

An Exploration of the Importance of Social Influence in the Decision to Start Bicycling in England

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Abstract

The purpose of this paper is to gain a better understanding, through qualitative exploration, of the ways in which social influence affects the decision to start bicycling in England. ‘Social influence’ is defined as the process by which an individual’s thoughts and actions are changed by the thoughts and action of others. Its role was investigated at three levels: the immediate family, household members and significant others (direct social influence); the extended family, friends, peers and colleagues (less direct social influence); and the wider cultural context (indirect social influence). Interviews with 61 individuals living in 12 towns and cities across England were analysed. Half of the interviewees were new regular bicyclists and the other half did not bicycle at all, or only occasionally. Social influence was found to be the dominant factor for a minority of the cases where participants started bicycling regularly. It played a role alongside other factors in other cases. It could take the form of direct influence from family, friends and peers or indirect influence from the social and cultural context. The analysis illustrates the difficulty of capturing social influence which is often hidden and emerges incidentally in the course of the interviews and interacts with other contributing factors. The role of social influence found in this research challenges the rational approach to explaining travel decision making that has traditionally dominated transport studies. The paper suggests that social processes could be harnessed to improve the efficacy of bicycling promotion programs.

Keywords

Social influence, bicycling, travel behaviour, qualitative, ecological model, life course

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Highlights

- Challenges the rational approach to travel decision making
- Uses conceptual models to emphasize the dynamic nature of travel decision making and the role of social influence as one type of influencing factor
- Social influence was found to be the dominant factor for a minority of the cases where interview participants started bicycling regularly but played a role alongside other factors in other cases

1. Introduction

Increasingly the idea that individuals exercise rational decision making with regard to the choice of transport mode based on personal attributes and attributes of the transport system without reference to their social context is being challenged (Axsen and Kurani 2011). Social and cultural cues are being acknowledged as an important avenue of investigation in travel behaviour (Van Acker et al. 2010; Clarke and Scott 2013; Heinen et al. 2010). Social network effects are increasingly being considered in travel behaviour studies (Axhausen 2008; Carrasco and Miller 2009; Goetzke and Rave 2010). The powerful influence of social relationships has long been recognized in other fields such as health (Christakis and Fowler 2007) but what constitutes ‘social influence’ is hard to define and works in subtle ways, with contradictory theories and multiple definitions arising in different disciplines. It is important that a better understanding is obtained of the role of social influence in travel behaviour change in order that policy analysis tools such as transport models can incorporate this and ultimately policy formulation can account for it.

The purpose of the paper is to gain a better understanding of the ways in which social influence affects the decision to start bicycling in England where bicycling accounts for only two percent of all trips (DfT 2011). This level is low relative to other Northern European countries (Pucher and Buehler 2008), despite a number of policies and investments to promote bicycling (Sherwin 2010). Recent research in one city in the USA found that three groups of people were frequently mentioned by participants with respect to their bicycling life histories – family members, peers and the broader community (Gordon and Handy 2012). This suggests that a deeper understanding of the social context of bicycling may assist bicycling policy. Hence this research looks specifically at individuals who recently started bicycling and live in 12 different urban settlements¹ across England to explore the role of social influence.

Social influence works at many different levels and interacts with other influencing factors. A particular difficulty in researching social influence is that individuals are either unaware of the extent to which they are socially influenced or rarely admit to it (Nolan et al. 2008). Therefore ‘measuring’ social influence by directly asking an interviewee how influential a particular individual was in their present bicycling status would be unlikely to elicit a useful response. This suggested that a broad interpretation of social influence would be most useful and we define it for the purposes of this paper as *the process by which an individual’s thoughts and actions are changed by the thoughts and actions of others*.

