generally don't. {Right?} I don't, don't think there's Is there, there might have been in the past, erm, but it's like a 30 mile an hour, speed limit at that point and there's, speed cameras, enforcing that. So that sort of feels quite safe. I don't go at the speed I would, I can go cause, I ride defensively...*

The availability of an adjacent public transport corridor enables those who would be cycling under normal circumstances, to be able to change and combine modes if a change of external conditions were to make cycling seem unsafe. Jessica outlined how she would choose not to cycle along a major highway if it rained heavily, or if dense fog were to make her more vulnerable to the reduced visibility afforded to car drivers by the prevailing weather conditions:

J: *yeah so, erm, – just from the safety perspective of, – even though I might have however many lights on, it's just one of those –, a bit like the rain so, rain is, me getting wet but also, the impact on visibility of drivers, erm. I know what it's like when I drive, and it's raining and you've got windscreen wipers going on you're fogging up you don't –, you can't see people as well as, you can on a clear, well-lit day.*

Me: *Sure. And what do you switch to then when, when it becomes either very heavy rain, or foggy. What mode of transport would you be using?*

J: *I'd be walking to the train station, walking at the other end. Or I might still take my Brompton, what I wouldn't to, is do the, the ride down the A 65.*

Pamela too was a cycling enthusiast who regularly rode to work in Harrogate from Leeds during the summer months on her road bike. However in winter she normally drove, but when her partner Simon needed to use the car, or she planned to socialise with colleagues in Harrogate after work she would use her folding-bicycle, cycling the short distances at either end of the relatively long bus journey:

Me: *erm, so how often would you say that you, you take your bike I mean it changes in the season doesn't it... So in the summer do you go every day or...?*

P: *commuting to work?*

Me: *yeah, the Brompton on the bus?*

P: *oh, on the Brompton on the bus, not very often from –, it's more just if I cycle –, I think the Brompton is more likely to be in winter... Because in the summer erm, basically I don't cycle on the A61 in winter cause it's too dark, because there's no lights and there's people doing 60 miles an hour down there, and generally you get days like, the windy and rain day that it's been today, so, in the winter if I'm going to use the bike I would, - yeah, I'd be using the Brompton so I've most probably be either erm, well partly I think if Simon does need the car, is I will, cycle to the bus stop get on the 36 bus, and I cycle at the other end, and then I'll either*

do that back, or see if I can persuade somebody to, erm, put the Brompton in the boot and drop me off somewhere nearby and then cycle from their car, back to wherever...

Me: *somebody who... Lives in Leeds?*

P: *...Live somewhere in North Leeds so at least I can cycle back from there... rather than necessarily waiting for the bus.*

Me: *yeah sure, but it's normally the bus out in the morning isn't it?*

P: *it would be, yeah, I think so, if I'm going to do that, if I'm not using the car.*

Me: *Mmm hmm... How often might that be?*

P: *once a month, maybe something like that, I should think.*

Pamela's use of the folding-bicycle and bus, like that of Jessica above, was motivated by her belief in the greater risks of cycling in conditions of poor visibility and darkness on a highway with heavy and fast-moving traffic. The occasions on which she did so resulted from both household resourcing negotiations and externally scheduled social activities.

Other reasons people gave for combining Cycling-PT that were associated with the alleviation of risk, were also associated with less frequent and occasional journeys. Factors were related both to concerns over external conditions and incidents, as well as changes, temporary or longer term, in the person travelling. Derek indicated how his concern over the long drive to Cambridgeshire to visit his mother reflected his evaluation of his own capabilities, in this case – the onset of drowsiness when driving in the monotonous environment of the motorway:

D: *yeah, well it's just a long way to drive so, if, I always stay overnight at least one night, but if you're going down one day and coming back the next {Mmm} it's like a four-hour drive or something which I get-, I feel-, get sleepy, so it's, so it's safer and, and more enjoyable to go on the train often, especially if I'm on my own.*

Here the context for Derek's journey was one where he would be travelling alone, but was able to stay overnight at his mother's residence which was relatively accessible by bicycle from the local rail station.

Ability to transport oneself and bicycle in case of mechanical breakdown, a reason given particularly for using a folding-bicycle, as in Doreen's case below:

D: *yeah I think I, I'm not, I can mend punctures and do minor things, but there is a bit of -, bit of fear of what happens if something goes wrong and I'm stuck. That er, that motivates me quite often to use the Brompton er, you know, you can, get by can't you, somehow.*

Not all safety risks were external, as Doreen observed, cycling could be more hazardous after drinking alcohol. In this circumstance, for example, she would take her folding-bicycle home by tram:

D: *I..., Yeah if I'm going out in the evening,... If I'm going out in the evening and if... I'm meeting friends for a drink, I'll tend to cycle out there on me Brompton and fold it up and get the tram back or something, you know, so that's a bit of a combination.... You don't want to be, if you've had a few drinks trying to cycle back at night or whatever, it's not very safe.*

However Kirin, an experienced cyclist aware of the dangers faced when cycling and having fallen off her bike on wet tram lines and on icy roads, commented that she would be confident to cycle after having had an alcoholic drink. She qualified this by implying that she did not drink much but considered the bicycle better suited when travelling independently to social and other activities that did not require her to drive:

K: *I have a car but wherever I can I cycle and because I'm not going round with a family and kids that's pretty straightforward and because of where I live I can get into town or get to friends or get to work so it's not really been an issue. If I'm going out I'll quite often choose to cycle because it's not like I'm a big alcoholic or anything but I can drink and cycle.*

Opinions in other discussions about the dangers of cycling and alcohol varied, several people did rest at pubs during bicycle rides while some others tended to avoid mixing cycling and alcohol. One participant had heard that alcohol intoxication might have been a factor in a fatal cycling accident involving a distant relative. The abandonment of cycling during participants' teenage years (sometimes to be replaced by bus travel) was also associated with starting to drink alcohol as a social activity, although in one narrative cycling homewards from dances in country villages while intoxicated had been an integral part of life as a teenager using his bicycle for social activities in a rural part of the Lake District.

6.5.8 Channelled policies, infrastructure and services

The Cycle To Work scheme was often mentioned as having been one of the elements in supporting participants' purchase of a bicycle, both for people who had previously owned a bicycle and wanted to obtain a more up-to-date model, but had also been instrumental in enabling others who had not cycled for some time to start cycling. The availability of the Cycle To Work scheme in combination with an opportunity to try cycling through a workplace bicycle loan scheme seemed to have particular success in encouraging some participants to begin cycling to work on a regular basis. Monique described how the comprehensive integration of workplace measures to support cycling had supported her as she had begun to cycle and use the train fairly regularly:

M: ... Yeah a loan, {MH} and it was just great and I was like-, I knew within the first 10 minutes I was like "yeah, this is just brilliant!" it was so much fun, I absolutely loved it. And, before the six-week was up I just signed up I think after about three weeks said yeah I just knew I definitely wanted a bike so I'd -, when, used the Cycle To Work scheme and I, borrowed the money to get a bike, and everything else I needed, so yeah, you couldn't -, you know they give you everything you need... to be able to borrow the money to get a bike took up cycling, have a shower, and make sure your bikes safe and you've got the... Bike Hub as well, so there's any issues there you can wash your bike and get it fixed or whatever, so it was brilliant.

In both Nottingham and Leeds there have been a number of infrastructure developments intended to support cycling. In Nottingham some cycling provision coincided with the development of the tram network and its subsequent extension to the South of the city towards Clifton and the line extending past the university to Toton. Other cycling infrastructure was also available and more recent plans are coordinated with the redevelopment of the road network passing through the South of the city adjacent to the railway station. In Nottingham the provision of locked cycle parking cages around the city at a number of tram terminals, local rail stations and some sports centres gave some participants greater confidence in cycling around the city and in combining with public transport. The Citycard Cycle Hub at the former Broadmarsh bus and coach station was used by participants who combined with bus and coach travel, but also by some who then walked the short distance to the main railway station to catch a train service. Another participant had become accustomed to using a more recently installed secure cycle parking facility at Nottingham Railway station and would park his bicycle there, even when taking a coach from the Broadmarsh bus station and when visiting shops in the city centre nearby.

The existence of cycling infrastructure was sometimes mentioned as one of several factors that had helped participants to gain confidence as they began to combine cycling with public transport. In Leeds, Ambrose had begun to combine Cycling-PT for his regular commute to work in Wakefield since obtaining a bicycle from a social enterprise scheme recommended by a work colleague. He had not cycled regularly since his adolescence and had never owned a

bicycle previously. In addition to time savings gained through not needing to walk at either end of a combined bus and train journey, he was appreciative of the existence of marked cycle lanes extending from the area where he lived down to the city centre towards the station from where he would daily catch his train:

A: *...Now, since I've started cycling, I've found that I've saved myself about an 1 hour and 20 mins a day, easily time-wise, cause on a mornin', you know to walk to the bus station that's like 5 minutes... and then I might have to wait like 10-15 minutes, 20 minutes for a bus, get into town, then another 5-10 minutes walk to the train station, whereas I can cycle to the train station in 10 minutes, sometimes -15 at a push. They... fortunately I've got like quite a nice route there, cause they've got like lots of cycle lanes and things so it's quite a safe journey as well cause... with the cycle lanes makes it so much safer... you're kind of divorced from the traffic, so you don't have to, have that. Plus the way they've designed it, it kind of forces the drivers to be looking out for you, cause they've got all these red zones, and... (unclear...) ...stop and look, so it feels a bit safer anyway. So there's that aspect to it, so, there's a time-. I don't really save that much more money... I still buy the same bus pass that, that I use for the train to go to work and things, so I don't really save a lot of money in terms of that.*

For Ambrose, the time savings as motivation were combined with the benefits of exercise (see Chapter 4) as he had noticed a change in his fitness levels in the six weeks since he had started cycling and combining Cycling-PT.

Miles also observed that his route by bicycle into the city centre had improved since the City-Connect cycle superhighway had been constructed, as it extended to his neighbourhood and now provided him with greater separation from traffic, particularly at junctions.

6.6 Chapter Summary

In the preceding sections of this chapter factors have been identified that help to explain why participants have combined cycling with public transport as part of their everyday lives. These explanations for combining Cycling-PT are summarised below, starting with those related to instrumental factors and concluding with some more tentative interpretations:

6.6.1 Optimising travel time and enabling other activities

- Cycling to catch public transport saved time that could be spent on other activities or chores
- Perceptions of the working week compared with weekend allocation of time reflected mental models of the different sets of activities, particularly for a recently retired person.
- when travelling in public transport, people used the time productively to read or do other work, such as marking student's work. Some people took laptops with them, others used paper notebooks.
- People also used time on public transport to relax by listening to music, writing poetry, or, on longer journeys to catch up on sleep.
- Public transport journey stages also led to people developing acquaintanceships and forming alliances with other regular passengers.

6.6.2 Combining Cycling-PT Saves Money

- Some people were relatively unconcerned about the perceived financial savings of using bicycles, though others were more cost-conscious
- 'Thrift' was not confined to families with children, other individuals living as couples self-defined themselves as 'tight' with money. These seemed to include people who could drive but preferred not to
- Costs of travel were set into context, people made estimates of the relative cost of travel by various modes when contemplating investing in bicycles or travel passes, anticipating their regular use over a certain period of time.
- Costs of cycling did not need to be high, local 'thrift' stores that sold bicycle equipment and accessories were mentioned, and low-priced, second-hand, old or donated bicycles were used by participants for combining with public transport.
- People who had given up a car argued that this had made greater cost savings. Those who had retired from work no longer needed a car, and in some cases could no longer afford to run a car on their retirement income.
- Passes that gave someone free travel on public transport were important in some decisions around getting rid of a car, particularly for single adult households. A free rail travel pass had given one individual the opportunity to make a series of day-trips combining Cycling-PT for recreation. This occupied his time when his wife was also busy with her work or pastimes.

6.6.3 The shape and times of journeys: managing commuting stress and motoring frustrations

Managing commuting stress and motoring frustrations such as constrained parking availability at the destination activity were reasons that a number of participants gave for combining Cycling-PT. These issues were related to the time that people were travelling, the morning peak seemed to be more critical (unless collecting younger Children from school or nursery).

- Depending on the time of day that people travelled, the choice of using a car might be less attractive than the combined Cycling-PT journey could offer a more pleasant alternative to having to drive through 'nightmare' traffic.
- People preferred to drive in 'traffic free' conditions, disliking the 'stop-start' traffic that was characteristic of driving on some regional 'A-road' highways at peak traffic times. Motorways were also regarded as a frustration avoided by combining Cycling-PT, especially for trips taken at peak times.
- Some preferred to take the train or public transport, rather than driving;
- Parking in cities and towns where people worked, was a frustration identified by a few participants that had commuted regularly for work purposes. One participant had commented that the company he worked for may have moved out from Nottingham as a result of that city's workplace parking levy, into an adjacent borough in the county of Nottinghamshire.
- Bus travel was considered slow by comparison with cycling, and many people used cycling as an alternative to walking or taking a bus.
- Taking up cycling had occurred at university or later, some people resuming cycling aged in their mid-twenties and sometimes motivated by the wish to incorporate some exercise. University and the first few years of employment had also stimulated

some participants to first combine Cycling-PT either for visiting friends or returning to the parental home during holidays and weekends.

6.6.4 Flexibility – ability to respond to changing situations

Flexibility, often enabled by proximity to a public transport corridor with relatively regular services, was related to several aspects of activities:

- widening the range of stations and thereby service options that could be taken for greater convenience
- the choice and degree to which the activity of cycling for exercise could be incorporated into the journey;
- being able to alter activity plans during the working day, changing destinations at short notice
- ability to use the time on board public transport productively for work-related activity or for relaxation
- when planning to make an extended trip somewhere, having a bicycle available gave opportunities for flexibility of mobility in the destination locale, giving scope for exploration of the city or countryside

6.6.5 Control of your own journey

- Participants seemed to be largely motivated by the beliefs they held in their ability to optimise their use of time through cycling to access public transport.
- In some cases where the public transport was not described as unreliable, then it was argued that poor connection timings between public transport services was their motivation for cycling.
- ‘Keeping things simple’, where the complex alternative would involve a collection of travel passes and additional bus schedules.
- A preference for using public transport was also possibly linked to the relative uncertainty and lack of control over issues related to driving, i.e. congestion delays, or difficulties finding parking near the destination.
- Autonomy, for adults with concerned relatives, parents or friends inclined to offer lifts or favours, then the bicycle provides an individual with an argument that releases others from sense of obligation – especially in an automotive society where ‘the car is the norm’...
- Some parents had tried to encourage their children to cycle, both in their adolescence, and after returning as adult ‘boomerang children’ to live with parents, (Dawn?)

6.6.6 Occasional and recreational cycling exploration of the city and countryside...

- Cycling around a city changes the sense of scale, as people had commented;
- Exploration of a city visited by bicycle had enabled people to enjoy that city, hiring a bicycle gave someone relatively unrestricted mobility through the city;
- Through combining Cycling-PT people constructed adventures with a degree of unpredictability that would form future shared stories and bonds between people;
- People had also gone on cycling holidays alone through combining Cycling-PT;

- Adolescents were also enabled to explore the countryside, discovering both its geographic and its social spaces and affordances;
- Bonding between partners, or between a parent (or grandparent) and child was an outcome of combining Cycling-PT for day-trips or longer journeys together;
- Reconnecting with other friends (or family members) when using public transport to go for a bicycle ride or tour;
- Being able to take children with their bicycles on buses could be potentially valuable to people living in a Nottingham suburb characterised by a high plateau at the top of a long steep hill.

6.6.7 Optimisation of household travel resources

One-car households

- Viewed through the perspective of mobility biographies, car ownership had fluctuated through the lifecycle of the family in many cases;
- The household vehicle fleet had also been reduced to a single vehicle when the requirement to use the car for work had ceased for one parent based regularly in one office a short cycle-ride from home;
- With reduced capabilities that affected the ability to drive, or after retirement, people sometimes gave up one of the cars in the household.

Car-free households

- Several individuals and some household heads did not drive, including one family with children; their transport resources included bicycles, scooters (children); skateboards and travel passes or season tickets;
- For anticipated long-distance travel discounted advance-purchase tickets were generally used;
- Taxis were sometimes used in periods of illness, post-accident recuperation, severely inclement weather, or when a bicycle had malfunctioned;
- Some families had decided not to own cars, using public transport or cycling, sometimes both in combination;
- More typically people had decided to live without a car following retirement, Cycling-PT had enabled them to make longer trips for social and family purposes than just by cycling.

Bicycle use

- Secure bicycle storage schemes requiring card or key-fob access were a resource that were valued by participants, including those without a car. Access to this facility could be shared informally with others in the household through the loan of the key fob;
- Folding-bicycles were considered to be easily adaptable for other people to use, and had been lent to relatives and friends, or occasionally borrowed
- Those who owned a Brompton folding-bicycle sometimes referred to the ease with which it could be used by others in the household.
- Folding-bicycles had been taken onto trams in Nottingham and had been carried on buses, coaches and in cars and taxis. For several participants, the Brompton folding-bicycle had become emblematic for combining Cycling-PT;

- Bicycles as a resource were valued possessions and many detailed day-to-day decisions were aimed at avoiding or preventing theft of the bicycle or parts, or damage to the bicycle;
- The existence of cycle parking 'behind the barriers' at Leeds station provided some with more confidence in leaving their bicycles locked-up there for several hours;

Travel passes and season tickets

- People tried to optimise their ownership of a travel pass or season ticket by avoiding the purchase of multiple passes for different regions that they would travel through on a regular basis, the bicycle was sometimes integral to this optimisation for short sections of a longer journey by rail, or to access a station within a lower-cost travel zone;
- The multi-modal regional travel pass, 'Metro-card' was used in conjunction with cycling in West Yorkshire when it offered savings to regular destinations;
- The travel pass or season tickets were used occasionally for journeys other than the regular commute and sometimes when travelling with other family members who did not have a travel pass for the particular service, to or from recreational activities.

6.6.8 Personal and household beliefs and values

- Individual beliefs about the mental and physical health benefits were sometimes shared by partners in families...
- although their mobility behaviours were often different and related to family roles as well as pleasure derived from the activity
- values related to sustainability were often expressed superficially as being shared within households, although behaviours often differed
- Households often valued engagement in regular cultural, social or physical activities that seemed to be important to their collective identities.
- It is unclear how people's beliefs may have altered as a result of sudden life events (e.g. loss of driving licence, episodes of mental health problems, accidents and injuries, separation from a partner) that caused people to change their set of activities, or how they travelled between them.

6.6.9 Integration of physical activity into daily life

- Cycling to take public transport was one facet of the range of physical activities that some saw as integral to their lives, these people used their everyday environment as a gym – without the membership subscription, stairs were an opportunity to do a little additional exercise, even if it meant carrying the bicycle.
- The availability for use of the train meant that people could cycle in one direction, usually towards work, then return by train in the evening when tired;
- Some regarded the short journey to the station in the morning, or the ride home in the evening as opportunities for some exercise;
- The exercise of riding a bicycle, even a folding-bicycle to the bus-stop was argued to be part of a wider regime of training for a cyclist who took part in club cycling events or triathlons;
- Some regarded cycling as secondary activity to other preferred sporting activities, such as running or rock-climbing;

6.6.10 Biographical factors that influenced the combination of Cycling-PT

Cycling biographies

- A 'cyclist' identity could be limited to one generation, or to a few members within a larger family group.
- Some families had traditions of cycling that had originated with grandparents who had cycled avidly, or been members of the CTC (Cyclists' Touring Club) several decades previously;
- Families had placed stories of the cycling prowess or activities of parents into the imagination, despite the participant never having seen their parent ride a bicycle;
- Narratives suggested attempts at assimilation into cycling activities in processes of household amalgamation or fusion;
- The experience of combining Cycling-PT for leisure or recreational cycling as a child was a memory for several participants who had commuted using bicycle and train together.

Household Identities

- Families included adults who as couples had both combined Cycling-PT for commuting or for holidays before they became parents;
- Some adult participants used terms to label their families variously as: 'kind of hippy', 'country bumpkins' or 'geeky, headbanger';
- Families with children had in a few cases lived car-free altermobile lives, or were doing so in the present day by choice.

6.6.11 Managing risks through combining Cycling-PT

Risks to health

- The risk of getting diabetes could be reduced through regular incorporation of exercise within the commute to work, and also through having the means of exercise available while away for work for a few days, in the case of truck driver for example.

Risk of fatigue and tiredness

- The possibility for someone to take their bicycle on public transport meant that the risk of becoming tired could be managed, as could the accumulation of fatigue that could occur if cycling long distances every day;
- A journey by bicycle with a child could be completed when the child became tired by returning on a train;
- The discomfort of cycling at night in poor weather could be averted if it were possible to take a bicycle on local public transport, buses, or the tram in particular, it was suggested by participants in Nottingham;

Road safety risks mitigated by combining Cycling-PT

- Cycling on unlit A-roads was considered hazardous in some regions, particularly in Winter and during periods of poor weather when the vision of a motorist would be impaired by fog or rain. For someone cycling for the morning commute in daylight, taking the train to return would offer a way to get home safely in the dark;

- Parents and partners were reportedly reassured at the relatively low risk to their family member who was combining Cycling-PT when only cycling a short distance to make a longer journey stage by public transport;
- For someone potentially making a long journey of several hours by car, combining cycling with the train had offered a way to avoid the potential risk of an accident through drowsiness when driving in the dark;

This chapter has examined the stated explanations for contemporary travel behaviours, identifying relevant past experiences and considering the beliefs and values described by participants. Interpreting these factors from a household perspective, we find instrumental factors related to time-management and financial-savings to be balanced with varied levels of individual and collective affect, beliefs and identities within households and families. These findings and those of the preceding two chapters are discussed in the next chapter to answer the research questions in relation to previous research identified in the literature review.

7 Discussion and conclusions

This chapter discusses the project's findings about how multimodal cycling in combination with public transport responds to everyday activities and processes in households and families. The processes within households and other factors that shape travel behaviour identified using thematic analysis as described in Chapters 4-6 are discussed critically against the theoretical framework encompassing a biographical perspective applied to the analysis of activity.

This study contributes to the existing and available knowledge on how intra-household processes related to the organisation and management of activities interact with external factors. Various behaviours and motivations were to be found in the cross-section of people who participated, with variation also evident along the life-course of individuals. The adoption of a qualitative biographic approach has enabled changes in both the individual's and household's behaviour and in societal trends to be made visible.

Changes over time occur in both household and individual contexts, as well as in the external environment, but household and individual factors prevail in many decisions by this group of travellers. Where initiatives intended to support cycling's integration with public transport through improved infrastructure and facilities help to raise the profile of this modal combination, as identified in a report for ATOC (Steer Davies Gleave, 2009), other factors also affect the decision to combine Cycling-PT. The findings presented in this thesis illustrate some of the environmental, household, social and individual factors (Panter *et al.*, 2013; Panter *et al.*, 2011), that had contributed to shaping the behaviour of people who had cycled as part of journeys integrated with train, bus or tram. The combination of cycling with public transport is a distinctive form of travel, but its practitioners are identified not to be a uniform group, even though there are some recurring forms of the behaviour.

This study contributes to the following areas of research:

1. understanding household travel behaviour through the life-course
2. Planning of transport integration for regional multimodal travel
3. Specification and design of transport interchange facilities and infrastructure
4. Policy-making for the promotion of sustainable and active travel through integration of cycling with public transport

This chapter begins by revisiting the general aims of the study and the specific research questions it set out to address. The second, third and fourth sections summarise the key findings related to each research question (see section 1.7.1) on the combination of cycling with public transport identifying the contribution of this study in context of the literature. The fifth section concludes by comparing the key findings with the research questions and knowledge-gaps identified in the literature. The sixth section reflects on the strengths and limitations of this study, including issues of data quality and confidentiality. The study's implications are considered in the final section, for travel policy, planning practice and transport design, as well as the scope for future research.

7.1 research aims and contemporary context:

This research is aligned with contemporary debates around sustainable travel options for an increasingly flexible workforce and households, options for improving population health and

wellbeing in a demographically ageing society that has become systematically more car dependent over past decades.

Discourses around the levels of government subsidy provided for the benefit of rail commuters at the expense of road users as it is seen by some in the national media, raise issues of transport equity and social class stereotypes.

The aim of this research was to understand why people had combined cycling with public transport and how this form of multimodal travel behaviour reflected other activities and related patterns of travel within their households. It aimed to explore the influence that children have on household integration processes and the effect on children in turn, of changing activity patterns following transitions between life stages. A review of literature related to the organisation of activities in time and space, the multimodal combination of cycling with public transport, and the activities and related travel of households and families with children was conducted. Through identification of the gaps in existing research on the multimodal integration of cycling with public transport, the following research questions were formulated to guide the research design and provide an outline for more detailed analysis of the data:

- I. How does the integration of cycling with PT act as an enabler of household activities?
- II. What role does cycling's integration with PT play in responding to household transitions?
- III. Why do households integrate cycling with PT as part of everyday activities?

These questions indicated that qualitative methods would be appropriate to identify underlying processes using theoretical categories derived from the activity approach, with analysis of life-course events and household transitions described in contemporary and biographical narratives around childhood and household activities. An interview guide was developed that helped reveal how Cycling-PT was of benefit to people who practiced this form of travel, by exploring where, when and with whom they had travelled by this combination and what the challenges were.

The findings are discussed in sections 7.2 – 7.4 below. Several findings were identified that related to more than one research question, they are discussed here categorised by the research questions addressed and analysed respectively in Chapters 4, 5 and 6. Chapter 5 explored how people's activities had changed over time, and how rhythmic and periodic changes to behaviour had responded to variation in external contexts, and household transitions. Chapter 6 addressed themes related to identity as perceived by the individuals who combined, and how their varied identities, beliefs and values appeared to have interacted with those of others to contribute to household projects, informing behaviours and common goals. Challenges to cycling and using public transport were discussed here, including a comparison of experiences and perceptions of risk. In this chapter some policy initiatives mentioned by participants were identified and their impact on the practice of combining Cycling-PT considered.

7.2 Discussion of findings that identify how the integration of cycling with PT acts as an enabler of household activities

Chapter 4 addressed how Cycling-PT had enabled activities within households. Two key activities and values were identified: a) journeys to and from school or related to the everyday care of children; b) how participants believed the combination of cycling with public transport contributed to their health and well-being.

7.2.1 Specialism, integration, gendered roles and childcare activities

Cycling-PT had enabled members of households of various kinds to commute regularly to work including individuals who lived alone or as individuals within households of multiple adults, single parents, and adults in dual-headed households with and without children. These experiences enable some insights to be gleaned on the organisation of travel around the most common purposes for intermodal travel, i.e. commuting to work or education (Kuhnimhof *et al.*, 2010; Nobis, 2007; Pucher and Buehler, 2008) (see section 2.6.2). Participants in this study who commuted by combining Cycling-PT differed from the prototypical members described by Nobis (i.e. retired older women and adolescent urban schoolchildren) including employed men and women of varying age. With the exception of those children taking part with their parents, children were excluded from this study to comply with the agreed Ethics procedures, although I encountered several seventeen-year-olds while recruiting. Those who combined Cycling-PT occasionally for recreation or to attend training activities or conferences bore similarities to “Multimodal Car and Bicycle Users” and “Monomodal Bicycle Users” defined by Nobis (2007).

In the car-owning households represented in this study, similar multimodal practices were observed, particularly households with only one car, the car either not being used to commute or used regularly by one household head while the other cycled. In these households, the combination of cycling with public transport enabled commuting for one of the partners, or was sometimes used by family groups for occasional recreational excursions. The family car was also typically used for shopping and discretionary activities including accessing sports and leisure facilities.

The combination of Cycling-PT had also been used by many of these households for recreation and leisure activities, some of which were centred around cycling as a pastime, but which also included trips to sporting events or other entertainment as spectators. Echoing Kuhnimhof's (2010) study that found German cyclists used bicycles 3 days per week on average, in this study commuting behaviours involved repertoires with different scripted journeys invoked according to their planned daily schedule. People varied their combined use of the bicycle according to the needs of the day's activities, as well as constraints imposed by the public transport experience. Commuting repertoires ranged from regular 5 days per week patterns to other arrangements that included working from more than one regular site or regular visits to client organisations within the region, working from home on at least one day per week, to weekly tours of living and working a few days each week based at another site outside the region. One participant commuted regularly once every eight days to a work-rota involving long-distance lorry-driving, a pattern not anticipated by 7 day-specific or weekly models of intra- or inter-personal variability in activity and travel. This is consistent with the evidence of Schwanen (2007) who found specialism within the household resulting in an unexpectedly larger impact on men's participation than on women's. Independent

activity participation increased with household size for females compared with joint participation.

The journey to work was generally tightly constrained by household factors related to roles and pre-allocated resources (see chapter 2, section 2.2.10), schedules imposed by the workplace and factors related to the journey experience. The return journey was sometimes described as being different, it could for example, offer scope for variation of route in the absence of social obligations.

Clear differences emerged however when returning to collect children from childcare or schools and 'wraparound' care, these could be related to the unequal exhaustion of travel-time budgets by parents in families; Many studies have identified gendered differences in household serving trips, and especially for chauffeuring or escorting children (Eyer and Ferreira, 2015; He, 2013; McQuoid and Dijst, 2012; Saraceno, 1989; Scheiner, 2014a; Schwanen *et al.*, 2007; Taylor *et al.*, 2015). Analysing UK travel data, Susilo and Avineri (2014) identified that, "it is only full-time workers' out-of-home time expenditure that has reached its limit. Having dependent children reduces the flexibility of adults' hidden out-of-home time constraints thus reducing their ability to be further engaged in out-of-home activities.". Schwanen *et al.* (2007) found that fathers' involvement in childcare collection duties was reduced in the afternoon compared with escorting children in the morning, a finding supported by Scheiner (2016) "Homebound trips are less likely to be escorted by the father, which is in line with expectations." Scheiner also observed a seasonal effect suggesting that fathers' accompaniment of children declined over time.

The combination of Cycling-PT had been integrated by some families into routines around the accompaniment of children to childcare or primary school. Generally, households (of more than 1 person) that combined cycling with public transport regularly had negotiated schedules within the household for the care of children and for other chores; in several households the role of childcare escorting to or from their regular activities varied according to factors related to the occupation of parents. Use of Cycling-PT at weekends and on holidays to facilitate constructive activities under the supervision of parent or other relatives was a surprising finding. In the case of several families, particularly for those parents with health-related mobility limitations, there was usually a primary 'chauffeur'/escort role for children, often the mother, but the father was indicated in two accounts in this role. Narratives revealed that fathers' work-time arrangements were an important factor in their allocation of the childcare role (Scheiner, 2016). Fathers who had been self-employed and worked from home on some weekdays, or commuted later, had been involved in dropping children off at school and collecting them to bring them to activities, or to take them home at the end of the day.

In this study, journeys to childcare that involved Cycling-PT seemed to revolve around parental roles in households and the respective employment patterns of each parent. Although in some households roles reflected the traditional pattern of full-time male employment, part time employment or a full-time carer role for women, there were several cases of dual-earner households where the childcare role or escorting and chauffeuring role appeared to be allocated according to the temporal availability of parents and their preferred travel resources. The literature on role allocation for childcare journeys tends to make assumptions, exemplified by Weiss and Habib (2017) using data from Canada, that the car user in one-car households adopts this role, "*This analysis was based on two major assumptions. First, drop-off trips occurred in the morning peak period while pickup trips occurred in the evening peak, and second, all escort trips occurred by car.*". Some parents

described collecting children from nursery at the end of the morning, avoiding travel during some peak hours.

In the present study trips to accompany to or from childcare or primary school had included several modes, including walking, cycling, taking the bus and being chauffeured by car. Parents' repertoires included taking children first to nursery or school, then either cycling directly to catch the train to work, or returning home before cycling onwards to the station. The case of a family's use of bicycle and train to benefit from subsidised workplace childcare seemed unusual, but

For the parent who combined Cycling-PT to commute to and from work and who was unavailable to escort their children to or from afternoon activities, another adult was usually required to accompany the younger children. Either the partner, an au-pair, or a family friend would be tasked with travelling with the child, although arrangements could also be made to have a child taken by taxi between activities, if no other trusted adult or older sibling was available to travel with them. Older siblings had often accompanied a younger child on journeys to school, or to other activities when these coincided with their own activities.

Public transport was being used by children, particularly after the transition to secondary school, for instance to travel between school and another afternoon activity, to visit or meet friends, particularly when parents had to work. Although family groups had travelled together combining Cycling-PT, more often it had been used by one adult accompanying a child to a leisure or recreational destination at the weekend.

The discussion narratives and maps drawn by the households who took part with their children indicated a complex mix of regular activities of people and their families or dependent relatives (see Appendix 9). Parents and children in particular demonstrated the complexity of managing the dispersed geography of activities under scheduling and resource constraints.

In discussions attention was often drawn by participants to other activities that were health or sports related, recreational, cultural and educational. Shopping destinations were sometimes framed in the participants' narratives as part of recreational or social trips, a complementary activity to accompaniment to a child's regular cultural, sports or social engagement and was in most families often supported by use of a car, although bicycles were also sometimes used. Use of the bicycle to access local activities or to go shopping was more often described by adults from households without children.

7.2.2 Processes in Cycling-PT for childcare trips or health and well-being

Following Schönfelder and Axhausen (2010), short-term scheduling dynamics were found to have interacted with long-term processes as follows.

Participants had established activity repertoires over time, that involved different scripted behaviours (Gärling and Axhausen, 2003) invoked either to set patterns, such as a father's 'working from home day' enabling him to collect the children from after-school club to take them swimming. Alternatively, fathers who were not normally involved with childcare trips could bring their children to school on some days when their early arrival at work was not necessary. While these differently scripted behaviours were infrequent but normal parts of childcare repertoires, there were occasions when the day's schedule experienced more urgent scheduling dynamics (Schönfelder and Axhausen, 2010).

The mobilization of resources often involves calling on family members or others in positions of “social proximity” (Schwanen and Ettema, 2009). An area of concern to fathers interviewed was the possibility of delay while returning home to collect children from after-school care facilities. Two fathers in one group discussion recalled being prevented from boarding a train with their bicycles when returning from work intending to collect their children. One described how this had resulted in hastily making other arrangements for the collection of his children. The implications for families who may be penalised for repeated lateness by childcare providers can be serious and have detrimental financial as well as social consequences (Schwanen, 2008).

In the longer term, people sought solutions for contingencies such as delays to collection of children, for example bringing a lock with them to leave the bicycle at the station if the train was already full. Alternatively a solution was found by both husband and wife negotiating schedules to establish a stable and reliable pattern of escorting the children and externally with employers to allow some affordances within an otherwise rigid weekly work schedule. Working from home, and from a different office on one day each week enabled the family to be confident that the father could meet his household obligation to take the children to their swimming lessons.

To the tactics and strategies employed by parents who combined Cycling-PT to ensure the collection of younger children from childcare at the end of the working day, could be added other processes within these households in the context of trips to and from childcare.

7.2.2.1 Management of Mobility Resources

Managing household resources and making efficiencies was facilitated when participants had regular working hours and relatively stable travel patterns between home and workplace. This enabled participants to include scripts involving cycling for exercise or wellbeing into repertoires of combining Cycling-PT. It had also facilitated integration of childcare scripts for a few. A consistent set of activities with fixed spatial origin and destination had enabled households to save travel costs through using season tickets for their full-time workers. Weekly, monthly or annual travel passes also varied in their coverage. West Yorkshire residents could select between rail season tickets, bus passes, or the multimodal ‘Metrocard’ that provided travel on both rail and bus services and was available for an extensive range of zones. Residents of Nottingham and some of the surrounding Nottinghamshire boroughs could select between passes that gave access to one of the two bus operators and the NET tram network, the Robin Hood season including train travel to a few rail stations. For those that regularly travelled by train from stations further away from the city centre, a rail season ticket was preferred where there was no regular requirement to use buses or the tram. Economies of a travel pass were not always available to those who commuted on fewer than 5 days per week, in which case people had normally purchased day-return tickets.

Bicycles were resources that required maintenance, this could be provided by an annual contract with a major retail chain where the bicycles had been purchased, or through ad-hoc visits to local shops. Many participants had learned over time how to maintain their own bicycles and also serviced those belonging to their partners. Storage of travel resources including bicycles and helmets, protective clothing, luggage, etc., could be burdensome and had combined with other seasonal factors to reduce family cycling in winter in some households. Participants had used their sometimes small front gardens to construct small shelters where visiting friends’ children’s bicycles and scooters could be parked, however the

family's bicycles were usually locked in the shed at the back of the house and in some cases this impeded their everyday use.

Other resources were also necessary to ensure day-to-day cycling with children was achievable safely and with comfort that was adaptable according to the season and weather. These included weatherproof luggage for carrying children's materials, waterproof and hi-visibility clothing, safety helmets and lighting equipment. The same consideration had often been given to clothing, luggage and other equipment used in combining Cycling-PT by childless people, who also varied how they cycled in bad weather. Access to the bicycle could also require negotiation with other members of the household, for example to ensure that children's bicycles had been prepared for use the evening before being needed for the school run, when good weather encouraged the mother and children to ride to school.

7.2.2.2 Scheduling childcare escort duties

Families had established schedules for dropping the children at school or nursery and for their collection that had been optimized around the parents' availability and working patterns. In some families one parent had the main childcare escort role. The pattern of children's activities and childcare or schooling for had critically taken place around the normal availability of this parent who, in several cases, had worked part time, or was able to start work, or leave work to coincide with escorting or chauffeuring children to, or from their education or childcare facility. Many of the children had been attending after-school clubs and other activities, although some would have preferred to come home by themselves.

Participants' narratives revealed that parents' schedules associated with the journeys to and from nursery or primary school were critical to the families to ensure that their arrival time at care-providers and for the children concerned were appropriate and acceptable (Schwanen, 2008). Where the mother and the father had shared childcare escort duties, the father had typically integrated bringing children to school or nursery in the morning with the Cycling-PT enabled trip to work. The mother normally collecting the children at the end of school or additional wraparound care. Narratives also indicated that repertoires around childcare escort roles were subject to change, or could vary through the parent being delayed with consequent and hurried ad-hoc communication rearrangement, facilitated by urgent mobile phone calls and text messaging. In one narrative, parents had been confused about which parent was to collect the children from school on one or two occasions resulting in a hurried return home by one of the parents alerted to the situation.

Travelling together for parts of journeys had given people an opportunity to discuss and negotiate activity schedules and plans: sharing part of the route of one parent's journey to work and a child's school by car, the father disembarking midway to cycle to the station. This behaviour fits with findings by Schwanen et al. (2007) suggesting companionship or altruism motivates spouses' joint engagement in household activities. Furthermore, escorting a spouse to continue their multimodal journey as observed in at least two households may be an additional factor in other people's multimodal journeys combining Cycling-PT.

Some families' narratives indicated the importance attached to established childcare relationships, or to particular schools and children's established social networks. This was evident when a residential move resulted in enlargement of activity spaces, in these cases resulting in additional chauffeuring of children by car, though without major impact on the parent who had been regularly combining Cycling-PT.

7.2.3 Workplace roles, activity associations and working patterns

Processes were also evident between households and external agents or institutions such as employers. Negotiated alterations to childcare could result from changes to working patterns, for example. The decision to cease combining Cycling-PT on Fridays in a family with one car had resulted in the car being used by the father every Friday, requiring the rescheduling of formal childcare provision to adapt to the altered availability of the car normally used by the mother who had ceased working to care for their young children. In this case negotiations with the nursery had enabled the child to be cared for on Friday mornings rather than afternoons, but nurseries may not always have spare capacity to absorb such changes.

Renshaw's (1976) observation on conflict between process and family goals, was evident in some job roles, such as the lorry driver's 8-day shift pattern that would conflict with the estranged family's (presumed) 7-day activity schedule. The combination of Cycling-PT had enabled the job to be maintained through efficient travel avoiding traffic congestion, integrating contact with an elderly parent, as well as enabling exercise for health. Similarly, the job and childcare commitments of a single mother. In her case, Cycling-PT was an economical and time-saving routine that enabled the balance between career maintenance and care of children. Other households demonstrated some flexibility on the part of employers, or at least measures to enable employees to manage stress through the exercise they could obtain through cycling as part of their commutes.

