

**WHO ENCOURAGES US TO CYCLE? A NOVEL APPROACH TO RESEARCHING
SOCIAL INFLUENCE IN UK CYCLING**

Title: Ms Forename: Anja Surname: Dalton

Position: PhD Research Student

Institution: University of the West of England, Bristol, UK

Title: Dr Forename: Jane Surname: Powell

Position: Reader in Public Health

Institution: University of the West of England, Bristol, UK

Title: Prof. Forename: Graham Surname: Parkhurst

Position: Professor of Sustainable Mobility

Institution: University of the West of England, Bristol, UK

Abstract

This PhD research is an exciting opportunity to explore an under-researched area of transport and health studies; how gender and social influence relate to cycling behaviour. As well as being cross-disciplinary, it is also novel in the usage of a methodology untried in the transport field prior to this. This involves a two-stage methodology involving interviews with existing cyclists, followed by focus groups with members of their social network (family, friends or colleagues).

An exploratory study to test this approach in Bristol was carried out from May to September 2010 and involved interviews with eight existing cyclists and focus groups with some of the social contacts of two of them, who were a mixture of cyclists and non-cyclists. This study shows that methodology does seem to be a feasible, though challenging way of collecting data about this important and not fully comprehended area of travel behaviour. Many lessons have been learned over the timeframe of the exploratory study and skills and knowledge have also been developed and extended around data collection and analysis.

Further data is now being collected in Cardiff employing a refined version of the same method involving interviews with 20 - 30 cyclists and focus groups with 5 – 10 groups of their social contacts. It is hoped that the research will make a contribution to the growing body of evidence around the workings of social influence, in a new area. It also has potential to enhance our understanding of why greater numbers of women are not cycling in a UK context and how barriers to this may be overcome in the future.

Introduction and summary

This paper focuses on the methodology being used for a three year full-time PhD research study, funded by the EPSRC (Engineering & Physical Sciences Research Council), into gender and experiences of cycling and the extent to which social factors play a part in encouraging or discouraging travel by bicycle. Firstly, I will briefly describe the transport policy context and background literature which informs this study. Secondly, I will set out the aims, research questions, objectives and rationale of the project. Thirdly, I will describe and justify my research design and strategy, including the phases of data collection and the method of

analysis used. This section focuses largely on the first phase of my research design; the Exploratory Study which was conducted in Bristol during spring and summer 2010 and describes the lessons learned which will be applied to later data collection phases.

The research is cross-disciplinary, drawing on expertise in the fields of both health and transport, with the researcher registered with the Department of Health and Life Sciences, supervised by Dr Jane Powell (DoS) and Dr Paul Pilkington, but also linked with the Centre for Transport and Society, based in the Faculty of Environment and Technology, with further supervision from Prof. Graham Parkhurst. As well as the fields of health and transport, perspectives from sociology, psychology and environmental studies will also inform the study.

The iConnect research programme

This PhD research project will take place in the context of a large evaluation of Sustrans' Connect2, an infrastructural programme to connect communities around the UK. The iConnect consortium, (<http://www.icconnect.ac.uk/>) is an interdisciplinary consortium of eight academic institutions with expertise in energy, environment, physical activity, public health and transport research. The iConnect study, funded by the Engineering and Physical Sciences Research Council (EPSRC), aims to measure and evaluate the changes in travel, physical activity and carbon emissions associated with Sustrans' Connect2 programme (<http://www.sustransconnect2.org.uk/>).

Background – cycling within current transport policy and practice

In recent years, cycling has received increased political interest in the UK; unprecedented amounts of money have been made available for cycling infrastructure, and for the promotion and evaluation of programmes (Cycling England, 2008). Cycling levels are increasing in some areas after decades of steady decline, and prominent politicians and public figures have taken enthusiastically to their bikes (Observer 26/07/09 p2). High profile projects, such as, Sustrans' Connect2, Cycling England's Cycling City and Towns and the development and success of the London Cycle Network have all contributed towards a greater prominence and credibility for cycling as both a transport and leisure option (Deegan, 2009).