For the purposes of this exploratory investigation of the role of social influence, it is postulated that social influence occurs at three levels: *direct* social influence through social interaction with partners and families (those living in the same household), *less direct* social influence through peers, friends and colleagues and *indirect* social influence through the wider social and cultural context. This is consistent with the three groups identified by Gordon and Handy (2012). The rationale for this approach

¹ Known as Bicycling Cities and Towns – Blackpool, Bristol, Cambridge, Chester, Colchester, Leighton-Linslade, Shrewsbury, Southend, Southport, Stoke, York and Woking.

is further developed in the following section.

This paper builds on previous work (Chatterjee et al. 2013a&b) investigating the impacts of a £43 million investment program to promote bicycling in 12 urban settlements in England between October 2008 and March 2011. The research involved qualitative interviews conducted across the 12 urban settlements. The analysis by Chatterjee et al. (2013a&b) sought to understand the circumstances and factors that influenced people to start, stop or significantly change their amount of bicycling and showed that life events were usually the trigger for a change in bicycling but other factors such as the physical and social environment played a role. This paper is based on further detailed analysis of a subset of those interviews and focuses on the role of social influence in the decision to start bicycling.

The next section provides a conceptual framework for the role of social influence in travel decision making and specifically the decision to start bicycling. The paper then provides a summary of the methodological approach before examining the three levels of social influence through the analysis of the interviews. The paper concludes with recommendations on taking account of social influence in policy, practice and future research efforts.

2. The Impact of Social Influence on the Decision to Cycle

The traditional assumption in transport planning is that travel behaviour is the product of deliberate, rational decision making with time and cost the dominant influencing factors. Increasingly this viewpoint is challenged, acknowledging that decision makers may have incomplete information or bounded rationality (Kahneman 2003) or little actual knowledge or experience of travel alternatives, so that emotions and perceptions become as influential as cost or time in the decision making process (van Exel and Rietveld 2009; Thaler and Sunstein 2008).

Disciplines outside transport see bicycling in a much broader context, not just as a mode of transport but as an activity that has meanings that are different across urban, gendered, ethnic and class identities (Steinbach et al. 2011), as an activity that has moral significance (Green et al. 2012) or as an activity that affects perceptions of the self in relation to natural and social environments (Aldred 2010). Others would view bicycling as a 'practice' integrating 'meanings', 'skills' and 'stuff' which evolve over time, de-emphasizing the importance of individual decision making and considering the practice of bicycling as the unit of analysis (Shove 2010 and Shove et al. 2013).

This paper follows the traditional way of analyzing travel decision making at the individual level but challenges the assumption that decisions are solely rational choices. The conceptual framework introduced in the paper represents the individual as part of a dynamic system where social influence is one important factor.