Affordances enabling intra-household specialisation around the twin roles associated with childcare and with commuting to a full-time job had been described in one case as resulting from negotiation with the employer. Another mother had negotiated a later start to the day to enable her to accompany her daughters to school when they were young, an agreement she valued and had retained for some time after she no-longer needed to accompany her children. Negotiations with employers were not always successful. An employer had declined one lone parent's request to change the working hours of her relatively low-paid part time job, resulting in her juggling several part time jobs around time needed to care for her then adolescent daughter. The inequality in ability to negotiate with an employer evident in these participants' narratives is consistent with other research that has found that well-paid professionals and academics have greater flexibility in working practices than those in low-paid and manual occupations.

Negotiations in other situations had been used by participants to request permissions or facilities to enable them to cycle to work, or to take their bicycle on work-related trips. This had resulted in these employees' heightened awareness of the special arrangements they had been permitted, which they valued and were loath to contravene.

7.2.4 Socialisation effects on children of combining Cycling-PT

Analysts interested in socialisation effects on travel behaviour, have proposed that early habitual experiences of travel and the example set to children by parents and other groups important to children can have long-lasting effects on individual travel behaviours later in life (Barker, 2003; Baslington, 2008; Grønhoj and Thøgersen, 2012). This has been proposed by Baslington (2008) to be the outcome of family, peer, and school effects. Some participants who had returned to cycling later in adult life had experienced periods in adolescence when socialisation effects had reduced cycling, the practice perceived by peers as "uncool". This

echoes research by Underwood et al. (2014) who noted that in the USA, female high school children in particular were sensitive to the stigmatization of cycling.

Within this study, many participants had, as children, observed the bicycling behaviour and public transport use of parents and other relatives. People had cycled both recreationally and as transport to school or to maintain social connections and for some, cycling was “in the blood” and maintained throughout adulthood. Although combining Cycling-PT as a child had been limited amongst participants, typically as a sporadic experience for recreation with a parent, it had remained in the memory of several who had as adults combined Cycling-PT on a regular basis.

The effect of present-day parents taking children to social, cultural or sporting activities or events by combining Cycling-PT, had been considered useful for families with several children where each parent could separately support an activity with a child. Parents held positive views about the concept of active mobility and considered that through their parents’ multimodal behaviour, their children saw the ability to combine Cycling-PT as ‘normal’. It had released other travel resources for use by the other parent and child, or had become part of the overall set of activities, adding to the experience of the day for parent and child. From the perspective of the analyst, it also seems likely to remain a memory capable of acting as a future resource under circumstances that would resemble those experienced in childhood.

Even for very young children, the experience of being carried on a multimodal journey had enabled the child to demonstrate familiarity with the route the parent took. A parent’s account of a three-year-old child while carried in a child seat giving arm-signals in anticipation of the parent’s imminent manoeuvre revealed the socialising effect of the routine journey. This had both enabled the development of the child’s mental map of the route and their knowledge of comportment related to the anticipated manoeuvre with which they had become familiar. In a different family, the five-year-old child could remember details of the train station he had passed through on a few occasions with his mother and their bicycles, and when asked whether he had seen bicycles on buses, confidently asserted that bicycles were not permitted on buses. These children had clearly become familiar with some of the features of the transport environment through the journeys they had made with varying frequency with their parents. Although descriptions of children’s activities indicated that travel preferences could change over time, the experience of combining Cycling-PT would remain as a potential resource for activities in future contexts, if remembered.

7.2.5 Holiday activities and children’s supervision

Supervision of children during the school holidays had required the alteration of work-schedules by some parents to supervise young children. Concerns over the risks of leaving an adolescent alone during the holidays had been addressed by combining use of the bicycle with journeys by train in the case of one parent and child who did not drive. By this means, a child had experienced a culturally and socially different and more rural locale through scheduling time with grandparents while his mother had maintained her career while working through the summer. In another family, the combination of Cycling-PT had enabled a parent having to work at a weekend to take their children to the workplace at weekends.

According to Stewart (2018), summer holiday experiences are shaped by parental resources affecting the academic progress of children and their wellbeing. For children from some low-income families in the UK, holidays can be boring, isolated and inactive periods, characterised by experiencing exclusion from cultural and healthy activities. Stewart has argued that accessing appropriate childcare is essential for one-parent families to fulfill responsibilities

towards employment, especially during summer holidays, to avoid risks of minimal supervision for their children or leaving them “home alone” (Stewart *et al.*, 2018). In the North American context, Chin and Phillips (2004) identified that few children, regardless of social background made serious efforts to practice or improve their academic skills during the summer vacation, regarding the period as a “break from school”, but there were differences in the quantity of opportunities that middle-class children were able to access. Where parents or nannies were available to chauffeur children between activities, accumulated differences over several summers in the development of talents and cultural exposure were likely to “contribute to social-class related disparities children's future life chances.”. Chin and Phillips (2004) argued that “Children have the most-varied, most-stimulating summers when they marshal their own social and creative resources and when their parents encourage and support them, with their own resources, as best they can.” (Chin and Phillips, 2004).

In this study, families had allocated their own time, or marshalled their social network resources to provide their children with meaningful recreational activities during holidays. Parents had in some cases been able to arrange their employment patterns during the summer holidays to be at home with the children, but other parents could not take time off work throughout the summer holidays and had devised alternative activities, negotiating with children and their social network resources. Some parents were constrained to fixed patterns of working time, or had very busy schedules that were not easy to renegotiate. Others, particularly those who worked in education as academics were able to make arrangements to accompany their children during the holidays, in one case enabling the parent who normally worked part time and had the childcare role to work full-time during this period.

Several adults had many years previously, as teenagers, cycled and combined this with public transport to explore the countryside, to visit places in central London by Underground when they had lived in the outskirts, or to visit grandparents. Although the calendar context had not been specified, engagement in these kinds of activities would have been appropriate occupation during the summer and other longer holidays.

The mapping and model-based discussions with families were designed for the involvement of children who generally engaged actively with the tasks. Younger children were more playful in their construction of the station settings, but gave descriptions of people and station features they remembered. Food was a theme that seemed particularly memorable in children's descriptions of travel experiences, although this could have been prompted by the Lego scenic elements that included a mobile food stand. Children's memories of cycling journeys sometimes recalled experiencing tiredness. Asked to reflect on their parents' multimodal Cycling-PT behaviour, children recognised its usefulness and value in their household context and associated the behaviour as beneficial to the environment, but was also considered ‘complex’ and had not been experienced directly by children in all eight of the households interviewed. Children's memories of the station layouts varied, with a five-year-old being able to recall some details of the small station at Mansfield, but some slightly older children less clear about the details of a large station such as Leeds.

From the analysts's perspective, as Goodman *et al.* (2012) found regarding the benefits of commuting by car in Cambridge, the combination of Cycling-PT to get to work in the Leeds and Nottingham areas was also enabling the long-term goals of families, individuals and couples in this study to be realised through a mix of transport resources that in the case of at least three families and several couples and individuals, had not included car ownership.

7.2.6 Activities, enabling exercise, positive uses of travel time and reported health and well-being benefits:

Like Sherwin's (2010) study that categorised a number of reasons people gave for combining Cycling-PT (Sherwin, 2010), this study also found that physical fitness, mental health and wellbeing were prominent in narratives of participants. This was a factor in most of the discussions, but the kinds of benefits varied according to people's age, their beliefs and sometimes direct health-related experiences.

7.2.6.1 Combining and the health benefits to young people

The literature about active travel and health dwells largely on the value of physical activity to children and young people (Chillon *et al.*, 2012; Panter *et al.*, 2008; Pont *et al.*, 2011), and on the role of activities and mobility in later life (Huxhold *et al.*, 2013; Spinney *et al.*, 2009; Ziegler and Schwanen, 2011). Families interviewed expressed pride in their children's stamina for cycling, or referred to their children's physical fitness through their other activities or sports. Health benefits to children were rarely specified otherwise. One mother preferred her daughter to be outdoors cycling with her father, rather than spending that time '*glued to a screen*' in sedentary indoor pursuits. The father and daughter had recently been on a bicycling tour of Scotland, travelling from and returning to Leeds by train. Most families described at least one occasion when they had been bicycling together as a family group, although these activities were usually conducted on traffic-free conditions in country parks, alongside canals, or other off-road routes.

Some parents noted the reduced interest of older children in cycling, although they still had bicycles, used occasionally used to go to meet friends. Parental appreciation of the benefits of cycling appeared often to be balanced with concern over the risk to children from traffic accidents. Research has found that children in some economically deprived communities in the UK have more opportunity to engage in physical activity at school than in and around their homes (Eyre *et al.*, 2014) as a result of both parents' and children's safety concerns about the suitability of their local environment as places for children to play outdoors, see Christie *et al.* (2011). As cycling for most of the children was primarily for leisure, family recreation, or social use with other young people, rather than for everyday uses, such as commuting to school, it appeared to have a peripheral role in most participants' children's health-related activities.

However, social uses of Cycling-PT had enabled adult-child bonding in situations when children had themselves experienced the combination, either travelling with bicycles on trains, or when a family group had cycled to a station then travelled onward by train to an event or activity elsewhere. Although a parent had usually travelled with the child, it had also facilitated children's independent journeys to visit grandparents. Children had also been accompanied by a grandparent, or a close family friend. These journeys had provided young people with access to the countryside and to test and develop their physical capabilities cycling over longer distances, contributing to their health and well-being through physical activity and maintaining their social network.

7.2.6.2 Health benefits for adults combining Cycling-PT

Young adult participants sometimes mentioned exercise as a factor in their use of the bicycle, but as in other studies, they tended to prioritise other benefits, such as flexibility or

autonomy. As most participants did cycle regularly, they reflected research that has associated greater awareness of potential health benefits amongst everyday young adult cyclists than for students who cycled occasionally (Swiers *et al.*, 2017). Health is given low prominence as a factor in young adults' motivation for cycling, according to researchers proposing travel behaviour change interventions (Simons *et al.*, 2014).

Participants claimed that by cycling, either as part of an intermodal journey, or by alternating between cycling and public transport use, according to the direction of the trip, their health had benefited from the exercise. Where participants did not combine Cycling-PT for everyday journeys, they sometimes replaced cycling with walking, or did not use public transport daily despite cycling regularly. How they had varied modes accords with other research investigating variation among commuters in Cambridge during a typical week, (Heinen *et al.*, 2015). Some people reported having lost weight as a result of cycling to and from public transport, where they had not been cycling much at other times. One participant had ceased combining Cycling-PT for the journey to his studies that he had made on an almost daily basis for three years. He observed that since starting a new job earlier in the year that required him to drive a car, no-longer cycling to the train station he had put on weight. This and other participants' subjective associations of the impact of their active travel behaviour with changes in bodyweight reflects findings from quantitative research comparing active modes and multimodal travel with monomodal car use (Flint and Cummins, 2016). For some the incorporation of cycling had replaced walking for journeys to access public transport, with probably small differences in overall exercise benefits. Others, however, had incorporated relatively long distances by bicycle into the commute to, or from work. For these people the alternative could be the car, or using a bus or tram as an intermediate mode with less scope for incorporating exercise into everyday journeys overall.

Participants often spoke in terms of cancelling their gym membership since starting to combine Cycling-PT. While from the analyst's perspective this appeared to be a rhetorical device, people's exercise and physical activity preferences may have changed over time, with the moderate exercise of cycling replacing more vigorous forms of sport or exercise. Others recognised their travel behaviour to have physical health benefits, but also participated in other physical sports or recreational activities, such as running, martial arts or playing football. Some participants did not consider their routinised cycling trip stages as 'exercise' where they were part of regular commutes, they defined their exercise through activities using other facilities, such as the local gym.

Some people in sedentary jobs regarded cycling as a way of avoiding ill-health or of losing fitness. Their motivation sometimes came from their more active friends or colleagues. Awareness of the association of diabetes with his profession had been part of one long-distance lorry driver's motivation for integrating cycling for exercise and to get to shops during his multi-daytours of duty. This had involved getting to and from the lorry depot by bicycle and train. Similarly, changes in people's capabilities as they became aware of the processes of ageing, were also anticipated by some retired adults who were beginning to experience restricted vision and mobility difficulties. They anticipated that their cycling and mobility in general would be assisted by greater reliance on public transport in the years ahead.

7.2.6.3 The combined effects of cycling with public transport on wellbeing

Travel offers 'transition time' (Jain and Lyons, 2008; Watts and Urry, 2008), as one of several positive utilities observed in a variety of studies since Mokhtarian and Salomon (2001)

contemplated the ability to relax or think while travelling. In this study, participants described their use of public transport both in positive terms, and described negative interactions with the transport system and people within it that could lead to stressful experiences. Often the cycling part of combined journeys had enabled people to cope with stress caused by workplace, study, or other factors.

Augmenting the benefits of cycling that many participants mentioned, some people also saw value in its combination with public transport. This seemed to relate to the transition effect between work and home life, and vice-versa. The transition effect also seemed to involve using public transport for slightly longer inter-urban trips rather than short suburban commutes. A PhD student returning to his young family in Nottingham each evening from Sheffield, used the hour's train journey to read, and the ability to work on trains was valued by others. The train journey enabling study to continue, creating time for other activities once home with his wife and two young children.

The final journey stage homewards by bicycle allowed a transition from the working mode that some had extended onto the train journey. The 'last mile' by bicycle and the change in concentration required by cycling meant they, "*cycled away some of the daily stress...*" before they got home, primed by "*happy hormones*" (endorphins) released by the exercise of cycling and the adrenaline-rush (Larsen, 2017) and necessity for alertness during the ride (Steinbach *et al.*, 2011). Some thought their Cycling-PT routines contributed to their "*better mood*" with positive effects on partners and families, an effect also observed by another family member in one discussion.

The ability of the combined Cycling-PT journey to integrate both the benefits of cycling and the productive activities enabled by a stage by bus or train were outlined by a few participants. Cycling a short distance in the morning to the bus stop helped one participant to "*wake up*", breathe "*fresh air*" and warm up. Subsequently catching the Nottingham university Hopper bus for the 40 minute journey to a rural campus offered time to read or "*catch up with friends*". The homeward journey commenced "*still thinking about uni...*" but the final bicycle stage cleared the remaining preoccupations. As one put it, "*you leave work on the bus!*". In similar ways, others described how they derived satisfaction from their journeys, even if the public transport stage only took 20 minutes. Participants derived wellbeing from the combination of Cycling-PT, the journey to work involving mental preparation for the day's work or study activities, the trip home allowing them to be forgotten.

Echoing Ziegler and Schwanen's (2011) definition of wellbeing, another group of participants concluded their discussion by summarising that their contentment with their routine journeys combining Cycling-PT was derived despite the minor discomforts and inconveniences. This resourceful yet resilient acceptance of the imperfect, evident in so many of the tales of minor misadventures and challenges distributed throughout the narratives also contributes to understanding how this practice has enabled wellbeing.

7.2.7 Facilitating factors in transport services and provision

Facilitating factors for childcare journeys that emerged from participant narratives related both to institutions of childcare, as well as the public transport system and the ability for ad-hoc rescheduling enabled by present-day communications technologies.

Provision of childcare had been of fundamental importance to families. For those parents who worked and had young school-age children, pre-school and after-school wrap-around

care had enabled full-time employment. Taking younger children to nursery had in some cases involved parents carrying them by bicycle, although a mix of transport modes were mentioned in discussions with parents that had included walking or pushing a pram, taking the bus, using taxis, driving by car and carrying children on a bicycle.

Narratives indicated differences in parents' confidence in cycling with their children, some of the mothers having pushed the bicycle carrying their very young child whereas the fathers would apparently cycle with the child in the seat. Descriptions of children accustomed to cycling with their family suggested they were familiar with the comportment expected of them, but younger children (aged 5-8) had typically cycled on the pavement. For the Cycling-PT journeys involving children, the child's physical capabilities for manoeuvring the bicycle in the public transport environment seemed to have been considered suitable by around 9 or 10 years old. The ability to lift a bicycle onto a train would depend partly on the weight of the bicycle, a factor some related to the cost of bicycles, also on the design of the train itself.

Free carriage on-board public transport for under-5 year old children had facilitated access to childcare close to a participant's workplace, at a crèche facility offered to staff at his institution. This had added little additional effort or complexity, or time to this father's daily trip, in contrast to the experiences of the single mothers' daily journeys, "*slowed by a high reliance on public transportation*" around San Francisco (McQuoid and Dijst, 2012).

Accustomed to combining Cycling-PT, the addition of the child seat made the infant's multimodal journey possible. At the expense of the purchase of a child seat, books, games and other materials and snacks to entertain the child on the journey, this gave the family access to subsidised childcare in a part of central Nottingham, saving any additional expense of car parking in the only UK city to apply a workplace parking levy, were he to have driven. This relatively low-cost childcare solution, integrated into the parents' respective work schedules had enabled the mother's part time employment two days each week. Taylor et al. (2015) have argued that the cost of childcare is among several factors considered in women's decisions about employment.

For families wanting to use children's bicycles for the school run, the ability to leave children's bicycles, skateboards or scooters with associated paraphernalia at the school, or nursery during the day was important. Lack of such facilities was a problem mentioned in discussions, including the evolution of school policies that discouraged cycling in some places in Nottingham and Leeds. The secure storage facilities and training programmes offered at one private school in York were described as a facility encouraging families and their children to cycle to school. The kinds of facilitation described above had also interacted with flexibility in the 'combining' parent's work arrangements or pattern described in section 7.4.3

Availability of cycle parking suitable for children's bicycles at, or very close to the boarding point for a public transport journey stage was associated by participants mainly with recreational cycling. Family groups had either travelled with the bicycles on trains, or had parked at stations on weekends. One father and son had appreciated using the secure "CyclePoint" storage facility offered at Leeds station for their valued road bikes during a trip to spectate at a cycling competition in Manchester. Commuting multimodally to school or college by bus, tram, or train could be facilitated by secure bicycle parking for children travelling independently as biographic narratives identified. The need to consider alternative forms of bicycles when designing cycle parking facilities at train stations has already been noted: guidelines exist that recommend making future provision for newly popular types of bicycles and trailers (Sully, 2012), including 'Bakfiets' cargo bicycles as used by one family for their school run in York.

The telephone had enabled dynamic rescheduling of collection from childcare or school. Ad-hoc changes to the required another person as a resource to caring for the child or children when a parent faced a delay. If a spouse or partner worked then the ability to depart from work at short notice would also be a necessity. The case of an older sibling being contacted by a school wanting to confirm an altered childcare collection arrangement by an unknown taxi driver illustrated the emphasis on use of the telephone in circumstances where confidence or trust were important. Mobile phones are ubiquitous and frequently used by households in the inevitable processes of coordination and ad-hoc “re-ordering” schedules (Wind, 2013), and the gendered “juggling” of caregiving obligations with employment (Schwanen and de Jong, 2008). Phones are also often given to children to confirm any spontaneous changes to plans pre-arranged with parents or friends (Mikkelsen and Christensen, 2009), however I found that children’s and parents’ immediate availability by phone could not always be relied upon.

7.2.7.1 Facilitating factors for Health and wellbeing

Health and well-being factors differed between the needs of households and of individuals. In the case of combining Cycling-PT for commuting, factors related to the accessibility of public transport were of basic importance to most people. The ability to be transported with the bicycle in one direction, but cycling along the same route in the opposite, facilitated more strenuous cycling for exercise. This also enabled people to benefit from the opportunity to ‘*be in nature*’ as part of everyday life. Bicycle carriage on trains had also facilitated socialising with other family members in town after work, before returning home together by train.

Although some cycled to or from work along the highway for speed or because of the availability of streetlighting, off-road cycling routes, such as canal towpaths and other quiet routes, were preferred as distanced from the safety risks, stress and noise of highway traffic. Quieter routes without motor vehicle traffic were also preferred and had been used for family cycling activities, whether disused railway lines, or canal and riverside tracks. Cycling routes perceived as safe had encouraged people who had not cycled for many years to return to cycling as part of commuting journeys, particularly where the journey had been shared with another cyclist when first adopting this travel behaviour.

Bicycle parking at the train station or at a bus stop or terminal had been of use when going walking in the countryside by bus or train. It had offering low-cost all-day parking for personal transport that allowed flexible times of departure and return home, particularly on weekends when local bus (and train) services had operated with lower frequencies.

Facilities provided by employers and at the workplace were also valued and appeared to have supported people’s decisions to incorporate cycling into their commute. The ‘Cycle To Work’ tax-efficient salary sacrifice scheme had enabled those who had not owned a bicycle in recent years to purchase a bicycle and related equipment in readiness for commuting to or from work via public transport. This scheme had been taken up by participants working generally for larger organisations, part of the attraction possibly having been the tax incentives mentioned by some participants. Others, mechanically confident individuals, or those who wanted to save money, had used secondhand or old bicycles retained by the family over time. The ability to try commuting by bicycle and train through the temporary rental of a bicycle or loan from a friend had also convinced some participants to continue their new travel behaviour.

Although many participants did not use them, while others did, the availability of shower facilities at the workplace and lockers, or somewhere to leave a change of clothes was

generally seen as useful. Their use seemed to depend on whether the individual cycled a long way into work in the mornings, supporting and encouraging people to treat the journey to work as an opportunity for more strenuous exercise. Those who cycled short distances of two or three miles before using the public transport tended to mention not using showers where they had been available at work. These participants often parked at stations although some brought their bikes with them, using deodorants and anti-perspirants to ready themselves for the workplace.

Having the ability to work from home on some days, or having flexible working patterns that resulted in work-related activity occurring in different locations on fewer than 5 days per week were other factors related to employment. Flexible or regular scheduled start times that had routinely enabled people to take their children to childcare before work, were valued by families. Where people worked from different locations within a regular repertoire of activities, combining Cycling-PT had enabled one destination, or sometimes multiple activities to be accessed.

7.2.8 Challenges to Cycling-PT for childcare trips and health and well-being

Many challenges were identified across the series of discussions. These ranged from factors associated with the public transport system through inadequacy of infrastructure and facilities, to unpredictable interpretation of rules by staff in public transport imposing itinerary changes or preventing availability of the bicycle. People's uncertainty over bicycle capacity on trains, was compounded often by lack information about the location of bicycle compartment on trains and difficulties manoeuvring bicycles along crowded platforms. The colour-coded sign on the driving cab of some EMT (East Midlands Trains) services indicated the sequence of carriages and location of bicycle stowage to more experienced travellers. Another issue was the variable response of bus drivers to people travelling with folding-bicycles, some participants having been prevented from boarding, others using the bus regularly without problem. Attitudinal differences among transport staff seemed to stem from workplace cultures of the various operating companies, but also varying over time.

There was frustration from several participants in Nottingham that the tram did not carry bicycles, though a few were of the view that the tram was crowded throughout most of the day and lacked space for bicycles.

The discussions with families revealed that parents were concerned at the perceived risk to children below about 15 years old cycling alone on highways with heavy or fast-moving traffic in the absence of an adequate network of separated cycle paths. Children's and parents' narratives suggested that children found cycling in very hilly terrain to be tiring. It was also in the hilliest suburbs of both cities that there were few segregated safe cycling routes. This was considered a barrier to cycling with children, and some participants proposed that if buses carried bicycles that would be very helpful to families wanting to benefit from the pleasant recreational cycling routes to the South-west of the city.

Some of the factors that participants felt were preventing children from cycling were safety-related, such as the threat posed by larger vehicles to cycling through risks of accident and injury, and 'stranger danger', both factors encountered in other research on cycling by children and families (Carver *et al.*, 2014; Henne *et al.*, 2014; Hillman *et al.*, 1990; Panter *et al.*, 2010). Amongst challenges described by adult participants that potentially impact on children even more, are the effects of being exerting effort when surrounded by motor

vehicle exhaust pollution (van Wee and Ettema, 2016), particularly when cycling uphill alongside heavy traffic.

Challenges of various kinds to combining Cycling-PT were exposed, including institutional constraints arising from schools' safeguarding principles and uncertainties within the public transport system. Others included the capabilities of family members, complexity of planned activities, as well as household structure and resources.

Health and well-being challenges included the possibility that participants' perceptions of positive effects on others in the household might not be shared by their partners or spouses. Certain health conditions or physical impairments can also make cycling more difficult and in these circumstances people may revert to walking or make more use of public transport, if they are not able to go by car.

To conclude, this section had identified the main findings of **how** the integration of cycling with PT acts as an enabler of household activities through enablement of household activities. The focus on the enablement of childcare journeys reflects the contribution made by analysis of the data about family travel, while findings related to health and well-being of households and their members was a pervasive theme evident distilled from most of the research discussions. I now turn to discuss findings related to the transitions that occur in households over time.

7.3 Discussion of findings related to the role played by cycling's integration with PT in response to HH transitions

The way people travelled over the life-course had changed at times in most people's lives, the combination of Cycling-PT being used generally when it fitted a need and people had been able to reflect on and question their own existing travel behaviour regarding specific activities, such as commuting to work. Drawing on the analysis presented in Chapter 5 in responses to the biographic questions and other narratives, I discuss the main findings related to the second research question of this thesis, i.e. to:

- II. What role does cycling's integration with PT play in responding to household transitions?

Four key types of transitions were mentioned in discussions: changes in the household's membership, the arrival and growth of children in families, changes in activity spaces through residential and employment changes, changes in people's skills and capabilities over time. The discussions involved participants representing some of the wide range of household types that comprise contemporary society. They also revealed changes in the background context of people's experiences over time, coded as 'timescape' in the analysis of transcripts. Participants raised the themes of increased traffic density, changes in authorities' regulations and societal norms, developments in cycling infrastructure, and alterations to trains' capacity to carry bicycles.

For some, combining with PT was additional to their enjoyment of cycling, used occasionally to support their cycling for leisure, recreation or to visit or meet up with other people, including in work-related situations such as training events and courses. For this group, cycling was a key interest or pastime, regardless of car ownership status. These individuals

explored how to maintain cycling within their pattern of everyday activities. Changes in spatial activity patterns might result in replacement of public transport by car use, but cycling was retained as an occasional script in a repertoire of commuting options for intermediate distances of 10-25 miles for exercise, or as training for cycling as a sport.

For others combining Cycling-PT was part of how they had managed to lead active and busy lives by cycling with little if any dependency on, or access to a car. Evidence of the narratives indicated people's decisions were rational and had been made in response to changes in both scheduling conditions, geographic contexts and specific household projects. Changes were reversible, and people had taken up cycling to combine with public transport use as older adults, sometimes after many years of having used cars and other transport modes for commuting. The form of transport that Kager et al. (2016) have described in the Dutch context as, "*the combined use of bicycles and transit services as a distinct transport mode*" is revealed in this study to have been influenced by a variety of motivating factors, constraints, differing experiences and perceptions.

Those who had begun combining, or returned to this form of travel relatively late in their careers seemed to have found it a reassuring and practical commuting method that they fitted around other combinations of public transport, use of a car, or just cycling according to the moment. For others it had been part of a repertoire of travel options since it had been experienced in childhood. Adjustments in travel behaviour were for many participants, fundamentally aligned with attempts to match existing beliefs and values to real-world circumstances and opportunities.

7.3.1 Household domain and family transitions

7.3.1.1 Changes in household composition over time

Findings of this study broadly concurred with those of Jones et al (1983) where the household composition was in alignment with those based on the traditional family and social structure of small and medium sized UK provincial towns in the early 1980s. These authors acknowledged the exclusion of other household types already prevalent at the time. For this study in 2016, I sought to recruit in two larger English provincial cities of Leeds and Nottingham, the difference in spatial size of the urban locale and elapsed time meant that a wider range of potential household types was anticipated as being inevitable in respondents to this study.

Where the household composition aligned with those FLC categories described by Jones (1983) as prototypical of characteristics and behavioural patterns by Jones et al (1983), findings of this study broadly concurred. For example, older and retired adult households (Stages G and H see table 1, Section 2.4.3.) had often reduced their car ownership levels to 1 for the household. Some families had become 2-car users over time, however most of the families represented in interviews and discussions including those with a young child, had either 1 car, or were living without a car available at home. A few narratives in this study reflected an observation by (Jones, 2013, p.210) that active travel (by combining Cycling-PT) was portrayed by respondents as facilitating use of the household's car for childcare duties by the other parent.

Across all respondents, there were examples of the eight categories "A-H" from Jones' (1983) study. Through the inclusion of same-sex partners (no children), older single people, older divorced or separated single adults (with and without child-custodianship) older childless couples and single-parent families, this study reflected some of the wider diversity in

household composition portrayed by Backer and Lynch (2017) in their research into family tourism in Australia.

Participants who had been brought up by older parents sometimes associated their parents' age with reduced cycling in childhood. Amongst the participants there were experiences of marital separation or re-cohabitation and some had, as children, been brought up by a single parent.

Inter-generational support from grandparents was sometimes associated with the use of buses by children. The expertise that this older generation demonstrated in use of travel Apps and navigation on public transport was commented on in the context of journeys with their grandchildren. The support of grandparents (both paternal and maternal) had been very helpful to a single mother requiring activities and supervision for her son during the long summer holidays. This experience reflects demographic changes described by Bengtson (2001) who argued that there was a kinship-based increase in multigenerational networks, "*who can be activated to provide support and well-being for younger family members.*" This case, and another recollection of travelling as a young child with a 12-year-old brother by train to visit their estranged father in London also underline Scheiner and Holz-Rau's (2013) hypothesis that present-day families "*stretch beyond an individual's household*" as the need for travel arises after parental divorce or separation. For children unable or unwilling to depend on their custodial parent's transport resources, the combination of cycling with public transport could provide additional means of maintaining contact with the separated parent, allowing the redefinition or re-establishment of their role as a parent through leisure (Jenkins, 2009).

7.3.1.2 Scheduling and resource implications for separated families

Split households could also result in a reduction of experiences related to combining Cycling-PT. One father's 8-day work rota commitments was an example of a particularly extreme scheduling challenge to maintaining contact with his estranged daughter. Working to different schedules, they would be without opportunity to meet at all on weekends over four consecutive weeks in every eight weeks. Contact had ended some months previously, the daughter's interests having already started to diverge from her father's as she entered adolescence. She had not shared his enthusiasm for the cycling that he enjoyed recreationally as well as for his combined commuting. Other narratives indicated that fathers' enjoyment of cycling could be shared with children. However, maintaining and storing bicycles was affected by limited resources and negotiation challenges with former partners post-separation. Split households either needed duplicate bicycles for younger children, or temporal limitations restricted their availability and use. The potential for children from separated households to experience combining Cycling-PT could thereby be limited by the practices and the constrained financial and spatial resources of either parent.

According to Scheiner (2014), separation from a partner does not have significant gendered effects on travel mode choice. This may be because the individual adult maintains their travel habits and associated resources, or lack of resources. However, from the limited relevant evidence in this study, the impact of parental divorce, separation, or re-cohabitation suggests that children's everyday travel experiences may be characterised by the resources of the custodial parent and tighter scheduling constraints. Narratives about the children of single parents suggested less time had been spent on escorting and chauffeuring children than in two-parent families, reflecting findings by Stradling (2005). Additionally there was evidence that the multimodal single mothers interviewed had encouraged their children to develop

the physical skills and capabilities for independent travel from a relatively young age. Additionally some single parents as well as double-headed families had encouraged children to become familiar with public transport in readiness for starting secondary school. The theme of children's activity-travel in post-reconfiguration households was not comprehensively examined, however, and would merit further attention.

For one single parent faced with changing mobility resources following household reconfiguration and temporally constrained by work and childcare, the combination of Cycling-PT was a solution for her. Living in proximity to the opportunity space accessible by both the local rail and tram networks, she was able to mobilise her experience of cycling in childhood and early adult life and the bicycle in the shed to establish a tightly choreographed everyday commuting routine. This impacted her whole household, and also interacted with other relational resources to provide meaningful activities for her son during the holidays when she still had to work.

7.3.1.3 Arrival and growth of children in families

Changes had occurred at several points in households biographies during the ages when children lived at home, in some cases changing frequently over relatively short periods of time. The way in which children had interacted with households' activity travel reflected at once, their age and need for accompaniment or chauffeuring, the presence and relative age of siblings, and children's own agency and travel preferences. Three stages were recognisable with differences related to changes in children's capabilities, skills, and interests: early years when children require constant supervision from 1 to around 5 years old and are carried on the bicycle of an environmental activist (Horton, 2006) or confident and experienced parent (Hansson, 2015), subsequent years when children cycle with family or friends – ending around 9-11 (Clayton and Musselwhite, 2013), finally becoming independent travellers during adolescence when cycling becomes a gendered experience, affected by schoolfriends and social networks (Davies *et al.*, 1997).

From about ten months to around four years old, children had been carried on a child seat. According to participants' narratives, some had been chauffeured to nursery by a parent who continued their journey by bicycle and public transport to work. Narratives of children at this age reflected the observation by Chatterjee *et al.* (2013) that as children grew bigger cycling temporarily reduced. As the same authors identified, some participating mothers had started to cycle again more routinely after their children had started to attend primary school aged around 5 years old, pushing their bicycle or riding with them to school and cycling onwards to work. Having children of different ages sometimes meant pauses in cycling until the youngest child could propel themselves using a bicycle with pedals.

Carrying the additional items young children need for school was identified as a challenge to mothers' cycling in Australian suburbs in research by Bonham and Wilson (2011). Similar challenges had been addressed by the parents in this study for the extra-curricula activities and wraparound care for their children. Year-round cycling with young children in the UK had involved investment in bicycles and weatherproof clothing for the 5-year-olds and the purchase of bicycle luggage enabling the children's paraphernalia to be carried. The child of the single mother carried his own bag, but after accompanying the child to 'breakfast club' at the nursery, his mother usually returned home to collect her 'work' backpack before cycling to the station and train to work.

Family biographies related to the arrival and growth of children in the household often resonated with the analysis of women's gendered experience of cycling through the life

course by Bonham and Wilson (2011). In descriptions of three families, both the woman and man had previously cycled to the local station, each to catch a train to a separate destination. Motherhood had in each case resulted in more localised patterns of activity upon her return to work part time whilst retaining the main childcare role, as her husband continued to combine Cycling-PT for his commute.

Bonham and Wilson's (2011) study of the bicycling life course of women is in part a reflection of household transitions as the authors comment: "the interviews are replete with references to husbands, boyfriends, partners, housemates, friend or "group of friends" who were already riding...". These authors encountered examples of male partners contributing to domestic routines, including the childcare trips. In this study some fathers were self-employed or had working hours that enabled them to carry the child to nursery by bicycle and had subsequently cycled to the station to travel to work by train. With the exception of the family whose two children had been taken in succession by bicycle and train to and from the crèche at the father's workplace, men were mainly described as doing the childcare run in the mornings or before going to work. Although the mother who did not combine Cycling-PT typically collected the children from school or childcare, narratives illustrated that fathers also did so, but that the distance they commuted and their practice of taking the bicycle with them by train exposed them to risk of being delayed.

Some parents had also walked with their bicycle accompanying children who walked or used scooters to school before cycling to the station. From 7-8 years old children had been taken on board public transport with bicycles as part of short bicycle rides, or to accompany a parent with weekend duties at work. At this age, before leaving primary school, the activities of children and adolescents had often reflected the activities, enthusiasms and values projected by parents or siblings. Parental enthusiasm for cycling as an activity to be shared with children has been recognised in previous research (Bonham and Wilson, 2011; Davies *et al.*, 1997). This was mentioned by some older participants recalling how they had returned to cycling when their children were young who, now grown up and with children of their own, continued to cycle.

As children became adolescents, as found in other studies (Johansson *et al.*, 2012; Underwood *et al.*, 2014), engagement in physical activities and cycling in particular reduced. One participant described herself as having been an active child who had cycled for recreation to a part time job as a teenager. She recalled her friends in adolescence becoming less physically active and more home-bound, or people met in the park. Changes in modes used for routine commuting to school in adolescence was described as socially influenced. Cycling either became stigmatised as 'uncool' or was replaced by walking or public transport as both distances travelled to school and the urge to socialise with friends increased. At this age, journeys combining Cycling-PT with a parent were sometimes to attend an event or activity of mutual interest, or described as opportunities for bonding. Just as another participant described the adventures shared with her partner when combining cycling trips with public transport on holidays later in adulthood.

At around the same age, some participants had as adolescents started using Cycling-PT without adult accompaniment, for recreation or social purposes. Activities described by participants included taking BMX bikes when going to meet other people in Mansfield when aged 13-14 years old. A mature adult participant recalled visiting central London by Underground accessed by bicycle. Another had visited railway locomotive sheds in the Bristol area when a keen trainspotter as a youth. People had, as 15-year olds, taken a train to visit his grandmother in Peterborough then cycled back to his North Yorkshire home. Another had

travelled by train with a friend and their bicycles to stay with grandparents when going cycling in the Yorkshire dales. These last two examples are reminiscent of the observation by Clayton and Musselwhite (2013) that children's permission to cycle independently has often been to specific places, more typically a school, park or to visit friends. Narratives in our study sometimes reflected the adventurous purposes that older children wanted, but also reinforcing the notion of boundaries applied in cycling memories of young childhood (Clayton and Musselwhite, 2013).

Throughout childhood and adolescence, children in the households of participants had either directly experienced, or observed the practice of combining Cycling-PT by their parents, or sometimes a family friend or relative.

7.3.1.4 Transitions of adults later in life

Transitions experienced by adults without children included changes in relationships, and alterations in spatial activity patterns through residential relocation and employment changes. These altered the way people travelled, but some additional factors were raised in narratives about changing activities in older age.

Adults, including some still in employment, had acquired debilitating health conditions that had affected some activities. For example, some had replaced running with cycling, either because of physical pain experienced, or as one older participant commented, because the activity became less enjoyable as his performance became less competitive and noticed his 'Park Run' times were worsening. Eye conditions had affected two participants, one who still worked had a young family had adopted multimodal travel with a folding-bicycle following the cessation of driving. The other had never driven and now walked or used buses as she was recovering from an eye operation. If successful, she hoped to resume cycling after recuperating. Her sciatica had also limited her cycling range and choice of bicycle from several that she owned.

People's activity patterns beyond retirement did not immediately lose the structure imposed by the weekday - weekend dichotomy. Many of those who had retired and no-longer worked as employees were involved in voluntary activities that often involved local or travel, sometimes related to their former profession. Two retirees had combined Cycling-PT to access or return from their charity's respective facilities. Several older couples had experienced periods when one partner had entered retirement, but the other continued in employment. This had sometimes resulted in a reduction in the number of cars owned and the resumption of cycling by the retiree for some activities, less time-constrained than in his former working life. Retired people had also synchronised some of their activities with younger people, including relatives with young families. In some cases the newly retired retained connections with several generations including much older parents some living in care homes, others independently.

Participants' narratives indicated that older people just before and after retirement had experienced residential transitions, or were contemplating moving in the near future. Some who had decided to retire from employment early, in their late 50s, had moved between regions as they retired from paid employment. Their motivation had either been financial, needing to buy a house where one was affordable, or due to biographical social connections and familiarity with the locale. Constrained finances had led one in Nottingham to reconsider the need to retain car ownership, resorting to combining Cycling-PT occasionally to meet up with a walking group in countryside. The few adults who did not indicate participation in

higher education had mainly remained within the region where they had grown up, although many had moved a few miles from their childhood neighbourhood.

7.3.2 Accessibility domain and trajectories in spatial mobility

7.3.2.1 Residential transitions and the role of Cycling-PT

Changes in the locales where people worked and lived and their children went to school had resulted in alterations in patterns of activity and modes of travel. The varied spatial factors included changes in distance, altitude (topography), availability of public transport connections and distribution of activity sites. Spatial factors had interacted with people's reflexivity and capabilities related to mobility to result in combining Cycling-PT, or change from Cycling-PT to other modes and combinations. The spatial interactions in everyday journeys related to the major transitions of changes related to employment, moving home and children changing schools are considered first.

Moving home had occurred with varying levels of frequency in people's lives. For many participants, studying at university or college in another city or town had involved a spatial move and alterations to the relative location of friends and family. Travel modes had sometimes changed, abandoning car-use in some cases as students moved to live close to their places of study. Some of the universities where people had studied were also situated in 'high cycling' cities, this factor combined with financial savings and the convenience of cycling or walking had triggered a return to using the bicycle for some. Living away from home at university had resulted in people combining Cycling-PT for journeys to visit old friends, and later established new social connections that could be maintained after university in the same way. For young adults without children, residential and employment transitions were initially interrelated as embarking on a career often involved moving between towns and cities. Some, including the foreign nationals, had moved several times during the course of their early careers. Others, however, mentioned only one significant change of region since leaving university.