However, this is set against a background in which levels of cycling are still very low, at 2% of all transport trips nationally (DfT, 2008). Additionally, there is evidence that persuading more people to change their travel behaviour may still present a significant challenge as a recent study of pro-environmental behaviour by Defra (Department for Food and Rural Affairs) highlights (Defra, 2008). This study found that whilst using a car less for short trips would have a high impact in terms of reducing CO₂ levels, people's willingness to change their travel behaviour was fairly low, compared with their willingness to participate in other pro-environmental behaviours such as recycling, wasting less food and better energy management.

Another significant factor in increasing cycling levels is that current uptake of cycling is unequally distributed, with only half (1%) as many transport trips by British women, compared to men with (2%) of all trips being cycling trips (DfT, 2008). Certain groups, such as older people and ethnic minorities are also currently under-represented (DfT, 2008, WDS, 2005). This not only presents equity issues if some groups feel unable to cycle, but may also hinder efforts to encourage greater levels of cycling in the population if large sectors of society are simply not visible as cyclists. Studies of other socially desirable behaviours have found that simply making the behaviour more visible may be one of the factors which can encourage additional uptake (White et al., 2009).

The low level of cycling amongst women in Britain is a pattern which is common to English-speaking westernised countries, such as Australia and the United States (Garrard, 2003). These countries, like the UK, have a low cycling modal share generally, which means that other forms of transport, especially the car, predominate. The same is certainly not the case in other countries with high cycling modal share, such as Holland, Denmark and Germany where

women cycle more than men (ibid.). In the Netherlands, for example, 31% of all trips taken by women were by bike, compared with 26% of all trips by men (Den Haag, NL cited in Garrard, 2003). In these countries, a 'critical mass' has occurred, 'such that it becomes accepted that the bicycle is a 'normal' mode of transport (Mayes et al., 1996). So, this raises a number of questions concerning women's participation in cycling compared with men in the UK. Could it be that women are just less active, with lower levels of interest in sport and exercise generally and therefore inherently much less likely to cycle? Are women more risk-averse than men and if so, why? Or are they, as Merom has suggested, (Merom, 2003) simply less interested in cycling? Parkin has argued that factors such as 'self image, perceived ability and social norms also play a part', though again, these have not been comprehensively examined with respect to gender (Parkin, 2007a).

Literature review: Active Travel within Transport

Within the transport research field cycling and walking have traditionally received scant attention and have not been accorded the same status as motorised forms of transport (Hillman, 1997a). More recently this has begun to change, with a greater number of funded studies to try and evaluate the worth of the active travel modes (cycling & walking) from economic, health & social and environmental angles. This has emerged due to the recognition of a whole host of problems with current patterns of mobility; emissions from transport contributing to climate change, pollution, obesity and overweight due to inactive lifestyles, restrictions on children's play, lack of social connections and social exclusion amongst others (Foresight, 2007).

There is increasing interest from the health sector in the contribution which active travel can make towards better health and decreased incidence of overweight and obesity among the population. Given that only one third of men and a quarter of women achieve the government's physical activity targets of 30 minutes of physical activity at least five times per week (BHF, 2005), the potential of easy, cheap and convenient forms of exercise such as walking and cycling is clear.

Conversely, looking at the general trend of a reduction in walking and cycling, Davis et al found that 'a reduction in walking of just eight minutes a day may be sufficient over the long term to increase body weight from a BMI of between 20-25 (healthy weight range) to over 30 (obese)' (Davis et al., 2007: 49). In addition to weight control, active travel can also help guard against modern health problems, such as cardiovascular disease.

A Danish study of active travel provided evidence that 'commuting physical activity, independent of leisure time physical activity, was associated with a healthier level of most of the cardiovascular risk factors. An increase in commuting physical activity in the population may therefore reduce the incidence of CVD (cardiovascular disease)' (von Huth Smith & Borch-Johnsen, 2007: 771). They also found that this effect was strongest in women, so women may receive proportionately more benefit from active travel than men, though it is not clear exactly why this is the case. It may be linked to the amount of other, leisure time physical activity which men and women take part in, since women in general are known to exercise less (WHO, 06/11/2009). Therefore, the protective effects from regular, long-term active travel may be of greater importance to women.