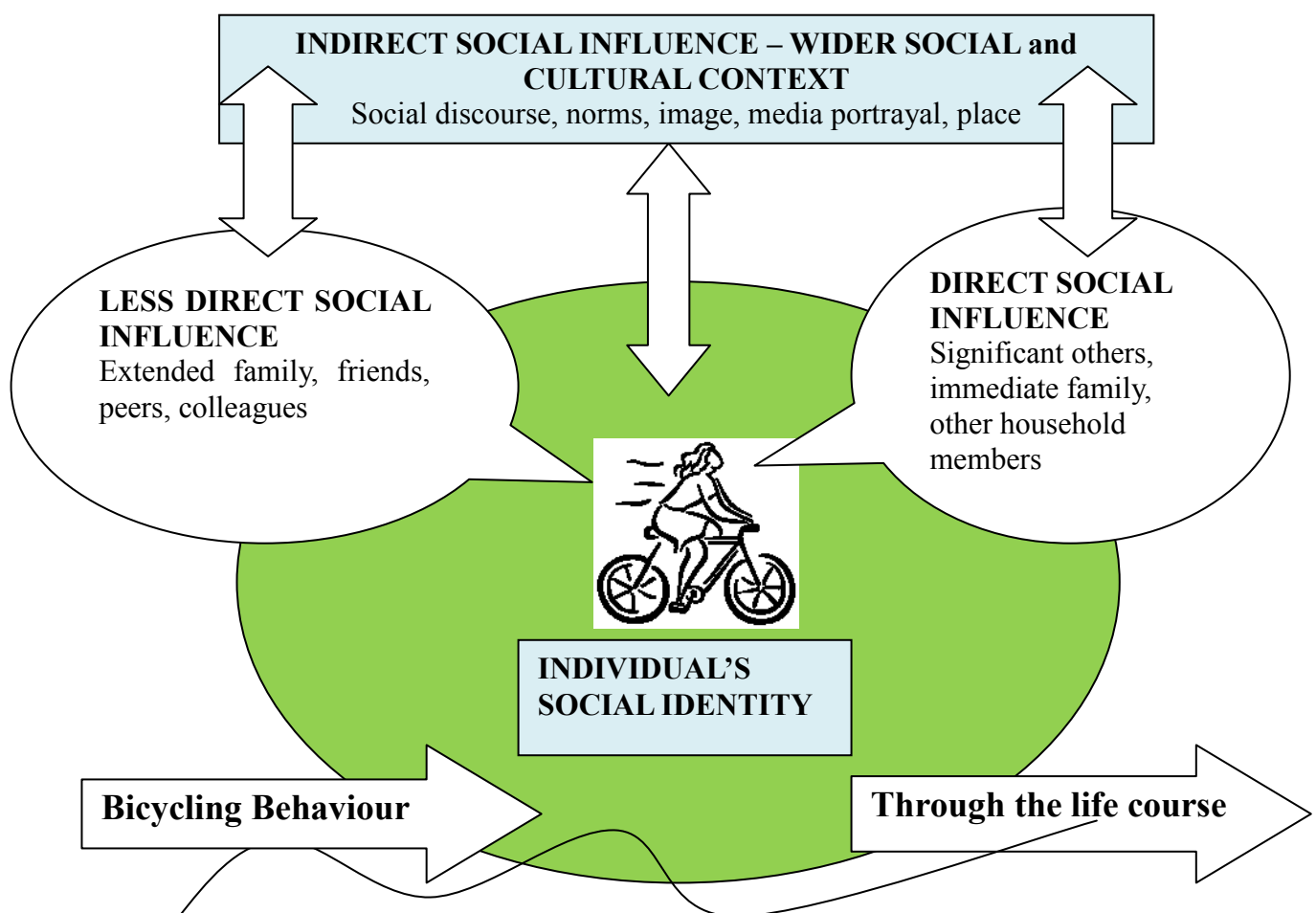
There is a considerable body of research in psychology that confirms that people rarely engage in rational consideration of the pros and cons of each action but rely on mental short cuts (Tversky and Kahneman 1974, 1981). An individual's perception of bicycling, and the way that the choice to bicycle is framed by the particular context

are crucial factors in determining the choice that will be made (Thaler and Sunstein 2008). Social norms form part of the framing of a decision and have been shown to affect human action systematically and powerfully (Cialdini et al. 1991). Cialdini et al. (1991) defined three types of social norms:

- descriptive norm which guide's one behaviour via the perception of how most others would behave;
- social norms of the injunctive kind, which guide one's behaviour via the perception of how most others would approve/disapprove of one's own conduct;
- personal norms, which guide one's behaviour via the perception of how one would approve/disapprove of one's own conduct.

The salience of each of these norms will depend on the context: at any given time an individual's action is likely to conform to the norm that is currently most salient even if the other norms dictate contrary conduct (Cialdini et al. 1991). The descriptive and social norm in most parts of England is car driving rather than bicycling and therefore the decision to start bicycling is likely to be difficult.