During these early stages, before some started the family cycle, Cycling-PT had enabled students and young graduates to maintain contact with university friends and family. This practice sometimes continued indefinitely, however others had started to drive to work at this stage in their biography, usually for geographic reasons. Few suggested that they had cycled for ideological reasons, some had economised by doing so. Residential transitions started to diverge from those related to employment after participants' families were formed.

For those families with children, parental career moves could involve moving home, but residential relocation became more localised as children had started to attend schools and the children's education and family social networks became more extensive locally. With a second and in some cases a third child of different ages, activity spaces became more more complex and had contributed to more complex juggling of activities under greater scheduling and resource constraints. Those families that had moved home with very young children had sometimes retained previous care arrangements or primary school links until the re-alignment of activities as the transition to a new school more accessible from the new home occurred. In these situations the person who combined Cycling-PT had not been described as responsible for escorting the child to care, this role being allocated to a parent who worked part time locally and had resulted in chauffeuring children by car.

In a few cases the Cycling-PT combination had continued to facilitate the commute to work by one member of the household when either the location of the workplace, or home, had differed, suggesting this multimodal combination had given satisfaction to the individual and their household. Other narratives of household residential moves were complicated by concurrent changes of career, or changes to the other people in the household. Although cycling for transport appeared to have resumed for some on moving to locales with flatter terrain, changes in how people combined Cycling-PT may have been related to other influences.

The combination of Cycling-PT had been considered in residential relocation decisions one family had made as they moved closer to the place where mother worked part-time and the school their older child attended. This family had retained the husband's existing travel mode, whereas relocation often entails trade-offs between active commuting preferences against other priorities (Jones and Ogilvie, 2012). The new home's location remained within a comfortable cycling distance of Leeds rail station, giving the father access to jobs situated in the many towns across the region that were accessible directly by rail while the mother had used the car to maintain daycare arrangements for their younger child with their existing childminder. Regional connectivity by public transport had been a factor in this family's career decisions that had also involved retraining and seeking new employment.

7.3.2.2 Employment transitions biography

Changes in people's employment through starting a new job, revealed reconfiguration of Cycling-PT and an association with mental models as summarised in the following paragraphs.

Residential changes in people's early working lives had often been interlinked with relocation to find or start work and with moving between jobs or further periods of study. While some had started to drive early in their working lives and had continued to do so for some time, several participants obtained their driver's licence relatively late, in their mid-twenties or later. Others who had earlier been licensed car drivers or motorcyclists, or who had been dependent on public transport or walking, had taken up cycling as young adults, some from their mid-twenties. Having reflected on their activities, these people had either sought to reduce journey times or to integrate exercise into their routines. As people had changed between jobs, different modes and combinations of modes had been tried, sometimes tentatively continuing with an existing behaviour until familiarisation with the new scenario and recognition of its affordances had led to reconfigured behaviour. In this way changes of jobs had sometimes preceded the acquisition of a bicycle and resumption of cycling through the innovative realisation of its potential for integration with a multimodal journey.

Some features of people's workplaces had a positive effect towards the integration of cycling with the commute to work. Somewhere to leave the bicycle securely while at work, somewhere to get changed and the provision of lockers or store a change of clothes were helpful to those who commuted by bicycle, while the availability of showers supported and perhaps encouraged people to consider the journey as an opportunity to exercise. For some participants, particularly in the Leeds area, this encouraged periodic, sometimes daily cycle commutes over relatively long distances of up to 9 or 10 miles in each direction. People had taken advantage of the gradual downhill gradient to commute into the centre from suburbs and towns to the West and North-West of Leeds, sometimes returning homewards in the evenings by train. The bus had been used by some with folding-bicycles or others who had sometimes alternated the days on which they cycled and took public transport.

As roles had changed in the workplace, the spatial pattern of some people's regular and occasional trips had sometimes altered. For example the transition to a management role had meant attending meetings beyond the employer's local site resulting in the occasional combination of Cycling-PT, supplementing an established previous pattern of cycling between home and work. Other regular bicycle users had combined Cycling-PT for occasional journeys to attend conferences, meetings or training activities. Changing to a more stable pattern of shift start and finish times that synchronised with the availability of public transport had resulted in the adoption of Cycling-PT as a commute mode, where the participant had previously commuted by car and wanted an alternative. Here, as in some other narratives, the bicycle had widened the variety of accessible train services offering greater flexibility.

The mental map of the rational commuter was important for integration of Cycling-PT to be contemplated as an option for commuting. Geographic changes in the location of a workplace had led to adaptation of existing habitual cycling behaviour. Having previously cycled to work, public transport had been incorporated where this appeared in the user's mental map to be in-line with the extended spatial path between the new workplace and the home location. By contrast, where the journey combining Cycling-PT led to a misalignment of the location of public transport interchange, so that combining cycling with public transport would involve a journey that was conceived by the individual as lengthier than the route if cycled or driven directly by car, the public transport stage had been eliminated, the combination of Cycling-PT had been replaced by monomodal transport, either cycling or driving by car. Thus combining had been integrated for journeys related to people's occupations where the geographical relationships and public transport networks had been perceived as optimised.

7.3.3 Mobility domain: transitions in travel tools and resource availability

In participating families, children as young as seven had cycled with their parents on the highway when parking their bicycles at a station and going by train together to an event. Children as young as nine years old had taken their own bicycles on board trains accompanied by a parent or grandparent, usually following a verbal briefing about the anticipated journey.

Skills & training was a theme for which transcripts had been coded. In older adults' biographies cycling Proficiency and more recently, Bikeability training courses for children had enabled parents to give their children licence to cycle independently for everyday transport. Some parents who had withheld permission to prevent their children from receiving cycle training, were suspected by their grown-up children of having wanted to prevent their children from cycling independently on the highway. Some participants had never taken a driving test, they ranged from experienced middle-aged and older cyclists, to younger people unsure how to interact with traffic. Others had obtained their driver's licence young, but had never driven since that time, either content to use public transport or having found cycling to be a convenient mode of transport from their early twenties onwards. Adult participants who had not been formally trained either to cycle or to drive revealed their uncertainty about the correct comportment when cycling.

The age at which participants had started to drive varied, but several parents with young children had not started driving until their mid-twenties or early thirties. The reasons given for starting to use a car were sometimes related to their work, rather than specifically linked

to activities with children, although car-owning families appeared to use them more once they had a second child. The donation or gift, or inheritance of a car was mentioned by some participants, usually from a parent and at a time when there had been very young children in the family, in one case a car had been inherited from a grandparent.

Car-less family mobility was achievable. Families with young children that had either given up car-ownership, or had not owned a car, but where there was an adult who could drive, had used hire-cars for family holidays, to get to places near the city that were hard to access in other ways, to transport large items and to take the family with their bicycles to places suitable for cycling with the children. Many parents had used child-seats attached to a bicycle to carry a young child. Some participants had used the seat to carry their child as part of trip-chains involving a regular public transport journey, some had also carried a child in a seat when integrating a recreational cycling trip with a stage by train. The child-seat had in a couple of instances enabled two children to travel with one or both parents, one child using their own bicycle.

Motorcycles had been used by a few participants and the kinaesthetic similarity between the experience of cycling and motorcycling was mentioned by one participant. In all-but-one case the participant no-longer rode the motorcycle but continued to cycle and combined this periodically with public transport.

All participants owned a bicycle. Several indicated their emotional attachment to their bicycle, some had been inherited from a close relative but other as mature adults had retained a bicycle that had been in their possession since adolescence. Folding-bicycles had been adopted by many participants, especially those who had anticipated combining cycling with public transport on a regular basis as part of a commute to work. They had also been bought as vehicles for leisure journeys and were often being used both for recreational and commuting trips as everyday mobility tools. The ownership of several bicycles was commonplace, with participants identifying certain bicycles used for commuting when combining with public transport. Not all participants had owned bicycles in their adult lives until they had started to combine cycling with public transport. A few had obtained a bicycle and returned to cycling when they had decided to start to commute by combining Cycling-PT. Others had started cycling in adulthood as their main commuting mode, only combining cycling with public transport for leisure and recreational journeys.

Bike Share Schemes had been used by a few participants, one or two had used the Santander ('Boris Bikes') BSS in London on a regular basis when visiting the capital. In a couple of cases, a parent with an adolescent son, another with a grown-up daughter had used the scheme or considered using it when travelling together. Other bike-share schemes had been experienced by a few participants while living overseas, but the Nottingham 'CityCard Cycle Scheme' had not been tried by participants, nor had the 'Bike n Go' scheme that operated from some of the stations in the Leeds region – participants had no need to use them when their own bicycles were available, lighter in weight and adapted to their luggage needs in some cases.

Facilities for bicycle storage at home varied and people had often needed to identify or create new solutions for the safekeeping of their bicycles when moving to a new home, folding-bicycles presented less of a storage problem at home and could also be brought into the workplace and some other public venues for safe-keeping.

Reaching the age of 60, whether retired or not, meant eligibility for the Senior Railcard offering discounts of 30% on train travel. This and other concessionary travel options made

Cycling-PT become a cost-effective for older travellers. Free bus travel for those of state pension age both encouraged the use of buses (and trams in Nottingham) when combined with a folding-bicycle, and sometimes replaced cycling to destinations with relatively frequent public transport services, particularly in the presence of disincentives to cycling, such as the closure of a convenient parallel cycling route.

Having examined the role that cycling's integration with PT plays in responding to HH transitions, I found that it had become a travel solution for people at several stages in the trajectories of individuals, couples and families. The next chapter addresses the question of why, despite the challenges associated with both cycling and the use of public transport, people have chosen to combine cycling with public transport.

Other contextual changes in the transport system had been experienced over time, as biographic accounts and participants reflections revealed. These included the perception cycling as an activity had become more popular in both Leeds and Nottingham, and revealed that recent developments in infrastructure for cycling were being noticed and were generally appreciated. Many commented on the higher profile of cycling in London in recent years, though with reservations at what they sometimes regarded as transgressional behaviour of cyclists in London, by comparison with their provincial cities.

Mentions of the 'guard's van' were commonplace among participants who had been combining Cycling-PT since the mid-nineteen-eighties, usually contrasting the flexibility and ease with which they had travelled in the past, with more tightly constrained opportunities in the present day. One participant recalled that as a child growing up in Surrey, he had often seen people attired for office-work cycling to the station to go to work in London. A discussion about the potential for lockers and showers for cyclists to be provided at stations as possible future facilities for cycling integration revealed that people realised the transport system had become partly shaped by wider concerns such as bomb threats.

Participants also often mentioned the increasing traffic over time in the context of it being problematic for cycling, but did not mention similar concerns at increasing effects of congestion on satisfaction with the driving experience. This may reflect the fact that congestion has been a concern over several decades in the UK and recently completed highway enlargement schemes that have responded to this have mitigated the effects on some routes. Other schemes, such as Nottingham's workplace parking levy may also have helped to manage the impact of congestion, this, combined with a slow-down in young men driving may mean that effect of congestion and traffic-related stresses as a disincentive to drive is not a major factor in many individual decisions to switch to the combination of cycling with public transport. There were references to decreasing enjoyment in driving, however this was related to the process of ageing in the narratives.

Memories of childhood freedoms were also frequently contrasted with the more limited possibilities for children's independent activities in contemporary Britain. Parents often reflected on the differences between their own, free-ranging childhood mobility and the older ages at which they gave their children licence to roam.

7.4 Discussion of findings that help to explain why people combine Cycling-PT for everyday activities

Following from the previous section's discussion of transitions experienced in three biographical domains, this section discusses findings that help to answer the third Research Question, i.e.:

III. Why do households integrate cycling with PT as part of everyday activities?

Analytical interpretation of motives apparent within the discussion narratives identified some of the meanings for the individuals, households and families involved. Participants held beliefs about their behaviour related to:

- 1) time optimised or reassigned to positive uses and flexibility
- 2) control, autonomy and independence from others in the household
- 3) the management of stress related to commuting and motoring
- 4) alignment of combining behaviour with multimodal travel corridors
- 5) ownership and optimisation of household travel resources
- 6) integration of physical activity and its role in multimodal household identities

These explanations for combining Cycling-PT are summarised below, starting with those related to instrumental factors and concluding with some more tentative interpretations:

7.4.1 Optimising travel time and enabling other activities

Narratives supported the notion that travel time savings when combining Cycling-PT were used for other domestic activities. Cycling to catch public transport as part of a routine trip saved time that could be spent on other activities, like preparing the household meal as one working participant described. This productive weekday time saved for 'chores' was differentiated from activities at the weekend for one recently retired person, appearing to reflect a mental model that continued to contrast working days with weekends.

People also used public transport time productively to read, study, to do other office work or mark students' work. Some took laptops with them, others used paper notebooks. Affective uses included relaxing by listening to music, writing poetry, playing games with their child and looking out of the window. Train stations had offered the opportunity to do some shopping, or get refreshments. Experiences also included those pleasant conversations (Ettema *et al.*, 2012; Mokhtarian *et al.*, 2015) with fellow passengers in routine public transport journeys that had also led to people developing acquaintanceships and forming alliances with other commuters (Larsen, 2017). Some participants described a sense of 'community' on the bus or in the train. Longer train journeys, i.e. from Nottingham to London were an opportunity to catch up on sleep. When combined with the bicycle ride at the end of a days commute back from work, Cycling-PT had offered people a strong transition effect between work and home (Mokhtarian and Salomon, 2001), or as Watts and Urry (2008) describe, "*for switching between different forms of work, including informal and emotional work that is not economically visible*".

Flexibility in travel behaviour through ad-hoc or planned variation in repertoires and scripts was one way in which people had optimised their journeys. Living in proximity to a public transport corridor with relatively regular services provided scope for widening the range of stations and thereby service options that could be taken. This gave additional choice at times when transport services were less frequent, and enabled people who needed to take their

bicycle with them, to select stations and trains offering greater capacity at peak times. Taking the bicycle by train had also provided flexibility when meetings and destinations had needed to be altered at short notice during the working day. Sometimes having a bicycle available gave opportunities for flexibility of mobility in the destination locale, giving scope for exploration of the city or countryside, or to access meetings beyond city centres and local public transport connections.

Cycling for recreation was itself a major motivation for many who occasionally combined Cycling-PT, partly resembling a “true affinity for travel” (Mokhtarian and Salomon, 2001). Day trips and city breaks were opportunities to use the bicycle to enjoy exploring a city. These were occasions when bicycles were hired, giving the user relatively unrestricted mobility through the city enabling its exploration. By comparison with public transport, people developed a different sense of scale of the place. In a similar way, adolescents had combined Cycling-PT to explore the countryside, enabling them to develop mental maps of their cultural and social geographic surroundings. Recreational cycling trips and holidays in remote places made more accessible by public transport were often memorable activities, adventures shared with friends or a partner, sometimes between a parent (or grandparent) and child.

7.4.2 Control of your own journey

Participants sometimes stated that the bicycle gave them control over a multimodal journey that was otherwise vulnerable to scheduling uncertainties if using several public transport connections in succession. In this way it enabled freedom from the temporal constraints of local public transport, particularly bus services. In some cases where the reliability of public transport was not in question, poor connection timings between public transport services was their motivation for cycling.

People's combination of Cycling-PT was largely motivated by the beliefs they held in their ability to optimise their use of time through cycling to access public transport. One argued that cycling to the station was *'keeping things simple'*, where the alternative would involve a more complex collection of travel passes and additional bus schedules.

As identified in Chapter 5, the combination of Cycling-PT had enabled some adolescents to travel autonomously, sometimes in groups with friends, and usually with the support or approval of their families. Chapter 4 presented evidence that parents valued and in various ways nurtured skills related to independent travel from quite early in the child's development; they often used the term 'independent' when referring to the child's ability to propel themselves when travelling on foot, or using a wheeled device such as a scooter or bicycle. Parents had also encouraged their children to start to use bus or tram services to go to secondary school at, or just before, the transition from primary school. When

Combining also offered some autonomy within the social network. For adults with concerned relatives, parents or friends inclined to offer lifts or favours, the bicycle had provided an individual with an argument that released others from sense of obligation. It was therefore not just a tool for independence for adults, but in adolescence too. The combination of Cycling-PT had enabled some adolescents to travel autonomously usually with the approval or support of their families. Chapter 4 presented evidence that parents valued and in various ways nurtured skills related to independent travel from quite early in the child's

development. Their use of the term 'independent' when referring to the child's ability to propel themselves on a scooter or bicycle and the encouragement of their children to start to use bus or tram services to secondary school suggests that children's independent mobility was still valued, despite reservations related to the perceived risks of children cycling.

7.4.3 The shape and times of journeys: managing commuting stress and motoring frustrations

Many households had access to a car, as in previous research (Kuhnimhof *et al.*, 2010; Mackett, 2000), they used it for tasks considered unsuited to the bicycle including longer intra-urban journeys, holidays and passenger-serving trips for the young and older relatives. Although some spouses and partners commuted by car, many participants preferred to commute by combining Cycling-PT rather than driving, either because they preferred travelling by train, or citing stress and frustration at journeys slowed due to congestion. Depending on the time of day that people travelled, the choice of using a car might be less attractive than the combined Cycling-PT journey which could offer a more pleasant alternative to having to drive through 'nightmare' traffic. People disliked the 'stop-start' traffic that was characteristic of driving on some regional 'A-road' highways at peak traffic times, a problem also associated with some motorways. Parking in cities and towns where people worked, was also a frustration identified by a few participants that had commuted regularly for work purposes. One Cycling-PT commuter commented that his employers may have relocated from Nottingham into an adjacent Nottinghamshire borough partly as a result of the city's workplace parking levy.

Health and safety risks associated with driving had also motivated some participants to integrate combining Cycling-PT into their travel repertoires. One truck driver hoped to reduce the risk of getting diabetes by cycling and commuting by train to work, also by cycling for exercise and shopping between working shifts on his regular five-day tours by lorry in South-West England. For other participants potentially making a long journey of several hours by car, combining cycling with the train had offered a way to avoid the potential risk of an accident through drowsiness when driving in the dark.

Managing risks through combining Cycling-PT

People had combined Cycling-PT to avoid cycling in circumstances they felt could pose a risk to their health or safety. When a child became tired during a journey by bicycle, the risk of fatigue and tiredness had been avoided by parent and child returning on a train. Road safety risks when cycling could also be mitigated by combining Cycling-PT. Cycling on unlit A-roads was considered hazardous in some regions, particularly during poor weather when the vision of a motorist would be impaired by fog or rain. For someone cycling for the morning commute in daylight, taking the train to return would offer a way to get home safely in the dark in Winter. Some parents and partners were reportedly reassured at the relatively low risk to their family member who was combining Cycling-PT when only cycling a short distance to make a longer journey stage by public transport.

7.4.4 Geographic corridors of multimodal opportunity

The routes that people cycled in asymmetric daily or periodic patterns often ran adjacent to transport corridors that reflected historical transportation 'corridor' effects (Merriman,

2016). Cycling alongside rivers and canals, parallel to the roads and railway lines that took advantage of topographies with level or gently graded pathways, people valued the ability to enjoy nature and avoid traffic and related fumes when using the towpath. Some more experienced cyclists, however, preferred the higher speeds achievable along the adjacent highway routes. Some cycled very early in the morning to avoid times when highway congestion would lead to greater risk through motorists behaving more unpredictably. Several had switched between cycling on the highway and using canal towpaths seasonally and according to the lighting conditions.

Cycling in the darkness along canal towpaths was generally avoided, and some were worried about the possibility of being attacked by strangers when cycling in the isolated conditions of the early mornings and late evenings. The darkness, tiredness and the uphill incline Westwards were factors that had caused people at various times and with varying frequency to use the train to return home in the evenings. Experiences in Nottingham were similar, but the distances participants reported cycling between outlying suburbs and the city were shorter. For users of folding-bicycles and those whose bicycles could be seen locked up at Park and Ride sites, the recent tram extension to Toton had provided another alternative mode along the level river, canal and railway corridor to the West of the city.

7.4.5 Optimisation of household travel resources

Increasing and decreasing car use has been identified as a characteristic of households spatial biographies, car ownership fluctuating through the family lifecycle related to accessibility and gendered activity patterns (Scheiner, 2014a). Participants that had reduced their household fleet to a single vehicle cited financial savings. Some rationalised limiting the household to one car when the requirement to use the car for work by one of two household heads ceased, or if working at a location a short cycle-ride from home. In two cases where the participating families had been given another car, the second car had been disposed of after a period of reflection. When a mother was prevented from driving because of her reduced visual acuity, she had replaced driving with using a folding-bicycle for multimodal travel. The family had retained one car that the father used for commuting and chauffeuring the children.

Alongside many participants' rational arguments, other factors were often evident, either the positive factors or avoidance of frustrations and risks outlined in the preceding sections. Implicit in some narratives, there were also 'environmental' motivations around minimising driving wherever possible, these related to pollution reduction, or, the reassuring presence of people visibly cycling through streets otherwise bereft of people. This suggested that the management of household travel resources had, in some households at least, a relationship to values and beliefs. It was otherwise not clear why some families had chosen not to own cars and to live largely 'car-free' lives, using public transport and cycling, hiring a car occasionally. Some older people had decided to live without a car following retirement, Cycling-PT enabled them to continue making longer trips for social and family purposes than just by cycling. A few people interviewed had never driven, some uninterested in learning to drive from their youth.

Bike share schemes had been used outside the participants' residential locales. London's 'Boris Bikes' had been used by a few. One participant had purchased a key for the scheme, using it sporadically on visits to London for work. Schemes abroad had been used by a few

young adults without children, providing useful urban mobility especially where they had provided 30 minutes free travel.

Bicycles used for Cycling-PT were mainly privately-owned by the user, who sometimes owned several bicycles of different types. Folding-bicycles were popular amongst many for their ability to be accommodated in multiple travel scenarios and ease of stowage indoors. Folding-bicycles had been taken onto trams in Nottingham and had been carried on buses, coaches and in cars and taxis. The Brompton folding-bicycle had become emblematic for combining Cycling-PT for many. Their adaptability had also enabled them to be used by others in the household, lent to relatives and friends, or occasionally borrowed has resulted in it becoming a tool enabling experimentation with combining Cycling-PT and thereby socialisation. The popularity of this model, particularly with many older people, seems to reflect changes in the railway system that have been designed to replace flexible general purpose stowage facilities previously available in the train's 'guard's van' with dedicated 'bicycle spaces', often poorly designed and offering limited capacity and flexibility. Cycle stowage on trains, sometimes co-located with disabled people's provision, or adjacent to toilets, had been contested by other passengers immovable from fold-down seats. Lifting a fixed-frame bicycle to stow it correctly in some carriage designs required considerable strength, space to manoeuvre the bicycle and luggage and was found to be unsuited to short-distance trips.

Bicycles as a resource, both fixed-frame and folding models were often valued possessions and many detailed day-to-day behaviours were characterised by practices aimed at addressing the "vulnerable nature of the bicycle at rest" (Aldred and Jungnickel, 2013), i.e. the risk of theft or damage. This impacted on the way they were used, often travelling with the bicycle where there was no secure bicycle parking provision at a public transport stop or station. For this reason, secure bicycle storage schemes requiring card or key-fob access were appreciated, if not fully trusted. This resource had in one case been shared with another family member through the loan of the cycle storage scheme's key fob. The existence of cycle parking 'behind the barriers' at Leeds station enabled some to confidently leave their bicycles locked-up there for several hours.

Travel passes and season tickets were used by many participants who normally commuted to work 5 days per week. People had tried to optimise their ownership of a travel pass or season ticket by avoiding the purchase of multiple passes for different regions that they would travel through on a regular basis, the bicycle was sometimes integral to this optimisation for short sections of a longer journey by rail, or to access a station within a lower-cost travel zone. There were some differences between the range of modes covered by passes, and some people optimised their investment in a pass limited to a specific part of their journey, while others had purchased passes with wider applicability. The annual rail season-ticket facilitated travel between Hucknall and Nottingham by the most rapid mode, by comparison with multimodal passes that included the tram and bus, both considerably slower than the train even for this relatively short trip. The West Yorkshire multi-modal regional 'Metro-card' had been used in conjunction with cycling when it offered savings to regular destinations. In some cases the Metro-card had been purchased or retained to avoid other inconveniences, i.e. delays queueing for tickets or the stigma attached to travelling in haste without a ticket.

Travel passes and season tickets were also used occasionally for other journeys, sometimes when travelling with other family members who did not have a travel pass, to or from recreational activities. Passes that provided free travel on public transport were important in some decisions to give up car ownership, particularly for single adult households. A free rail

travel pass enabled one retiree to make multiple recreational day-trips combining Cycling-PT each year. This occupied his time when his wife was busy with her work or pastimes.

Participants revealed differing opinions about the financial cost-savings of combining Cycling-PT. People had made contextual comparisons of the cost of travel by various modes when contemplating investing in bicycles or travel passes, anticipating their regular use over a certain period of time. Some salaried workers were relatively unconcerned about the perceived financial savings of combining Cycling-PT while also maintaining a car. Others on lower incomes compared the frugality of their cycling and the additional costs of combining Cycling-PT with occasional use of alternatives like taxis they regarded as more expensive.

Although some cycling enthusiasts had invested in expensive bicycles and good quality clothing and accessories, the costs of cycling did not need to be high. Local 'thrift' stores that sold bicycle equipment and accessories were mentioned, and low-priced, second-hand, old or donated bicycles were used by participants for combining with public transport. Some families believed they had economised through only having one car and using Cycling-PT. Thrift as motivation was not confined to families with children, one individual living in a couple household defined himself as 'tight' with money. Those who had retired from work and had given up a car argued that this had made greater cost savings, in one case running a car was no longer affordable on the individual's retirement income.

The financial savings described above are based on the participants' own statements. Family narratives indicating the enlargement of spatial accessibility through combining Cycling-PT enable contemplation of other potential financial advantages for families. The parent who did not drive could access a wider range of childcare providers, enabling her to find one that fitted with her work patterns, particularly early starts or late finishes. It had also enabled access to workplace childcare provision, benefitting the household financially through access to subsidised childcare. When used for the journey to work by one parent, Cycling-PT can reduce overhead costs of family car ownership. This is offset to some extent, however, by the costs of bicycle ownership and additional related equipment for cycling.

7.4.6 Integration of physical activity into daily life

Cycling to take public transport was one of a range of physical activities that some saw as integral to their lives. Some regarded the short cycling trip to the station in the morning, or the ride home in the evening as opportunities for some light or brisk exercise. Depending on the overall journey distance, proximity to a train station meant that people could cycle in one direction, usually towards work for those who commuted to Leeds, then return by train in the evening when tired. Others described getting off the train early to add a few miles on the bicycle getting to their destination, whether home, or the office. The exercise derived by riding a bicycle, even a folding-bicycle to the bus-stop, was argued to be part of a wider regime of training for a cyclist who took part in club cycling events or triathlons.

In many cases, cycling was secondary to other preferred sporting activities, such as running, playing football or rock-climbing for, but still enjoyed as an opportunity for physical activity. Some people even regarded their everyday environment as a gym – without the membership subscription costs. Stairs leading to and from station platforms were an opportunity to incorporate additional exercise, carrying the weight of a bicycle added to the benefits.

Values related to sustainability were often expressed as being shared within households, although individual mobility behaviours in many households differed. Differences were related to (childcare and employment) roles adopted within families, also to capabilities, confidence and the enjoyment of cycling. Individual beliefs about the mental and physical health benefits were sometimes shared by partners in families, but differences were apparent with respect to perceptions of risk related to cycling or its perceived inconveniences. Beliefs and values related to travel behaviour, its environmental impact and personal benefits when shared between parents, had in several cases not been reflected by the behaviours of children in adolescence and after starting their secondary school careers.

Although cycling had been an experience shared in most households' biographies, when interviewed, several of the participants' children, spouses or partners no-longer cycled. Narratives suggested they often exercised in other ways, for example, running, horse-riding, or going to the gym, but that they also valued physical activity. In family discussions the parents appeared to express values through expressions of pride in their children's achievements of particular kinds. Physical recreational activities, such as tennis or swimming were in some families complemented by engagement in regular cultural activities, music or drama groups, that seemed to be important to the household as a collective. i.e. the 'social content' according to Schönfelder and Axhausen (2010).

Descriptions of children's rapid acquisition of bicycling skills and capabilities, stamina on long rides, or resistance to cold suggesting resilience was valued alongside being physically active. The resilience of individuals also emerged as a theme in narratives about recovering and returning to cycling after bicycle accidents, when participants (sometimes their relations) had been quite seriously injured. Returning to cycling after other sudden life events (e.g. loss of driving licence, episodes of mental health problems, accidents and injuries, separation from a partner) also points to the role travel behaviour in enabling resilience of the household in response to disruption to its wellbeing as many decisions are made in the context of the family (Guell *et al.*, 2012).

Household identity was sometimes labelled by participants who saw themselves as having an image, but the identity was also revealed through narratives about values related to autonomy, resilience and being fit through remaining active. The family identity was also suggested by travel behaviours and preferences, such as those families who as couples had both combined Cycling-PT for commuting or for holidays before they became parents. A few adults used terms to label their families variously as: 'kind of hippy', 'country bumpkins' or 'geeky, headbanger'. Additionally, families with children had in a few cases lived car-free 'altermobile' lives by choice, or were doing so in the present day .

Some narratives suggested participants shared a household identity related to the concept of a 'family culture' (Saraceno, 1989), or 'paradigm' (Day *et al.*, 2009). This complemented findings about common household values around physical activity and resilience. There were also narratives that described a 'cyclist' identity which could be limited to one generation, or to a few members within a larger family group. Some families had traditions of cycling that had originated with grandparents who had cycled avidly, or been members of the CTC (Cyclists' Touring Club) several decades previously. Families had placed stories of the cycling prowess or activities of parents into the imagination, despite the participant never having seen their parent ride a bicycle. Some narratives also suggested attempts at assimilation into cycling activities during periods when households merged and new people joined.

In this section I have interpreted both those explanations stated by participants for contemporary travel behaviours, and analysed relevant past experiences to examine and reveal the beliefs and values suggested by participants', as well as those they described. Interpreted from a household perspective, instrumental factors related to time-management and financial-savings were found to be balanced with varied levels of individual and collective affect, beliefs and identities within households and families.

7.5 Conclusions

The analysis of households' integration of Cycling-PT that has been the subject of this study, has resulted in a modification to the original integration model proposed in Section 2.6 (Figure 9, p. 43).

Following Giddens' theory of structuration, interconnected scheduling involving coordination between institutional practices and those related to household activities form a system, as identified in the pink cluster of Figure 16, below. Time constraints for families are related to employment, childcare and schooling that interact with the schedules of transport providers and with other users of transport systems. Support for households may be available through synchronisation with other family members, friends or relations, although these also have their own scheduling constraints.

The household that combines Cycling-PT experiences a transport system that is in principle shaped by policies that share many objectives with the household, aspires to inclusion, responds to the changing demands of an ageing population and resonates with household beliefs and values related to health and well-being, enablement of independent action (i.e. offers choices) and resilience. Dominant social practices, however, mediate the household experience of integration through an emphasis on traffic congestion reduction and reduced journey times favouring individual travel by car. The experience of integrating active travel modes with public transport is thus filtered through layers of economic and planning-related measures that shape provision, while infrastructure and facilities combine with information in delivering a message that in principle encourage multimodality, but in practice provide limited support for the individual agent and even less for households and families.

The households that do find opportunities to integrate Cycling-PT for everyday activities exhibit a resilient determination when applying their agency to the execution of their travel behaviours. Through their behaviour, they attempt to uphold shared household values in the pursuit of household and individual projects and life-goals. Those that combine cycling with public transport for intermodal journeys predominantly believe in the value of the integration of physical activity in their everyday travel choices.

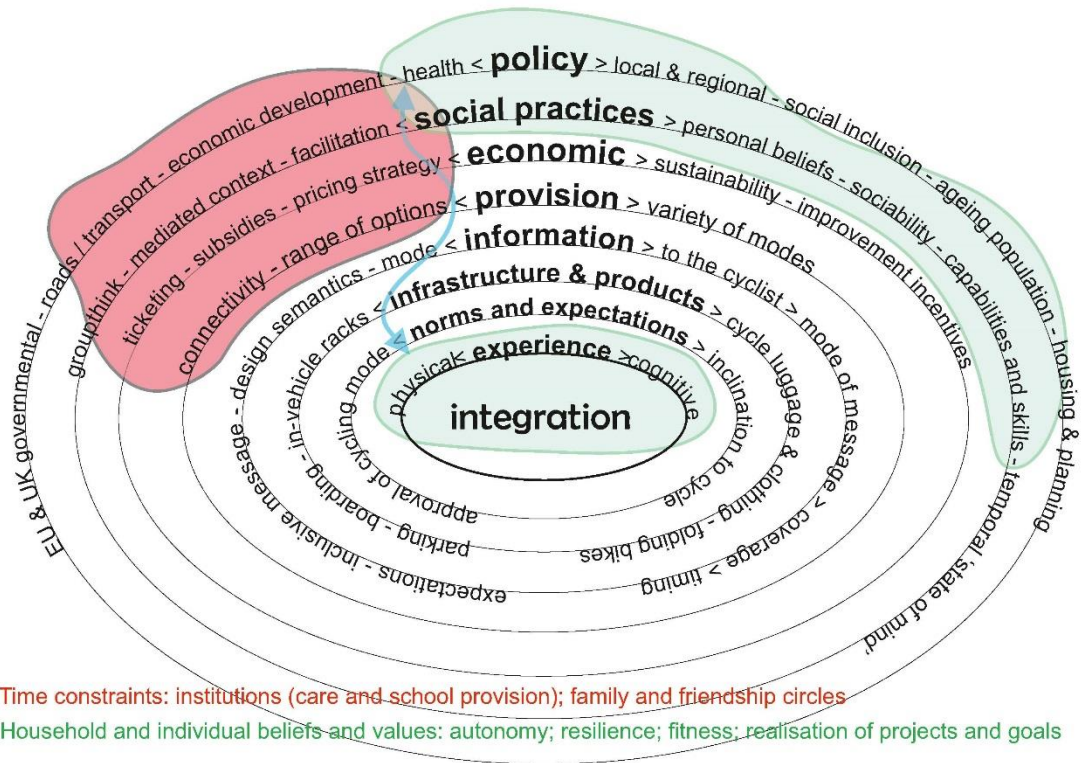


Figure 16. Revised model representation of the integration of cycling with PT systems.

Created by the author

7.5.1 Key findings

The key findings are summarised in Table 10 below, mapped to the research questions and the gaps in knowledge identified through the review of literature (Chapter 2).

Table 10. Summary of key findings in relation to research questions and knowledge gaps identified

Gaps Identified	Research Questions	Key Findings
<p>Understanding integration of cycling as an enabler of household activities.</p> <p>Understanding how people respond to the promotion of cycling integration with PT.</p> <p>Exploring how these modes in particular, could be adopted or adapted to support cycling pt integration better.</p>	<p>I. How does the integration of cycling with PT act as an enabler of household activities?</p>	<ul style="list-style-type: none"> • Travel patterns ranged from a regular monthly trip, to routinised 5 days per week commuting. Many mixed the way they commuted, varying modes used during weekly travel. • Enabled access to well-paid/specialised employment for people unable to drive and with pre-existing household or family spatial ‘moorings’. • Childcare escorting trips could be integrated into morning commute when combining. • Had enabled adolescents to travel independently to engage in meaningful activities during holidays. • Physical activity integrated into the commute and recreation trips. • Benefits of cycling (<i>‘blow away the cobwebs’</i>) combined with a (bus, or train) journey of sufficient duration enables its use for a practical task or for relaxation. • Optimising travel time and enabling other activities before/after the journey. • Negotiation with employers had enabled individually tailored working arrangements, and other concessions. • Tolerance of transgression of the ‘2-bike-rule’ had enabled people to become confident in the ability to take bicycles onto a few routes during peak times. • Challenges: inadequacy and uncertainty of PT provision; risks for children; differences in perception of benefits within households.

Gaps Identified	Research Questions	Key Findings
<p>Multimodal cycling behaviours from a household biography perspective, in particular the family cycle as children develop skills and capabilities for independent travel.</p> <p>The processes within households that shape travel through predicting or responding to changes and transitions.</p> <p>Exploring how these modes in particular, could be adopted or adapted to support Cycling-PT integration better.</p>	<p>II. What role does cycling's integration with PT play in responding to household transitions?</p>	<ul style="list-style-type: none"> • Mobility and social network maintenance for students and early career post-graduation. • Children's routine and extra curricula activities shape travel patterns of households. • Specialisms and roles of childcare and employment interact with Cycling-PT when households transition to having children. • Household negotiations between partners – different views and beliefs, but common household objectives and projects. • After major transitions in employment, or after moving home, a period of evaluation and reflection had usually preceded a change in travel behaviour. Often a period of several months elapsed as people became familiar with a route, observed the behaviour of others and recognised affordances in public transport, or came to recognise inefficiencies in their existing use of personal transport tools. • Cessation of combining was usually the result of changed circumstances that affected either the mental map of a 'rational route', altered spatial activity, changed domestic role or obligations, or altered capabilities through illness, or the loss or theft of a bicycle. • Car acquisition had not replaced using Cycling-PT amongst those who took part in this study. • Post-work no need for car use, Cycling-PT enables car-free activity-travel, or reduction in fleet to 1 car with working partner/spouse.

Gaps Identified	Research Questions	Key Findings
<p>Understanding the meaning to users of integrating physical activity when cycling to or from public transport trips.</p> <p>Understanding how people may use their time differently when cycling from when travelling on public transport.</p> <p>Exploration of how the combination of cycling with public transport may have a positive utility for the users.</p> <p>External interactions with other individuals, households and institutions that have influenced travel decisions.</p> <p>Exploring how these modes in particular, could be adopted or adapted to support cycling pt integration better</p>	<p>III. Why do households integrate cycling with PT as part of everyday activities?</p>	<ul style="list-style-type: none"> • Beliefs, values and identities related to the integration of physical activity into daily life are important. • Personal resilience (endurance) capabilities are valued. • Desire for autonomy and ability to travel independently. • Enjoys and gains satisfaction from Cycling-PT behaviour. • Crossing PTE administrative boundaries can make Cycling-PT financially attractive/simpler, eliminating an additional season ticket need.

7.6 Strengths and limitations of the study

Strengths

One strength of this project has been the in-depth qualitative interview data gathered from people who have combined Cycling-PT for many different purposes. The emphasis on building knowledge about households' integration of Cycling-PT has given the study a novel insight into this multimodal travel behaviour. It contributes to a deeper understanding of how travel behaviours adapt over time, particularly during the family life-cycle as household roles are adjusted in response to constraints imposed by childcare and employment.

Pooley et al. (2018) have argued that the use of qualitative data is necessary to understand changes in travel behaviour over time and to “provide selective insights into the interactions between family responsibilities, everyday travel and a range of other personal and external factors” (Pooley *et al.*, 2018). These provide insights into how people make decisions about everyday travel in relation to family activities and responsibilities (Pooley *et al.*, 2018).

Acknowledging the changing demography and increasingly diverse patterns in the life-cycle of the family, this study also achieved its aim of including experiences of single-headed families and other household types, where participants made these known to the researcher. This study also succeeded in recording experiences of participants who had combined Cycling-PT on a regular basis for inter-regional commuting, a practice suggested by analysis of NRTS data while scoping the city-regions for inclusion in the study.

Adopting a biographic approach to the interview topic guide and subsequent analysis elicited many examples of activities, behaviours and relationships relevant to understanding Cycling-PT behaviour later in life. This approach also led to participants reflecting on changes in the travel environment, cultural norms, practices, and infrastructure. This added context and supported analysis of the role of external factors to the explanation of Cycling-PT as a household practice.

This study did elicit rich descriptions of some of the lived experiences of real users. The involvement of families with children illuminated issues related to the scheduling and accessibility of children's schools, nurseries or other childcare arrangements and their many other extra-curricula activities. It also revealed children as having competencies, preferences, roles, and exercising agency in household activities.