Cycling and Gender

Women in the UK currently cycle much less than their male counterparts, whereas this is not the case in countries which have high levels of cycling generally, such as Holland, Denmark and Germany (Garrard, 2003). In the UK 1% of all transport trips by women are by bike, whilst for men it is 2% (DfT, 2008). In London, where levels of cycling have been increasing significantly over recent years, the gender gap is most evident in the youngest age group; 2% of females aged under 25 cycle, whilst 11% of males in the same age group do. In the 25 – 44 age group, 40% of males and 21% of females cycle,

whilst in the 45 and above age group levels are similar at 12% for women and 14% for men (TfL, 2008). This shows that although women of all ages cycle less than men, there may be peaks of disparity in cycling levels at different stages of people's lives.

In the US context, research found that areas with higher levels of cycling tended to have a higher ratio of female to male cyclists (Emond, 2009). This echoes research in a European context by Smith, who concluded: 'a more even balance of male-female cycling tends to be correlated with more cycling, reflecting a more mature, well-developed cycling market. As cycling retakes market share, it expands from early adopters (typically young males) to the wider population' (Smith, 2005: 4). The mechanics of how such a shift occurs is not well-known, however.

There are a number of reasons why cycling may offer a good transport and leisure solution for women and also why women may be more persuaded by the benefits of using a bike. As mentioned earlier, women often have more complicated patterns of travel behaviour, which may be managed more easily by bike, if other barriers have been overcome (Lehner-Lierz, 1997). If facilities are present, a trip chain which involves dropping a child off at school, picking up a few items from the shop, visiting the bank and then going to work yourself, may even be accomplished more quickly and easily by bike than by any other mode and does not involve looking up lots of complicated timetables, or searching for car parking spaces.

If some of the key barriers to women's participation in cycling can be overcome, using a bike may provide women with a flexible, quick and cheap transport option, especially in large urban centres. Some research has found that women can sometimes feel safer on a bike, as compared to walking, as Aldred found with one of her interviewees: 'As a woman... I kind of think I'm less vulnerable on a bicycle so I would cycle places where I wouldn't walk' (Aldred, 2008: 10). Of course, whilst women may feel safer on a bike than as a pedestrian, they may still feel less safe as a cyclist than as a driver, depending on their perceptions and experiences.

Social influence

In recent years a great deal of interest has been shown in a range of theories and methods which examine our social relations and how people influence one another. Fields such as social psychology, behavioural economics and social marketing have been seen as instrumental in helping to solve some of the more intractable social problems. Such theories challenge the previous 'rational choice orthodoxy' and have a premise that people generally do not necessarily behave in a rational, predictable, self-interested way, but instead are greatly influenced by both their own values, beliefs, norms and emotions and also by those of others.

Research from a number of fields is useful to draw upon in consideration of the ways individuals respond to social influences in changing their behaviour. White et al, in their study of social influence in the area of household recycling claimed that "future interventions should attempt to address perceptions about the ease and self-efficacy of recycling" (White et al., 2009: 155). This study found that the 'visibility' of the behaviour which was being encouraged was important, so that people "can accurately perceive the number of people engaged in the target behaviour". This type of social norm may also be important in encouraging cycling amongst women – if women do not see other women cycling they may not be able to sufficiently 'identify' with it as something they can see themselves doing.

Within the health field many recent programmes have used either social marketing techniques or social behaviour theories to try and achieve behavioural change on issues

such as smoking, drug and alcohol abuse, diet, exercise and healthy lifestyle. Some of these programmes have looked at how social pressures via peer groups are particularly influential in encouraging or discouraging certain behaviours, and this will be an important aspect to probe in my research.