Figure 1 **Levels of Social Influence**



The conceptual framework in Figure 1 was conceived as an initial basis to organize our exploratory analysis of the role of social influence in the decision to start bicycling. Preliminary reading of interview transcripts indicated that reference was made separately to immediate household members (represented as ‘Direct Social Influence’), known others outside the household (represented as ‘Less Direct Social Influence’) and the wider social and cultural context (represented as ‘Indirect Social Influence’).

Figure 1 identifies that the wider social and cultural context (discourse, norms, image, etc.) will affect the individual as represented by the shaded oval, as well as those who directly or less directly social influence that same individual. The individual and their social network will also participate in the wider process of discourse and establishing norms and image and hence the arrows show two-way relationships. The wave line and arrows for ‘bicycling behaviour through the life course’ are used to represent the changing relationship with bicycling that an individual will experience over time. Social identity is shown as one aspect of the individual that will change over time and influence whether that individual bicycles or not.

To illustrate the conceptual framework, indirect social influence may contribute to the way an individual views the possibility of bicycling, so, for example, a move from a town with low levels of bicycling to one with high levels might change their view of bicycling as an option. An individual may feel they ‘ought’ to bicycle (injunctive norm) but if those that they interact with on a daily basis (direct and less direct social influence) do not bicycle or approve of bicycling, they may discount the bicycling option.

We acknowledge that this framework is a simplification and that as knowledge is gained on the role of social influence it can be refined. In reality social interactions will take place across all these three levels of directness, across time and each individual’s social context will differ. We have used the term ‘directness’ in our framework implying that it refers to physical proximity (via family/household relationships), whereas it could be argued that peer/social groups to which an individual belongs could exert a stronger influence. Peer/social groups may not be physically proximate. For example, social media is allowing people to develop social connections with dispersed and distant groups with shared interests.

The literature provides theoretical ideas on the mechanisms by which the social influences shown in Figure 1 act out. It is suggested that individuals perceive a sense of identity, and shape their self-presentation and image to others around them (Leary and Kowalski 1990). For example, Steg (2005) argues a car or a bicycle is part of an individual’s self presentation, thus visually (and materially) representing how they conform, or not, to the social norm of a specific social context (e.g. a business meeting) (Leary 1996). While a person’s identity and their social identity are interdependent (Tajfel 1981), social norms and identities are not static. The information that is received and conveyed by individuals is constantly filtered through social and community interactions and these social contexts may change over the life course (e.g. by moving house, changing job, or new people entering the social group).

A growing body of research suggests that whether an individual chooses to bicycle or not will be affected by their perception of the group ‘bicyclists’ in the community, and

whether or not that individual wants to be identified with that group (Aldred 2010 & 2013; Gatersleben and Haddad 2010; Gordon and Handy 2012; Green et al. 2012; Skinner and Rosen 2007; Steinbach et al. 2011). The individual's perception is an outcome of the interactions and conversations within their own group(s).

Research shows that 'direct' social influence from immediate family or household members plays a key role. In England, many people learn to bicycle as a child, and gaining this early skill is likely to influence adult travel choices (Haustein, Klockner & Blobaum 2009). Moving along the life course, if the people who you live with (e.g. housemates, or partners) bicycle then you are more directly exposed to the idea by observing another person's behaviour, and can sample the activity (Denrell and Le Mens 2007; Bandura 1977). Thus, individuals may 'discover' bicycling at different times in their lives, and take it up in different ways (for example, for utility purposes or leisure purposes) (Bonham and Wilson 2012).

Rogers (2003) among others makes the argument that new ideas, technologies, or social practices spread within a society by a process of social diffusion. An individual starts bicycling, derives some benefit which they discuss with friends, family and colleagues, and then members of these groups are encouraged to participate. He argues that a 'critical mass' may be reached where further diffusion becomes self-sustaining, with new norms created which bring about societal transformation. In other words, at a certain point in time the social network² that surrounds an individual, will become less important. So, in the case of whether an individual chooses to bicycle or not, this suggests that in a cultural context where few people bicycle as in England, direct and less direct social influence are likely to be more important than in a society where bicycling is the norm as in The Netherlands.