Limitations

Recruitment strategies employed may partly explain the preponderance of higher-income households and university educated individuals that took part. A study design that involved small group interviews may also have deterred participants not accustomed to engaging in debates with others outside their family and social networks. However, a more likely explanation is simply that lower-income workers were time-poor, several people offered to complete a survey questionnaire while at the station waiting for trains, but could not find time participate unless it was in some way integrated with their routine journey.

The challenges of recruiting whole family groups as well as low-income workers is also considered here. The outcomes of the involvement of children as subjects of the study alongside adults for the analysis of family activities are also reflected upon.

Limitations of qualitative interview-based research have been described by Roulston (2010) include the possibility that participants have fabricated, or embellished their accounts. More likely, memories of past experiences were at times unclear. Participants often queried the reliability of their own memories about their childhood behaviour, some details of behaviours and experiences unclear. Some like Kirin, resorted to describing the context in which her activities took place to try to confirm her behaviours:

- K: *I'm trying to remember if I did my paper round on a bike or not and I can't remember because I think it's quite often a bit of a hassle if the houses are close together you're forever getting on and off.*
- J: *Yeah, yeah, fair point.*
- K: *And we had a stonking great hill in one of my bits so I suspect I didn't.*

A further limitation of qualitative micro-sociological methods, as identified by Manderscheid (2014), is that by using collections of narrated data they focus on active experiences of mobility, foregrounding "*intentional practices, action and activity over more fragile ways of being mobile.*" (Manderscheid, 2014). A critique that could apply to this study.

Qualitative interviews always are thought not to be consistent, however, they are rich in detail, but transferability is contingent on context, limiting the potential for generalisability. Providing rich description and details that can help to explain behaviours and associated processes, methods such as 'sit-down' interviews are ideal for exploring biographies and perceptions, particularly people's descriptions of their activities and their explanations (Carpiano, 2009). Through their potential for exploring the influence of collective and social interaction in households, qualitative methods were proposed by Guell *et al.* (2012) for investigating travel-related enjoyment and wellbeing. These methods can help to shape planning and policy-making practice by identifying opportunities for tailoring approaches to intervention delivery, considering the diverse social context of targeted populations.

7.6.1 Data quality, confidentiality and protection

Evaluating travel behaviour based on the broad variety of activities presented here is likely to reflect some of the differences in context behind regular activities related to commuting, and others for leisure, for example, as Anable and Gatersleben (2005) identified for their investigation of affective and instrumental factors in journeys to work and leisure by different modes (Anable and Gatersleben, 2005).

The participating households and individuals cannot be considered as representative of the wider population, but neither would they be unusual in today's society. The experiences of one single-parent household are not sufficient to fully understand the range of activity behaviours, beliefs, values, identities and challenges in the lives of other people in this household category or in blended families. The wider range of activity-travel interactions with extended family networks that may involve have also not been addressed through this study.

The small number of families interviewed with the involvement of their children has limited the range of children's experiences of combining Cycling-PT to be heard. From observations made at stations and comments of some young participants, there are likely to be children and adolescents who more routinely combine Cycling-PT.

Although I talked to many people traversing through rail stations with old or worn or damaged bicycles, or who were dressed in utilitarian work clothing, they were either in too much hurry, failed to turn up to a discussion having tentatively agreed to attend, or chatted briefly about the purpose of their journey but did not accept my invitation to take part in the study.

After the first phase of recruitment during the summer of 2016 when I generally dressed in a sports jacket and Leeds University T-shirt, I adopted a more obviously 'cyclist' identity during the second phase in December 2016 and January 2017. Then I wore a newly purchased cycling jacket and carried my materials in a bag visibly designed for use on a bicycle.

The study's weakness of being likely to have excluded time-poor families with limited transport options means that factors related to households' mobility and access to low-paid, temporary, or casual work have not been adequately addressed.

7.7 Implications

7.7.1 Policy and practice

Inclusion of discretionary activities, particularly those undertaken at weekends and holidays has been helpful to identify opportunities that combining cycling with public transport presents for family, parent and child and longer duration journeys for leisure, recreation and exercise. It also helps to unveil opportunities for the public transport sector to develop products, services and new partnerships, based around household activities and recreation. Policies should be reviewed to assess the potential benefits of facilitating independent travel by children and young people, and skills and competencies in its staff.

Gorely (2009) examining the relationship of sedentary behaviours to family circumstances observed: "Understanding how non-modifiable characteristics of the family, such as composition (single vs. dual parent, presence or absence of siblings) and socio-economic status (SES), influence health behaviour allows for targeting of 'at-risk' groups and enables researchers to tailor their interventions appropriately".

Policies that encourage workplace childcare facilities could enable parents to make time-savings and even to re-enter the workforce where previously family commitments with young children prevented full-time entry to work. As noted in the OECD report "the Future of Families to 2030", changes in the workplace with increasingly non-standard conditions of employment could challenge many people's access to employer-based creches and nurseries.

Children's mobility has continued to be neglected by policy over many years since John Barker commented "*current transport policy fails to treat children as political citizens, neglecting to represent or respond to their travel needs.*" (Barker, 2003).

Baslington argued that car dependency required a social policy approach rather than just travel demand management (Baslington, 2008). If the mode by which young people travel is to be made more sustainable then the policy guidance offered by Gronhoj and Thorgersen (2012) should also be heeded, that young people's attitudes should be targeted directly through educational resources and in consideration of new media, and that parents should be made aware of their role in shaping sustainable behaviours in their young, i.e.: "*parents should be advised to make their pro-environmental behaviour visible to their children.*"

(Grønhøj and Thøgersen, 2012). Echoing these authors, leadership is required from parents, schools and the government to illustrate behaviours that demonstrate responsibility for creating a sustainable future.

When dealing with interventions and packages of measures aimed at younger people, the recommendations of Simons et al. (2014) might well be heeded, that health benefits and ecological concerns are secondary to young adults to other factors, such as autonomy, and the speed and efficiency of the journey, and the security of their bicycles from theft or damage, a concern expressed in many research discussions and interviews.

Goodman et al., 2012 identified flexible working hours as a factor that reduced the barriers to labour force participation, together with the affordability of car-based transport that enabled people unable to afford high property prices in Cambridge to combine their family roles with employment in the city. These authors suggest combining measures to make environments less car-oriented with interventions aimed at individual car-use, such as workplace parking (Goodman *et al.*, 2012).

7.7.2 Scope for design in public transport spaces

1. Changing facilities or locker provision at some smaller railway stations.
2. Secure cycle parking 'hubs' at bus terminals where there is already a security presence.
3. In residential areas and where pavement space permits, bicycle parking stands could be situated adjacent to bus or tram stops to facilitate local intermodal journeys.
4. Short-term bicycle parking stands with timed auto release mechanisms.
5. Clearer indication of cycle routes to/from stations, and recommended exits to be used.
6. Better information for all travellers regarding the location of on-board provision for cyclists on incoming trains. This is sometimes announced at stations but is inconsistent. Some trains have signs that experienced Cycling-PT commuters recognise to determine which end of the train the cycle provision is at, but not all.
7. Along with consideration of accessibility for disabled people's needs, cycle access should be designed-in to any station re-design process.
8. Adequate lift space to accommodate bicycles as well as wheelchair users, families with prams, luggage, etc. at railway stations.
9. Intelligent / MAAS-style ticketing concepts that transcend traditional regional structural (and operator's) boundaries to facilitate intermodal public transport use across different funding authorities.
10. Bike share schemes that accommodate children with integrated or removable (hired/loaned) child-seats.
11. Workplace crèches that have parking spaces for children's and parents bicycles.
12. Policies of childcare facilities and primary/secondary schools should offer greater scope for independent travel by children, or small groups of children, this requires coordination with investment in infrastructure and facilities.
13. Greater flexibility of child collection / drop-off times.
14. Flexibility of arrival/departure schedules at workplaces contributes to integration of multimodality.

7.7.3 Future research opportunities

- Future research should address the weaknesses in this research of the bias towards a higher-educated social sample and the limited number of families with children, through use of other innovative qualitative methods for data gathering.
- Research using data gathered by bike share scheme operators would be useful to understand how these schemes are being used for intermodal journeys.
- A future survey design could explore the motivation for combining Cycling-PT, why some households limit themselves to one car, how this responds to spatial changes and household transitions. It needs to be designed to attract a high response from all socio-economic groups and should explore variability. This could enable cluster analysis of user groups and help understand how household contexts influence travel decisions.
- Innovative research methods could include temporary 'installations' located in public transport interchanges inviting passengers (particularly those with children) to respond by inputting their own journey and household data – blending AR interaction and feedback methods with digital data gathering for a survey of travel behaviour and household contexts.
- The 3D-model based research methods explored in this study could be developed further to explore how families choreograph their activities through creation of scripts and repertoires that use the home, bicycles, cars, digital devices, prams and push-chairs, skateboards, travel passes, and other resources to access their activities and carry out their projects.

8 References

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9 Appendices

Appendix 1. Interview protocol

Appendix 1.a Protocol used for small adult groups and individual interviews

Below is shown the focus group guide / interview protocol used during the first phase of fieldwork for this research, 20 July – 2 August 2016

Cycling with Public Transport – Pilot Focus Groups – Peter Atkinson (ITS PhD student)

Focus Group Guide – V18

Venue:

Date:

Have participants seen and read the Participant Information Letter?

Ask participants to complete and sign the consent form, circling all of the relevant points indicating their agreement.

Introduction:

Your input to this focus group will help us to understand how and why people combine cycling with public transport in UK city-regions outside London.

Your contribution to the discussion will help us to start to answer the research questions we have about the benefits and challenges of cycling when combined with public transport (as an alternative to car use). It should also ensure that our questions will be understood by other ordinary people and that they will be able to answer them without difficulty in future interviews and workshops.

Today we want to hear your memories and experiences of when and how you make journeys by cycling to and from public transport and what makes you think about doing so.

We also want to hear what makes you reduce or stop cycling to and from public transport and how and when you replace this by other means of travel.

Before we start today's discussion – let's agree to try not to judge each other based on our descriptions of what we do and how. (*e.g. how we travel with children may differ from person to person, but let's accept all perspectives here.*)

"Ice-breaker" question: (4 mins)

Please tell us your name and, thinking back to when you were still at school, can you tell us about a particularly memorable school drama or performance?

About recent journeys combining cycling with public transport

This study is about cycling and it is about public transport. To understand how you travel using both forms of transport together, it is useful to get an idea of where you go and the sorts of things you are able to do when you travel by bike and by public transport.

1. Thinking back to the last time when you combined cycling with using public transport – For what purpose did you combine cycling with public transport as part of a journey? (5 mins, **total 9**)

Prompts:

What for?(try to ensure all get to speak)
Where?
When?
How far?
Who came with you / did you meet?
How often
Why (cycle)?
What replaces it?

2. What are the challenges you face when you try to take your bike on a long journey? (5 mins, **total 14**)

Prompts:

Weather
Time constraints
Topography (hills, etc)
Traffic
Connections
Information
People

(SKIP THE NEXT 'SHOW CARDS ON COMBINING' QUESTION IF SESSION IS PROGRESSING TOO SLOWLY, OR IF SESSION IS BELOW 90 MINUTES)

3. Can you identify the different ways you have combined a trip by/ with a bicycle with a trip by public transport? ("show-cards" exercise – 4 minutes, **total 18**)



Placeholder images (here L to R, but provided to participants as sets of cards with images):

1. bike parked at station/stop near home
2. full-size bike taken on board
3. folding bike taken on board
4. public share bicycle such as 'Boris Bikes', Bike & Go, etc.
5. Other (please sketch your own simple cartoon or diagram)

About changes to travel

We know that travel varies from day to day and from week to week, sometimes because of changes to when or where something takes place, or because a particular form of transport may not be available for some reason. First we'll explore changes that can arise from one day to the next, then we'll think about what's happened over the longer term.

4. Thinking back over the past month (or when you last combined cycling), how does the "typical" cycling with public transport journey vary? (5 minutes, **total 23**)

Prompt:

what causes any variation (if not already described)

5. Thinking back further, over the past year and a half, how has your everyday travel changed as a result of something that's happened to your household? (8 minutes, **total 31**)

If 18 months is too short to highlight any changes, go back further to any significant events, including, but not limited to the following:

- *you moved home*
- *someone changed job or workplace location*
- *someone obtained a full licence to drive*
- *son or daughter moved out of the household*
- *somebody else living as part of the household moved out*
- *someone moved in to live as part of the household*
- *changes to a person or their abilities*
- *a child changed or started at a (new) school or college*
- *other (as defined by participants)*

6. Are there changes in the wider environment you've noticed recently that mean you cycle more? (4 minutes, **total 35**)

Probes:

- *Travel & parking costs*
- *Public transport availability*
- *Accessibility*
- *Cycling infrastructure*
- *Behaviour change campaigns*

(next – about cycling and childhood)

About cycling as a child

As part of studying the effect that other people have on cycling with public transport, we are interested in finding out how caring for and bringing up children can affect journeys. We'll be asking you to remember how you travelled when you were young looking at how and when you were accompanied. We're also interested in how you may be passing on your experience to your own children or those that you look after.

(Accompaniment, mentoring processes and travel companions)

7. As a young child, how did you travel around in your neighbourhood on your own? (4 minutes, **total 39**)

Prompts:

- *cycling*
- *public transport*
 - *to school*
 - *to other places (not school)*

(age, if you can remember then?)

8. (If not covered in answers to previous Q.) How did other people in your family travel around then? (4 mins, **total 43**)

Prompts:

parents
brothers
sisters
other relatives

9. Where and when did **you** first experience combining a bike ride with a trip on public transport? (3 minutes, **total 46**)

About cycling with (your) children

If you have children you are responsible for, or you know a family well who have children, please stay and answer the last couple of questions (...**if not, you are free to go!**)

(This set of Qs may also apply to some participants whose children have grown up and left home)

10. How do you / did you teach your children to know how to travel on their own without you? (4 minutes, **total 50**)

Probes:

Walking

public transport

cycling

cycle training

following your example

taking them with you

planning route & schedule

paying for travel

maintaining contact en-route

11. When and where did **your children** first travel with a bicycle to, from, or on public transport? (*assuming they've already done so*) (2 minutes, **total 52**)

12. How did you prepare the children for this journey? (3 minutes, **total 55**)

Summary Question (Krueger and Casey, 2015)

Do we think that 'internal' household factors more important than external environment in maintaining cycling with public transport?

We've covered... (summarise briefly those areas discussed in some depth today)

13. Is there anything important you feel we've missed during our discussion today? (5 minutes, **total 60**)

Thank you for helping us with our research today! You are welcome to keep in touch and I'll be happy to let you know the outcome of today's study when we've had time to go through and analyse some of the discussion we've had today.

Summary Question (Krueger and Casey, 2015)

Do we think that 'internal' household factors more important than external environment in maintaining cycling with public transport?

We've covered... (summarise briefly those areas discussed in some depth today)

14. Is there anything important you feel we've missed during our discussion today? (5 minutes, **total 65**)
15. I may want to ask you for clarification about something we discussed today – if so, would it be OK for me to contact you again about this?
16. I may also like to invite you and your family to contribute to the study through another research activity, such as keeping a diary of all activities and travel for a few days (with an additional small cash reward for your family's time), please confirm on the household demographic form if you'd be happy for me to contact you in this case?

Thank you for helping us with our research today! You are welcome to keep in touch and I'll be happy to let you know the outcome of today's study in due course.

Appendix 1.b Discussion Guide (Model Workshop) V27n

Group Discussion Model Workshop Guide - V27-CM-PA.docx

Cycling with Public Transport – Group Discussion – Peter Atkinson (ITS PhD student)

Group Discussion (Model Workshop) Guide – V27n

Venue:

Date:

Materials:

Leeds Cycling maps

regional map (Leeds + whole of Yorkshire)

Lego/Wilko blocks

Plasticine

Flip Chart

Documentation:

PILs – adult (child versions if carers may need to bring their children to the session)

Consent Forms – adult (& child versions)

HH Demographic Q'nnaire (paper copies sufficient for all likely participants)

Have participants seen and read the Participant Information Letter?

Ask participants to complete and sign the consent form, circling all of the relevant points indicating their agreement.

Introduction:

Your input to this focus group will help us to understand how and why people combine cycling with public transport in UK city-regions outside London.

Your contribution to the discussion will help us to start to answer the research questions we have about the benefits and challenges of cycling when combined with public transport (as an alternative to car use).

Today we want to hear your memories and experiences of when and how you make journeys by cycling to and from public transport, and what made you start doing so. It is important for us to understand how this allows you and others in your family to go about your daily and other occasional household activities.

We also want to hear what makes you reduce or stop cycling to and from public transport and how and when you replace this by other means of travel.

Before we start today's discussion – let's agree to try not to judge each other based on our descriptions of what we do and how. (*e.g. how we travel with children may differ from person to person, but let's accept all perspectives here.*)

“Ice-breaker” question: (4 mins)

Please tell us your name and, thinking back to the last time you went into a bike shop (or a shop that you went to because it sells bikes or bike accessories), what cycling-related thing were you looking for?

About recent journeys combining cycling with public transport

This study is about cycling and it is about public transport. To understand how you travel using both forms of transport together, it is useful to get an idea of where you go and the sorts of things you are able to do when you travel by bike and by public transport.

1. Thinking back to the last time when you combined cycling with using public transport – For what purpose did you combine cycling with public transport as part of a journey? (5 mins, **total 9**)

MAKE A PLASTICINE ACCESSORY OR LUGGAGE ITEM

Prompts:

What for?(try to ensure all get to speak)
Where?
What did you take with you? – (Using the plasticine, make a small model of the luggage or another other object that came with you on that trip)
When?
How far? (or, how long...?)
Who came with you / did you meet?
How often
Why (cycle)?

Map your Activities (if participants typically live and cycle in Leeds or Nottingham)

Taking the cycling map of Leeds, each person places a dot near to home. – add the home postcode on a little white label.

Put coloured dots on places that you have travelled to regularly, or occasionally. (*include public transport stops or stations you have used*).

Draw lines indicating the routes that you **cycled** to or from your activities, and include anywhere you cycle sometimes, even if just for fun or exercise.

If your journey includes both public transport and cycling, indicate this by connecting up **your** dots with a solid line in your chosen colour and labelling with the form of transport used.

Finally, put a gold star marker where you particularly like to ride your bikes in a group with other people (i.e. at least 2 of you who sometimes cycle together).

2. **What are the challenges** you face when you try to take your bike on a long journey? *[these may already have been addressed naturally by the participants]* (5 mins, **total 14**)

ASSEMBLE THE STATION MODEL

Prompts:

Weather
 Time constraints
 Topography (hills, etc)
 Connections
 (for connections with Public Transport – use the scale models provided to explain your experiences of using the facilities)
 Information
 Traffic
 People

- (2a) How might cycling with PT be enabling you and other people in your household to be doing things at the same time? (5 mins, **total 19**)

Prompts:

- Together or collectively
- Separately or independently
- Partners / spouses?
- Children / parents?
- Other family members
- Time savings
- Cost savings
- Travel resources

Group Discussion Model Workshop Guide - V27-CM-PA.docx

3. (SKIP THE NEXT 'SHOW CARDS ON COMBINING' QUESTION IF SESSION IS PROGRESSING TOO SLOWLY, OR IF SESSION IS BELOW 90 MINUTES)
4. Can you identify the different ways you have combined a trip by/ with a bicycle with a trip by public transport? ("show-cards" exercise – 4 minutes, **total 23**)



Placeholder images (here L to R, but provided to participants as sets of cards with images):

1. full-size bike taken on board
2. bike parked at station/stop near home
3. two bikes – one used at either end of a (regular) journey
4. public share bicycle such as 'Boris Bikes', Bike & Go, CityCard cycle scheme, etc.
5. folding bike taken on board
6. Other (please sketch your own simple cartoon or diagram)

About changes to travel

We know that travel varies from day to day and from week to week, sometimes because of changes to when or where something takes place, or because a particular form of transport may not be available for some reason. First we'll explore changes that can arise from one day to the next, then we'll think about what's happened over the longer term.

5. Thinking back over the past month (or when you last combined cycling), how does the "typical" cycling with public transport journey vary? (5 minutes, **total 28**)

Prompt:

what causes any variation (if not already described)

how does the change from routine affect others in your household?

What replaces cycling? (if not already described)

What replaces public transport? (if not already...)

6. Thinking back further, over the past year and a half, how has your everyday travel changed as a result of something that's happened to your household?
(8 minutes, **total 36**)

If 18 months is too short to highlight any changes, go back further to any significant events, including, but not limited to the following:

- *you moved home*
- *someone changed job or workplace location*
- *someone obtained a full licence to drive*
- *son or daughter moved out of the household*
- *somebody else living as part of the household moved out*
- *someone moved in to live as part of the household*
- *changes to a person or their abilities*
- *a child changed or started at a (new) school or college*
- *other (as defined by participants)*
- *has anyone acquired or lost a bike?*

7. Are there changes in the wider environment you've noticed recently that mean you cycle more? (4 minutes, **total 40**)

Probes:

- *Public transport availability*
- *Facilities at public transport stops and stations*
- *Accessibility*
- *Cycling infrastructure*
- *Behaviour change campaigns*
- *Travel & parking costs*

About cycling as a child

As part of studying the effect that other people have on cycling with public transport, we are interested in finding out how caring for and bringing up children can affect journeys. We'll be asking you to remember how you travelled when you were young looking at how and when you were accompanied. We're also interested in how you may be passing on your experience to your own children or those that you look after.

(Accompaniment, mentoring processes and travel companions)

8. As a young child, how did you travel around in your neighbourhood on your own? (4 minutes, **total 44**)

Prompts:

- *cycling*
- *public transport*
 - *to school*
 - *to other places (not school)*

(*age, if you can remember then?*)

9. (If not covered in answers to previous Q.) How did other people in your family travel around then? (4 mins, **total 48**)

Prompts:

- *parents*
- *brothers*
- *sisters*
- *other relatives*

10. Where and when did **you** first experience combining a bike ride with a trip on public transport? (3 minutes, **total 51**)

About cycling with (your) children

If you have children you are responsible for, or you know a family well who have children, please stay and answer the last couple of questions (**...if not, you are free to go!**)

(This set of Qs may also apply to some participants whose children have grown up and left home)

11. How do you / did you teach your children to know how to travel on their own without you? (4 minutes, **total 55**)

Probes:

Walking

public transport

cycling

*cycle training (*inc. adults*)*

following your example

taking them with you

planning route & schedule

paying for travel

maintaining contact en-route

12. When and where did **your children** first travel with a bicycle to, from, or on public transport? (*assuming they've already done so*) (2 minutes, **total 57**)

13. How did you prepare the children for this journey? (3 minutes, **total 60**)

Appendix 2. Recruitment materials

Appendix 2.a Example of poster aimed at recruiting families

Do you cycle to or from the bus, the train, or the tram?



If you have combined cycling with public transport for at least three journeys in the past 18 months and have children aged 9-21, I'd like to hear your experiences at a **household activity discussion**

You will tell us about your experiences and give your suggestions for future transport designs using 3D models and pictures.

A **£15 reward** is offered for taking part together with your children.

The discussion can take place at your home, or in a nearby public library, or another agreed venue, between **18 April – 16 July 2017**.

If you're interested in taking part, contact Leeds University PhD student Peter Atkinson: tspa@leeds.ac.uk or text/phone: **07821 479515**.

Appendix 2.a Examples of participant recruitment forms, upper: phase 1 Nottingham; lower: used for both Nottingham and Leeds during phase 2.

Focus Group Sessions: Study of Cycling with Public Transport

I have been invited to share my recent experiences of combining cycling with public transport, whether on an occasional or regular basis.

I most often / recently combined cycling with: train / bus / ferry / Metro / tram (please specify) to go from.....to.....

My name is.....

Main occupation is / are.....

My contact phone number is.....

My contact email address is.....

My household includes adults children (0 – 8) children (9–21)

I would be most likely to join the discussion meeting/s that I've ticked below....

(Other individual or household interviews may take place at other times marked 'free' by mutual agreement)

	1:30 - 3 pm	3 - 4:30 pm	5:45 - 7:15 pm
Wednesday 27 July	City centre (venue t.b.c.)	Bentnick Hotel (adj. Nottingham Rail Stn.)	Beeston Library
Thursday 28 July	10 - 11:30 am	3:30 - 5 pm	6 pm - 7:30
	Beeston centre (café t.b.c.)	Bentnick Hotel (adj. Nottingham Rail Stn.)	Bulwell Library (t.b.c.)
Saturday 30 July	10:30 - 12 noon		5 pm - 6:30
	Bulwell Library (family workshop & activity)		
Monday 1 Aug	10 - 11:30 am	3 - 4:30 pm	5 - 7 pm
		Bentnick Hotel (adj. Nottingham Rail Stn.)	Bentnick Hotel (adj. Nottingham Rail Stn.)
Tuesday 2 Aug	10 - 11:30 am (free)	12:30 - 2 pm (free)	4 - 6 pm
			Sneinton Library

This is part of the PhD student research study: "Fitting the bike to the chain: An activity analysis of transitions towards households integration of multi-modal cycling" by Peter Atkinson at the Institute for Transport Studies, University of Leeds.

Please scan/photograph this form and send to Peter Atkinson:
email: tspa@leeds.ac.uk mobile: 07821 479515

I'd like to take part in the Study of Cycling with Public Transport

My name is.....

My occupation is.....

My contact phone number is.....

My contact email address is.....

My household includes adults children (0 – 8) children (9–21)

I most often / recently combined cycling with: train / bus / ferry / Metro / tram

(please specify) to go from.....to.....

(Please indicate any other times in the week when you're generally available. Write down another local library if it's more convenient for you.)

	10am - 12	12 - 2 pm	2 - 4 pm	4 - 6 pm	6 pm or later...
Mondays					
Tuesdays					
Wednesdays					
Thursdays					
Fridays					
Saturdays					
Sundays					

Please scan/photograph this form and send your details to Peter Atkinson:
email: tspa@leeds.ac.uk mobile: 07821 479515

Appendix 3. Participant Information Letter

Appendix 3.a Parent or child-carer's participant information letter for household interviews

04 April 2016

TSPA-Participant-HHI-AdultLetter-23-CyclingIntegrationStudy-amended.doc

Participant Information Letter (interviews & household activity case study)

A Study of Cycling with Public Transport

This is part of a PhD student research study titled *"Fitting the bike to the chain: An activity analysis of transitions towards households integration of multi-modal cycling"* by PhD student Peter Atkinson, supervised by Frances Hodgson and Caroline Mullen, University of Leeds.

Please read through the following sections of this information sheet and do contact the researcher with any questions you may have. Take time to discuss this with the other people in your household, ensure you have their support before deciding whether you wish to take part in this research.

Project aims

We want to find out who combines cycling with public transport, how this helps your household or family, and whether this is something that has changed as your children have grown up. We would also like to find out what makes cycling in combination with public transport difficult.

Cycling is already popular in combination with rail journeys for getting to work, school or college, but this study is also interested in the potential for combining cycling with buses, trams and Metro rail systems, and for social, recreational and many other purposes.

Why are our experiences of value to the study?

The experiences of the members of households with children and young people (aged 9–21), where someone combines cycling with other modes of transport, are essential to this project. The comments and observations of others in the household who may not cycle – including children – are also important. Finding out how people in your household arrange, prepare and undertake everyday activities and associated travel is essential to understanding the challenges and constraints which can be associated with everyday cycling. It will also help us to identify and communicate any benefits it could offer to other households.

What will we need to do?

Yours will be one of a limited number of households (approximately 15) whose activities and associated journeys – together and individually – will be analysed in great detail to form a case study of where, when and how the integration of cycling with public transport fits in. The researcher will meet with you to interview you and the others in your household. If you have agreed to provide your activity and travel data, the researcher will also explain the technical details about the diary and GPS/Wifi travel activity tracking. A number of methods will be used which together, will help us to understand who, when, why and how people make integrated journeys by combining cycling with public transport:

1. A biographical interview with all members of the household present, either by video link, or at the home location, would explore in greater detail themes related to:
 - how children and young people learn to travel on their own with their bikes and who helps them to learn the necessary skills
 - factors resulting from the changing needs of growing children, as well as changes to the household over the same period
 - resource issues, the costs of cycling and particularly those related to children, space for storing bicycles and other equipment.

04 April 2016

TSPA-Participant-HHI-AdultLetter-23-CyclingIntegrationStudy-amended.doc

2. Activity and travel data records. This would involve you keeping an activity diary that gives a detailed record of individuals' activities and travel over a 2 week period (covering at least one week within school term time). Also, a GPS/WiFi based smartphone travel activity tracking app would be used to record the trips of adults (aged 16+) in your household, as an alternative to the diary.

Later the downloaded data would be forwarded to the researcher to enable journeys to be mapped, categorised and analysed by purpose, size of group travelling, means of travel (walking, cycling, public transport, car, etc.). You will be shown how to switch off the app's GPS/WiFi travel activity tracking function, for those times when you may not wish to have all of your movements tracked, nor the locations you visit recorded.

3. A mobile interview with household members who usually integrate cycling with public transport; you would be accompanied by the researcher on a typical journey where you would normally combine a bike trip with public transport. *(You might need to allow a little more time than usual, considering that the researcher may need time to catch up safely, both when cycling on the highway and when moving through public transport interchanges or in other public places).*

Together, these methods support analysis of:

- the different activities undertaken by bike, places travelled to and reasons why people go on bike trips
- people who cycle with you, or people who you visit, or meet by bike
- the practical challenges you prepare for when you take your bike on a long journey
- the uncertainties imposed by the public transport system and related infrastructure
- the reasons why you choose this particular combination.

What are the disadvantages and risks of taking part?

The household interview will require up to two hours of time from you and your household. It would be useful if this could take place within your own home, enabling issues of storage and access to be discussed and observed 'in-situ'. Alternatively, the interview could be arranged to take place at a distance using Skype.

Activity diaries require you to complete sections within a booklet prepared by the researcher, using a combination of tick-boxes, writing some comments of your own about the activities you did and the journeys made, and noting the time of day at the start and end of each trip. Although not particularly time-consuming, it requires you to keep the diary with you and to remember to complete it every day during the 2 weeks you agreed with the researcher.

The GPS smartphone app 'Moves' (Android or iPhone only) requires relatively little input after installing it and setting up an account using an existing email address. On a daily basis over a period of a fortnight, you would be asked to check the app's record of your daily activities and travel means, adding or correcting some details which it has automatically recorded (such as a description of a place visited, or by which means of transport you travelled). After two weeks, you would be asked to download the digital records of your activity patterns and provide these to the researcher. You would be free to delete the app at the end of the study.

What are the possible advantages and benefits of participating in this study?

You will be making a contributing to the knowledge of how the integration of cycling may be useful to support household activities. This will be relevant to other households looking for independent travel opportunities for their younger members, as well as to policy-makers and professionals involved in

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planning for cycling integration. You may also find out about other facilities, resources and information to help you and your family make journeys by integrating cycling with public transport.

We offer a £15 reward as thanks for your family's time in the household interview described above. We also offer an additional reward of £15 for the completion and return of the activity-travel diaries and the transfer of 2 weeks activity data downloaded from the 'Moves' GPS/WiFi activity app, in any combination covering all members of the household.

There would be no reward payment for the mobile interview which would take place during a typical household journey you would be doing anyway.

Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form and give separate authorisation for your child to take part. After giving your written consent, you may choose not to respond to any particular question or activity prompt within the interview you participate in.

You may take part in any of the 4 methods described above, in any combination. Please identify to the researcher which methods you would like to participate in.

You may withdraw from the study at any time without it affecting any benefits and no further data will be collected. You will have a two-week cooling-off period after taking part in any of these research methods. Within this period you may request that the data you have directly contributed, such as transcripts and quotes of the things you said and any audio, photographic and/or video recordings of you and/or your children or their activities, should be deleted. Additionally, during the first two weeks after you have transferred any GPS/WiFi travel activity data to the Researcher, or sent in an activity diary, you may request that it be deleted or destroyed.

What is the purpose of the research and where will the research findings be reported?

This study intends to share the anonymised real-world knowledge gained from households with policy-makers, transport planners, operators and other members of the general public. It is important for policy-makers contemplating transport investment and support programmes to know how you have responded to the challenges, constraints and opportunities for combining cycling with public transport. The study's findings will be reported at conferences, in journal papers and the researcher's PhD thesis. A project website and regional media releases will enable the public to follow the project.

Why will interviews be recorded, and how will these be used?

The interview (or ride-along mobile interview) will be recorded on audio, and preferably with video, to enable analysis of the discussion and any of the physical features that may be referred to in the interview discussion. Digitised drawings and other visual materials may be generated within the interview too, these will be analysed to identify themes which may be important for the effective integration of cycling. The audio, photographic and/or video recordings of your activities, journey or household features made during this research will be used only for illustration in conference presentations and lectures. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings.

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Will our contribution be anonymous?

Yes, in all outputs, data and images will be anonymised. Your personal information will remain known only to the research team. Neither you, nor other people to whom you may refer, will be personally identified by your real names, nor be identifiable in any other way in outputs from the research. We may sometimes use a pseudonym (a kind of nickname that no-one else knows is yours) to quote what you or other in your household have said.

How will my data be stored and who will have access to it?

A paper-based record of your consent will be retained securely within the University. Recordings and transcripts of the interview discussions, photos, videos, GPS/WiFi tracking data and other digitised materials will be stored on a secure computer and linked to your name by a code word that only the researchers have.

Only the research team will have access to your anonymised data. Relevant sections of the data collected during the study, may be looked at by individuals from the University of Leeds or from regulatory authorities where it is relevant to your taking part in this research.

Anonymous archival and Sharing of Research Data

Anonymised digital data in the form of photographs, scanned drawings, GPS/WiFi tracking patterns, or edited video and audio recording transcripts of interviews, observations, or other activities) will be retained in the University of Leeds 'Research Data Leeds Repository'. These anonymised archives would be available, following a formal application process, to other researchers.

Funding for the study

This PhD project is sponsored by the White Rose Doctoral Training College (WRDTC), with funding provided by the Economic and Social Research Council (ESRC).

Contacts

Peter Atkinson: tspa@leeds.ac.uk; mobile 07821 479515

Frances Hodgson: F.C.Hodgson@its.leeds.ac.uk

Caroline Mullen: C.A.Mullen@leeds.ac.uk

Institute for Transport Studies (ITS)
c/o Geography East
University of Leeds
Leeds
LS2 9JT

Appendix 3.b Young person's and child's participant information letter for household interviews

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Young Participants' Information Letter (workshop activity and discussion)

A Study of Cycling with Public Transport

This is part of a PhD student research study titled "*Fitting the bike to the chain: An activity analysis of transitions towards households integration of multi-modal cycling*" by PhD student Peter Atkinson, supervised by Frances Hodgson and Caroline Mullen, University of Leeds.

About this project

Please read through this information sheet and contact the researcher to ask any questions you may have. The researcher will be at the workshop where he will explain anything you still don't understand. Take time to decide with your parents or another adult who is looking after you, whether you wish to take part.

Project aims

We want to find out who combines cycling with public transport, how this helps your family and how this changes as you grow up and start to go to places independently. We would also like to find out what makes cycling in combination with public transport difficult.

Although many people already cycle to get to railway stations for getting to work, or a place where they study, we are also interested in journeys for meeting friends or relatives, to go the shops, going out for (or coming back from) a longer bike ride for fun, or any other reason. If you or your family have also tried to take your bike with you on a bus, tram or Metro train, we are particularly interested in hearing your experiences.

If I take part, why will this be useful for the study?

Finding out about the experiences of children and young people in families where someone (probably an adult) integrates cycling with other modes of transport is important to this study. It does not matter whether you cycle or not. Understanding how you and your family make travel arrangements together and independently will help us understand what the difficulties are, as well as the benefits.

What will I need to do?

You will be involved in a workshop activity and discussion. You and your parents or adults looking after you, would create drawings, maps and describe travel stories and places in words and pictures, as well as materials like Lego, Plasticine and scale models. In this workshop, we hope to understand:

- the different activities undertaken by bike, places travelled to and reasons why people go on bike trips
- the changes in your activities as you have grown up, as well as other changes at home over the same period.
- how you are learning to travel on your own with your bike and who helps you to learn this
- people who cycle with you, or people who you visit, or meet by bike
- the difficulties you face when you try to take your bike on a long journey
- the costs of cycling, space for storing bicycles and other equipment

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What are the disadvantages and risks of taking part?

Taking part in the workshop will require you to give up about an hour of your time. It may take place in a busy public place, so we will try to invite you to join in at a time when we think the workshop session will not be full.

What are the possible advantages and benefits of participating in this study?

- Your thoughts and experiences could help other families and young people who would like to travel independently. It may also help transport operators, or the local council to make plans for combining cycling with public transport
- You may find out about other facilities, resources and information to help you and your family make journeys
- You may also learn something about doing research, which could be useful to you in your own studies and projects at school or college

Do I have to take part?

It is up to you to decide whether or not you will take part. If you do decide to take part you will be given this information sheet to keep. We will ask you to sign a consent form which confirms you have read the information sheet and are happy to take part. As your age is less than 16 years, your parent or a legal guardian is also required to sign to say they will let you take part.

You can choose not to take part in any particular workshop activity, and you do not have to answer any questions asked within the workshop sessions. You can also decide to withdraw from the study completely, but your family will still be allowed to get any benefits they were offered, such as entry to the prize draw. If you let us know within fourteen days after taking part, that you want to withdraw from the study, we will also be able to delete all our records of what you said and any drawings or other visual work you contributed, if you so wish.

What is the purpose of the research and how will the results be shared?

It is important for people who work in the transport industry, and those in local government, to know what difficulties people have when trying to combine cycling with public transport. They will also need to know how, where and when their designs, information and other actions have been helpful.

Your drawings and models and what you say may be included in the researcher's PhD thesis, and in articles that he will write for journals, web pages and conferences – without you being personally identified. A project website will let you see how the project is getting on.

Why are the interviews and workshops going to be recorded, and how will these be used?

Recording what you say using video and sound recorders, particularly about what is shown in the drawings, maps or diagrams and models you create, will help us to identify themes which may be important for the effective integration of cycling. Photographs, videos and other digitised materials will be stored on a secure computer and linked to your name by a code word that only the researchers have.

Will my contribution be anonymous?

Yes, in all of our articles, reports and other communications, we will make it impossible for you to be identified. We will not show images of your face, nor will we allow which school you go to be identified. We may sometimes use a pseudonym (a kind of nickname that no-one else knows is

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yours) to quote what you have said. Maintaining the confidentiality of all participants in the study is important to us, so we will not reveal your name, or other personal details, although we cannot promise this on behalf of other participants in the workshop activities.

Anonymous archival and Sharing of Research Data

Transcripts from the video and audio recordings of interviews, observations, or workshops, as well as photographs of models, scanned drawings and activity maps will be stored in the University of Leeds 'Research Data Leeds Repository' after the end of the project. These archives would be available, following a formal application process, to other researchers.

Funding for the study

This PhD project is sponsored by the White Rose Doctoral Training College (WRDTC), with funding provided by the Economic and Social Research Council (ESRC).