Aims, Objectives and Research Questions

I am interested in the way in which gender impacts on people's willingness to cycle and whether (and how) those that do take up cycling socially influence others. Such behaviour may have the potential to create a 'virtuous circle' (whereby those who take up cycling encourage others to do so; over time creating a significant transport and cultural shift) which promotes greater levels of walking and cycling (Plowden cited in Avineri et al., 2009). Bristol has been used as the site for the exploratory study, whilst for the main data collection the area around the Connect2 site in Cardiff/Penarth will be used as a case study in which to investigate these issues.

Aims:

- To investigate gender differences in cycling in the UK and determine the key reasons for the lack of participation in cycling by women.
- To understand the relationships between culture, environment, infrastructure and gender in cycling behaviour.
- To discover whether social influence is a significant factor in persuading more people (and especially more women) to cycle.

Objectives:

- 1) Understanding the context: to explore the existing evidence base relating to gender and cycling and discover reasons for the current disparity between men's and women's levels of cycling.
- 2) Exploring practical and social factors: to better understand how instrumental and affective dimensions influence cycling for both genders, but particularly women.
- 3) Assessing behavioural change: to determine how cyclists may or may not socially influence their friends, family and colleagues.
- 4) Using the evidence: to disseminate insights from the study with the hope that future cycling initiatives and policies will be targeted to appeal to both men and women.

The literature review explored previous research from the transport and health fields into transport and more specifically gender and cycling. It then gave a brief overview of approaches taken in the behavioural change fields which will inform the part of this study which is examining the role social influence may play in cycling. The research design attempts to find the most appropriate way of answering the research questions below; in this case it is believed that a mixed-methods approach using in-depth interviews, social reference focus groups and using the wealth of secondary quantitative data available to the researcher is the most fitting.

Much of the evidence collected in this study will be qualitative data, which will give voice to how men and women's experiences of cycling may differ and also how people may be influenced by others in a social context to adopt new or different behaviours. The findings will be used as part of this PhD research, but also form part of the iConnect consortium evaluation of the Connect2 programme.

Research Questions:

The research will be conducted in four phases; 1) Exploratory study, 2) In-depth interviews, 3) Social reference focus groups and 4) Secondary quantitative

1. In what ways do men and women perceive barriers to using cycling as a mode of transport for both commuting & leisure needs? (Phase 1: Exploratory study & 4: Secondary quantitative)
2. What role does social influence play in encouraging people to participate in cycling? (Phase 2: In-depth interviews)
3. To what extent are there gender differences in the ways in which social influence operates on participation in cycling? (Phase 2: In-depth interviews)

4. To what extent do social reference groups provide a valid method to examine the construction of social influence in relation to women's participation in cycling for transport and leisure? (Phase 3: Social reference focus groups)
5. How can the enabling cultural and environmental factors which encourage women's participation in cycling best be facilitated?
(Phases 1: Exploratory study, 2: In-depth interviews & 3: Social reference focus groups)

Research design & strategy

These research questions will be approached using a mixed methods, flexible research design which will include in-depth, semi-structured interviews with 'egos' (initial research participants) and social reference focus groups, as well as use of secondary quantitative data to investigate broader UK gender and cycling patterns. The rationale and assumptions underpinning the adoption of a flexible design such as this are described below. Robson describes how flexible designs incorporate a number of key factors, such as: an evolving design, the presentation of multiple realities and a focus on participants' views (Robson, 2002: 166). These factors are derived from a critical realist perspective which rejects the extremes of both positivism and relativism and instead seeks to recognise that whilst there is an external reality which exists independent of our awareness of it, that reality is only knowable through socially constructed meanings (Snape & Spencer, 2003: 16).