In effect, if those in your social network bicycle, you are more likely to consider bicycling as an option. These relationships can provide crucial social support that can be direct and tangible (bicycling with another person) or informational (talking about bicycling and different routes). It has been shown that individuals with high levels of social support and modelling (learning from those around them who bicycle) were more likely to bicycle (de Geus et al. 2008). This raises the possibility of policy interventions to encourage social interaction that could promote bicycling (Bartle 2011). Orsini and O'Brien (2006) suggest that a bicycling promotion program that targeted the friends of existing bicyclists is more likely to succeed than those aimed more generally at non-bicyclists.

Evidence from German municipalities support the idea that social diffusion of a bicycle culture is supported through social networks (Goetzke and Rave 2010). For example, Vandenbulcke et al. (2011) found that high rates of bicycle use in one municipality were found to stimulate bicycling in neighboring municipalities. Likewise in a study of six small cities in the US a culture of utilitarian bicycling rather than bicycling for leisure was found to be a key influencing factor for transportation bicycling (Xing et al. 2010).

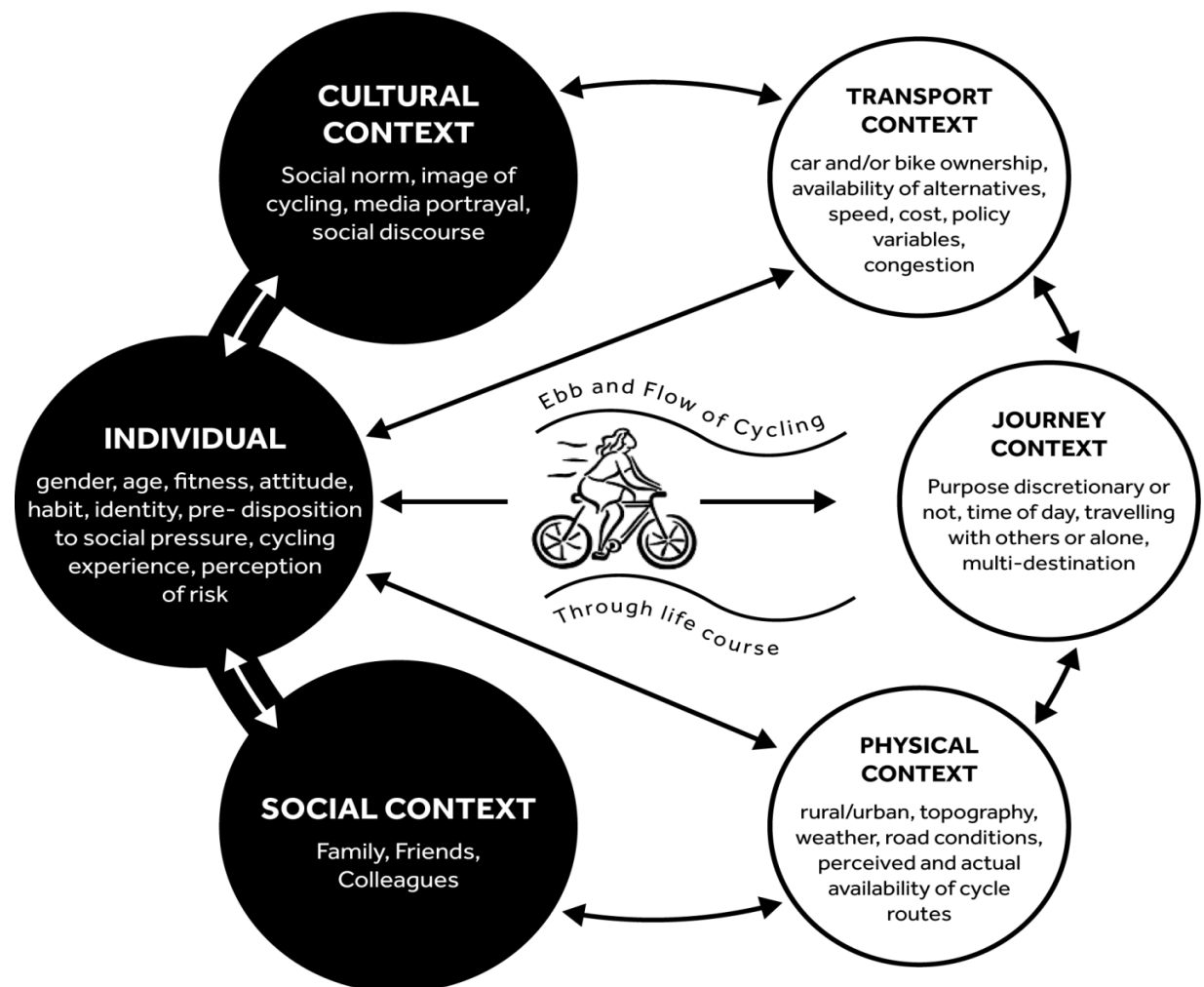
Social influence is increasingly recognised as an important factor in travel behaviour research (Carrasco and Miller 2009), but it remains challenging to isolate it and