Contacts

Peter Atkinson: tspa@leeds.ac.uk; mobile 07821 479515


Frances Hodgson: F.C.Hodgson@its.leeds.ac.uk

Caroline Mullen: C.A.Mullen@leeds.ac.uk

The University of Leeds
Institute for Transport Studies
c/o Geography East
University Road
Leeds
LS2 9JT

Appendix 4. Consent and other Project materials


Appendix 4.a Consent form for adults

<p>Institute for Transport Studies</p>	 UNIVERSITY OF LEEDS
<p>Consent to take part in: A Study of Cycling with Public Transport¹</p> <p style="text-align: right;"><i>Please circle either Yes to confirm your agreement, or No</i></p>	
I/we confirm that I/we have read and understand the participant information letter dated 04 April 2016.	Yes No
I/we have been given the opportunity to ask questions about the project.	Yes No
I/we agree to take part in the above research project. Taking part in the project will include being recorded (audio, photo and video) and copies being made of the drawings and models we make.	Yes No
I/we understand that our participation is voluntary and I/we and our children are free to withdraw at any time without giving any reason and without loss of any benefit such as a reward payment. Should we not wish to answer any particular question or questions, we are free to decline.	Yes No
Use of the information I/we provide for this project only	
I/we understand that our names and our household's personal details such as phone numbers, addresses and schools attended will not be revealed to people outside the project.	Yes No
I/we understand that neither I/we, nor other people to whom we may refer, will be personally identified by our real names, nor be identifiable in any other way in outputs from the research.	Yes No
I/we understand and agree that my/our words, drawings and any models that I/we and our children provide, may be quoted and used in publications, reports, web pages, and other research outputs.	Yes No
I/we understand and agree that analysis of my/our household's travel activity data generated from described, mapped or GPS/WiFi tracked journeys may be published or presented in anonymised, or aggregated (blended with data from several other participants) form.	Yes No
Use of the information I/we provide beyond this project	
I/we agree for the data I/we provide to be archived at the University of Leeds, Research Data Leeds Repository beyond the end of the project.	Yes No
I/we understand that other genuine researchers may use our words, drawings, and images of models in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	Yes No
I/we understand that relevant sections of the data collected during the study, may be looked at by individuals from the University of Leeds or from regulatory authorities where it is relevant to our taking part in this research. I/we give permission for these individuals to have access to our records.	Yes No
So we can use the information and visual materials you provide legally	
I/we hereby assign copyright in any drawings and models generated during activities related to this project to Peter Atkinson and the University of Leeds, Research Data Leeds Repository.	Yes No

Name of participant		
Participant signature/s		
Date		
lead researcher:	Peter Atkinson (mobile phone: 07821 479515 / email: tspa@leeds.ac.uk)	
Signature		
Date*		

¹ This is part of a PhD student research study titled "*Fitting the bike to the chain: An activity analysis of transitions towards households integration of multi-modal cycling*" being carried out by PhD student Peter Atkinson, supervised by Frances Hodgson and Caroline Mullen, at the Institute for Transport Studies, University of Leeds.

Appendix 4.b Assent form for children

<p>Child & Parental Consent Form</p> <p>A Study of Cycling with Public Transport¹</p> <p>Part A – to be completed by the young person</p> <p>I agree to take part in A Study of Cycling with Public Transport and would like to take part in (please tick one or more of the following):</p> <p><input type="checkbox"/> A workshop activity with other young people and adults responsible for them</p> <p><input type="checkbox"/> A focus group activity with other young people</p> <p><input type="checkbox"/> An interview together with my parents or another person responsible for me</p> <p><input type="checkbox"/> Keeping an activity diary recording the things I do and the journeys I go on</p> <p>I have read and understood the participant information letter dated 04 April 2016. I know what the study is about and what I am being asked to do. I know that I do not have to answer all of the questions and that I can decide not to continue at any time without loss of any benefit.</p> <p>I understand and agree that what I say, and the drawings and any models that I help to make, may be published in journals (specialist magazines), reports, web pages, and in other ways. My real name will not be published, nor will my address or which school I attend be mentioned.</p> <p>I agree that the materials I provide can be archived (stored) securely at the University of Leeds, Research Data Leeds Repository following the completion of the study.</p> <p>I agree that my words, drawings and models may be looked at and used by other researchers who will not know our real names, nor have access to our contact details.</p> <p>Name Age</p> <p>Signature School Year</p>	 UNIVERSITY OF LEEDS
<p>Part B – to be completed by the parent or guardian</p> <p>I/we have read and understood the participant information letter dated 04 April 2016 for the study of Households Integration of Multi-Modal Cycling and I/we give my/our permission for the child/children named above to be included.</p> <p>Name Date</p> <p>Signature</p> <p>Relationship to child</p> <p>This form must be completed and returned to the research project team to enable the young person named here to be included.</p> <p>Further information about this study is contained in the Participant Information Letters dated 04 April 2016. If you are unsure about what any of the statements above mean, please contact the researcher, or ask at the event, before signing this form or starting the activity, task or interview.</p> <hr style="width: 20%; margin-left: 0;"/> <p>¹ This is part of a PhD student research study titled "<i>Fitting the bike to the chain: An activity analysis of transitions towards households integration of multi-modal cycling</i>" by PhD student Peter Atkinson at the Institute for Transport Studies, University of Leeds.</p>	

Appendix 5. Household demographic questionnaire

FGW Participant and Household Domestic Info

Page 1: Page 1: Cycling with public transport questionnaire

Introduction

If you have shared your experience of combining cycling with public transport journeys at a Focus Group or Family Activity Workshop & Discussion, we ask you to fill in this questionnaire to tell us a little more about yourself and your household.

To help us analyse the data from this research, we would like to know a little more about you:

- about your age and gender
- about others who live with you
- the approximate level of your household income
- whether you use a car or other private motorised transport
- confirming where you live and how we can contact you if necessary

Your participation in this study is entirely voluntary and you may withdraw from the survey at any time without giving any reason. You do not have to answer any questions you do not want to.

- We are also looking for families with one or more children (aged 9 - 21) living at home who combine cycling with public transport; if this describes you and you would be happy to talk to the researcher together with your family, please tick the box at the end of the questionnaire. We will invite you to an interview, or to take part in a family workshop activity and discussion.

Your responses to this questionnaire will be stored in this paper record only and kept securely in the University of Leeds. Only the research team will have access to your responses and contact details.

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This is part of a PhD student research study titled "Fitting the bike to the chain: An activity analysis of transitions towards households integration of multi-modal cycling" being carried out by Peter Atkinson at the Institute for Transport Studies, University of Leeds.

This study has ethics approval from University of Leeds AREA Research Ethics Committee. (Ref. **AREA 15-088**)

For more information, contact Peter by email: tspa@leeds.ac.uk; or mobile: 07821 479515.

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Page 2: Part 1. About you and your household

Are you female or male?

female male

How old are you?

Do you drive a car or van, or ride a motorcycle?

Yes No

How many cars, vans, or motorcycles does your household have regularly available for use?

0 (no car, van or other powered motor vehicle)
 1
 2
 3
 4
 5 or more

Into which of the following income groups would your household income fit? (gross value, including any benefits, before tax is deducted) See last page for

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Income bands.

Up to £5,199
 £5,200 and up to £10,399
 £10,400 and up to £15,599
 £15,600 and up to £20,799
 £20,800 and up to £25,999
 £26,000 and up to £31,199
 £31,200 and up to £36,399
 £36,400 and up to £51,999
 £52,000 and above

How many adults (age 16 or older) live in your household, in total?

0 1 2
 3 4 5 or more

Please describe briefly the other people who live with you and their relationship to you:

Your answer should be no more than 320 characters long.

Of the adults living in your household, how many are young adults aged 16 - 21?

0 1 2
 3 4 5 or more

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How many children (aged 15 or younger) live within your household?

0 1 2
 3 4 5 or more

Of these children, how many are aged 8 or younger?

0 1 2
 3 4 5 or more

Have you experienced any of the following changes in your household within the past 18 months?

You moved home
 Someone changed their job
 Someone obtained a full licence to drive
 A son or daughter moved out of the household
 somebody else living as part of the household moved out
 Someone moved in to live as part of the household
 A change happened to a person affecting their abilities
 a child changed or started at a (new) school or college
 Other

If you selected Other, please specify: *Optional*

Your answer should be no more than 320 characters long.

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Appendix 5. (continued) Household demographic questionnaire

Please write down your full home address, including the postcode:

If you live at more than one address for part of the time, tell us more about why and when you travel between the different places where you live:

Your answer should be no more than 320 characters long.

Please confirm your email address and a contact phone number, in case we need to get in touch with you later:

If you and your family would be happy to be invited to take part in our further research on cycling with public transport, please confirm by selecting YES. (if you select NO, we would only contact you if we needed to change the way we hold or use the data we already have from you).

 YES NO

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Page 3: Part 6. Many thanks for completing this survey!

Many thanks for your time and the responses you've given to this questionnaire.

For more information about this project, please contact the researcher, PhD student Peter Atkinson:

Institute for Transport Studies
Geography East Building
University of Leeds
Leeds LS2 9JT
United Kingdom

Email: tspa@leeds.ac.uk

Mobile: 07821 479515

Appendix 6. Models constructed by participants

Plasticine luggage and Station models assembled by participants



Appendix 7. Other social and relational activities enabled through combining Cycling-pt

Table of themes from inter-generational relationships enabled through Cycling-PT.

Activity / behaviour / practice	Descriptive Theme	Linking-theme
Accompany child for several days: Derek; Lawrence's wife Jackie; Harold (biog); Darius (biog); Ingrid (biog)	Cycle touring together	Parent-child bonding, Transferring skills, compartments and passions/enthusiasms
Going to specific leisure activity, eg. cinema, (Dinah & Monique); football (Justin) match; spectate cycling (Ivan & Tris) competition at velodrome; Dave & Margaret with children to see Le Tour.	Access to Leisure and recreation activities (Cycling-PT is useful to get to matches and events). Some are cycling-related but other general leisure activities.	nurturing & supporting child's activities shared with parent/s; facilitates child's leisure activity
Accompany child/children to go for recreational cycling trip: Justin; Alfred; Kearney & wife; Heather & her non-godchild; Kenton; Darius with grandson; Denzel with grandmother (biog)	Cycling-PT enables access to sites suitable for cycling with young children ('Skyride'; off-road cycle routes in countryside or alongside canals & rivers)	Transferring skills, compartments and passions/enthusiasms; exploring; share family values?
Taking a child to stay with grandparents: Angela with Denzel (biog.)	Visit grandparents (and distant relatives); Access to informal childcare	Enables parent to work during vacations; retain contacts with extended family, family values? Experience different cultural & social 'milieu'.
Accompany a parent needing to work on a holiday or weekend: Doug with Thalia and Suki	Parent with rare weekend work commitment, off-peak group travel of with child (once with 2 children) plus bicycles by train.	Experience different cultural & social 'milieu'. Ad-hoc childcare.
Grown-up child cycling-touring with parent/s using PT: Matthew & son; Pamela & father	Train used to get to/from start and finish points of a planned long-distance bicycle ride; one party less constrained by time.	Shared cycling passion or enthusiasm; an enjoyable challenge?

Combining cycling and public transport for family visits

Table of themes from visits to other family members

Activity / behaviour / practice	Descriptive Theme	Linking-theme
Visit to parents & other family member/s: Haziq; Grace; Bernard; Victor, Charles, Dustin, Randolph, Sarah, Grant	Flexibility of travel arrangements at destination end; self-reliance – no need for lifts (car-less participants)	Maintaining contact with other family members
Combining visit to family and friends: Gerald, Marcus, Bruce, Rolf	Combining multiple social activities into visits; flexibility	Re-connecting socially in areas where previously resided.
Visiting frail or unwell parents: Derek; Edith; Wayne; Gerald; Haziq	Visits to parents who are either in residential care or living at home but frail	Support for older family members
Visiting grandparents: Denzel, Shaun (biog + recently), Lawrence (biog), Gemma (with dad Derek en-route to Scotland)	Unaccompanied children had visited grandparents had made relatively long-distance journeys to visit grandparents	Support for older family members; Inter-generational contact; family relationships.

Combining Cycling-PT with a partner or a spouse

Activity / behaviour / practice	Descriptive Theme	Linking-theme
Natalie, Shaun , Kenton (biog), Harold & Doreen, Simon & Pamela, Ingrid, Darius, Jeremy	Cycle-touring (without children)	Recreation, Bonding with partner/spouse
Day trips out with partner/spouse: Jessica, Ken and Teresa, Dustin	Recreational cycling and sightseeing	Leisure, exploring, shared experiences
Meeting up with a partner/spouse as part of a sequence of everyday activities: Dawn; Lawrence	Meetings to socialise after work; being collected from or met at a PT hub or station.	Talk over issues and relax in other surroundings?
Combining on long-distance cycling journeys by people using different modes (Simon and Pamela) or with different work commitments or cycling capabilities (Harold & Doreen)	Rendezvous at or near a PT hub or station	Enables a cycling tour to be enjoyed by people with different time availability

Appendix 8. Biographies of Cycling with Public Transport

01.

Pamela has considered trying out the Bike And Go bikeshare scheme. P and S are unsure whether they could use the bikes just in one direction but think it would be quite nice to:- "do a... bike ride and then catch a train by back, but we've never been organised enough to do it..."

Simon travelled on the bus to work near the city centre in the last few years before he retired. Parking availability was restricted (none available at that office), but did drive to his own business' office in Horsforth as no buses ran directly between his home and Horsforth.

Three years earlier, Simon had been co-opted by Pamela into a cycle-touring trip along the Danube, where they also used PT to travel between some European cities, however they had used rented bikes, and the train and ferry.

Pamela remembered first going on a cycle-touring trip as a 12-yo with her father in Norfolk on a tandem, taking the bike there by train from Leeds.

Simon had bought his first 'proper' bike when a student in Chichester, but had not combined CyPT until he had met Pamela. His first direct experience of taking a bike on a train was a cycling trip in the "Black Isle" in Scotland, although Pamela had still gone on a bike-rail holiday to/from Carlisle after they had first met but were still "doing separate holidays then still."

02.

Doreen had never been interested in driving a car but had used her old bike when a student in Hull, that her mother had sent up to her by train. she describe that city as *"Hull. So it was reasonably flat, and easy."*. She continued to get around by bike when she returned to Nottingham and started work. She had once taken her bike on the North Yorkshire Moors Railway to Pickering in the 1970s, but then used bike-rail more to visit her friends who had either stayed in Hull, or had moved to Manchester, Preston and other places after uni. "It was a big blow to me when they, did away with guards vans and all these restrictions."

Harold cycled as a young child but used it less for a few years until his mid-adolescence. He took up cycling seriously at University in Cambridge, where he replaced dinghy sailing as a pastime with cycling having sold his boat and the car he had used to tow it: *"so that at the age of about 21 I ceased to be a car owner and never have had one since."* He really got into cycling and thinks his first experiences of combining were taking the bike between home town and Cambridge, and was introduced to the concept of going on holiday through train and bike by CTC cycling groups.

Doreen and Harold have travelled in a group of 3 or more by train with their bikes and luggage.

03.

Faith first experienced combining cycling with public transport, from her childhood home in Aylesbury, to the Aylesbury train station to save time, *"you could get a bus but, was kind of pointless like, yeah, - and it would be like a 10 minutes cycle as opposed to a, you know nearly like half-hour walk so, yeah."*

She first experienced this as a teenager and *"did it a lot when I was about 19, I was doing an internship in London so I was commuting from home"*.

Heather remembered first combining cycling and PT was when she lived in San Francisco: *"On the buses you described earlier that take two on the front, and those routes in San Francisco, run on the hilliest places, so... touristy and hilly places, is where those run so, you could reasonably, commute say in in the morning and then, what happens in San Francisco is the fog comes in in the afternoon, and the temperature will drop 15°, and it gets, wet and chill and windy, and so it's reasonable to, bring your bike home, via the bus over the Hill."*

Heather grew up in New York but did not combine cycling with PT there because she was a child, although she did have other family members who did cycle in that city.

Me: ...I thought bikes were allowed on the subway?'

H: They are! I just, I wouldn't, I wasn't an adult in New York...

04.

Walter had cycled daily to school (with friends) after starting at secondary school, cycling independently in the late 1950s-early 1960s. There were fewer cars around then.

(Walter may have experienced combining CyPT as a teenager???)

Walter and his wife had supervised their daughters' first trips by bus, driving to the end of the bus route to make sure she had disembarked safely, having seen her get on the bus at the start. The daughter that had taken the cycling proficiency test still cycles nowadays as an adult, the other daughter did not learn but is an active walker and runner.

Vincent had learned to ride as a young child, but stopped cycling at 11 when his bike wore out. Started cycling after getting bike as a gift at 13-14. He considered that he had been affected in how much he cycled in previous times by the influence of his 'social group' as an adolescent. As a child, he had walked to primary school in Leeds, and took the bus, there being few if any facilities for bikes at the school, nor (infrastructure) for cycling to school.

Vincent had started cycling again at university as a low-cost commuting method, after a significant period not cycling.

First experiences of combining CyPT were as an adult going to and from Liverpool (where his wife lived and worked for a time).

05.

Justin had recently worked in Manchester for a year, leaving his bike at Leeds rail station, using another bike in Manchester until that one, a folding bike, was stolen from within a locked cycle storage area. He now works in Leeds, bringing his bike with him on the train on most days and cycling to his workplace.

Nick cycled as a child and young adolescent around his "smallish town", and only started to take buses after he was about 15 or 16, after someone had queried why he didn't use the bus, but the "advent of alcohol" led him to use the bus more.

Sarah too had cycled as a child from as young as 6, originally accompanied, but living in the country 8 miles from a bigger town, as a teenager she would cycle into work in the town. Sarah

but was unsure why she generally had not used the bike when going out in the evenings with friends for socialising, even though the bus stop was about 2 miles from her home: "...so we'd have to get a lift back from the bus, so there was that kind of added hassle...".

Sarah's "quite liberating" use of the bike to "explore the city and the surrounding area" began in her mid-20s, when she started to use the bike on a daily basis.

06.

Ambrose had cycled from his late teens until he was about 21 when he passed his driving test and drove cars. At the time of our discussion, he had recently "got back into it." i.e. cycling, and had been combining CyPT almost daily for the preceding 4 weeks, commuting to and from work.

Elton's cycling had ebbed and flowed, although he had never stopped altogether. From being someone who would cycle in all weathers but did not use public transport, over time cycling had become more discretionary for him: *"I've become much more of a fair-weather cyclist."* His first experience of combining had been when travelling to an archeological site in Northamptonshire, using the bike and train to take his camping gear and other items, in the 1980s. After that using bike-rail occasionally: *"That would be long-distance journeys; in those days you could generally put your bike in the guard's van."*

07.

Lawrence had grown up in a village where his parents had moved to emulate their own childhoods, but allowed their sons to cycle away from home once they had received cycle training, realising the limitations of living in a village without a public transport service for their children and the obligation this would impose: *"...and, them having to taxi us around and stuff if we wanted to do things..."*. Lawrence had used a school bus service, but remembered starting to combine cycling 4 miles to Allens West station for the short rail trip for the journey to Sixth Form college in Darlington, from when he had bought himself a bicycle until he passed his driving test and inherited a car. *"I seem to set of pattern there for gruelling long train bike commutes, cause, obviously I come a long way now!"*. Before that, he recalled taking his bike on the train aged 14 or 15 for a long distance bike ride back from visiting his grandmother in Peterborough.

Lawrence's wife had also cycled as an adolescent and before they had children, had combined cycling with rail journeys commuting between cities in North Yorkshire.

Wendy remembered using the train to get her bike to university as a young student as part of the process of moving home, perhaps also taking it with her when she went home.

Noel thought his first experience of combining CyPT was probably in his mid 20's when he "did the Coast-to-Coast, bike ride." Noel does not take many public transport journeys, preferring to live close to his activities, "I like to, live within, 20 minutes of, anything that I need to do which is why live in the cit-, sort of the city."

08.

Efi had used public bike share schemes extensively in Barcelona and Seville, only combining with PT, in Barcelona where the bikeshare scheme closed at midnight after which time she would use the Metro. In Seville public bicycles were available 24 hours a day and she rarely if ever used the Metro there. She commented that as the bikes were quite heavy the scheme worked fine, "specially if the city that you live in is not very-, doesn't have a lot of uphill and downhill...". Efi had only started to combine CyPT since moving to the UK the previous September (interviewed in July) from Finland where she had cycled daily 5km both to and from work along a cycleway and hadn't needed to use public transport. Now there was no appealing route for her regular journey to Mirfield, although she wouldn't mind cycling the 18km or so back at least twice a week, *"...but the way back is really awful!"*. She sometimes cycled from Mirfield to Dewsbury where she took the train back to Leeds.

Gregory grew up in Shanghai and started cycling approx 2 miles to school at 14 yo, when the buses would travel slowly in the jammed traffic, "it will take like 30 minute to-, for 3 miles, it's almost like you can walk there in 30 minutes, but if you ride, you don't have to suffer the traffic jam so, I cycled to school."

To go to university Gregory used the Metroway as it was almost an hour's journey even by this means. He took his bike on most days to get to Leeds train station to travel daily to work in Skipton.

Faye who worked at the railway station in Leeds had seen other people combine cycling with rail, but had only recently started to take her bike on the train occasionally as part of her commute from home just outside Leeds to work. She cycled 12 minutes to get to Garforth station in preference to the walk of 35 minutes. She had been combining bike and train to get to her early shifts, but would use the car when working 'lates'. Although she had the option of getting a different train to another station close to her home, she preferred to avoid the hillclimb that that journey would entail. As a child Faye had cycled regularly until aged around 13 when it had become 'uncool' to cycle amongst her peer group.

Howard had cycled for a long time since growing up as a child in a village near Normanton where his parents had enrolled him on a cycling safety course at primary school. He had always lived fairly close to his workplace or where he went shopping so had only recently started in his mid-20s, to combine cycling with train journeys to increase the distances of his leisure bike rides. When he had been training for the London Marathon, a friend had suggested taking the train out from the city and running back, *"and I just thought, "...can do that with my bike as well!" and then I started doing it..."*. His most recent combined journey had been returning from his parents home where he had shown off his newly acquired bike to them.

09.

Frieda lived in the the middle of the countryside, did not cycle much as a child, but walked or took the bus, her parents taking her to scl, then driving her to the bus stop when she took the bus to her sixth form college. As an adult she took up cycling and started exploring the area around her childhood home, and a Sustrans cycle route passes by her parent's home, but was not there when she was a girl.

Harry goes cycling with this younger half brother, his father's son by a subsequent wife. His father was quite a keen cyclist and had several unusual bikes including a tandem on which he had gone on holidays with H's stepmother. As a child he had been driven to school when younger, or to the bus stop when going to sixth form.

Carlos had a number of experiences of combining cycling with forms of public transport as a youth, including once returning with his father from a cycle ride into Budapest to take part in a cycling event organised by his school, his father had asked a neighbour who drove the local bus to give them a lift up the hill to their village with their bikes. He had been disappointed that he didn't cycle all the way back home. His first experience had been taking his bike on the cog railway back to their school, part of a group of approx 20 instead of the 8 permitted officially on the little mountain train. Carlos' father was quite old and didn't cycle much with his son after he was about 12 yo.

10.

Bruce had cycled with his parents as part of family activities in Herefordshire, including occasional quite long rides of around 50 miles around the Black Mountains. Like many of his friends who went to his sixth form school who, *"everyone was just desperate to get their driver's licence as quick as possible..."* He started to drive aged 17 when driving facilitated his participation in the social life of the sixth form, although he took the bus to his sixth form studies. Bruce's first experiences of combining CyPT was visiting a friend in Oxford, taking the coach from Cambridge fairly regularly, putting his bike in the bottom of the coach aged around 19.

Shaun remembered travelling with bikes and a friend as a 15 year old, meeting his grandfather at Leeds station and going on to stay with his grandparents near Skipton, to go cycling in the Yorkshire Dales. He remembered an incident on the return journey, where a train guard had objected to the two adolescents taking their bikes on the train without adult accompaniment, their grandfather negotiated to enable the youths to travel home.

11.

India had recently moved home due to "a change in circumstances", prior to which for about six months, she had cycled a mile to Beeston station and taken the train to her work in Loughborough, smts using a folding bike, cycling the 3 miles in Loughborough, a journey that she had alternated with driving, and cycling all the way. Moving further from the station that connected directly to Loughborough, she no longer cycled and took the train. The logic of cycling to go to Nottingham rail stn, in the opposite direction to her workplace seemed illogical to her just to take the train so she now either cycled or drove all the way, depending on the season to some extent.

India could not remember when she had first combined cyPT, but had done so for a long time.

Fraser first combined CyPT for work after he had started to work in London in a management role, whereas before he had worked locally and cycled directly to work. In the management role

he worked in different locations, leading him to start using "multimodal transport if you like...".

As children, both India and Fraser had used buses, they recalled it being cheaper than rail travel. Fraser's first trip to London had not occurred until he was a teenager.

12.

Christian recalled taking the bus aged 11 or so, in terms of his independence growing up in Ipswich adjacent to a major road with relatively fast traffic. He went cycling with his family in the countryside.

Dawn grew up in Lancashire, went to school by bus at 11, like many of her friends, some of whom travelled long distances. Her children cycled at 7, but were not very interested in cycling, perhaps influenced by their non-cycling friends, but her grandchildren liked riding on the back of her folding bike when she visited them, they are now quite confident cycling children. and may come to visit Dawn one day by train from their area in the countryside.

Dawn described herself and her partner as as, "kind of hippy" and aspired to live "that greener lifestyle" and be, as young parents, "non-conventional". Dawn's young family had avoided car use for several years, even after their first child was born, going house-hunting by public transport with their small child. She eventually accepted the loan of a car from her father for a few months after "he took pity on us".

Rolf who currently cycles "a lot", had ridden a motorbike since 17 as his main transport, only got a car in his mid-30s, but had always had a bicycle since his mid-20s. He had cycled as a child, sometimes riding on the highway between his (boarding?) school and his parent's home town, a distance of a few miles, as a child.

13.

Jason remembered that when they were younger, it seemed much easier "to get bikes on trains", esp. growing up in London's "commuter belt" he remembered there being quite a lot of ppl "that didn't own cars, you know, company executives used to get on the bikes and cycle to the station." Not having had a bike for 20 years, 12 years previously, a year after starting to work in Leicester where his wife also worked, he and his wife had bought bicycles and started to cycle to the station, Jason preferring to cycle the 2 miles rather than drive that distance. Prior to that he had driven to work at Nottm Uni because his work had involved going out to sites, and often collecting other people, or being picked up en-route.

Kirin had cycled all her life, including when she had worked abroad, for a variety of activities: "Functional, pleasure, holidays."

14.

Bartholomew cycled on the road after having passed the Cycling Proficiency test, cycling to get around to his activities, although his mother drove him to primary school. Secondary was reached either by 107 bus, or by cycling. His father had always commuted by bus and tube, walking to the bus stop and sometimes taking the bus all the way in preference to changing into the Tube. At 11 was given a Raleigh racing bike, which he cycled into Barnet from home.

Neither of his parents cycled. Bartholomew had cycled to Barnet Underground station from home when travelling on the tube into London since his early teenage years, when going on leisure trips there: *"just for, for fun."* Before he had children, he (and his wife, presumably) had been on holiday to Ireland with bikes, something he considered a more complex activity with children, although he has taken his Brompton folding bike to the South of France with his children, being easy to take on trains without the space constraints.

Kenton had cycled as child in Telford area, using his bikes in the evenings and at weekends to ride to local shops, parks and to meet with his friends. His mother was Dutch, although he never remembered her cycling, he presumed she had done so previously in Holland. His father had worked night shifts a lot, and had tried cycling to work for a short while, but had returned quite quickly to using the car. As an adult, Kenton had been cycling a lot including to go to work in his home city of Sheffield, he then started commuting by bike-rail when he got a job in Leeds, cycling to save time compared to walking to his local station.

Trevor had cycled at 10 to primary school, and to secondary school up to 16, later he used the bus to get to college because it was "just a bit further". He had lived with his young family in Sherwood in North Nottingham (22-23 years previously?), both he and his wife each had a car, he was unable to recall cycling into the city because the bus service was better (than from their current West Bridgford home?). For six years he had lived in London, then in Norwich, then they returned to Nottingham, this time living in West Bridgford, and as his children were becoming teenagers they decided to give up one car, because T could then cycle to his workplace, living relatively close and his job was more "deskbound" than in his previous Nottingham role. It was also becoming difficult to run two cars, so they became a "one car family". Trevor generally goes down just for the day from Nottm, he had previously stayed over in London for a couple of days at a time.

15.

Charles had brothers and sisters who are several years older than him, although they had all become car drivers. He recalled his father having cycled, but not much together with him, Charles had cycled more with his own friends, and by himself, although his maternal grandmother had been a keen cyclist and had met his grandfather through the Nottingham Cycling Club. Charles had started to combine CyPT some 15 years previously when they had gone to the Peak District, to get to Nottingham Station from home.

Dominic cycled from an early age, his father was a keen cyclist. He remembered as a child having combined a bike ride with a trip on public transport during a family holiday in Holland, using the ferry having cycled to the ferry terminal, assuming that he must have used some form of public transport when they were in Holland.

16.

Javaid had grown up in Pakistan where he had cycled to school a mile and a half or so, from 11 or 12 years old until he left school at around 17-18, when he started to ride a motorbike.

Lee could not recall his childhood clearly, thinking that he had sometimes cycled with his

brother at the weekend, perhaps to the park, although he didn't use it too much. In senior school he had used a bus pass, but his mother took him to "smaller school" up to a certain age when he started to go (walk) on his own.

Callum had cycled "all the time as a child" growing up in Edinburgh and had enjoyed it, although he had never really had a particularly good bike. He had tried to do *"tricks and stuff like that"* enjoying the playful aspects of using the bike.

17.

Darius had retired from employment 5 years previously, but had been a volunteer trustee for an organisation since then. Years previously he had lived in Sheffield and used bike-rail to commute then to Leeds for a period of 6 months during the 1980s. He has also used the combination for going on holiday. He currently lives alone, although he had a family and has two grown up children who learned to cycle from an early age, both cycling through their late teens and early 20s, their mother also having cycled. Darius gave up car-ownership 5 years previously when he retired as he had needed one previously for work, describing it thus: "it just felt like real liberation". He had shared a car initially, an arrangement that ended following changes in circumstances. Others had also sometimes shared their cars with him. Darius probably first combined CyPT in his 40s, for example going on holiday to Belgium with their young children, taking the family's bikes on the train to Hull from Sheffield, and again on the return to home. He is trying to live without a car, a decision he would reconsider if he eventually found it too difficult to cycle.

Ingrid had lived in Germany until 7 years old, and thinks she first experienced combining CyPT in her late teens when she came back to live in the UK. Now she goes on a short cycling holiday once or twice a year to places like France or Holland, journeys limited by the amount of leave time she has available from her employment. She had also cycled with her son when he was younger, she recalled cycling with a friend and accompanied by her son aged around 10 along the canals from Leeds to Manchester, staying overnight and using trains at either end of the journey, not a unique activity: "*so, we've done quite a bit of that when he was younger, yeah.*"

18.

Randolph:

Cycled as a young child, but did less between 9 and 21. Has been regularly riding a bicycle since 2003-4.

Cycling offers time savings over the bus, has led to him cycling more than using the bus in past 8-10 years, previously he had used the bus "half the time". Moving a bit further away (from work?), taking the bus required a 45 minute earlier start to the day. Now rarely uses modes other than the bicycle.

First experience of combining Cycling-PT was probably going to visit family in London, or for a bike ride in the Dales.

Tim:

Combined CyPT aged around 12 in 1961 after he got a bicycle, to bypass a walk of a mile to the station to use the train as it was much faster than the equivalent bus journey to his secondary

school in Glasgow from his home in a council housing scheme on the outskirts of the city. Had informal arrangement with the station master to leave the bike in a secure place, an arrangement that ended at the insistence of more senior railway company management.

Tim got a car as soon as he reached 17, and had *"a long fallow period"* from 17 until 29 when he did not cycle at all.

Warren:

Had a scooter as a child and his sister's hand-me-down 'girls' bicycle which he used locally, but started cycling regularly only in adulthood. Compared his more extensive childhood bike rides to the limited cycling he imagined children experience nowadays present day roads as, *"too clogged up with, vehicles"*.

When studying, he had borrowed a bicycle for a while then got a second-hand bicycle, *"that's what sort of got me into cycling really as an adult"*.

Moved from York to Leeds 30 years ago, bringing his bicycle, *"just moving it as a piece of, furniture almost..."* and initially did not cycle, but in recent years, cycling has been his main mode of transport.

Victor:

Currently cycles *"everywhere really"*. He grew up in Scotland but did not remember combining cycling with PT then, but only after he had come to Leeds. A journey to Derbyshire to visit an aunt may have been his first experience of combining CyPT about 5-6 years ago.

19.

Kearney:

had lived for a while in Switzerland and remembered taking his bicycle on buses there, buses that had racks for bicycles on the rear.

20.

Alan

learned to cycle at 8 in his back garden and had cycled as a child (9-11) around his Edinburgh neighbourhood, but after a break in cycling, he started to cycle to work after arriving in Nottm in 1977 in his mid-20s. He was happy then to cycle along the inner ring road and Mansfield Rd (routes he would be less keen to cycle along nowadays), to save money as he was "worse off" then. He also had "more courage and fitness then". A came to car ownership late, a reason he believed for also using cycling for leisure. Alan's mother had cycled when he was a child, but his brother was a lifelong cyclist, living in London at the age of 60 and had never had a driving licence.

Bernard

Originally walked to school along the A41 in London, to save the money from his fare for the bus that followed the same route and getting a bit of fitness from the exercise. Although he may have had bicycles as a child given to him by his father, at 13 - 14 "it all died back". He recalled being given a bike by his uncle who had cycled from Mill Hill to his shop in Bethnal Green, "held up as the family example of that's what you can do...". Bernard started considering cycling as an alternative means of getting to school at 16, as in his third year he had had to change to a

secondary school to which there was no obvious or simple bus route, "well there's no bus, obviously gets me to that school so, I might as well ride..." encouraged by the existence of provision for bicycles at the new school. B also preferred and used Cycling as an alternative to more traditional sports and PE activities during his 6th form. Going on to study at Cambridge, he continued to use cycling as a form of transport, gradually expanding its use to social activities too.

Dustin

Only learned to ride a bike at 18 at his family home in Wakefield, not motivated as a child (had and once fallen off a bike with stabilisers at a cousin's house and this had put him off as a child) and had learned to drive a car before he could cycle. Anticipation of going to study in Cambridge had been the reason for his learning to ride, using his mother's old bike. His father had cycled to work, a short distance away but D had never seen his mother riding her bike which he understood had been an 18th birthday present for her.

Cyril

Had ridden bikes since he was a very young child. Cycled the mile distance to and from his boy's school, four times a day including at lunchtimes. He remembered his school gradually weakening support for cycling and children cycling to school "less and less" at his school in Clifton, Nottm. His mother and brother had also gone cycling together, although his father, the only car driver at home, drove to work and back.

Cyril had originally used the bus to get to work, as cycling was not easy then, "There was no safe places and, difficult to get to so I've always used buses but I've always used cycling for leisure." C had cycled with his children but his wife did not share his views and methods: "she didn't have that, same interest in actually, human movement... To what I have." His children are now all car-drivers, his sons sharing C's interest in motorsports, but not his ability to compartmentalise "real life" as distinct from "that's sports..." in the context of constrained finances. The divorce from his wife made Cyril feel that his former wife had affected the values that C was hoping to instil in their children: "she was undoing everything I was trying to bringing them up like erm, so, it was difficult time. ...For instance she would rather drive the children places. //Whereas, I would want to walk them, or cycle them there. (1:44:27)" His children had never experienced combining CyPT, but had walked, or cycled with their father and gone by car. Before becoming drivers themselves, C believes they had also used PT, but they did not like using PT as adults.

21.

Nicole had probably combined CyPT in the UK a couple of years previously when she met up with a friend on a four occasions to cycle along the West Yorkshire Cycleway, in a series of one-day cycle rides.

Marcus remembered cycling aged 13-14 from his teenage home in Bradford to places like Keighley, Otley or Ilkley and then, "getting the train back, not in a particularly planned way, just thinking "Ah, I've got this far, how... .. Don't wanna cycle back, I'll get the train back and er, I suppose thinking "oh, this is quite fun! This works..." Yeah."

Marcus was the only person in his family interested in doing this kind of triMe: "I just seemed to taken it on myself, to, to do it yeah."

22.

Matthew had used buses and cycled as a child to visit friends who lived "further away" in villages near to Hucknall, his parents not being car owners, but he had "jumped" to motorcycling and then returned later in life to cycling. He had not cycled to the schools he taught at, but had always driven his car, also dropping off his own children at their school on the way to work, and picking them up going home. His son enjoyed cycling but working as a headteacher in a primary school 16 miles from his (son's) home he commented on the importance of maintaining a professional image: "he's head of a primary school so he's got a, image to keep up as well!". Now retired M spends a lot of time in London, his wife's home city, where he found the (increased) numbers of cyclists there amazing, observing also that a lot of people took their folding bikes when he took an early train to London for work that he still did there occasionally.

Norman had worked in the building trade and needed to drive carrying tools so could not cycle to work. His daughter was teaching and did cycle to work however, not in the winter when she would drive instead. Years ago Norman had prepared his young son then aged 4 or 5, for a long coach trip by taking him the day before on a trip by local bus, "just rode around the estate, until he sort of calm down and he was happy with being on a bus you know!" Another time Norman had also taken his son on a train journey from Long Eaton to Nottingham to get him ready for journeys by train as his son had generally been nervous of travel "on things".

As a youth, Larry had been a professional footballer and had combined CyPT to get around. One of his first experiences had been to go to Matlock Spa from Langley Mill by train, taking the bike (presumably for recreation). He remembered combining CyPT from 15-18. Larry had cycled whenever he could, including to his current workplace, Bilborough College, until the companion with whom he had cycled to work for around 10 years retired, when the journey seemed "not quite the same" and he couldn't be bothered with needing a shower and so on. Larry explained what the value of sharing the cycling journey had been: "...apart from we both enjoyed cycling that, it was also a good opportunity to, well for instance, a little bit of lesson planning and suchlike on the way you know, and all that sort of thing, and on the way back a bit of analysis afterward,..."

Both Matthew and Larry had had holidays in France when their families were younger and had taken bicycles with them. Recently they had also been cycling with their children's families, including grandchildren in local beautyspots such as Clumber Park.

The group as a whole also mentioned their wives who had all cycled at some point in their lives, Matthew's had cycled when she was younger, but did not do so currently as she had COPE, a condition affecting her breathing although she had been interested in getting an electric bike. Despite not cycling these days, the wives were all supportive of their husbands continuing to cycle. Larry's wife had begun to feel insecure on a bike and didn't cycle now, although she had used it for shopping, and both she and Norman's wife had cycled socially with their husbands and on family rides such as the Great Nottm Bike Ride.

As children, they had generally walked to school, those living more than 1 mile from school had had permission to cycle from the schools to cycle there, but did so sporadically living close enough to walk.

23.

Rosamond is from Holland, her experiences of cycling are conditioned by experience of her family members sisters and brother, mother often cycled to work when the weather makes it convenient, her father driving as he has to commute further. Rosamond first combined CyPT in the UK to go to the Peak District to do some cycling there about, 2 1/2 years ago shortly after arriving in Nottm. She didn't combine CyPT at all when living in Holland, taking bikes on the train being "fussy" and requiring separate bicycle train tickets with a prohibition at peak times and because of her concern at the risk of the bicycle being stolen. Neither had she cycled to stations and parked, because the station being at a distance, "fairly far out" she would take the bus to the station in preference. Her grandfather at 68-69 years cycles around 20km a day, on an electric bike.

Shelley, an Australian most frequently had combined CyPT after arriving in Nottm as a result of her experiences of the University Hopper bus being really unreliable, within two weeks she had bought a motorbike to get to and from SB campus, but since then the bus service had improved and become more reliable. She had also cycled to the station once or twice in London to get a "train to go somewhere else...", mainly "to meet people or something, so, it wasn't very -, like I've used it, but not, very often." Shelley's mother does not cycle, but her father was a keen road (racing) and track cyclist and Shelley had cycled with him sometimes while still at high school. A maternal uncle still cycles at 76 on a folding bike in Singapore and in the Phillipines, "so he just, gets on his bicycle and just will, go out for a pootle." Shelley had used the Cycle-To-Work scheme while working in London before university but described her cycling behaviour then as inconsistent and herself then as, "a fair weather cyclist". She had cycled more frequently since she became a student when, "it was just too expensive to always take public transport, so I'd cycled everywhere..."

24 : FGW-2017-01-25-Nottm-StAnnsV-4partips

11:15

Bridget

After several years as a household with no car Bridget's had become a 2-car hh which they, "really don't want to be". Bridget bought a car after starting a new job 5 yrs previously, then her partner also changed jobs to one "where he needed a car". B "used to cycle to work every day, and had cycled everywhere", noticing the change in herself after replacing cycling with driving regularly.