Research methods: Phase 1 – Exploratory study (Questions 1 & 5)

I have chosen Bristol as the study area for the pilot study for reasons of practicality, convenience and also since it has a higher than average level of cycling and was awarded Cycling City status. The pilot phase will help to determine how feasible this will be in practice. The initial interviewees, whilst perfectly willing to be interviewed themselves, may feel uncomfortable about giving me contact details about people they know. Also, since the focus groups will concentrate on discussing the cycling behaviour of the initial interviewee, they may also think that they are going to be 'judged' by their peer or family group; again something with which they might not be comfortable. Spatial patterns are considerably different in current society than they were a few decades ago when family and friend groups were more distinctly spatially located

Phase 2 – Qualitative (Part A) (Questions 2, 3 & 5)

This phase of the research will involve conducting semi-structured interviews informed by the exploratory study. This method has been chosen both for the ability to retain some comparability between interviews but also to give participants greater freedom to express themselves than is possible within the confines of a structured interview (May, 2001: 123). The participants in this phase of the research will be 'egos' (initial interviewees), comprised of adult male and female members of the local Cardiff/Penarth communities who participate in commuting, practical or leisure cycling on a regular basis.

Phase 3 – Qualitative (Part B) (Questions 4 & 5)

The second part of the qualitative research will use the social networks of people involved in Phase 2, the 'egos'. Initial interviewees will be invited to take part in part B. Again, since this is a novel methodology, I do not have a precedent for numbers of initial participants who might be willing to engage with phase 3 of the research, and envisage that the key barrier may be recruiting the people willing to provide contact details of their friends, family or work colleagues. One key factor I would like to investigate at this point is the idea of a behaviour (in this case cycling) entering into a person's consciousness due to a friend/colleague/family member participating in it. The Women's Design Service, in their 'Cycling for Women' project with 10 London-based women, found that women involved in the project spontaneously mentioned how they felt they had impacted on other people they knew. One participant stated: 'All my friends have reacted to it and are now interested in cycling' (WDS, 2005).

Phase 4 – Secondary Quantitative (Question 1)

Two separate quantitative research projects will be carried out by other researchers in the case study area during the research time frame; an iConnect pre- and post-Connect2 intervention questionnaire and a Sustrans route-user monitoring study (these have been reviewed and revised via the iConnect project). Depending on the exact timescales of these two initiatives I will be able to use either/or both to determine changes in rates of cycling and also differences in the composition of cycling groups. There are also possibilities for me to have access to some of the quantitative data generated by the Cycling City and Towns evaluation. These will assist in building up a picture of gender differences in cycling, and provide some quantitative data to add to the large volume of qualitative data which will be collected in the earlier stages of the research.

Sampling strategy

A purposive or criterion based sampling strategy has been decided upon due to the low numbers of people in the specific category which is of interest in the study. Cyclists themselves are 'rare' in the overall transportation mix, and regular women cyclists, as has been noted, are available in even lower numbers. Therefore, a homogeneous sampling technique, deliberately targeting regular male and female cyclists via workplaces, bike shops and other locations will be employed (Ritchie et al., 2003). Approximately half of the interviews will be with males and half with females and I would like to achieve a fairly wide age spread within this. However, cyclists do tend to be clustered amongst certain age groups in this country, so it may be difficult to locate suitable older cyclists and older female participants in particular. The sample will not be representative of the wider population. In Phase 1 (Bristol Exploratory Study) 8 interviews and 2 focus groups were conducted, whilst it is envisaged that Phase 2 and 3 (both in Cardiff) will involve 20 – 30 and 5 – 10 interviews respectively.

The purpose of the group discussions is to explore participants' views about cycling, how much they themselves cycle, if they would consider it in the future and also what they think about the cyclist they know. For this, Phase 3 of the research, both the instigators who are asked for their contacts and the social reference groups will comprise both men and women. Ideally I would like to have some groups composed entirely of female friends, family and colleagues and some of male, but in practice this may not be achievable, since it will depend on the number of contacts given by the instigator who are willing to take part in the research. I am interested to see if any differences can be seen in how men and women view cycling and the perceptions they have of the person cycling.