² the term social network refers to the web of social relationships that surrounds an individual (Heaney and Israel 2008).

incorporate it into transport models (Dugundji et al. 2008), although attempts are being made (Ferdous et al. 2011; Walker et al. 2011). As Axhausen (2008) argues, the subtle differences and gradations in human interaction make it difficult to measure the extent of social influence and each person may categorise a ‘friend’ or ‘acquaintance’ differently. This is further complicated with the burgeoning availability and use of social media. As already mentioned, individuals are also unwilling to admit that they are susceptible to social influence despite the evidence that it plays an important role in behaviour choice (Nolan et al. 2008).

Despite these challenges, this paper further explores the role of social influence with the idea that policy analysis tools could be improved by increased understanding of how travel behaviour change is shaped by it, and with the view that harnessing social processes could enhance more conventional interventions to promote bicycling such as improved infrastructure. However, it is important to acknowledge that social influence is one factor among others as shown in the dynamic ecological model in Figure 2.

Figure 2 **Dynamic Ecological Model for Bicycling Behaviour**



The individual is shown embedded in their social and cultural context as illustrated by

the darker shaded circles (the social influence mechanisms were developed in more detail in Figure 1). The more conventionally considered influences on travel behaviour are shown to the right. These are the journey context (specific needs of a journey), physical context (built environment relevant to the journey) and transport context (transport alternatives available for the journey). Travel behaviour decisions are made based on the combined influence of the different contextual factors. The contextual factors will change over time, as will the individual, and this will shape how bicycling behaviour evolves over time.

Although the individual is represented at the centre of this model, that individual is just one of many parts within an interacting system. A fuller explanation of this model and its implications for bicycle promotion can be found in Sherwin (2010). Its implications for policy is that a complementary package of measures (aimed at the different contextual factors) is likely to have most success in promoting bicycling, as suggested by Pucher et al. (2010). Policies that focus on just one part of the system (e.g. infrastructure) are unlikely to be effective (Jones 2008). A better understanding of the role of social influence will assist in the design of future interventions to promote bicycling.

3. Methodology and Data Collection

A qualitative methodology was used to try to explore and understand the ‘real world’ manifestations of the processes discussed in the previous section. Interviews were conducted with 144 individuals by five interviewers (4 females and one male) between October 2010 and February 2011 across 12 Bicycling Cities and Towns in England as part of the wider evaluation outlined in the introduction (Chatterjee et al. 2013b). The 12 cities and towns had different levels of bicycling to work and local estimates of the mode share of bicycling in each city and town are shown in Table 1.