Dorothy

Had walked a lot, including to the parks, and to school on her own as a child, and taking the bus as she had grown up. She had started to cycle in her late 20s, after finding walking for one and a half hours each way to and from work, "was getting a little bit ridiculous!" she had found the

buses to be unsatisfactory and hers, "Just a bad bus route, what's wrong with a bicycle?" and had cycled since then as her primary transport.

As a parent, frustrated at having to walk her child to school until she was 8 - a slow process interrupted with impromptu conversations.

D had a car even when her daughter was young, in order to help older relatives, including her own mother, however she preferred to cycle.

Chester:

Did not use a bicycle while at Nottingham Trent university's Clifton campus, but got to Uni from West Bridgford by bus, or walked locally. Owned a bike from 21 and living in Nottingham.

Lived in Derby in his late 20s, early 30s when working at Rowsley in the Peak District near Bakewell, had cycled to Derby bus station then took the bus for an hour's trip to work. After the bike was stolen the journey took longer because he had to walk to catch the bus, "And then, it was a longer, distance between my house and the er, the bus station."

The two mothers, B and D compared notes on their respective daughters' preference for walking with friends, travelling in groups, and how they had prepared their daughters for journeys to secondary school by bus, involving journeys to a dancing class in the city centre for Dorothy's daughter, practice journeys into town by bus during the summer for Bridget's eldest daughter, the youngest going for the first time with her older sister.

25 : FGW-2017-01-27-Nottm-QMC-2Partips

11:35

Grant:

Grew up in an isolated location with no near neighbours, and was driven to nursery from 3 and to primary school, often by the family's nanny. He taught himself to cycle aged 3, cycling in the grounds of the family home, with both parents often at work he had no options for cycling further afield. First major cycling experience was a Birmingham to Liverpool charity cycle ride at 13-14 with his father. He attended a boarding school in a small village near Shrewsbury at his own insistence and "became quite independent there. I started enjoying cycling." There he had cycled for exercise, a practice he continued when he went to another boys' school cycling in the park and along a canal.

His father has now "become actually very keen on cycling recently" and has ridden long distances across France. Grant's first Cycling-PT combining experience was taking his bicycle from home to Nottingham as a university student, during a return visit home "an excuse to get my washing done".

Dominique:

Described her childhood memories as "a bit of a haze" but grew up in America for a few years. Her mother had carried her on the back of her bike as a child in Grantham, although not to school, and she remembered using an American bike with unusual brakes. She had cycled at 6-7 around the cul-de-sac with other children from the area.

D had been given a lift by car to both primary and secondary school by her mum who had

probably had to make a detour from her own commute to work, but describing her mother's motivation as, "probably seemed a bit of a detour but she probably was just a nice mum!" she also pondered why she had not walked, considering the distance had only been 2-3 miles, although her work was probably too far to cycle.

D had insisted on walking to school at secondary, and then cycled to school in sixth form "to save time", although her friends would walk if they lived closer to school. At university in Edinburgh D had initially walked a lot and did not use the bike, but later asked her parents to bring her bike up to her after she became conscious of her own health condition and wanted to exercise more: "cause of drinking alcohol and having too much fun, I'd put on quite a bit of weight so I was doing other exercise apart from walking".

After studying in Edinburgh, she did her final year of GP training in Lincoln but did not have her bike there, being a very busy year and need to use the car for home visits to patients, being on standby for emergencies, "on-calls" and the distances to locations.

26 : FGW-2017-02-06-Nottm-Bentinck-3-1-Partips

11:55

Una:

Had walked to primary school and secondary. Had not been confident riding a bike until 8-9 and went then for bike rides initially with her father then with cousins and aunt, but these family rides stopped at 12 or so, after her parents' divorce she didn't do so much. As she entered her teens "it wasn't such a thing anymore." A camping holiday with a friend's family going to Italy had been the last time Una had cycled regularly before her purchase of a bicycle during the previous year.

Parents divorced when she was 9, after then she periodically travelled by train from Newark with her then 12 years old brother to stay with her father who had moved to Canterbury and did not drive, "a public transport King" so she considered long train journeys as normal: "So that's always been quite normal to me to get the train quite far". The siblings had travelled unaccompanied as far as London where they were met by their father sometimes, or went with their grandmother when they had needed to change in London.

As a young adult she had moved to work in Leeds, then studied in Liverpool where she had walked or used the bus, she then returned to do her Masters in Leeds, but had travelled extensively by train visiting friends, "round the North on the train".

Una gets travel sick on coaches and buses and prefers the train if there's a choice, and thinks this may be one reason why she's "not a big fan of cars probably", remembering that she had felt quite sick even on the 30 minute drive from Chesterfield to Mansfield when her mother had picked her up returning from university in Liverpool.

Wayne:

Wayne had cycled with his sister, a keen recreational cyclist, several years before, sometimes carrying his nephew on a child seat attached to his bicycle. His sister had died 3 years previously. Wayne's mother had had a bicycle 45 years ago, but his grandparents (since deceased) had obtained bikes "as they were getting older" for exercise. W's father had not been "overprotective", nor overly concerned about letting his young son go out on his bike, provided he was always with a friend, a reflection perhaps of his own childhood experiences of becoming independent and learning to cope with potential bullying and other challenges. Wayne had

walked to both his schools in Clifton, so cycling was a recreational activity, going out with friends after school. His father had devised wayfinding challenges for the young Wayne, drawing small maps of destinations that he considered equal to his son's road sense and self-preservation capabilities, routes that W reflected "are quite busy now".

Leaving school at 16, obtained a 'racer' bicycle to travel the 3-4 miles into work from Clifton to West Bridgford. He found the bicycle journey to have been similar to that by bus, using the bus as a handy "scale of time". He thought he had cycled faster as a young man, than he currently did, although it was now more "a lot more pleasure".

Wayne's first job as a motor mechanic had not been well paid, so could not afford a car. He had ridden a motorcycle, even after changing job to become a lorry driver until his motorcycle accident, since when he had driven a car, or used public transport to get to work.

After his cycling to his first job, he had taken "quite a bit of a break" from cycling and lost interest for a while until he had started working for his current employer 4 years previously. At the new job, he was initially driving by car as a result of uncertainty: "I was just unsure of, everything. The start times...". Starting at different times of the day had meant that he could sometimes arrive from an afternoon driving shift too late to take a train home. A change since then to a regular shift pattern offered scope to incorporate a bike ride in his commute, satisfying his search for an alternative that would involve using the bicycle to help him keep fit, in particular: "to keep diabetes, which is prone to, lorry driving, at, at bay as best possible so the bike is a good way."

Wayne was also father to a daughter who lives with her mother, now separated from Wayne. He has cherished memories of taking her out on a trailer-bike attached to his when she would confound him by pedalling downhill but applying the brakes as her father attempted to tow her uphill, although when cycling she was, "exceptionally slow", he thought she was not really interested in cycling now and walked to school. W had not seen his daughter for some 2 months since he had started to argue with her mother, although not about cycling, as she did also have a bicycle. His daughter had stayed 2 nights each week with him, but had wanted to do things other than cycling with her father where previously they had cycled together in the park at Bramcote Hills.

27 : FGW-2017-02-09-Nottm-Bentinck-3Partips

12:15

Teresa:

Remembers walking a lot as a youngster living in a village, not having a bike, she did not generally receive lifts on an everyday basis or to visit some friends, although her parents did drive she would get lifts only, "if it was a distance...". As she had got older she had used the train for activities like shopping, further afield. Teresa's first experiences of combining Cycling-PT had been after she and Ken had bought Brompton folding-bicycles some 5-6 years previously, prior to which, she remembers using the bus to go to the station.

Ken:

Growing up in Stoke-on-Trent, he had cycled and walked, sometimes walking "for miles" as a child. He had also used buses and trains. Ken's bothers also cycled. He had studied in Portsmouth where he'd experienced having a bicycle stolen, but thinks he started to combine

Cycling-PT when after initially coming to live in Nottingham some 20 years previously. Describing it as a time of his, “second bike craze” he had bought a relatively expensive mountain-bike and would take the train to cycle around the tracks in Sherwood, since then and concerned at the risk of theft, he had only ever taken bicycles with him by train, never left one locked at a station.

Although as children, their parents could have given them a lift, children of that generation could often travel on their own in those days.

Neither Ken nor Teresa, a couple, have children, however Edith is a mother of 3 grown-up children.

Edith:

E’s parents did have a car when she was a child, but she remembered walking and using a bicycle when she was 11, as well as using the bus in Cardiff. At secondary school, she remembered then aged 13-14, cycling “quite a long way” to visit some friends who had lived in a different area of the city. Her brother had also cycled to school “quite a way across Cardiff”.

Edith remembered cycling as something her friends also typically did.

E could not remember when she had first combined cycling with public transport, but had started using it regularly some 2 years previously. She and her family including the young children had lived in Holland for 13 years. Through their acquaintance with a couple who stayed with them, they had been familiar with the practice of cycling and leaving a bicycle for use at each end of a regular commuting train journey to different cities, although Edith had not done so herself. She had even noticed that bus stops there had cycle parking provision. Then they had regularly cycled, and she presumed that her children had potentially combined Cycling-PT in some way then, but could not remember a particular occasion. To go to the local town they had either cycled, or they had walked and used the bus, but had not combined the two modes.

When living in Holland, they had used the car for holidays and day trips that were too far to cycle. Her children had spent their adolescence in Holland and all had cycled to school, her youngest arriving there aged 4 had been carried to school initially on a child seat on his mother’s bike.

Edith considered that Dutch familiarity with cycling was related to the ability of most people to empathise with the perspective of the cyclist: “bike tracks everywhere and, everyone, who’d, drive in their car, also cycled so they’re more considerate...”.

28 : HHI-2016-11-01-Headingley-family

14:35

Marianne:

Grew up in a small Dorset town where she had cycled regularly, including to meet up with a friend who lived in a distant village. Her cycling was social and functional as she compared with that of Derek her husband: “I don’t remember going off on the sort of-, cycling for the joy of it... it’s, always, pretty much always been, cycling to get somewhere specific.” Contemplating how

children would then gather and meet up, using bicycles, she considered that it would be less of an option nowadays, “because of the amount of traffic now.” She also contrasted the environment in which she grew up with the urban setting where her children were growing up: “meeting your friend on a bike, was very much what we did, especially in the local area, whereas, I-, it was partly-, probably I wouldn't feel comfortable about them going out, on their own on the bikes, in this context.”

As a student, M had once taken her bicycle on the train up from Dorset to Liverpool via Birmingham New Street, an experience she remembered as having been rather awkward with the bicycle. Before raising their children, Marianne had cycled to Derby station, taking a folding-bicycle on the train to her workplace, via Beeston rail station, where again she remembered the difficulty she had descending some steep steps in Winter with a bike that was particularly heavy.

Derek:

Had cycled around the RAF camp on which the family lived, then to primary school at 9, and from about 14 was cycling “tens of miles away”, riding with other people or on his own at weekends for leisure and as everyday transport. His parents did not give him lifts to places and cycling saved him money c/w using the bus, he had also considered the local bus service to be not very good.

As parents of three children, only the youngest, Gemma, rides a bicycle regularly nowadays and typically with her father, and also sometimes with other members of the family. Their eldest daughter can cycle, but prefers to walk to her sixth-form college, and used to take the bus to her secondary school some distance in the opposite direction. Brandon, their son (13) had enjoyed cycling when he had been around 7 years old, according to Derek.

29 : HHI-2016-12-15-Family1-Roundhay

16:00

Maggie:

Remembered walking in Tonbridge Wells to her primary school as a young child, her parents walking a lot. At around 9-10 she would run, or ride her bicycle along, “a circuit of pavement” near where she lived, considering this “quite a lot of freedom” it had enabled her to make quite a lot of decisions. Her father who couldn't initially ride a bike, learned to cycle once she and her siblings had become old enough to ride on the road (in year 8, i.e. at 12-13 years old): “they decided that they needed to come with us”. Her father went on to cycle around London as a commuter and taking the family on longer cycle rides and going touring, including cycling from the family home to the Mediterranean at around 13-14, returning by hire car having intended originally to return by train. Her brother currently also cycles to work, as Maggie commented: “so I think you do grow up with stuff.”

Went to secondary school ‘out of county’ in Sussex, most of the time travelling by taking two buses, a journey of about $\frac{3}{4}$ of an hour, a journey duration that she became acclimatised to: “I just had to bus it, so I kind of got used to that”. Attending a Foundation course in Maidstone involved a journey of approx. an hour and a half, “probably why I hate buses...”. Her mother cycled for recreation with the family, but had travelled to work by car.

Maggie's early cycling experiences with her parents involved putting bikes on trains, she thinks. At college in Bristol, she cycled everywhere and did not drive until she was 25, and after coming to Leeds, she combined Cycling-PT to commute to her job in Huddersfield before motherhood. She saw habituation to combining Cycling-PT as a child as part of her travel behaviour pattern in adulthood: "So I think, once you get used to it, you-, that's what you do isn't it, so I think I was probably, I was probably older than them [i.e. her own children], but still, a child."

Dave:

Grew up in NZ. Had cycled since the age of 9 he thought. Used to take the bus to school and back, a journey that required a change of buses between the ages of 5-8 accompanied by his brother just 2 years older, generating an anecdote about falling asleep on the bus then being assisted somehow by the driver to re-join his intended connecting service at another bus stop. From 9-16 Dave would cycle to school by himself (or with his brother), initially about 1 mile, then 4 miles to secondary school along roads that Maggie described as being "pretty quiet" and by Dave as having been "very wide". Dave described his family's approach to childcare when he was growing up as "pretty laissez-faire", comparing 1970s NZ to England in the 1950s. Maggie expanded on the theme of quiet roads, or the lack of them in contemporary Britain. Dave had chosen jobs that were accessible by train from Leeds. He had worked first as an engineer in Saltaire, then retrained as an optometrist at University of Bradford subsequently working for an employer across four locations across the West Yorks region.

The anecdotes about children's freedoms in their own youth led to comparisons with contemporary societal and structural expectations. Tensions were revealed between Maggie's professional requirement to consider children arriving at school unaccompanied as evidence of poor parenting, and her own preparedness to let her children play in the relatively quiet street outside their house where they now lived despite having a neighbour who "drives like a lunatic". She tried, "to allow them some freedom as well because I had quite a lot of freedom, and I think, I think it you learn a lot, don't you?"

30 : HHI-2016-12-21-Family2-Roundhay

13:20

Jemima:

Has little recollection of cycling as a young child, perhaps riding around the park near where she had lived then in Birmingham. She had gone to secondary school by bus, and then into town, as well as with friends. J has cycled to work fairly regularly enjoying her regular commute by bike, but does use the car when she needs to work or attend meetings at another of her employer's sites in Guiseley, a more difficult journey by bicycle, even if combining with the train: "well I suppose I could cycle into town and then get a train but it seems pointless, it seems a long way to do it". J doesn't feel confident enough cycling for leisure on her own, but does enjoy cycling as part of a group. However for short journeys she prefers to walk.

Ivan:

Described starting to cycle “relatively late” aged 8, the youngest of 6 children and used to ‘hand-me-down’ gifts, receiving Raleigh Kingpin as “a big ‘Christmas present memory’”. His parents didn’t cycle, although his sister did. Ivan considered that his cycle-handling skills then aged 10 to have been inferior to those of his friends, as well as of his own son, now 12. As a novice cyclist he had cycled around the local church hall trying to perform tricks with his friends. Later he would cycle around West Yorks out towards Bingley, but remembered that his brother and friends would cycle out to the Lake District on a couple of occasions to go camping.

For many years Ivan had not owned a bicycle with any sporting pretensions, however in his mid-40s he acquired a bike with “drop handlebars” after a friend at a running club they attended as a family suggested cycling as an alternative to running after he had developed hip-problems.

Ivan had also experienced some mental health issues since being involved in a relatively severe accident close to home a few years previously, cycling had also been part of his recuperation process when he had also bought a new bicycle.

Before having children, Ivan and Jemima had done long-distance walks, including the Pennine Way and Coast to Coast.

Ivan had cycled to work more since changing from working at Lawnswood school, a destination that had been more difficult to commute to by bicycle, as it had involved negotiating the busy and fast-moving outer ring road of Leeds. Now he cycled regularly to his workplace that was on the same side of that ring road as their home and closer to it. He had also started to cycle to work several years previously to a job located in Hunslet, the other side of the city centre, frustrated at the length of time the bus had taken and not wishing to drive in the car that he was looking after for a friend for a while.

31 : HHI-2017-01-21-Hucknall-10-Angela's family

13:40

This family discussion raised strong themes around the development of independence in childhood, support networks for childcare, connectivity to public transport and living in proximity to train stations (i.e. in Carlton, Bulwell and Hucknall) and tram stops as her son had grown up, and the effects of family reconfigurations and moving home that this young family had experienced on a number of occasions. Angela’s partner had a daughter whose bicycle was kept elsewhere meaning that they could not cycle in a blended family group, even when the partner had got a bike himself, family group rides then were infrequent. Once having just moved house in Hucknall, they had witnessed the tragedy of another child’s death in a road accident adjacent to their new home and the concern this raised in Angela, the mother over her son’s safety when he went to play with friends in a nearby park at 9-10 years old. Their narratives also revealed the sporadic nature of cycling as a recreational family activity over time, familiarity with the terrain and social milieu and the careful management of financial resources as applied to mobility tools and their maintenance.

Angela:

Had cycled as a girl, she had cycled with her mother and brother when she was younger, she had not cycled with her father who had, “never been around”. She remembered that her mother had

owned a car when Angela was younger, but after they had moved to the Meadows area of Nottingham, they used to do a lot of bicycling, riding everywhere, sometimes from the Meadows to Attenborough and Highfields, a “nice” experience.

Angela had almost always had a bicycle, although her use of cycling as transport had reduced greatly during the period living with a partner who drove both a van for work and a privately owned car and who had given Denzel a lift back from some of his extra-curricular activities. Angela had also carried her younger son Tom on a seat on her own bicycle when very young, but liking the children to develop independent mobility skills from an early age had soon started taking him to nursery on a balance-bike.

She was familiar with using the train, “obviously we've never been far from the tram station” finding the 16 minute journey by train a great advantage over the slower tram journey into Nottingham, and it also allowed her to buy her and her son’s bicycles from Halfords in Mansfield where the bikes were also serviced annually.

The combination of Cycling-PT had been particularly useful to Angela when Denzel had been younger and needed some supervision during the summer holidays when A had had to work, Angela initially taking D on the train to visit his grandparents who would themselves sometimes meet the pair halfway and travel back to the Grantham area where D would stay near to his father’s home. Later on, D would travel alone to spend the day with his maternal grandmother who still lived then in the Meadows area of Nottingham, sharing a meal and cycling around sometimes.

Denzel:

As a young child had used different kind of mobility toys, a push-along car, scooters and bicycles.

His step-father had taught him to ride a bicycle, and he had ridden alone along the driveways and around a piece of grass at the end of a cul-de-sac near the house, but within sight of his mother’s kitchen window, from the age of about 5.

For his first relatively long bike-ride outside Hucknall, aged 12 he had, “jumped on Morgan's bike” [a friend’s brother’s BMX bike] and cycled several miles at the instigation of another friend who had misled the group about their intended destination, ending up at Newstead Abbey rather than another, more local park. Cycling was for D a mainly social activity, taking their BMX bikes by train to Mansfield provided the boys with quicker transport and enabled them to meet “new people”.

He had often cycled on quite old bikes at 13-14 when he had been going over to Mansfield with friends by train, often faulty bikes, but temporarily repaired so that risk of theft was of little concern.

D had received a few injuries from his activities, most recently a football leg-injury had hampered his cycling and as a 3-year old he had crashed on his scooter getting a ‘black eye’. To attend college in Nottingham Denzel had a season ticket to use on the tram.

32 : HHI-2017-01-21-WBridgford-Family

14:00

This family discussion centred on the father’s career break to study for a PhD and the adjustments that had led to his combining Cycling-PT for the trip to his regular attendance at

Sheffield University. The young family had managed their temporarily constrained financial resources by reducing car ownership to one that was used by Ishrat the wife on 4 days per week while Haziq the father combined Cycling-PT, but on Friday's Haziq had used the car. The couple had moved to Nottingham when Haziq had found work at the hospital there, from London where they had both grown up as children and later studied at Kings College university in London.

Themes around the inter-relationships between different generations were evident in narratives around parental concerns over the safety of their children and the transfer of mobility resources and the replication of mobility behaviours. Cultural practices and social integration were other themes raised, e.g. by an anecdote of being subjected to verbal abuse from a passenger on the train to Mansfield, and also on another occasion when taking part in a cycle ride for charity, but also the practices related to cycling and how this was perceived socially by different groups, hospital surgeons, and members of the South Asian community in Britain.

As children, both had learned to ride a bicycle, however, cycling had mainly been Haziq's interest as a young medical professional, combining it on the occasions of a short stay with his wife in Darlington and once using hired bikes in Oxford.

Ishrat:

Growing up in London, Ishrat was one of four children all of whom had been taught to cycle by their father in their own garden. She recalled having gone on her bicycle as a child on Sundays with her father, following a regular route through a shopping area and ending up at Tooting Beck Common, quite close to where Haziq had lived. Cycling was an activity that had ended after she started secondary school, impeded in the "lazy teenager phase", probably by being "bogged down with homework" and the need to focus on her secondary school activities and studies. She first started to travel independently after starting university as her mother had been "very overprotective", not even letting her walk on her own to the corner shop nearby fearing that she would be mugged by children from a different school. She dramatized her mother's concern in the following terms: "it is a bit of a cultural sort of, if you leave the house someone-, you will get run over by a bus or-, sort of thing".

After not cycling for several years, she had cycled again on a few occasions after getting married, riding on cycling routes, including in the Peak District, but also hiring bicycles in Oxford for a day once.

She had developed a knee condition that impeded her cycling strenuously for any length of time, and had more recently used a rented electric bike for some recreational rides with Haziq. Commenting on the growth of cycling in London where she had lived for 20 years, and the use of "Boris bikes" hired by tourists she doubted she would be confident of cycling in London, except in quieter areas such as on Clapham Common.

Haziq:

As a boy, Haziq had walked the quarter mile to primary school, his mother sometimes meeting him with his small bicycle on which he would ride home. His father had taught him to ride when young, but he would be the only one to cycle. Later at primary school he had walked independently, meeting up with a friend in an adjacent street then walking together into Balham. The journey to secondary school had involved walking to Balham, typically in a "big group, there'd be about four of us" and then taking the bus to Dulwich.

His father drove a car, but his mother had never successfully learned to drive. Asked about the prospect of his own son's future likelihood of cycling to school subject to Bikeability training, Haziq said he had vivid memories of taking part in the Bikeability/Cycling Proficiency training at primary school, a factor that had proved useful when returning to cycling as an adult, although counter to the expectations of his own parents: "they were never intending for me going on the road when I actually did start cycling..."

H described his cycling within the family context, and its use for transport as, "an anomaly" and considered this related to the perceptions of cycling amongst his friends who were also from a South Asian background and had laughed on finding out that he cycled. H confirmed that learning to ride a bike as a child was standard practice in his community, but its use for transport was not generally considered beyond the social and family recreational activities: "You learn, you learn how to ride a bike, and that's it! Not really er, a done thing."

Working with senior hospital consultants at Nottingham's QMC, most of whom cycled, he had been influenced by their talking about their hobby of cycling, bikes, maintenance and related technologies. Having newly moved to the city, he had also wanted a bicycle, and initially bought one for recreation and to commute within the city from his home in Sherwood and between the two hospitals where he had worked.

Starting a PhD at Sheffield University had involved, "a massive pay cut" and so they sold one of the two cars they had owned, keeping one that his father had offered the couple, including paying for the vehicles ownership and maintenance costs leaving the young family with one car.

33 : HHI-2017-01-27-Leicester-Family

14:20

In this household with 3 children in Leicester, both parents had a history of cycling as children and as young adults.

Winnie established a household with Doug who she had befriended through their shared interest in cycling. Doug's cycling had only reduced during the period when he had been at university and lived nearby. Knowing that they could not afford to buy a house in Oxford or London had influenced their move from the capital to set up home in Leicester the city where Doug had studied, shortly before their first child, Bart, was born, not anticipating that they would settle there for the 15 years until I interviewed them.

Winnie:

Had enjoyed cycling as a young girl, when living in the large village of Kidlington near Oxford, cycling mainly with her father: "I remember it as being like me and my dad's thing we go on a bike rides." She had enjoyed playing at "bike maintenance", as well as feeling the tactile qualities of different road surfaces while cycling over them. Her mother also had cycled, but not for recreation, and although her brother had a bike, she did not cycle with him. She had cycled to school in primary school at 7 or 8 about 1.5 miles, later at 12-13 cycling the 4-5 miles into Oxford with a friend, and later at 14-15 cycling "everywhere". At 18 Winnie had gone camping with a friend by bicycle, and had cycled to Rugby a few times to visit her boyfriend.

Winnie had qualified for reduced transport fares when living in London as a dependent of her step-father through his employment with London Transport, but after completing her university education there, she had cycled in London also later when working as a cycle courier there.

Shortly after their move to Leicester Winnie gave birth to their first child at 28, then initially used the bus to commute to work in the city centre, finally learning to drive at 30 because she had needed a car for her work.

She was eventually prevented from cycling regularly when her 3 children were still babies and too small to go on bicycles.

Doug:

Had cycled relatively unconstrained, “as soon as the stabilisers came off I was, pretty much free to go wherever I wanted, and I did”, from age of about 6, sometimes going out riding with his grandfather around the East Coast, in the Midlands and Northamptonshire.

Cycled initially 1.5-2 miles to primary school, also later “quite a few miles” to secondary school and cycling to, “a little sort of, job” in the evenings.

Had cycled less as a student in Leicester, because he had lived near the university, but continued to own and use a mountain bike [presumably for leisure rides].

Had carried the two older children, each in succession for a few years from the age of 1 until they were 3 and 2 ½ to the nursery at his workplace in Nottingham, by bike and train on 2 days per week. There being no additional cost for their carriage by train at that age, and the cost of nursery places were subsidised.

A few years ago Doug had had an accident while mountain-biking, resulting in him suffering from a pulmonary embolism and cycling had been part of his recovery process, resorting to purchase of a road-bike and sometimes integrating a longer ride back by road from a station en-route back from Nottingham in place of mountain-biking for a while, something he continued to do to the present day.

34 : HHI-2017-01-31-Cambridge-Family

14:40

This family discussion elicited a rich description mainly of the family's present-day extra-curricula activities, and children's in particular. The narrative also revealed how a family living outside the urban boundaries of a major UK regional city had organised their travel, and their values related to schools and the development of social skills, domestic help with travel and supervision of the children in the form of an au pair, and negotiations with neighbourhood contacts when seeking alternative travel arrangements after loss of use of a car. They had moved home to their current location some 8 years previously, from a nearby village where the children had gone to primary school that Felicity, their young daughter still attended.

Themes of independence and the importance of familiarisation were raised by this family discussion, particularly in J's narratives of her own childhood and echoed by her daughter Felicity.

Both had studied in Cambridge, where students were “right in the centre of Cambridge”, not needing transport much of the time.

Jacqueline:

J grew up in Dorset in a very hilly area; Toller Porcorum, her “nocturnal” mother rode horses or walked, and her father was a “workaholic” farmer, who had been “actually quite keen” on cycling, and had as a youth ridden in and out of Brighton to school and work some 20-30 miles

a day. He mainly drove vehicles like tractors and lorries at the time of our discussion. At 7 or 8 she had learned to cycle on one of two children's bikes her mother had got in a swap for an adult bicycle won in a raffle, learning to ride very quickly comparing the experience to that of her own daughter's initiation to cycling: "and I learnt just like Felicity did in a weekend... erm and then I used to cycle a lot, erm after that."

Jacqueline's parents had been relatively unconcerned about the activities and whereabouts of her and her younger sister even when very young, and J had walked to school in the 1970s from her earliest days at school aged 4, sometimes followed by her 2-years old sister who would be brought home by people from the village. She had run away from home once aged about 10, but her parents had seemed unconcerned on her return: "so, eventually I went home and they said "oh hello!"".

At 7 she had changed school to one in a neighbouring village, a journey that involved going over a large hill and too dangerous for her to have cycled, though she did not describe how she had travelled there. She had enjoyed cycling as a child, although J's friends at the time, "such as they were..." were described as having lived within walking distance, the hills and narrowness of the country lanes making cycling unfeasible for her.

J's sister "does quite a bit of cycling" and commutes by bicycle when she is working on contracts in Bristol.

Jacqueline's arrival in Cambridge to study meant experiencing much heavier traffic than her village upbringing had exposed her to, and initially she had avoided cycling in the city and was cautious even when walking: "for a while I couldn't cross roads when I got to Cambridge (laughs) ha ha! Erm, so -, yes, so I'm quite careful; I don't like to go to places that I don't already know where I'm going...". She had taken up cycling again as a graduate student after a lull during her undergraduate studies there.

Some 6-7 years previously, J who had been regularly having eyesight examinations, had been prohibited from driving due to her deteriorating eyesight, necessitating an alternative means of getting to work in Nottingham the following Tuesday. Initially a friend offered her a lift to the train station in a nearby town, then taking the bus in Nottingham, she got a Brompton "quite quickly after that". Holidays [since then?] when visiting the children's maternal grandparents, or meeting up with J's sister and her child, had involved using the train to travel South, their father did not typically accompany them it seemed.

J had initially tended to find routes that avoided cycling up hills on her Brompton folding-bicycle that had 6 gears, but had become acclimatised to hills in Nottingham: "there was a phase when I used to go round them-, (laughs) but now I don't mind going over them, it's fine."

Colin:

Grew up in Leeds, his mother rode a moped when C was growing up between 8-16, and his father drove, but C couldn't recollect seeing his parents cycling. He has 2 sisters, they had also learned to cycle but like him, they only currently cycle recreationally.

Asked about first experiences of combining Cycling-PT, Colin recalled having left his bicycle at the station periodically as a student in Cambridge, musing that he must have "gone places", but unclear about the reason, "since it was in walking distance...".

Since then he had cycled with the family occasionally in country parks.

14:55

Monique:

Had walked to school aged 7 owing to the lack of traffic in Halifax, the area where she had lived then, also sometimes walking to friend's houses...

At secondary school she recalled having been given a bicycle by a cousin, but preferred to swap her Raleigh for a BMX bike that a male friend owned. M had taken the Cycling Proficiency course in primary school, but

She and her friends had only ridden around the local streets close to home. M had wanted to get her own daughter a BMX bicycle, but had found the cost of purchasing a BMX "really expensive".

As an 11-12 years old, she had played on foot in the local woods and walking into the centre of Halifax. The only person in her own household to cycle, she remembered that her cousins had bicycles, and her [maternal] aunt and uncle were still keen cyclists. Her parents had divorced, so M had not been able to get to know her father's side of the family.

Monique had left home relatively young, and did not own a bike for quite a long time, the first time she had got a bike since childhood, some two years ago, was the one she currently used to cycle to work.

Starting to work in Leeds, she had worked with someone who had also lived in her village who cycled to work, something she initially considered "a crazy thing to do it seemed like a long way in my head...", but tried out the journey by using a bicycle on loan from her employer, after 3 weeks of the 6 week loan, had signed up for the Cycle To Work scheme to buy her own bicycle. After some 10-11 years working, she had suffered from stress some 2 years previously, attempting to combine postgraduate study and work, since when the cycling had become an important part of M's life.

Her first experience of combining Cycling-PT had been just over 2 years previously, at the suggestion [perhaps] of her cycling companion, returning from Leeds by train and working out [presumably by herself] how to take the bicycle on the train: "it seems silly now once you've done it, but I suppose the first time -, sort of your working out how-, what d'you do with the bike, how'd you get it on where you put it that kind of stuff yeah, I found it a bit daunting!"

M had also once gone with her daughter Dinah to Leeds by train, both cycling to Shipley station, where they had parked their bikes for the day.

36 : IND-2016-07-25-Leeds-Academic in Physics Deck

15:10

Alberico:

The 'holiday bike'...

Grew up in suburban Rome, a place not conducive to cycling. Had originally been taught to cycle by his grandfather, an amateur racing cyclist, with whom he spent most of his summer holidays, enjoying going for, "bike rides in the countryside" during a couple of weeks in the summers, but at other times of the year the bike would be locked in the basement.

He had always travelled with his parents as a young child, either by car, or walking if the distance suited, his parents did not cycle on the road. His mother had driven him to school until 10, then at 11 onwards the school was within 10-15 minutes walking distance. The bus was more of an option for the school trip between 14-18 when the walking distance to school was about 25

minutes, comparable with the bus that he could use if he was running late, although, “I probably was walking because waiting to the bus make it even later than I was...”, a distance that he reflected he “should have used the bike... for”, although it would have been unusual, “I would have been literally the only cyclist on the roads.”, cycling on the road in suburban Rome “is not culturally a thing” although he has noted a change in the numbers of cyclists there in recent years and cycling is feasible within the city centre. His school friends would also only cycle for leisure “and only in specific circumstances”. Alberico’s sister can ride a bike, but doesn’t use one. Alberico had used buses, and then the underground [Metro] when he had started to be more independent in his adolescence from 12 until around 18. Getting his driving licence he had seen as “the turning point in my ability to travel, longer distances within the city of Rome” and subsequently became his main way of getting around the city. When travelling to work in Rome, Alberico would drive to the nearest Metro station and get the underground to his destination. After moving to Manchester from Rome some 5-6 years previously, he had been glad to realise immediately that he could cycle everywhere and had never really contemplated other options since. He had not cycled for the first 6 months, as he had acclimatised to the city and the traffic culture, “So there were a number of small things and I wanted to become familiar with the environment before starting cycle but then after six months I got the bike and yeah...”. Buses and taxis had sometimes replaced cycling for formal occasions and to avoid getting wet or sweaty. Initially he had commuted 15 minutes by bicycle to the university in Manchester saving time over the 40 minute walk or 30 minute bus-ride. Alberico had started working in Leeds some 1 ½ years before our discussion. His wife had worked in London until 2 years previously where she would cycle, then changed job to work in Leeds, the couple both taking their bicycles to the station and by train to Leeds on the 5 days each they worked there in term time, but less frequently during the vacations.

37 : IND-2016-07-25-Leeds-LGI-Academic-V3-Anonym
15:20

Nicholas grew up in Dublin, but now lives in York and works in Leeds. His father had instigated his first cycling skills at around 6, although he could not recall either parent cycling although his mother had when first leaving school and going to work, “her bicycle was always hanging up in the shed but, I... Not in my lifetime she cycled!” His two younger brothers cycled, his middle brother currently cycling his children to school in Dublin.

Had walked to school, but had cycled with friends in the evenings and at weekends, mainly for leisure but also for errands or “chores”. He remembered sharing a mountain bike with his brother and going mountain biking with friends until his late 20s, with accidents along the way. Then working as a trainee doctor he had had bikes, but mostly used public transport to get to and between the different hospitals he needed to go for his training. After qualifying and “on a more regular scheme, so you knew where you were for six months,” a cycling regularly for 7 years until he moved to London where he gave up because of perceived safety issues. He eventually returned to cycling, certainly after moving to Leeds in 2004, “got back on my bike then, and I haven't been off it since.”

Five years previously and before they had had children, N’s wife was working in Durham and both had cycled to the station, Nicholas then getting the train to Leeds and his wife getting the train to Durham, both bringing Bromptons on the trains. He speculated that in a few years time,

when both children could ride their own bikes, they would both return to commuting by Cycling-PT.

38 : IND-2016-07-26-P6-Leeds-ODI-12noon

15:30

Trainspotting!

Arthur:

As a child he had lived in a number of places. Remembered he learned to ride a bike as part of a group of children who had pushed each other down a steep field in Huile Grange (?) on a borrowed bicycle at about 7 or 8.

living in Princetown on Dartmoor, aged somewhere between 8-10 had “started ranging” independently by walking mainly, borrowing a neighbour’s dog as an excuse for going for walks: “as long as we had a dog nobody was that bothered.” Reflecting perhaps cultural assumptions of the late 1960s about the presence of children in public spaces.

First got serious about cycling at 12, living in Tavistock cycling regularly out to Brent Tor and Morewellham Quay, sometimes with a friend, also alone: “I’ve always been fairly self-reliant and quite comfortable to do all that stuff”, taking a packed lunch and returning at “teatime and nobody would have been the least bit bothered.”

When living for a while in Filton, Bristol, in the 1970s, he had cycled over suspension bridge to Chepstow, Severn Tunnel Junction or Newport to go train spotting, occasionally returning by train with the bicycle in the guard’s van: “that would have got me used to the idea that you can bung it in the garden in those days.”

Had for about 2-3 months, many years previously commuted by m/c into Manchester intending to save money c/w the train journey, but limited cost savings and awareness of the precariousness of motorcycling and potential for accidents put him off, although had owned a m/c for many years: “I realised that actually I wasn’t saving a huge amount of money on the train fare and at the same time I was hazarding myself so it was like, well, what’s the point?”

Arthur’s children had both had bicycles with stabilisers when young as Xmas presents and he had taught them to cycle. His children had been prepared for early travel more by their mother, living within easy walking distance of both primary and secondary schools.

He had taken his 13-14 years old son once on a 12 miles long ride into Manchester down the canal towpath, returning by train. His son also used the bicycle to do a paper round, although his daughter was never keen on bicycles and cycling, her bike remaining in the shed for years mainly unused.

His son, a railway enthusiast now working for Transport for London, currently owns a Brompton and other bicycles and “cycles a great deal”.

Arthur had normally commuted into Salford by train, taking the bus from home Milnrow to a train station during the period the Metrolink through Milnrow was being constructed.

Retired 3 years previously, after almost 40 years of full-time work Arthur likes to keep busy. In his first year of retirement took up a variety of activities intending to “focus a great deal on becoming more fit and I used the bike as part of that...” using the bicycle to go in and out of Rochdale, to get to many of the activities, some of which he dropped after a while but continued to take part in a choir, and became a director of a charitable organisation in Rochdale attending weekly meetings there, using the bicycle, “almost as a second car.”

His wife had been diagnosed and treated for breast cancer some 7 years previously, Arthur subsequently had become her carer, “I would call it light caring I suppose because it’s not full-time or intense”, but had meant that for some months he had ceased travelling to deal with the situation.

Arthur plans more independent trips and activities when his wife’s activities take her away from home or activities they plan to do together. Working in education she is at home more in the summer holiday months.

When travelling together with his wife, they go by car, her expectations of public transport availability being less attuned to “the needs of timetables and scheduling” to which he was more “clued in” through years of commuting. His wife had occasionally cycled with him on folding-bicycles they took by car.

39 : IND-2016-07-27-Nottm-Beeston-TheCrown-Indiv-10pm
15:40

Damon:

One of 5 children, the others older than him, Damon, had learned to cycle at 6-7.

He had “older parents” who had not cycled in Damon’s own lifetime, although he had been aware his father had owned a motorcycle when younger. were no own bike until about 11 or 12 receiving a Raleigh Chopper 5-Speed for X-mas. Used it for doing a paper round and some journeys of 5-10 miles out of town, going swimming etc.

At 15 got a 10-speed “decent touring bike” and used that for going camping in the Lakes, riding over Kirkstone Pass, “It was a real liberation. It still is a real liberation in an urban framework, you know.”. He had cycled vigorously as a teenager, using it to clear his head during the O-level exam revision periods and later to go to dances in villages, returning sometimes drunk. It had been important to him in that rural landscape as a way to get out to his friends amongst these [remote] communities.

Had cycled extensively around the part of the Lake District where as an adolescent he had grown up, not recalling being tired enough to need to use public transport to transport him and his bicycle, but also reflecting the limited provision there: “I mean, public transport’s not big in the Lake District, obviously, anyway...”

At university in Nottingham, he had cycled to get to the campus and into the city for shopping, but had not [regularly?] used public transport until he had started commuting to work in other E Midlands cities: “Leicester and Derby, which would be the last, - sort of, six or seven years...”.

Damon described his adoption of combining Cycling-PT as, “Sheer practicality”, first when working for a year in Derby, “covering for someone” and initially taking a local bus to catch the Red Arrow express bus from the QMC but then deterred by the long walk at the other end, soon changing to taking his bicycle on the train from Beeston station. “it’s actually further but it’s much quicker to, to go on a push bike because, you know, cycling’s in the blood, it’s like, “Well okay, let’s do that.” It’ll be fun as well, you know; we’ll get a bit of a run out in the morning.”