Bristol exploratory study data collection record of interviews & focus groups

Pseudonym	Date	Location	Type	Age	H'hold Income (£)
Tristan Evans	29/04/10	Bristol Uni	WP	37	50,000+
Kay Owens	05/05/10	Redland	H	51	15,000 – 29,999
John Chancer	21/05/10	Clifton	PP	34	50,000+
Toby Hislop	25/05/10	BRI	WP	42	50,000+
Lucy Minty	23/06/10	Filton	H	26	30,000 – 49,999
Ellen Fowler	30/06/10	Bishopston	H	55	30,000 – 49,999
Molly Jenkins	19/07/10	Westbury	H	61	30,000 – 49,999
Catherine Church	09/09/10	Cotham	H	49	30,000 – 49,999
Lucy's friends x 5 (FG)			29 th June 2010		Horfield
(Sarah Ubley, Hayley Carter, Ellie Prescott, Amber Little, Jane Potter)					
Molly's friends x 3 (FG)			3 rd Sept 2010		Westbury-on-Trym
(Adam Garrett, Kirsten Holme & Paula Krisp)					

A reasonable gender and age spread was achieved, especially considering that there are fewer women and older people who cycle. Out of the eight interviews, three were men and five were women, whilst in the focus groups seven participants were female and one male. In terms of age, six participants were in their 20's, two in their 30's, three in their 40's, four in their 50's and two in their 60's. Again, this ensured that the perspectives of a range of people of different ages was represented and achieving a similar age spread will be a goal for the Cardiff data collection phase also. Class was not asked for as a specific category on the mini-questionnaire, but most of these areas, such as Clifton, Bishopston and Westbury-on-Trym, tend to be the more affluent areas of the city. Some measure of affluence may be gleaned from the household income which was requested on the mini-questionnaire. This produced results in all of the categories but the most frequently circled were £30,000 - £49,999 & £50,000+. As the research progresses to the main data collection phase in Cardiff, it is anticipated that this level of affluence may change.

Data Analysis

NVivo was chosen for four main reasons; volume of data, variety of data, enhanced functionality and researcher development. Although the Exploratory Study was not a huge endeavour it did still generate a considerable amount of data. The eight interviews and two focus groups averaged 55mins, which when transcribed ranged from 5,500 – 10,800 words per transcript. This was a substantial amount of material to try and assess via piles of paper. In addition, as this was the first stage of the project, with further data collection to take place in Cardiff, which it is envisaged amount to 20-30 interviews and 5-10 focus groups, a much more substantial amount of data was yet to come. It was felt important to try and keep consistency in data analysis approach between the Exploratory Study and the main phase of data collection if practicable.

As has already been mentioned there was quite a variety of formats across the data set, with audio files, word-processed files and image files. NVivo8 provided the opportunity to store all of these together and to use several formats simultaneously, such as listening to an interview whilst reading the transcript. In terms of functionality the computer package provides the option for coding in various ways which can be hierarchically structured or not, instant access to lists of codes which can be printed off and a variety of output formats which enable the viewing of the data in various ways.

An inductive, open coding structure was developed, along thematic analysis lines (Braun & Clarke 2006). A total of 372 open codes (nodes in NVivo) has been initially made, encompassing such items as (importance of good driver behaviour, enjoyment of cycling speed and power, women cycle slower and dislike of others running red lights). This encompassed both the interviews and the focus groups. The codes will next be tidied up to remove duplicates, collapse similar themes into each other and develop broader themes which can then be developed into a thematic map and then conceptual framework of the research. As Braun and Clarke describe this process it 'involves the searching across a data set...to find repeated patterns of meaning' (Braun & Clarke 2006: 86). Luker describes it as 'pattern recognition', which gradually comes from the 'noise and discomfort and disorder of our very first batch of data' (Luker 2008: 199). This will be developed so that a preliminary coding structure is in place for the main, Cardiff data.

Discussion and Conclusions

Whilst the analysis is not yet complete for the Exploratory Study, a number of items have already emerged from the data, and will be discussed here. Their implications for the ongoing study and how the project will be taken forward are then summarised. One of the initial findings, around social influence, is that most of the 'egos' who were interviewed have a highly encouraging social context to their cycling behaviour. It was anticipated that this would be a balanced picture with a range of both encouraging (positive influences to their cycling) and

discouraging (negative influences to their cycling). However, these are strongly positive, with participants often finding it difficult to think of negative or discouraging influences either in discussion during the interview or when drawing the social map. Prompting sometimes elicited some of these, but the patterns overall were distinctly positive. In thinking and discussing this tentative finding (and providing that the underlying assumption is actually correct), a number of potential explanations have suggested themselves and these will be explored further with the new Phase 2 & 3 from Cardiff.