Table 1 **Bicycling Cities and Towns bicycling levels**

City and Towns	Population	2001 Census % bicycling to work	Approximate % mode share ³
Blackpool	142,000	3.6	1.5
Bristol	570,000	4.9	3-4
Cambridge	180,000	28.3	18
Chester	120,000	3.7	4
Colchester	104,000	4.7	3
Leighton	38,000	2.9	1.5
Shrewsbury	75,000	5.7	3-3.5
Southend	160,000	3.0	2
Southport	90,000	4.1	2-3
Stoke-on-Trent	240,000	1.7	2
Woking	91,000	2.9	4
York	184,000	13.0	10

Source Cycling England (2010)

In each town/city the target was to recruit two new regular bicyclists, three continuing

³ as estimated by towns and cities themselves prior to investment

regular bicyclists (with one or two increasing their bicycling), five occasional bicyclists (with two or three increasing their bicycling) and two non-bicyclists. These quotas reflected the aim of the research to investigate people who had recently increased their bicycling from different starting points, and they also reflect the sample source which included more occasional bicyclists than new regular bicyclists, for example. The sample source for the research was adult respondents (aged 16 and over) who had participated in a baseline questionnaire survey in 2009 and who said they would be willing to take part in further research. Recruitment telephone calls were made to selected survey respondents (selected based on answers to questions in the baseline survey asking about their frequency and duration of bicycling). The recruitment call included a series of questions to establish whether or not people had changed their behaviours during the investment period.

In order to explore the role of social influence on the decision to cycle, two groups were isolated from the 144 interviews. These were 30 new regular bicyclists (those who had started bicycling at least once a week for any purpose in the past 18 months) and 31 non-regular bicyclists (those who bicycled less than once a week or not at all and had not changed this behaviour in the past 18 months). Categorizing someone as a new regular bicyclist or non-regular bicyclist, as carried out in this research, was based on their reported behaviour at a particular point of time and their behaviour may have been different in the past and the influence of past behaviour on current behaviour was an issue that was investigated in the wider research reported by Chatterjee et al. (2013b).

It was not intended for the sample to be statistically representative of the populations of the towns and cities from which it was drawn, but to offer a purposive sample of those who had made a change to travel behaviour and a comparison sample of those who had not. The qualitative approach is used to enable a better understanding of the mechanisms and explanation behind the bicycling behaviour of the two groups. Table 2 shows the characteristics of the two groups in the sample. The groups are broadly similar in terms of gender, age, ethnicity, employment, car driving and household composition.

Table 2 Non-Regular and New Regular bicyclists' attributes

Characteristic	Category	Non-regular bicyclists (N=31)	New Regular bicyclists (N=30)
Gender	Male	16	15
	Female	15	15
Age	16-24	0	2
	25-44	14	17
	45-64	15	11
	65+	2	0
Ethnicity	White	31	29
	Non-white	0	1

Employment	Full-time	16	17
	Part-time	5	6
	Unemployed	2	2
	Looking after home/family	5	2
	Retired	3	2
	Student	0	1
Car driver⁴			
	Yes	27	24
	No	3	6
	Unknown	1	0
Town			
	Blackpool	2	1
	Bristol	3	4
	Cambridge	1	4
	Chester	3	3
	Colchester	2	3
	Leighton	3	2
	Shrewsbury	5	3
	Southend	4	2
	Southport	2	1
	Stoke-on-Trent	1	1
	Woking	1	4
	York	4	2
Household composition			
	Living Alone	1	2
	Couple living together	9	6
	Couple with adult children living at home	1	1
	Couple with any children under 5	5	6
	Couple with children aged 5-18	13	10
	Over 18 year old living with parent (s)	2	1
	17 year old living with mother and brother	0	1
	Flat share	0	2
	A parent with child 18 and under	0	1
Frequency of bicycling at 2009 baseline survey			
	>=5 trips/week	1	4
	1-4 trips/week	2	19
	>=1 trip/month but less than 1 trip/week	9	5
	>=1 trip/year but less than 1 trip/month	5	0
	No trips in last year	14	2

The interviews mainly took place in the homes of participants, or a venue of their choice (e.g. a café). A semi-structured topic guide was used for the interviews which covered a number of areas of interest to the project and in particular:

- Life and travel behaviour over the last three years (bicycling and other modes);
- A regular bicycling journey or potential bicycling journey;
- General experiences of bicycling in their town or city.