Damon had sometimes cycled to the QMC when his partner was in QMC for a while as a patient and sometimes leaving the bike locked up outside.

Currently one of his brothers has a bicycle, one brother had also had a severe accident on his bike in Keswick recently. Damon himself has had an accident that left him with a damaged shoulder.

Living close enough to his school as a child, meant Damon had never considered cycling there. Damon's partner had a son who had grown up with the couple, although his stepson had walked to primary school, he had soon started to cycle to his secondary school (Alderman White), as had many of his friends, from about 11-12 and again at 13.

Damon had gone with his stepson at 14 and 15 on the Great Nottingham Bike Ride on a couple of times, and used it and other off-road cycle rides as a way to bond with the youth and instil etiquette and some of his own values.

40 : IND-2016-07-27-Nottm-Bentinck-Individual

15:50

Nathan:

Learned to cycle as a 4-6 years old in Hertfordshire, cycled on the unmade dead-end road where he lived "pre-teens", also cycling in the [nearby] woods. As a 12, 13, 14-years old did a paper round on the bike.

Found from this a, "great sense of freedom really, to just escape and explore."

At 16 cycled once or twice 7-8 miles leisure cycling to the nearby town and back.

Did not do the Cycling Proficiency course as a child.

His younger brother had similarly cycled, doing a paper round, but took up cycling since his late teenage years.

Remembered cycling with his family once along the Tissington Trail in Derbyshire using hired bikes.

At 18 passed his driving test and reduced his cycling finding it "handy having a car" but not using it every day. Nathan returned to using the bicycle after taking his bicycle up to Newcastle when studying there when not wanting to walk, or pay bus fares.

For the past 11 years N has been teaching cycling, mainly to children aged between 9-11.

Recently also teaching 3 and 4 year olds to use balance bikes, and small pedal cycles.

Has had a folding-bicycle for a number of years, more than one over time.

In past years has parked a fixed frame bicycle at Nottingham Station.

41 : IND-2016-07-28-Nottm-Lomax House-PublicHealth

16:10

Charity:

As a child, growing up in Beeston, Notts, she had been taught to ride a bike from 6 by her father. Also walked, but "I always feel safer on a bike."

Used to get the bus to secondary school from the bus stop outside her house, a journey of probably just under 3 miles meaning she did not get subsidised bus travel for school. Sometimes walked across the golf course, saving the bus fare she could keep for her own use. Charity did not cycle to school, unable to remember any cycle storage facilities there at the time.

Used to visit her friends by bicycle, "meet them somewhere on bike", she thought that probably most of her friends had cycled at the time. She had cycled, "all times of day and night!".

Her parents were not initially car-drivers, but had acquired an old van when she was in her late teens. Her father had worked for the railways so (he?) had travelled by train free of charge until

she was 16. As a result, she had had to walk, cycle or use public transport most of the time, they had also gone on holidays by train as a family.

Charity cannot remember when she might have first combined Cycling-PT, but assumed it had been with friends, taking the bike on the train, but she thinks she would have “cycled more at that age than I do now, or longer distances, because I was fitter, probably”.

Charity has always been a “commuting cyclist” although having cycled long distances a few times, but her husband does not like cycling and this limits her use of it for leisure. She thinks her parents were mainly commuting cyclists, and her two brothers and her sister all cycled, as they still do currently.

Charity went to the Centre for Alternative Technology in Wales as a volunteer for a week in the 1990s, returning [inspired] to set up an alternative technology organisation while also working in her day job of Community Care Planning. Eventually set up partnerships with local Health Authority for the city and county from which emerged several little projects, including Ridewise to promote the health benefits of cycling, focusing particularly on training adults as a pathway to encourage them to support their own children in cycling.

C: Well I, erm, the organisation that I work for, erm, well, previous organisation that I worked for had a cycle scheme, a salary sacrifice cycle scheme, so I used that to buy a fold-up bike, so that enables me to go anywhere really, cycling and public transport. Erm, so the most recent journey was probably a bike and a train - to, from home to Nottingham. Erm, yeah.

42 : IND-2016-12-10-Leeds-Reginald-IndivInt

16:20

Jeremy:

Had learned to cycle when he was about 4.

His father had been a policeman, in a village in North Yorkshire... Jeremy had learned to ride his father’s old police bike when he had been still small enough to crouch beneath the crossbar. He thought had learned to ride his dad's bike before getting his own a bike.

He had cycled from his home in Thornton-Le-Dale to a catholic junior school in nearby Pickering, from about 6-9 when living in that area, commenting, “the traffic, you know the traffic was nothing, like it is now!”. He had not cycled every day, sometimes catching the bus for the 2 ½ mile journey to school in Pickering.

They had owned a private family car which not everybody had at that time, but the bicycle had initially been his father’s form of transport as a “village bobby” before getting a motorcycle.

His mother had not cycled, but his sister, 2 years younger, had also had a bicycle.

At 10 the family had moved to Scarborough, where he had lived very close to junior school, he remembered using bicycles “all the time”. After completing primary school in Scarborough, he went to a secondary school further from home where they had lived “in the old town”, using his bike most of the time for school.

He had gone bike-riding quite a lot, and keen on sport, he had used his bicycle to go to play in football matches locally.

When going to spectate at football matches, as Hull City supporters, he and his friends would go by train from Scarborough, also spectating at Scarborough’s local team matches. He

remembered his school once organising a coach trip to Hull to see the England U-23 team play there, his first visit to that football ground.

Jeremy came, at 23, to Leeds in 1980 for work, the bike being his first form of transport in Leeds, "So I was cycling in Leeds in 1980, but you didn't see many cyclists around, in them days."

Having been unemployed in Scarborough for a while he did not have much money, and when he got a job with the Council in the Landscaping department, he had to live on his [low] earnings. His father had bought him a bike that he used for at least 2 years, to travel from his Hyde Park accommodation to the sites where he had worked, finding it also a good way of getting to know the city. He had also cycled out into the countryside, also visiting friends in Barnsley occasionally.

Jeremy had had a family, with a son born around 1986 who had been encouraged by Jeremy to cycle from as young as 4 years old. When the son was young, J had taken him and a lot of his friends out in the big van he had used then for his self-employed business, carrying sometimes at least 6 bikes to cycle around relatively traffic-free sections at the Eccup reservoir near Leeds. Jeremy observed that his son had not been naturally enthusiastic, nor as sporting as his cousins who lived in the Scarborough area. The son sometimes cycled reluctantly, his father remembering pulling him with a rope between the bicycles along a disused railway route between Scarborough and Ravenscar, urging him on to pedal!

Jeremy had split up from his partner when the son was about 10, but had maintained contact, trying to go cycling sometimes when the son came to visit. They had gone on holiday together in Jeremy's caravan in his son's teenage years, always taking the bikes.

J had for a recent birthday present fixed up his son's mountain-bike and bought some cycling accessories, hoping that at 30, there would still be an opportunity to one day go cycling with his son who had suffered some health problems in recent years that had affected his breathing and had at one stage prevented physical exercise.

Using public transport became "quite a new, new phenomena" for Jeremy when he became older, using it in particular to go walking with an adult social care group, also sometimes going cycling with the same client group. In the early 2000s, Jeremy had sometimes used the Dales Bus with the adult social care group to go cycling in the Dales, sometimes catching the train back to Leeds. When going walking, he had often left his bicycle at Leeds station, whether taking the train, or a bus from the nearby bus station.

He then also made friends with Ingrid, a keen cycling campaigner, with whom he would go cycling to the CTC York Rally, annually each year since the late 1990s, and also cycle-touring on the continent with a group of mutual friends.

Three years previously he had used trains to meet up with a friend to do a ride from Malton towards Pickering, both then taking trains to different destinations. He had also combined cycling with train journeys for other recreational rides, such as once for a ride from Hull to Spurn Point.

Jeremy currently also has a car that he uses in the city and also sometimes to go with friends walking in the countryside.

43 : IND-2017-01-14-Leeds-CrossGates-Individual

16:30

Miles:

Lived with his mother and sister, he had not attended secondary school.

His sister had been given a bicycle when Miles was 13 and he wanted to try it, not knowing how to cycle he had taken it from his sister who then prompted him to try it, he had ridden into a wall and fell off. Since then he had taught himself to ride, although aware there were courses that encouraged people to cycle.

Started cycling at 14, about the same time as he also started to walk around independently at 14-15 to the local youth club and local shops, his mother having been quite protective when he'd been younger, worried about her son in the local context: "and all that goes on in Seacroft... it's not the same generation as it was back then where everything was safer." Miles' autism had at the time apparently not yet been diagnosed and some local people would have seen him "as a target to pick on and bully."

Miles had gone cycling with his father and sister to the Crossgates shopping precinct and the local ASDA supermarket, a phase limited to the summer season, that had soon ended.

His father had separated from his mother and lived in South side of Seacroft. Now his mother had a partner who lived separately but had a car and sometimes gave his mother a lift for shopping.

Until 3 years previously Miles, then around 17-19 years old had attended a motorcycle mechanic's course at a college in Wakefield. Originally he had walked to his local station in Leeds, Crossgates Rail travelling by train via Leeds station, but ended up taking a skateboard, and then his bicycle with him, to reduce the time taken to get to Glasshoughton Rail station from where there was an hourly train service back to Leeds. He only had some 5-10 minutes to get to the station and cross over a bridge to the opposite platform for his train, departure from courses sometimes delayed by unruly behaviour amongst his student colleagues or other reasons: "if you're running behind in college, college and you miss that train I have to wait an entire hour."

Later he had tended to cycle to and from Leeds station, as changing trains there was often affected by the late arrival of the first service he would take.

44 : IND-2017-01-17-Leeds-Reginald-Individual

16:40

Jessica:

Grew up outside Solihull.

Walked or used her bike when starting to travel alone.

Had cycled alone to Warwick along the canal at 13-14. Her family were not cyclists, her father had walked to the station for his commute, walking at the other end also. Her siblings also had bikes, but used them for: "just playing out."

Contemplating her identity as a cyclist she observed, "I wasn't a keen cyclist like I am now, you know I wasn't in any cycling clubs or anything, I was just a fit, active child, really erm, - so I was always doing sports."

Jessica had walked to primary school, and it had also been a 15 minute walk for her to secondary school.

She observed that her friends had become less engaged with cycling as they grew up, “cause it went from people playing out to then, going to people's houses or to the Park or something, it wasn't -, whereas before it was very active...”

Cycling for leisure, at 17, Jessica had a part-time job that involved her cycling within 4-5 miles to the homes of people for whom she had been, “doing, sort of home care stuff for people”.

Her first experiences of combining a bike ride with a trip on public transport she thinks would have been in 2008, working part-time in Leeds city centre but living 7 miles outside of Leeds in the village of Shadwell. Then she would often ride in on her bicycle, either cycle home, or leaving her bike in the secure underground bike storage facility at work, “get the bus home, and then bike home the next day.” Her decisions had been influenced both by the weather, and the way she felt about cycling uphill all the way home, not always wanting to do both distances.

She had used a bus service that she described as: “a nice bus route... it sort of goes through nice bits of Leeds so, they put nice buses on, and you don't have, - rowdy teenagers or, - or smelly people or, whatever you get on some of the other buses you get on in Leeds... {right?} ...are not as pleasant to, to ride in so to speak.”

Currently working mainly at St James hospital in Leeds, she had until the previous year worked in Bradford, cycling into work from her home near Guiseley and sometimes taking the train back home as she still currently does on some days from Leeds.

Her partner, also a cyclist, had had an accident cycling home some 2 years previously, after which she had been concerned about Jessica and had asked her to text her when she had “got in”.

45 : IND-2017-01-21-Nottm-StAnnsV-IndivInt

16:50

Brian:

Had grown up in Nottingham, at about 6 years old going to play football with friends on a pitch some ½ a mile from home, and cycling alone from about 7 or 8.

His primary school had been within walking distance, but he'd cycled the 2 ½ miles to secondary school from his first year there.

At 11 he used to take the bus to the city centre to go ice-skating with a friend, the pair going there unaccompanied.

As the family had no car then, his brothers and sisters used to ride bicycles. Although he was aware his mother had cycled before motherhood and been a member of the CTC, she did not have a bike when he grew up, sometimes borrowing his sister's bicycle to go the shops, however.

Brian was an electrician at first, he used to work “in town”, looking after machinery, from sewing machines through to large capital equipment.

At 21, Brian had got a job as a truck driver, experiencing early morning starts, “you know, if you start at four that means you've got to be up at three!”

His first experience of combining Cycling-PT was in his mid-20s, after cycling to Wales with a friend to go camping, running out of time on the journey back with work starting the following Monday, they had taken the train from Wrexham, he thinks, putting the bikes and camping gear on the train.

Although he had “always been a cyclist” he had owned a car at the time, and had occasionally gone to work in in the car, the last time having been seven years previously.

He associated use of the car with everyday activities involving his children, both moving children around, and in response to last-minute events: “So you think, "I'm not got time to use the bike, I'll jump in the car and go to work..." So I've been through all that...”.

Brian had fitted child seats on his bicycles, two seats at one stage on the same bicycle: “When they were really little, they were both on my bike... ...from 3, to 5 and, you know, up to about six-ish.” He had enjoyed the conversations he had had with the children, cycling along off-road trails in the Peak District, High Peak Trail, the Tissington trail and also further afield, in Bristol and the South-West of England.

Brian’s children had gone to secondary school by bicycle after he had taken them there to show them an appropriate cycling route, but they also walked, often with friends, and sometimes got a lift in their mother’s car depending on which of her employer’s two offices she was working at, and when she needed to start work. She had often offered the children a lift: "you know, "I've got to go to so and so tomorrow, you want to lift?" Or, "do you want your friends want to lift?" - So, and er yeah, kids always take the easy way out, don't they!”

Brian had been married at that time and had since divorced, living currently with another partner, although he seemed to have maintained a close relationship with his children. His grown-up daughter sometimes stayed with them and had once gone with Brian by train for a day out in Birmingham with folding-bicycles.

46 : IND-2017-01-23-Nottm-Carlton-Indiv

17:10

Gerald:

Grew up in rural North Norfolk on a farm and there learned to cycle by 5 or 6.

Primary school was about 1 mile away and he thought he cycled there, “up what was obviously a very familiar route, with very little traffic...” from about 7 or 8, and “with a degree of freedom, by 9 or 10 without a problem at all”.

Attending Grammar school some 10 miles away had required him to cycle a mile to take a bus from a local village where his mother had in all likelihood come to an arrangement with a local shopkeeper to let him, and also his older and younger brothers and a sister over a number of years, store their bikes in a safe compound behind the shop while they took the bus to school.

He may have once cycled all the way to the school “just for the hell of it” but otherwise took the bus there for 7 years.

Gerald’s mother had routinely cycled to the shops and other destinations, but she eventually got a driving licence. He didn’t recall his father cycling, only using farm-related work vehicles, but in later years after retirement he remembered his father “much more routinely” using a bicycle as transport.

He had studied at Coventry Lanchester Polytechnic, not owning a bike for most of his time there, but spent a year in Holland, where the scientific research establishment where he did his placement provided him with a bicycle and maintained it for him while there.

Gerald did get a bicycle to use in his final year studying in Coventry, then moved to Nottingham for his first job, finding that in the house he had moved into soon after arrival, “somebody was essentially using the house as a bicycle store” he had selected a bicycle after moving half of them to the cellar and had, “got back into, got into the principle of cycling to work” which he had never got out of since.

1980

Gerald would have first taken a bicycle occasionally in the 80s to travel between Nottingham and Norwich. Travelling sometimes over the Christmas period, he would cycle some of the way “to somewhere like Melton Mowbray, and then get on -, because in those days there wasn't a direct service between Nottingham and Norwich, the direct service was between Birmingham and Norwich”.

After working in Nottingham from 1980, he moved for “work progression reasons” to London, but kept a property in Nottingham.

2002

He had then moved from working in London to take a job in Norwich in 2002, which “didn't work out terribly well” remaining there for some 2-3 years before working for 2 ½ years again in London. There part-time, he had worked alternating weeks and stayed at a friend's house in Mill Hill from where he had used a folding-bicycle to commute 18 miles a day into central London to his work at UCL and back, returning to his own home in Norwich from Liverpool Street station at the end of the week. At the start of this pattern he had used the underground, before buying the folding-bicycle.

2014-15

Gerald had moved back to Nottingham some 18 months previously, after some 10 years living in Norwich where his 3 siblings and many friends still live, his parents 20 miles away in Fakenham, North Norfolk. Familiarity with Nottingham was part of his rationale for the move made in anticipation of his own retirement from employment: “having a property here and being in Nottingham a lot, for more than 20 years, it was a city that I very much liked and decided I would, that I would like to come back to it.” He had also taken into consideration the city's better overall transport connectivity.

Having always enjoyed “tough exercise”, over the years, Gerald had been a keen runner, still doing the Park Run in Norwich and in Nottingham, but the balance of his sporting activities had gradually shifted to doing more cycling than running. He explained how his motivation for running had changed: “I've done quite a few marathons but times, as one gets older, - times started to dip and, so you haven't got quite the same motivation if you're doing that. Cycling I don't really 'time' or anything, I don't mention my... Anything so, but having done much better time marathons once marathon wise, it gets more like hard work to be honest!”

47 : IND-2017-01-23-Nottm-StAnnsV

17:20

A LOVELY CYCLE ALONG THE RIVER

Stuart:

Grew up in rural Kent, near Hythe where he had gone to primary school.

He had been given a bicycle at 7 or 8, and had cycled beyond his parent's sight from about nine, cycling to primary school.

Secondary school was initially also in Hythe. In his early teens he would sometimes go cycling with friends up to 20 miles across the Romney Marsh area to New Romney, Ashford, Street, Appledore and Dungeness. He had loved the RHDR, a miniature railway that runs between Hythe and Dungeness.

After a year or two of secondary school he had started to cycle there.

At 16-17 Stuart had studied for his A-levels at Folkestone Grammar School, where his father had mainly given him a lift but he had walked the 4 miles back, sometimes he had caught the bus to school and when returning home.

Recalling the travel culture of the time, he commented on the acceptance then of walking: "I used to get a lift in yeah, I wouldn't walk, wouldn't have got -, walk... (Unclear words) that's 70s though, people walked that distance, and people didn't think anything of walking three or 4 miles home from school."

Stuart had not used the trains much as a child and adolescent, but had travelled between Sandling, the closest rail station to Hythe, and Oxford via Reading and Tonbridge, bringing his bicycle home by train at the end of term as his first experience of combining Cycling-PT: "They had guard's vans in those days! They were great, wasn't it, there was no problem."

In 1981 Stuart had bought a bike in Oxford, using it to cycle round the city and he used enjoy cycling there along the River - "it was nice", also cycling in the dark late at night from his digs to a job in a bar. He recalled the cycling culture of the city from his perspective as a student there: "Yeah, especially in a place like Oxford. A lot of people cycled. And a lot of people would take the bikes home and, to and from...? ...and it's, it's quite flat, flattish city... Apart from where I was, Headington which is, on a Hill, but, the rest of the city's flat.... So it's, good."

Stuart had been working in Hemel Hempsted, Hertfordshire until moving up to Nottingham 2 or 3 years previously, and had used to drive to and from work, ceasing driving when he had taken early retirement from the civil service in the preceding year, rationalising the dispersal of the car: "so I'm on a lot-, lot lower, income."

In Hertfordshire, living close to the Grand Union canal he had cycled in the summer months, between April and October, the 5 miles to and from work cycling along the canal, but driving by car throughout the winter.

In his working life he had used the bike just for recreation. Cycle rides and weekends, only weekends, frequenting the Peak District, and more recently areas to the South of Nottingham, but venturing further afield as well. He had used to take the bike on the train and go long distances, to the South coast for example, for touring.

Going shopping more or less daily in the city centre he had previously cycled with a backpack, but now with the return of a back injury, he tended to walk and take the bus back home. He had also been avoiding cycling in the colder months between October and May.

Since coming to Nottingham he had established a few favourite local places for both cycling and walking, including Colwick Park, Wollaton Park and Attenborough where he had cycled having

taken the train from Nottingham on one occasion, cycling along the river and returning again by train.

He also like to attend cricket matches, getting to the Trent Bridge ground by bus, in preference to cycling: “Yeah, I’ve never taken the bike. I don’t like, that, main road, London road much.”

As a member of a walking club, his most recent use of Cycling-PT, had been to go walking at Cromford in Derbyshire, using the bicycle to get between the train station and the nearby youth hostel.

Appendix 9. Code book used to log coding development during process of coding and analysis of discussion transcripts

Node title	Nickname	Description	Definitions	H 01	H 02	H 03
· Benefit		Benefits specific to the combination of Cycling with PT				
· Affective	AFEC	The partip derives an affective or perceived benefit from combining Cy & PT, but other options are available to them...				
· Economising	ECONO	Saves HH money...				
· Essential	ESSEN	Cy & PT is essential to conduct an activity (maybe because it is not possible for the partip to drive, the particular geographic location of activity or home, or other...?)				
Optimises Use of Resources	RESUSE	Enablement of car-free or one-car households to conduct parallel activities.				
· Optimises Time & Distance	OPTIM	Saves HH time and/or modes optimised given the distances between activities...				
· Resilience	RESIL	Bicycle mentioned as a 'fall-back' travel mode in context of the variable provision of UK public transport.				

· Cycling Use				5	16	
· Biographical	BIOGR	Adults reminisce about past travel behaviour and external conditions.				
· Public Transport Use		where Public Transport is used without explicit reference to its use in combination with cycling as an access or egress mode, nor where PT is used to carry someone with their bike/s.		4	4	
· Not Cycling	NOTCY	When cycling is not done, or is replaced by other means of travel.		3	9	
· Cy-PT	PTCYC	Combining use of the bicycle with a form of public transport.		17	9	
· On Foot	WALKI	Activities that are normally accessed on foot by walking or running, and where walking temporarily or occasionally replaces other modes, inc Cy-PT.		1	3	
· Household Activity	HHACT	anything the participants may do which would have some relevance, impact, or effect on others in the HH or the HH as a whole. Includes both regular and occasional/periodic, as well as one-off activities.		21	24	
· Asymmetrical routes	ASSYM	Journeys where the trip out differs from the return-to-home trip by that involve multiple destinations.				
· Care provision	CARE4	A sub-code of HH Activities, this code primarily indicates incidences of 'childcare' – but may also be coded in some circumstances where an adult is being				

		cared for or a vulnerable or frail adult is visited regularly to ensure their well-being.				
Maintaining Relationships	RELATE	Participants describe activities which help to sustain social and familial networks, including filial visits and visits to friends and partners				
· HHA - Occasional activity	OCCAS					
· HHA - One-off activity	ONEOF					
· HHA - Regular activity	OFTEN					
· Household Transition	HTRANS	indicators of events, or other changes, eg. to abilities, patterns of activity or destinations, which seem permanent or that mark the end of a previous HH phase and the start of new behaviours, routines, mode choices, etc.		12	11	
· HTrans – Landscape	LANDS	Initiatives, Policies, Campaigns and Infrastructure changes which may have been commented on by participants				
· HTrans – Life Events	EVENTS	Events associated with passage from childhood to adolescence and through adulthood, eg: Education and employment; Relationships and residential location				

· HTrans – Mobility Resources	TOOLS	based on Mobility Milestones (Rau and Manton 2016), eg. driving licence or vehicle acquisition/disposal, season ticket for public transport, etc.				
· HTrans – Life Course – Anticipated Future	FUTUR	Participants contemplate future HH changes which could pre-empt a change of travel behaviour or activity patterns. (17 Aug 2017)				
Timescape	SEASON	Descriptions of changes in experiences due to time of day, seasons, or duration, etc... (22 Oct 2017)				
· Going Alone	ALONE	Lone Travel by children and young people.		11	3	
· Image	IMAGE	Participants describe how they see themselves, their possessions, their lifestyle, or how these characteristics are perceived by others. This might be related to Identity and Attitude factors, to be considered further...(13 March 2017)		3	4	
· Car-Use	CAR	References to journeys and travel to activities made partly, or entirely by car. (13 April 2017)		*	7	
· Comfort	COMFY	Comfort, both physical, physiological and psychological. (13 April 2017)		*	7	
· GoingGroup	GROUP	Travel or journeys are experienced as a group of two or more people. (Family members only, or also in groups with others?) (13 April 2017)		*	6	

· Biographical	BIOG	Adults reminisce about past travel behaviour and external conditions. (14 April 2017)		*	4	
· Exclusion	Exclu	Children not belonging on the street environment, nor in public transport “difficult spaces”	*used subsequently when coding for ‘otherness’ evidenced by other partips.			2?
· Understandings	Persp	Beliefs and perspectives of people, including those with enhanced experiences, specialised skillsets or particular capabilities.				
· Beliefs		Participants express their beliefs and values related to mobility, travel, cycling, independence.		6	5	
· Children's understandings	Childs	Children and young people demonstrating their knowledge, understandings or perception of activities, travel, artifacts, spaces, relationships and situations.				2?
Parent's perspectives	PARENT	Parents observations on travel and activities, particularly in relation to travel by, or activities with their children or another adult's travel and activities within the HH.				
· Professional Perspectives	Profes	a posteriori code				

		participant switches their perspective or frame of reference from that of 'user' to that of 'insider' related to their work role or profession.				
· PT-Cyclist	PTCYU	participants demonstrate an understanding that integrates knowledge of using PT and perspectives that reflect the position of the cyclist within the PT system. (15 Aug 2017)				
· Challenges	CHALS	Challenges and Difficulties associated specifically with the combination of Cycling with PT...				
· Design Opportunities	DESIG	Participants identify opportunities for design improvements or innovations or propose solutions.				
· Vidalysis		Observations of interactions recorded on the video recordings of interviews.		18	*	
· Concern	Angst	Concern expressed by a person in the HH over the safety of others in the HH, particularly worries over their safety while cycling.				
· GeoData				7	13	
· Words&Terms				8	2	
· HHIGuideQuestion						

Processes		<p>Potentially includes processes such as:</p> <p>(inclusion of any themes below t.b.c.)</p> <p>Negotiation</p> <p>Scheduling</p> <p>Bartering (exchange of favours)</p> <p>Specialisation</p> <p>Routinisation</p> <p>Experimentation/ Testing new approaches</p> <p>Reconfiguration</p>				
Advocacy and Engagement	ENGAGE	Advocacy, Agitation and Engagement in consultative processes				
Learning New Skills	SKILLS	Skills acquisition and learning processes, such as training courses for safe cycling, but also those learned through informal and HH contacts are identified. There may be a relationship with, or implications for HH Transitions resulting from a training event...				

· Negotiation	NEGOT	Primarily about how people consciously accommodate each other's needs or activities, but might include other keywords around SUPPORTIVE interpersonal interactions, such as: EMPATHY; FORBEARANCE; COMPASSION; FACILITATION				
Role Allocation	ROLES	Addresses themes such as 'Specialisation' within households, and in recognition that amongst my participating families the gender differences seem less important than the 'carer' role and employment status of the heads of HH.				
Route Planning		Discussion of the premeditative actions or steps taken by participants when they contemplate making journeys. Applies to both temporal and geographic planning considerations. Unsure if applies to social considerations???				
· Scheduling	SCHED	(see Processes above)				
· Socialisation	SOCIA	Learning processes or awareness-building. From Chatterjee's ARBTA Windsor Discussion Paper. (15 Aug 2017)				

Appendix 10. Coding structure at end of analysis process

Nodes – Coding in NVivo

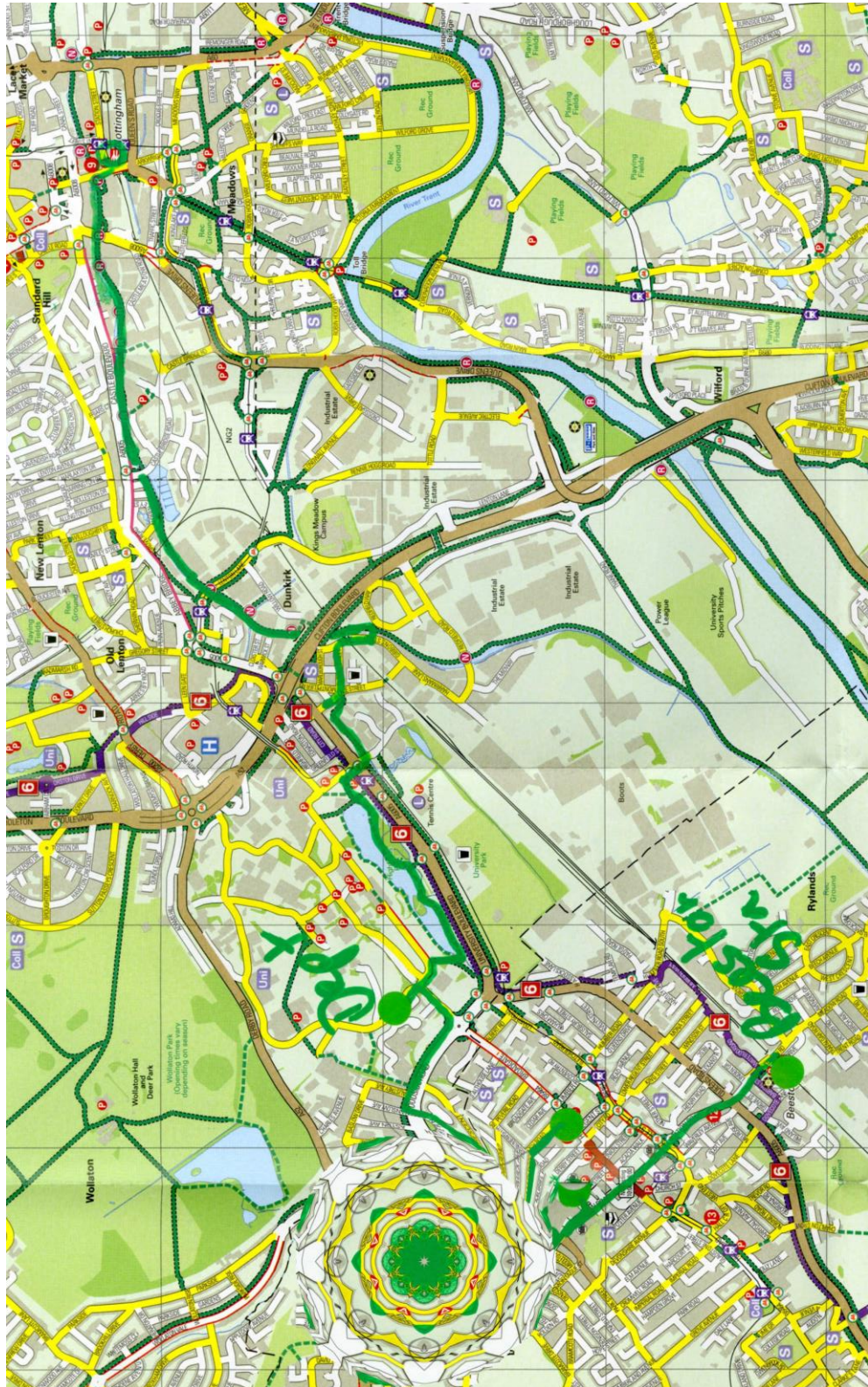
Name	Description	Sources	References
Admin-NVivo-stuff		0	0
Follow-up-Question		10	22
Geo-data		40	143
HHIGuideQuestion		12	139
Vidalysis	Observations of interactions recorded on the video recordings of interviews.	3	19
Words&Terms		46	162
Benefit	Benefits specific to the combination of Cycling with PT	7	8
Affective	The partip derives an affective or perceived benefit from combining Cy & PT, but other options are available to them...	68	206
Community impacts	Benefits for others in the wider community, beyond the HH and immediate social network...	5	6
Economising	Saves HH money...	37	58
Essential	Cy & PT is essential to conduct an activity (maybe because it is not possible for the partip to drive, the particular geographic location of activity or home, or...?)	9	10
Optimises Time & Distance	Saves HH time and/or modes optimised given the distances between activities...	41	79
Optimises Use of Resources	Enablement of car-free or one-car households to conduct parallel activities.	26	37
Resilience	use of the bicycle deals with the gaps in public transport availability	13	15
Safer than cycling all the way		1	1
Biographical	Adults reminisce about past travel behaviour and external conditions.	77	241
Car-Use	References to journeys and travel to activities made partly, or entirely by car.	62	255
Challenges	Challenges and Difficulties associated with either Cycling, PT, or with the combination...	85	511
Design Opportunities	Participants identify opportunities for design improvements or innovations or propose solutions to current problems or .	24	44
Comfort	Comfort, both physical, physiological and psychological	20	40

Name	Description	Sources	References
Concern	Concern expressed by a person in the HH over the safety of others in the HH, particularly worries over their safety while cycling.	40	80
Cycling		88	653
Cy-PUBLIC TRANSPORT	Combining use of the bicycle with a form of public transport.	92	686
Exclusion	Not Belonging - the notion of the transport environment or spaces where certain groups of ppl do not belong	14	24
Externalities	Activities, Enablements, Interactions, Transitions and Processes external to the household	0	0
Advocacy and Engagement	Advocacy, Agitation and Engagement in consultative processes	26	35
Cooperation	Co-operation from external indivs or organisations	11	17
Landscape	Initiatives, Policies, Campaigns and Infrastructure changes which may have been commented on by participants	74	304
Terrain & Hills	Partips describe or indicate that hills or other features of the natural physical landscape have had an impact on their activities or travel behaviour	1	2
Workplace factors	to do with experiences of working and at work	7	13
GoingAlone	Lone Travel by children and young people	47	115
GoingGroup	Travel or journeys are experienced as a group of two or more people. (Family members only, or also in groups with others?)	60	188
HH-Activity	anything the participants may do which would have some relevance, impact, or effect on others in the HH or the HH as a whole. Includes both regular and occasional/periodic, as well as one-off activities.	19	73
Asymmetrical routes	Journeys where the trip out differs from the return-to-home trip by mode, or by inclusion of different destinations, activities or just different routes chosen within the trip chain.	23	37
Care provision	Primarily indicates 'childcare' – but may also be coded in some circumstances where an adult is being cared for or their well-being is monitored or facilitated.	32	120
Maintaining Relationships	Participants describe activities which help to sustain social and familial networks, including filial visits and visits to friends and partners	45	132
Occasional activity		73	364
One-off activity		45	98
Regular activity		77	387
HH-Processes	Potentially includes processes such as: (all below t.b.c.) Negotiation Scheduling Bartering (exchange of favours)	0	0

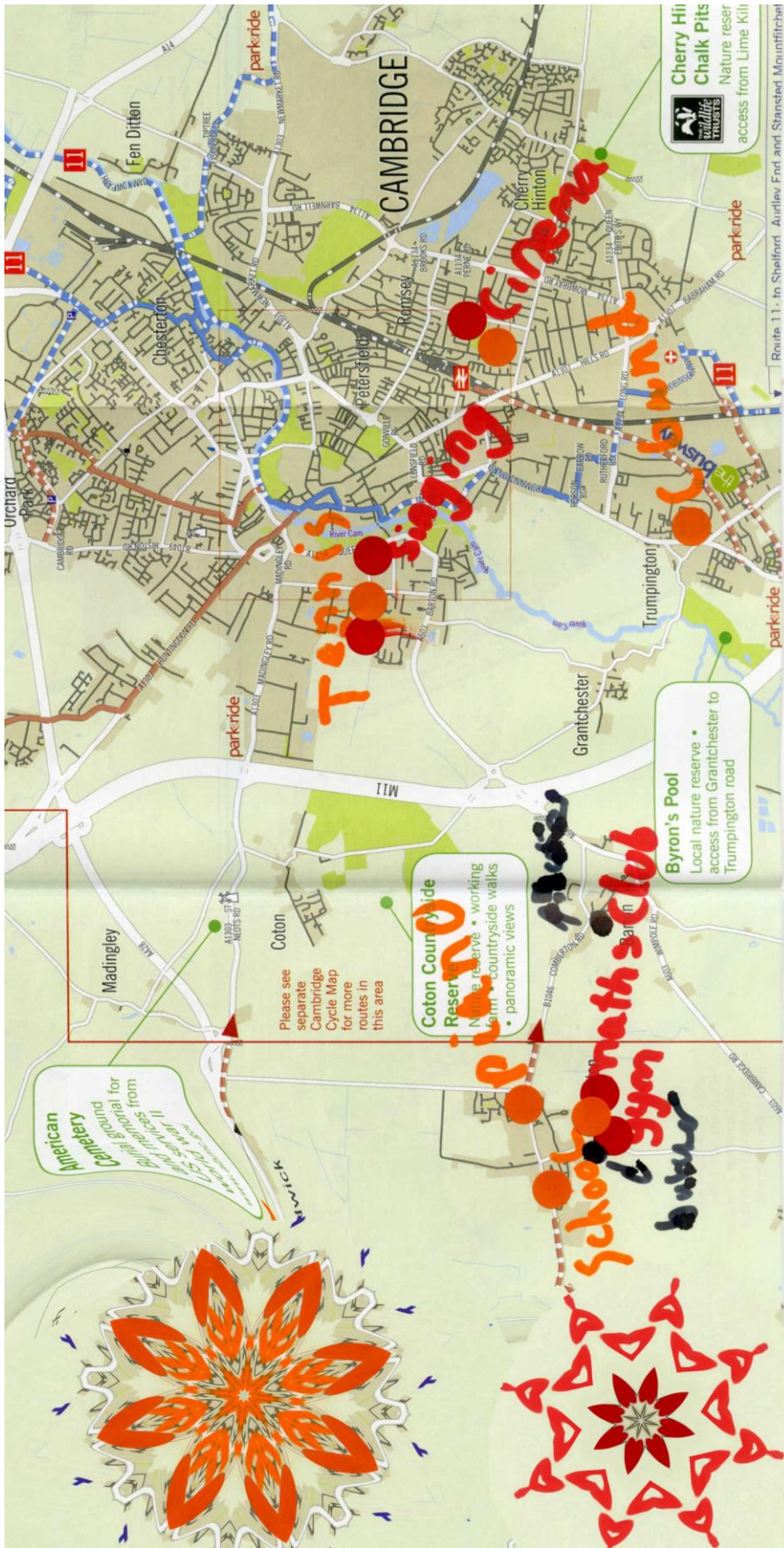
Name	Description	Sources	References
	Specialisation Routinisation Experimentation/ Testing new approaches Reconfiguration		
Learning New Skills	Skills acquisition and learning processes, such as training courses for safe cycling, but also those learned through informal and HH contacts are identified. There may be a relationship with, or implications for HH Transitions resulting from a training event...	46	96
Negotiation	Primarily about how people consciously accommodate each other's needs or activities, but might include other keywords around SUPPORTIVE interpersonal interactions, such as: EMPATHY; FORBEARANCE; COMPASSION; FACILITATION	48	112
Role Allocation	Addresses themes such as 'Specialisation' within households, and in recognition that amongst my participating families the gender differences seem less important than the 'carer' role and employment status of the heads of HH.	21	46
Route Planning	premeditative actions or steps taken by participants when they contemplate making journeys. Applies to both temporal and geographic planning considerations. Unsure (14/10/2017) if this applies to social considerations? Possible overlap with "Scheduling" processes.	41	80
Scheduling	HHs co-ordinate activities around each other's availability	41	135
Socialisation	Learning processes or awareness-building	65	193
HH-Transition	indicators of events, or other changes, eg. to abilities, patterns of activity or destinations, which seem permanent or that mark the end of a previous HH phase and the start of new behaviours, routines, mode choices, etc.	14	67
Life Course - Anticipated Future	Participants project forward to a future point where some change will have occurred to HH activities or travel behaviour	39	78
Life Events – Experienced	Events associated with passage from childhood to adolescence and adulthood, for example. (Rau and Manton 2016). Examples (Chatterjee 2013) include: Education and employment Relationships and residential location Children's development Physical health Leisure and fitness interests	72	246
Mobility resources	based on Mobility Milestones (Rau and Manton 2016), eg. driving licence or vehicle acquisition (or disposal), season ticket for public transport, etc.	57	131
Timescape	Descriptions of changes in experiences due to time of day, seasons, or duration, etc...	47	153
Image	Participants describe how they see themselves, their possessions, their lifestyle, or how these characteristics are perceived by others. This might be related to Identity and Attitude factors, to be considered further...(13 March 2017)	24	47
Not-Cycling	When cycling is not done, or is replaced by other means of travel.	58	156