The simplest explanation may be that only those who have a pre-disposing social circle of influence / social norms do in fact cycle. Those who do not, whose social circle contains largely those who view cycling as a dangerous or pointless activity, perhaps simply do not cycle. Of course the degree of influence which the social circle or prevailing social norms may have upon people is variable and perhaps those with a more individualistic mentality may also be among those choosing to cycle. It is acknowledged, however that people often underestimate the degree to which their social contacts do influence them and believe themselves to act in a much more individualistic manner than they actually do (Nolan et al., 2008).

Another potential explanation may be that participants may selectively remember many more positive influences rather than negative. A psychological rationale for such behaviour comes from the principle of cognitive dissonance, whereby two conflicting ideas held simultaneously cause mental discomfort. So information which does not fit with a person's worldview may then be actively left out of that person's field of reference. In terms of cycling it may be that to cycle even if you had a circle of people around you who are actively discouraging of cycling might be perceived as a difficult or silly thing to do. So, rather than acknowledge that this is the case, it may be easier to forget the negative influences which surround you.

A final suggestion is that it may simply lie with the data collection technique, which may perhaps be poor or the wrong mechanism with which to fully investigate such data. As previously mentioned the methodology, including the use of social mapping, is novel in the transport field. There seem to be gender differences emerging also in terms of style of cycling (both the level of confidence/aggression displayed and the speed and pattern of it), perceived levels of personal and traffic safety, tolerance of other road users and desire for different types of cycling facility. I also intend to investigate these differences between men and women and their cycling and reach some conclusions around these patterns once all the data has been collected.

In terms of taking this project forward the researcher has demonstrated that this methodology does seem to be a feasible, though challenging way of collecting data about this important and not fully comprehended area of travel behaviour. Many lessons have been learned over the timeframe of the Bristol Exploratory Study (Phase 1), over recruiting and liaising with participants and the level of trust and persistence necessary to progress to Stage 3 of the research process.

References & Bibliography

Aldred, R. (2008). Cycling Cultures: Some Initial Findings from a Narrative Research Project Paper presented at 5th Cycling and Society Symposium, University of the West of England, Bristol, 8-9 September.

Atkins, S. T. (1986) Women's Fears when Travelling: an Accurate Perception of Risk? Paper presented at the Second International Conference on Teaching of Statistics University of Victoria, BC, Canada 11-16 Aug 1986.

Bell, A.C., Garrard, J.Swinburn, B.A. (2006) Active Transport to Work in Australia: Is It All Downhill From Here? *Asia-Pacific Journal of Public Health* 18 62-68.

Blair, S.N. (2009) Physical Activity: the Biggest Public Health Problem of the 21st Century. *British Journal of Sports Medicine* pp431-2.

Braun, V. & Clarke, V. (2006) 'Using Thematic Analysis in Psychology' *Qualitative Research in Psychology* 3 pp77-101.

Chatterjee, K., Hardin, J., Viner, K. and Race, H. (2009) Measuring the Outcomes of the Cycling City and Towns Programme: Meeting the Research Challenges with a Household Panel Survey. *Cycling & Society Symposium, Bolton 06/09/2009* University of Bolton.

Costarelli, S., and Colloca, P. (2004) The Effects of Attitudinal Ambivalence on Pro-Environmental Behavioural Intentions. *Journal of Environmental Psychology* 24 (3) 279-288. <http://www.sciencedirect.com/science/article/B6WJ8-4D34KBX-1/1/dea0aac4a37ae33890cc848a156e6dc4>.

Cycling England, (2008) *Cycling England Annual Report 2007/08*. Cycling England.

Darnton, P. (2009) The Economic Cycle: Making an Economic Case for Cycling. *Passenger Transport* 22-25.