Name	Description	Sources	References
On-Foot	Activities that are normally accessed on foot by walking or running, and where walking temporarily or occasionally replaces other modes, inc Cy-PT.	49	98
PT-Use	where Public Transport is used without explicit reference to its use in combination with cycling as an access or egress mode, nor where PT is used to carry someone with their bike/s.	59	179
Reflecting on Research Participation		7	10
Understandings	Beliefs and perspectives of people, including those with enhanced experiences, specialised skillsets or particular capabilities.	8	9
Beliefs	Participants express their beliefs and values related to mobility, travel, cycling, independence.	51	134
Children's understandings	Children and young people demonstrating their knowledge, understandings or perception of activities, travel, artifacts, spaces, relationships and situations.	60	195
Parent's perspectives	Parents observations on travel and activities, particularly in relation to travel by, or activities with their children or another adult's travel and activities within the HH.	54	245
Professional Perspectives	a posteriori code participant switches their perspective or frame of reference from that of 'user' to that of 'insider' related to their work role or profession.	15	23
PT-Cyclist	participants demonstrate an understanding that integrates knowledge of using PT and perspectives that reflect the position of the cyclist within the PT system.	26	51
What if combining was easier or possible	Participants suggest changes they'd like to see, or speculate on potential uses for the combination of Cycling with PT...	27	38

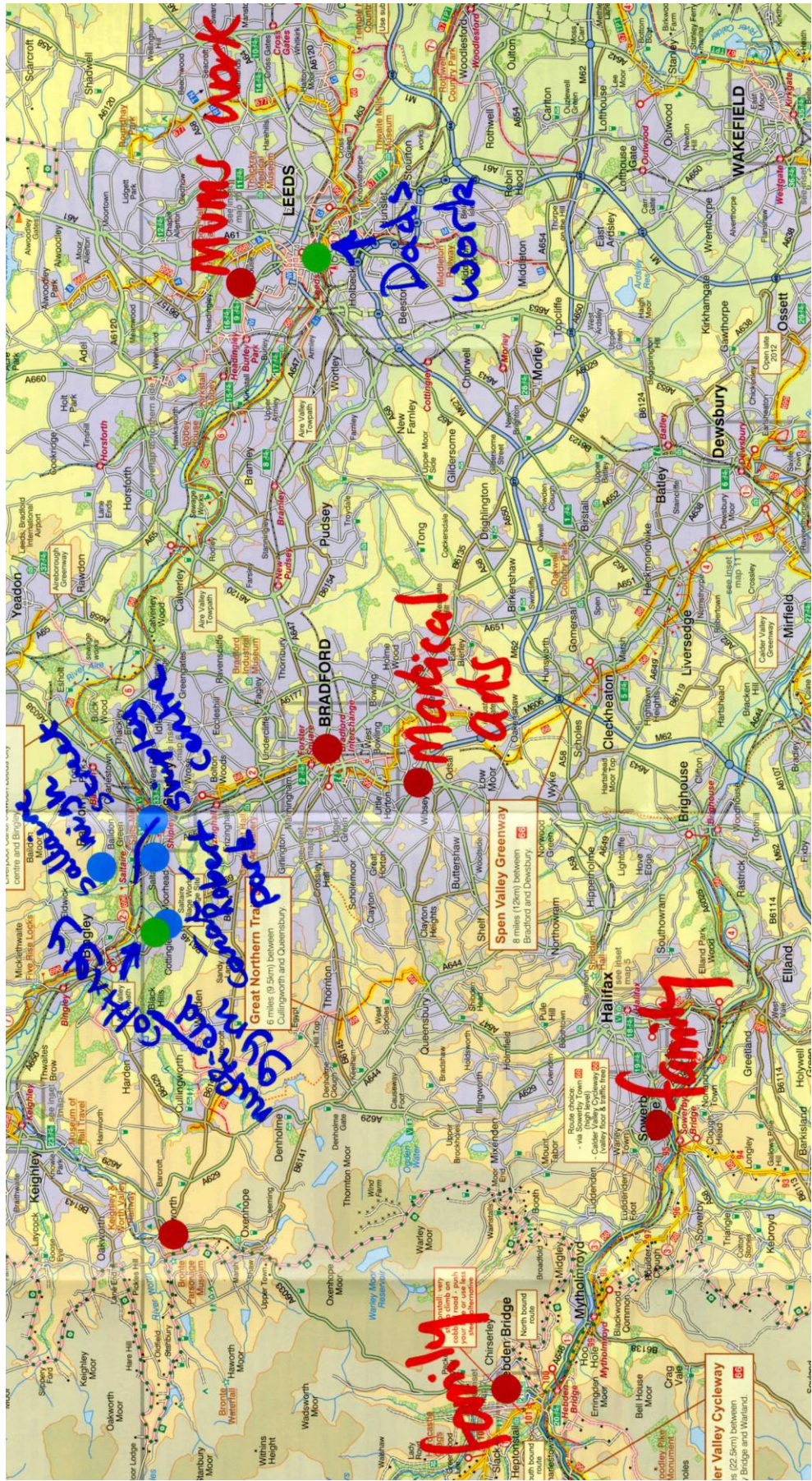
Appendix 11. Maps drawn by participating households of their everyday activity locales



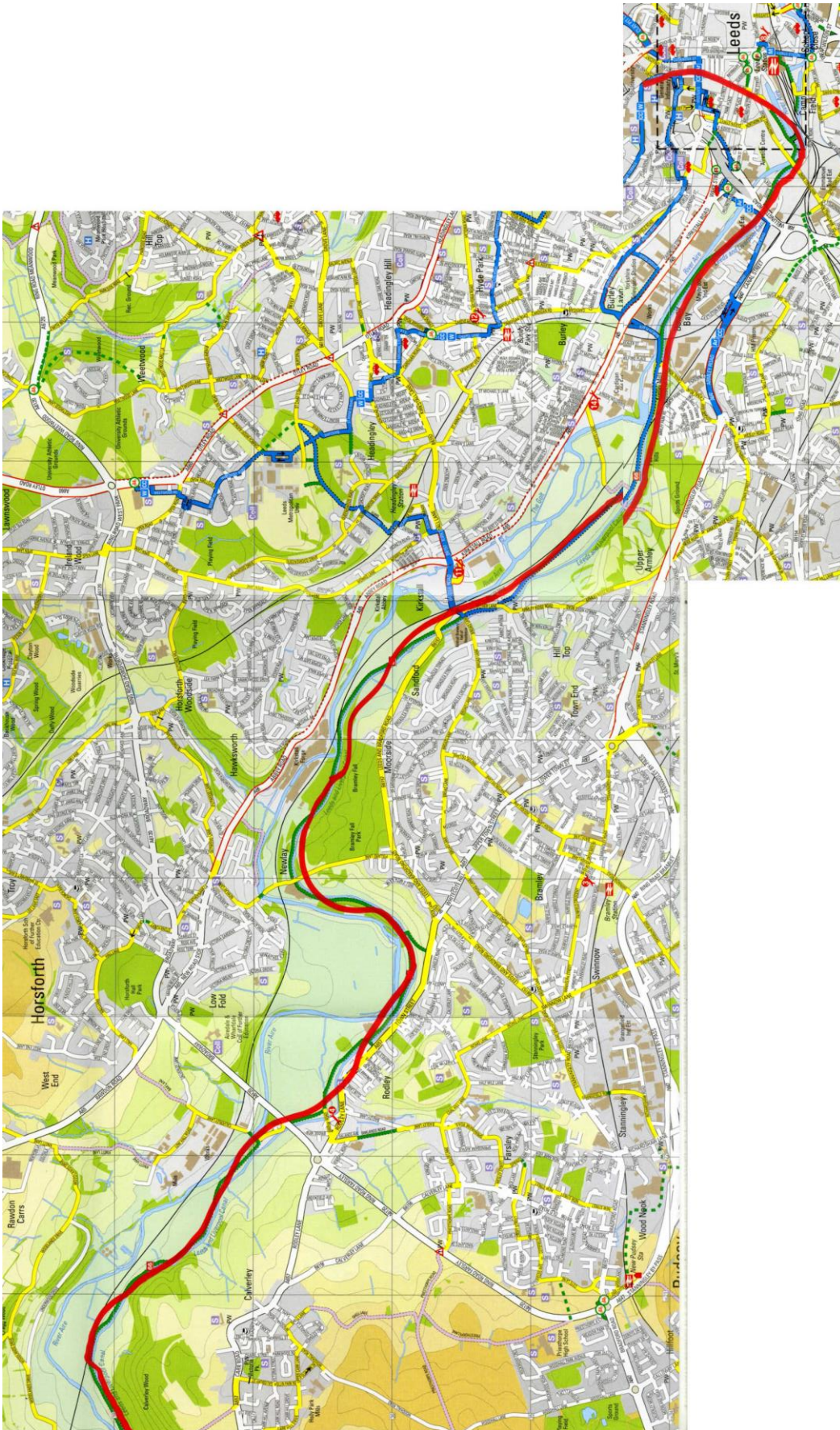
Jacqueline's Nottingham Station to Beeston ride along the canal



Jacqueline, Colin, Felicity and Robbie's Cambridge activities (by car usually)



Dinah, Monique and husband's activities



Monique's bike ride into work 2 days per week
(other maps have not been included for brevity)

Appendix 12. Ethical Approval paperwork

Performance, Governance and
Operations
Research & Innovation Service
Charles Thackrah Building
101 Clarendon Road
Leeds LS2 9LJ Tel: 0113 343 4873
Email: ResearchEthics@leeds.ac.uk



UNIVERSITY OF LEEDS

Peter Atkinson
Institute for Transport Studies
University of Leeds
LS2 9JT

**AREA Faculty Research Ethics Committee
University of Leeds**

22 October 2015

Dear Peter

Title of study: Fitting the bike to the chain: An activity analysis of transitions towards households integration of multi-modal cycling
Ethics reference: LTTRAN-062
Grant reference: ES/J500215/1

I am pleased to inform you that the above application for light touch ethical review has been reviewed by a School Ethics Representative of the ESSL, Environment and LUBS (AREA) Faculty Research Ethics Committee. Following your response to the committee's comments I can confirm a favourable ethical opinion on the basis of the application form as of the date of this letter. The following documentation was considered:

<i>Document</i>	<i>Version</i>	<i>Date</i>
LTTRAN-062 LightTouchEthicsForm-PeterAtkinson-v3CM.doc1	1	09/10/15

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval, including changes to recruitment methodology. All changes must receive ethical approval prior to implementation. The amendment form is available at <http://ris.leeds.ac.uk/EthicsAmendment>.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited. There is a checklist listing examples of documents to be kept which is available at <http://ris.leeds.ac.uk/EthicsAudits>.

We welcome feedback on your experience of the ethical review process and suggestions for improvement. Please email any comments to ResearchEthics@leeds.ac.uk.

Yours sincerely

Jennifer Blaikie
Senior Research Ethics Administrator, Research & Innovation Service

Performance, Governance and Operations
 Research & Innovation Service
 Charles Thackrah Building
 101 Clarendon Road
 Leeds LS2 9LJ Tel: 0113 343 4873
 Email: ResearchEthics@leeds.ac.uk



UNIVERSITY OF LEEDS

Peter Atkinson
 Institute for Transport Studies
 University of Leeds
 Leeds, LS2 9JT

**ESSL, Environment and LUBS (AREA) Faculty Research
 Ethics Committee
 University of Leeds**

19 July 2016

Dear Peter

Title of study: **Fitting the bike to the chain: An activity of analysis of transitions towards households integration of multi-modal cycling**

Ethics reference: **AREA 15-088 amendment July 2016**

Grant reference: **ES/J500215/1**

I am pleased to inform you that your amendment to the research application listed above has been reviewed by a representative of the ESSL, Environment and LUBS (AREA) Faculty Research Ethics Committee and, I can confirm a favourable ethical opinion as of the date of this letter. The following documentation was considered:

	Version	Date
088 amendment July 16 TSPA-Participant-FGW-AdultLetter-22-ationStudy-Linked2ChildLetter.doc	1	13/07/16
088 amendment July 16 TSPA-Participit-FocusGroup-AdultLetter-24-ationStudy.doc	1	13/07/16
Committee Provisional PA-Response.doc	1	05/04/16
Revisions-to-Ethics-3.xlsx	1	05/04/16
TSPA_flyer_to_recruit_questionnaire-respondents-8-amended.doc	2	05/04/16
TSPA_Questionnaire_draft-12-news submission.doc	1	05/04/16
TSPA_webnotice_to_recruit_research_participants-10-amended.doc	2	05/04/16
TSPA-Fieldwork_Med_Risk-Combined-Methods-v07-submission.doc	2	05/04/16
TSPA-Lone_Working_RA_Nov_15-Edit4-submission.docx	2	05/04/16
TSPA-Participant-Adult-consent-form-7-updated.doc	2	05/04/16
TSPA-Participant-Child-consent-form-6-updated.doc	2	05/04/16
TSPA-Participant-Child-Letter-08-CyclingIntegrationStudy-amended.doc	2	05/04/16
TSPA-Participant-FGW-AdultLetter-22-CyclingIntegrationStudy-amended.doc	2	05/04/16
TSPA-Participant-HHI-AdultLetter-23-CyclingIntegrationStudy-amended.doc	2	05/04/16
TSPA-PTCyclingIntegration-Ethical_Review_Form_V3-Edit-10.doc	2	05/04/16

Appendix 13. UTSG conference paper related to thesis

UTSG *January 2016
Bristol*

ATKINSON: Homing in on UK households who integrate cycling with public transport

HOMING IN ON UK HOUSEHOLDS WHO INTEGRATE CYCLING WITH PUBLIC TRANSPORT

Mr Peter Atkinson PhD student

Institute for Transport Studies, University of Leeds

Introduction

This paper describes a method used for identifying multi-modal household travel behaviours, through the analysis of activity patterns from an existing UK-wide dataset, the National Rail Travel Survey (NRTS). This analysis of activity patterns of people who integrated cycling with rail journeys ('integrators') is part of a mixed method PhD project aiming to develop an understanding of the integration of cycling as an enabler of household activities. Analysis of cycle-rail journeys is used to assist the researcher in identifying suitable city-regions and localities within them, to recruit households as participants for future in-depth interviews, activity diary study and mobility analysis using GPS tools. Identification of the potential benefits of integrating cycling with public transport to access everyday activities will be of value to other households keen to sustain cycling as an economic everyday means of travel. Understanding the challenges and constraints that households face when integrating activities through cycling should also help to inform future policies and provision for sustainable urban and suburban mobility.

Households for the purposes of this study, may be headed by dual parents or a single adult (with or without separated parent contactable for the study), be living as part of an extended family with other relatives, with lodgers, or other regular short-term visiting residents.

Considerable effort will go into the process of recruiting households as participants for this study. This is an attempt to identify suitable city-regions and the geographic neighbourhoods to maximise the likelihood of communicating the project to a wide range of households that meet the following criteria:

- HHs with at least one resident child, or more children in school years 5-12;
- One or more HHs members (adult or child) currently integrate cycling with PT on a regular or periodic basis.

This relatively wide definition of households for the purposes of the project enhances the chances for recruitment amongst the relatively small population of cycle-rail integrators and will, it is hoped, reflect some of the diversity of modern household compositions.

Activities may be classified in several categories, for example those related to work and employment, business, attendance at school, college or university, social engagements, personal business, shopping, or other household maintenance activities (health visits), recreation, sports or cultural and political and economic, as well as accompanying another adult, or children. Activity patterns, although often on a daily cycle, might exhibit multi-day patterns as observed in a previous study of cycle parking at rail stations in Bristol (Sherwin et al., 2011), the bicycle being quite well suited to being parked cost-free at stations, or transported with the traveller without additional cost.

This paper will contribute to the wider body of work that has studied cycling's integration with public transport modes from an economics or policy perspective through an analysis of the geographic distribution of cycle-rail facilitated activities by households. It informs the process of gathering data from participants in order to explore the wider project's research questions, which are:

1. to identify how the integration of cycling with public transport (PT) acts as an enabler
 - of household activities, through analysis of activity patterns
2. to explore why households integrate cycling with PT as part of everyday activities
3. to examine the role that cycling's integration with PT plays in responding to HH

Method transitions

NRTS survey data

Data from the National Rail Travel Survey (NRTS) of 2004-5 (Strategic Rail Authority (SRA), 2010) is used to explore levels of cycling, the broad socio-economic factors in the areas where cycle-rail integrators live. By exploring the relationship of the given range of recorded journey purposes with other variables, such as the time of day, demographic profile of the integrator, size of the group and distance travelled, comparison of access to egress mode, it can also raise questions for further qualitative exploration about the sort of activities that cycle-rail journeys facilitate. The NRTS was a unique comprehensive survey of journeys undertaken on the UK rail network. Combining survey data from the wider UK rail network, it incorporates data from the London Area Travel Survey (LATS) of 2001-2. The NRTS focused on weekdays, with surveys and passenger counts taken at 1500 stations and on board trains covering the remaining 1000 lesser used stations. The data from was combined to generate a comprehensive picture of passenger travel

The advantages of the NRTS survey and resulting analysis are that it provides a useful set of data on the nature of journeys encompassing a rail trip, their geographical characteristics, the demographic profiles of passengers, access modes and duration and distance of most stages of each recorded journey. Analysis of the reported activity purposes in the dataset allows for an initial categorisation of the reasons for travel, but future qualitative work will support a more detailed analysis of the reasons why households integrate cycling with rail.

In the UK the main combination of cycling with any mode of public transport by volume is with rail journeys. The NRTS is the most comprehensive national dataset on journeys which integrate cycling with any public transport mode, few other transport surveys having a comparably detailed question set, other than the NTS panel survey. The National Rail Passenger Satisfaction Survey (NRPS) also contains information on access modes and presents more recent data, but its focus on passenger satisfaction experiences and periodic sampling means that less detail is captured on the details of journey-makers origin and destination (O-D) addresses, an element of singular importance to the task of localising neighbourhoods with above average concentrations of integrators.

For the purposes of understanding travel patterns of cycle-rail integrators, the NRTS has some limitations:

Data on access and egress stages of journeys is comprehensive but does not confirm whether journeys by cycle-rail integrators involved the carriage of a bicycle on board the train. It includes the reported time taken to get to the station as well as distances travelled to get to the station imputed from data captured on the origin and destination postal addresses. For the purposes of this analysis and to keep respondents data confidential, the journey origin and destinations have been truncated at postcode sector level, i.e. the first part, a combination of one or two letters and a single or double digit number, followed by the first number of the second part of the postcode. Postcode Units are variable in size, ranging from a single address (i.e. for a large organisation with over 500 mail items per day) up to a maximum of 100 individual addresses. The 12,381 Postcode Sectors in the UK in 2014, represent on average around 140 individual Postcode Units each, i.e. typically around 2000 individual addresses (ONS).

Analysing the distribution of households using Postcode Sectors poses some technical challenges for the comparison of demographic information on cycle-rail integrators with other geographic socio-economic datasets. Postcodes are not fixed boundaries and are subject to the alteration of the distribution of postal addresses on a year-by-year basis. Postcode

boundaries do not align with other geographical units, such as census output areas or local authority boundaries, however an attempt has been made to locate the origin and destination zones for cycling integrators using a proprietary shapefile downloaded from Open Door Logistics (Welsh, 2015) based on ONS and Royal Mail geographic datasets. Locating the households of integrators using Postcode Sectors is thus possible to a resolution ranging from around a hundred addresses to a few thousand and within widely varying areas from several kilometres to a fraction of a km.

The NRTS did not capture the details of every individual journey and the extended period of the survey meant that details of outward journeys from a particular station were not always captured on the same day as a matching return trip was recorded. At some, particularly smaller and quieter stations, the survey was not conducted for the whole day; the data processing conducted by DfT statisticians has attempted to compensate for gaps in the data by a process of balancing and weighting responses, the full UK dataset contains around 2.7 million individual trips, expanded from approximately 436,000 completed survey questionnaires. The limitations of the dataset from NRTS data due to the 'imputation of records for time periods when there are no records using records from other time periods' at smaller and less comprehensively surveyed stations renders a statistical analysis of cycling access or egress journeys and associated integrators' demographic profiles at the level of individual 'small' stations with less than 150 journey records meaningless (DfT, 2010). The process of cloning journeys employed within the dataset also resulted in some duplication of journey records resulting in apparent and unexpected multiple instances of journeys with identical characteristics. By deselecting the journey records identified as 'cloned' a clearer picture emerges of the variety of journey O-D pairs.

For the purpose of our geographic analysis of variations in O-D journey patterns, station access mode data without the inclusion of cloned journeys is considered to represent the range of journey origin points from records of actual journeys, or from the reported return journey. As the focus is on a group of stations within a city region and the localisation of the home origin points for journeys, it is considered that the neighbourhoods in which cycling integrators' households are situated will be adequately revealed.

The data does not clearly identify those journeys that may be asymmetric, i.e. where the return trip is by another separately ticketed differently routed rail journey, or even by another mode. Other surveys of activity related travel, such as the NTS may represent this kind of multi-modality, or non-linear journey better. Asymmetrical and durations of longer return trips will also be explored within future household interviews in a later stage of this project.

The weekday focus also results in the effective absence of data on weekend travel within the NRTS. The journey purpose and passenger characteristics, as well as activity patterns observable in weekend data may differ from that of weekday journeys. The opportunity to explore the integration of cycling with rail to facilitate access to activities other than the commute to and from work, school or college, is thus limited to journeys conducted by a minority of passengers during weekdays. The data, representing journeys conducted on non-holiday weekdays between 2004 and 2005 is also not very current, despite being the most recent nationwide rail travel activity survey.

Interpreting the dataset

The NRTS dataset requested from DfT was based on records of journeys with their origin or destination at 153 stations within thirteen city regions (identified below). The data comprised 255,170 records of individual journeys involving all and any access or egress modes representative of a 'typical weekday' picture of rail journeys in the UK.

The dataset in SPSS format contains 90 variables covering aspects of the rail network, access and egress journey stages, journey purpose, ticket and purchase details, railcard use, travel group size, as well as demographic and socio-economic indicators, such as car availability, household size, presence of children and household income. Geolocation data on stations and origin and destination points are included in both postcode and Northing/Easting format.

Selecting 'bicycle' from the 13 options for access and egress mode, allowed for an initial count analysis to be made which showed that cycling was the access mode in the case of 6107 journeys, the majority of which were also completed by bicycle, although a sizable

number (1890) walked as the egress mode to their destination, or used other motorized modes (988). Cycling formed the egress mode for 6077 journeys, of which 1894 had commenced with a walk to the station, or in 636 cases had required motorized modes to arrive at the station.

City Region	Total of all passengers	cycle ingress mode count	%cycle ingress	cycle egress mode count	%cycle egress
(all regional stations)					
1. Cambridge (3)	16933	2002	11.8	1982	11.7
2. Bristol (17)	26419	1204	4.6	1183	4.5
3. York (2)	20963	697	3.3	692	3.3
4. Norwich (5)	10597	313	3	315	3
5. Coventry & N Warwicks (10)	24298	658	2.7	618	2.5
6. Herefordshire (4)	3527	88	2.5	93	2.6
7. Nottingham (10)	19148	451	2.4	452	2.4
8. Edinburgh (11)	47570	976	2.1	970	2
9. Sheffield (5)	21580	430	2	414	1.9
10. Manchester (23)	63943	829	1.3	817	1.3
11. Merseyside (41)	84269	974	1.2	888	1.1
12. Leeds (14)	64970	697	1.1	720	1.1
13. Newcastle (8)	21861	173	0.8	178	0.8

Table 1. Levels of cycling as the ingress (access) and egress mode for each of 13 city regions compared. Data here is the expanded statistically balanced NRTS dataset using weighted values for each included record. This table includes both inward and outward bound journeys (in most cases representing both an outbound and a return trip) to or from the specified city-region stations. (source: the author, from NRTS data)

Translation of geocoded data into QGIS

For rail stations, this was quite straightforward, enabling the individual stations, station combinations for the rail journey, or groups of stations to be input to QGIS as a series of Northing and Easting (N/E) co-ordinates.

For inputting O-D maps based on the station geocoding, the data needs to be manipulated into tables with the origin and destination co-ordinates (N/E) sequentially in columns, whereas they arrive in separate O and D columns. For multi-stage rail journeys, the intermediate stations need to be interposed and for each journey, a new sequential integer is added to indicate the vertex order. A unique grouping value is also given for each set of vertices.

To locate cycle-rail integrators' households with a degree of precision around the stations at which their rail journeys began or ended, the postcode sector information on journey origin and destination addresses was used (N/E data for the journey origin or destination addresses were withheld from the dataset). These were supplied in the NRTS dataset as two variables: the outer postcode district (a combination of one or two letters and a single or double digit number), followed by the first number of the second part of the postcode. The home postcode sector was concatenated from these variables creating new variables for the postcode sectors, to represent the journey's origin and destination addresses respectively. Once imported as a table of postcode sectors, together with other variables summarising the number of individual journey-makers and their median income level, these were associated in QGIS with zones within a Shapefile containing postcode sector zones as polygon boundaries in QGIS. These postcode sectors are clearly visible on the large scale map view (see figure 2), wherever the location of a cycle-rail integrator's home has been confirmed,

the numeral indicating the number of home addresses located within that sector. The coloured choropleth areas represent the Postcode sectors for the integrators' home neighbourhoods, darker zones indicate a higher median reported household income level according to the NRTS survey.

Considerable manipulation is required to prepare the basic dataset to reveal the O-D journey with the focus on the home end details. Most journeys reported were return journeys, so the dataset allows for these trips to form the proxy for the whole return journey and generally assumes the access and egress modes to be reversed according to the direction of travel. A small minority of return trips were recorded as having originated at the activity end of a journey. These needed to be separately manipulated and the details of the destination end reclassified as representing the home end, before inclusion in the O-D data table for use in QGIS.

It may be observed in the maps presented that journeys are shown 'as the crow flies' without deviations reflecting the change of trains on some, particularly longer journeys. The process of accurately visualising journeys taken via intermediate stations proved too complex for this initial analysis for the following reason. Approximately half of all journeys had been recorded during the return leg of a two-way journey, in the NRTS this has been paired up with imputed data to generate the outward portion of the journey where the outward trip was not surveyed. While this means that the access and egress mode details have been reversed within the dataset to match the direction of travel, the detail of any intermediate stations representing the sequence of trips from the activity end of the return journey, have not been reversed. In order to have combined these with data on sequences of intermediate stations recorded during other outward journeys, each stations set of Northing and Easting values would have had to be transposed to fit the imputed outward journey, a process considered excessively time consuming here. Data on journeys representing single ticket 'one-way' journeys were also re-oriented, where necessary to identify the 'home' end data and combine this with the simplified 'home-origin activity-destination' station O-D pairings represented in these maps. O-D paths were then created using the GIS programme (QGIS using the Points2One plugin).

Initial Findings

Within each of the 13 city regions patterns of travel relating to the selected railway station network are visible. Predictably the larger central stations see greater flows of cycle-rail passengers than peripheral stations.

Peripheral stations are used as a means of accessing the railway to travel towards urban centres, certain stations being more heavily used by integrators than others adjacent. The inclusion of the Merseyrail area allows this pattern to be more closely observed.

Predictably and echoing Sherwin's (2011) findings, the journey to work forms the bulk of weekday travel by cycle-rail integrators (see table 2 below), however the dataset includes journeys made for other purposes.

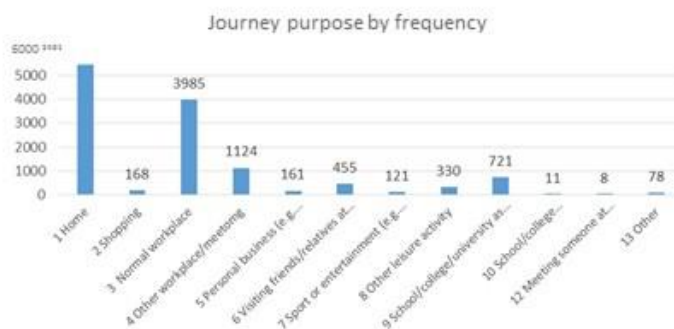


Table 2. Frequency of by cycle-rail integrated journeys, categorised by journey purpose, as described in the NRTS questionnaire (DfT, 2010)

The reported household income level also varies widely with the location of households. Relatively few journeys originated from homes with very low incomes, and in some areas with concentrations of integrators the income level is particularly high.

HomeRegion	IncomeGroupID Q26 Total household gross income group					Count of journey origins byRegion
	Median	Minimum	Maximum	Range	N	
1.00 Cambridge	5	2	6	4	7	352
2.00 Bristol	5	1	7	6	127	139
3.00 York	5	1	7	6	144	148
4.00 Norwich	5	1	7	6	48	52
5.00 Coventry	5	1	7	6	55	87
6.00 Herefordshire	5	2	6	4	11	12
7.00 Nottingham	5	1	7	6	55	59
8.00 Edinburgh	5	1	7	6	89	90
9.00 Sheffield	4	1	6	5	45	46
10.00 Manchester SW	5	1	7	6	82	82
11.00 Merseyside	4	1	7	6	73	73
12.00 Leeds	4	1	7	6	48	48
13.00 Newcastle	5	2	7	5	17	17
Total	5	1	7	6	801	1205
IncomeGroupID Variables	1 = Below £7000; 2 = £7000 -£12,500; 3 = £12,501 -£17,500; 4 = £17,501 -£35,000; 5 = £35,001 -£50,000; 6 = £50,001 -£75,000; 7 = More than £75,000					

Table 3. Comparison of household income levels by region. Totals N of cycle-rail integrator households represented within the NRTS survey are indicated for each region. *Discrepancies in counts of income levels compared with numbers surveyed in some regions reflects the incorporation of data from the earlier LATS survey which did not collect the full range of demographic information as the later NRTS survey.

This project has adopted a regional focus because London's transport provision is exceptional by comparison with that in many UK regional cities. The extensive and dense transport network in London offers a real alternative to car based lifestyles for a large proportion of its citizens and workforce. The less well-resourced public transport provision outside the capital and less dense public transport coverage both temporally and spatially may result in a particular set of needs for people cannot, or do not wish to drive cars. This project aims to explore factors encountered in regional cities and their distributed neighbourhoods, where the integration of cycling with public transport has been demonstrated to support household activities.

Rail journey characteristics

Rail journeys undertaken by cycle-rail integrators vary widely in distance, ranging from 0.7km to 546km, and while the average mean distances travelled by all integrators is around 45km, the median and mode values for integrators with children under 16 in the household are noticeably lower (25.7km for both values) compared with the same values for childless integrators (32.5km and 58km respectively).

For example, according to the balanced NRTS dataset 159 daily cycle-rail journeys occur between Leeds and York in both directions, forming 28% of the destinations reached for those from York and 31% from Leeds. Using the clone-free dataset, York retains its high proportion of cyclists ingressing to make onward journeys to Leeds, however a much smaller proportion of Leeds cyclists make reciprocal journeys. Uncloned records of Leeds integrators reveal a more widely dispersed range of journeys radiating out from the city. The main city stations in both cases attract the largest number of cycle-rail integrated journeys as the start or end point of the rail trip, but other journeys traverse the network between minor stations, some with an interchange point at the major city centre station.

How do the city regions compare?

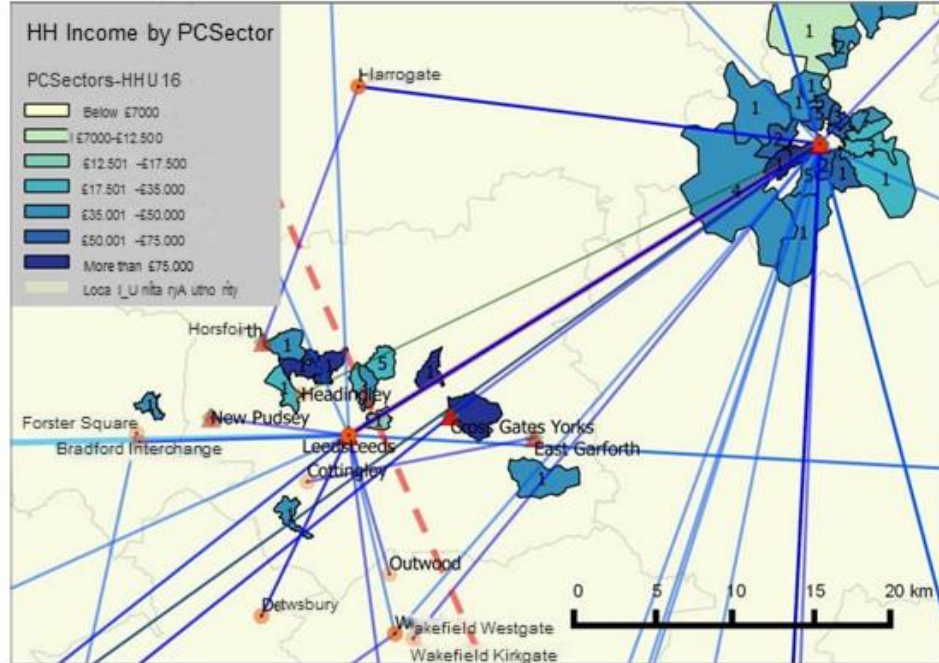


Figure 2. Detail view of the map showing journeys within the West Yorkshire region. For cycling integrators the two cities form an important O-D pairing of bike-rail journeys from either station.

Differences can be observed in the distribution of integrators' homes from these two city centres, with homes in greater proximity to York city centre. Leeds integrators benefit from a wider selection of local railway stations however Leeds city station is both a major destination as it is a departure station for cycling integrators. In the case of York, cycling is used to greater extent as the access mode for journeys by rail away from the city.

When comparing integrators from households with resident children under 16 to integrators without children, a difference in numbers is immediately apparent - people in households without young children (1190) outnumber those with children by almost five-to-one. Childless integrators are also more widely dispersed geographically, for example in the area explored to the South West of Manchester, seeming to be located along zones forming a couple of corridors. A similar infill pattern occurs in Coventry with the inclusion of childless households, although reasonable numbers of integrators with children are represented in the city.

In other areas, such as the Merseyrail area, a visual comparison of householders with children who integrate suggests that childless integrators have lower average household incomes. A useful future analysis would explore the relationship of integrators' household size to reported income level.

In Nottingham, childless integrators live closer to the city centre, these integrators add to the variation in income level being represented by some of the lowest incomes reported. The childless integrators are also dispersed amongst the more remote suburbs. In Sheffield, relatively few households with U-16 children are represented, the vast majority of integrators being from childless households and are entirely situated in the hillier and leafier Western part of the city. Both cities have mature tramway systems, however the impact of this on integrated cycling is as yet unclear.

Edinburgh's integrators with children in the household are clustered mainly to the South and East of the city. With the inclusion of the childless integrators, a corridor of areas to the West of the city centre emerges with also the addition of neighbourhoods to the North East and a

presence of integrators in district to the South of Edinburgh Park combined rail and tram interchange.

Bristol shows a great concentration of cycling integrators with rail. Households with children appear to be clustered, mainly outside the immediate inner city, other integrators households then 'fill in' the gaps across most of the city. Bristol contains a high concentration of cycling integrators.

Limitations of the NRTS for the analysis of integrated cycle-rail travel behaviour

- Due to the 'expansion' process and inclusion of cloned journey access/egress, demographic and other data variables limits the ability to use the dataset for some generalisations regarding smaller and less frequented stations.
- It is 10 years old (but still being re-visited from time to time by DfT statisticians). Further comparison with other more recent survey data (for example the NTS and Census data, as well as APS) will be required to confirm the relevance of this dataset to the study of current cycling integration behaviour.
- Some journeys do not appear to originate from home, but in some cases they originate from a College location, returning to this location at the end of the day. Any future iterations of the NRTS data collection survey questionnaires could identify residential locations away from traditional definitions of 'home'.
- The NRTS generally assumes the return journey (or outward, if the return was surveyed) is the mirror image of the trip chain in the opposite direction, however people may not use the same access / egress mode at opposite ends of the day, owing to lift-sharing or other household level factors. Future data collection could explore how combinations of multiple single ticketed journey sections may compose a return journey or tour.
- The incomplete demographic data caused by use of the older LATS data limits its scope for analysis of traveller demographic profiles at some stations.

Limitations of the presented approach to analysis of the dataset

- The selection of city regions was not systematic and contains some 'outliers', such as Hereford representing the smallest dataset, probably insufficient to sustain great scope for multiple case studies. On reflection, the Norwich region might offer greater scope for exploring why people in less urban surroundings might benefit from integrating cycling with rail.
- In practice, households from the wider range of socio-economic demographic categories may prove difficult to recruit as participants for the case studies, leaving the composition of the participants susceptible to self-selection, for example by enthusiast cycling households, rather than those who integrate cycling out of economic necessity, or due to other constraints.
- The comparison of households with U-16s present ('family' people?) with those without children resident
- The description of the variety of purposes for journeys based on NRTS classifications requires further work. The translation of the data into an analysis of how cycling integration works to facilitate non-commuting journeys for leisure or other utility purposes requires further effort.
- The method adopted is useful for visualising travel patterns and prepares the ground for deeper exploration of the local background context such as availability of designated cycle paths and routes, or the possible effect of topographic features which might impede cycling.

Conclusion

The challenge outlined in this paper is to identify areas within the UK suitable for the recruitment of households whose members regularly integrate cycling with PT. Through

secondary analysis of the existing dataset approximately 250 individuals were localised who appear to match the ideal participant, i.e. situated within a household with resident children. While this suggests a rather narrow scope for recruitment to the qualitative study, the spatial analysis of the wider range of cycling integrators living within the respective regions has identified several regions in which the practice of cycle-rail integration is more widespread than others and these include Cambridge (352), York (148), Bristol (139), Edinburgh (90) and Coventry (87). By contrast, Newcastle (17) and Hereford (12) would appear to offer little promise for participant recruitment, other than of isolated individual households. City regions with lower intensities of cycling integration may reflect the less extensive network of railway stations, or other factors, as yet unidentified.

In most of the city regions analysed, there are also neighbourhoods a short cycling distance from particular railway stations where there is good evidence of cycling integration, such as parts of Greater Manchester, Nottingham, Sheffield and Norwich. The data from cycle-rail integrators in households with children under 16 years appears to show some spatial differences from those of childless integrators. The planned qualitative study may help to interpret these findings, in any event it will provide insights into how households' activity patterns and residential location choices interact with integrative travel behaviours as children in households transition towards making their own independent journeys.

Further work

- The relationship of journey purpose with time of day, frequency of trips per week, or with journeys representing longer periods of stay away from home offers scope for space-time analysis. Exploring journey patterns based on the temporal variables included in the dataset might allow the relationship of the cycle access journey distance to the overall trip pattern to be visualised.
- The Relationship of journey purpose to rail trip distance, as well as to periodicity and frequency of making such trips would benefit from comparison with similar trip categories by non-cyclists.
- Improvements in the use of QGIS or alternative GIS tools should enable more efficient matching of data tables to maps, instead of the current approach where each layer represents a separate, or duplicated file. Future exploration of GIS will include advanced querying within the GIS tool.
- Maps which explore the O-D pairs of integrators travelling both into the city regions as well as those outbound reveal some additional travel patterns and potential wider scope for identifying households within these particular regions. Bristol, Edinburgh and Merseyside all exhibit this pattern to a more pronounced extent. The additional complexity of these travel patterns would benefit from further analysis.
- Further analysis of the match of cycling HH integrators home localities to surrounding terrain and topography, cycling routes and other infrastructure might contribute to the more accurate localisation of potential case study cycling integrator households.
- The exploration of the potential uptake of cycling's integration with other locally public transport modes, such as tramways or BRT bus schemes (Cambridge?) has not yet been developed. This remains a goal of the case studies, and should form a part of the process of understanding the travel behaviour of cycling integrators. Maps overlaying existing tram and BRT or other relevant bus corridors will be incorporated into the analysis as it develops.
- From the NRTS data alone it would not be possible to identify why people choose to integrate cycling with rail journeys, however it clearly offers the possibility to make extended journeys. Further analysis of the current dataset could be used to reveal:

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