Davies, D., Halliday, M. E., Mayes, M. & Pocock, R. L. (1997) Attitudes to Cycling: a Qualitative Study and Conceptual Framework TRL Report 266.

Davies, D., Gray, S., Gardner, G. & Harland, G. (2001) A Quantitative Study of the Attitudes of Individuals to Cycling TRL Report 481.

Deegan, B. (2009) What Impact has the London Cycle Network Project had on London's Social Climate? *Cycling & Society Symposium, Bolton 06/09/2009* University of Bolton.

Garrard, J., Rose, G.Kai Lo, S. (2008) Promoting Transportation Cycling for Women: the Role of Bicycle Infrastructure. *Preventative Medicine* 655-59.

Gatersleben, B., and Appleton, K.A. (2006) Contemplating Cycling to Work: Attitudes and Perceptions in Different Stages of Change *Transportation Research Part A* 41 302-312.

Gatersleben, B. (2007) "Chapter 12: Affective and Symbolic Aspects of Car Use" in Garling, T. & Steg, L. *Threats from Car Traffic to the Quality of Urban Life* Elsevier: London.

Hanson, S. (2010) 'Gender and Mobility: New Approaches for Informing Sustainability' *Gender, Place & Culture* (17) 1. pp 5-23.

Hillman, M. (1997) Cycling as the Most Realistic Substitute for Car Use in Urban Areas: Burying the Conventional Myth About Public Transport. In: R. Tolley, ed. *The Greening of Urban Transport*. Second ed. Chichester: Wiley & Sons.

Lehner-Lierz, U. (1997) The Role of Cycling for Women. In: R. Tolley, ed. *The Greening of Urban Transport* Second ed. Chichester: Wiley & Sons.

Lindenberg, S., and Steg, L. (2007) Normative, Gain and Hedonic Goal Frames Guiding Environmental Behaviour. *Journal of Social Issues* 63 (1) 117-137.

Nilsson, A., von Borgstede, C., Biel, A. (2004) Willingness to accept Climate Change Strategies: the Effect of Values and Norms *Journal of Environmental Psychology* 24 (3) 267-277. <http://www.sciencedirect.com/science/article/B6WJ8-4D1YX7S-1/1/603c8e516d73633388b21ce0408ab7d5>.

Nolan, J.M., Schultz, W., Cialdini, R.B., Goldstein, N.J., Griskevicius, V. (2008) Normative Social Influence is Underdetected. *Personality and Social Psychology Bulletin* 34 913-923. <http://psp.sagepub.com/cgi/content/abstract/34/7/913> [Accessed on: 14/09/2009].

Parkin, J., Ryley, T. & Jones, T. (2007) Chapter 3 - Barriers to Cycling: an Exploration of Quantitative Analyses In: Horton, D., Rosen, P. & Cox, P. *Cycling and Society* Aldershot, Hants: Ashgate.

Rosenbloom, S. (2004) Understanding Women's and Men's Travel Patterns: the Research Challenge Conference Proceedings 35: TRB November 18-20, 2004 Chicago, Illinois.

Saelens, B. (2003) Environmental Correlates of Walking and Cycling: Findings from the Transportation, Urban Design, and Planning Literatures *Annals of Behavioral Medicine* 25 (2) 80.

Steg, L. (2005) Car Use: Lust and Must. Instrumental, Symbolic and Affective Motives for Car Use. *Transportation Research Part A* 39 147-162.

Stredwick, A. (2010) Bicycle Belles: 'Could More 'Utility Cycling' by Women in Urban Areas be Good for the Economy?' *Transport Planning Society Paper*.

White, K.M., Smith, J.R., Terry, D.J., Greenslade, J.H. & McKimmie, B.M. (2009) Social Influence in the Theory of Planned Behaviour: the Role of Descriptive, Injunctive, and In-Group Norms *British Journal of Social Psychology* 48 135-158.

Whitelegg, J. (1997) *Critical Mass: Transport, Environment and Society in the Twenty-First Century* London: Pluto Press.