⁴ access to a car and have licence

The interviewers asked participants to explain changes to bicycling behaviour in their own words and then probed the reasons for changes, asking if anything else happened at the same time, if there were particular motivations or deterrents and if the environment around them had any influence. Participants were not asked directly about the role of social influence but if it was mentioned, or appeared relevant, the interviewers were encouraged to probe this.

So, for example, when discussing a regular bicycling journey (or potential bicycling journey) the participants were first asked to give details of the journey and why they made the journey by bicycle after which if it was relevant to the discussion the interviewer might further explore social influence using the following questions:

What role do other people (family/friends/colleagues etc) play in bicycling for this journey?

- What do people think of you bicycling for this journey?
- To what extent have you been influenced by others? Did anyone encourage or recommend that you cycle for this journey? Who specifically?
- To what extent have you influenced others? Have you recommended bicycling (for this journey) to others?

Participants were then asked about their general experiences of bicycling where they lived. They were asked what was good and bad about bicycling in their locality, what type of people cycle and what other people think about bicyclists. Then some specific questions were asked that were relevant to direct social influence:

Do your closest family/friends cycle?

- Are they positive about bicycling or not? Why/why not?
- Do they support/encourage you to cycle? If so, who in particular supports/encourages you to bicycle? – Why?
- Do you support/encourage your closest family/friends cycle? If so, who in particular do you support/encourage to bicycle? – Why?
- Do you encourage your children to bicycle/do your children encourage you? If so, why and for what trips? (For interviewees who were the parent of children in the house.)

In this way, participants were encouraged to first provide their own reasons for their behaviour and opinions with follow-on probing by the interviewer to find out how these were affected by the thoughts and actions of others. This was aimed at overcoming the problem identified by Nolan (2008) that individuals find it difficult to admit to being socially influenced.

4. Analysis

All 144 interviews (of the overall project) were digitally recorded and transcriptions produced to aid analysis. A systematic approach was taken for the analysis of the data. This was achieved using a thematic matrix approach assisted by the computer software

QSR NVivo. Categories (or codes) were developed based on a synthesis of the transcription and reference to the research objectives and topic guide. The categories formed a matrix of themes and the data was classified and allocated to the matrix.

For this paper, one interviewer, the lead author, took 61 interviews and analysed them in their entirety to focus purely on identifying emerging social influence themes, using a thematic analysis (Braun and Clarke 2006). Text that specifically referred to the thoughts and actions of others (social influence) was organized and placed under broad themes using Nvivo and these themes were further refined as new insights emerged as the process of analysis continued. This analysis approach was not to ‘test’ the validity of the conceptual framework in Figure 1 but to organise the empirical findings in a way where the relationships postulated in the conceptual framework could be examined further (Wilton et al. 2011).

5. Results

The conceptual model in Figure 2 emphasizes the dynamic nature of travel decision making over the life course. First, in sections 5.1 and 5.2, it is explained how the bicycling behaviour of the interviewees varied over time in terms of purpose and the extent of bicycling and how the influence of others shaped this. Then the three levels of social influence introduced in section 2 are used as the basis to report in more detail how others influenced the bicycling of the interviewees.

5.1 Bicycling Behaviour over Time

The analysis revealed considerable change in bicycling behaviour over time in both groups, confirming the value of a life course approach (Bonham and Wilson 2012; Chatterjee et al. 2013a) and revealing that individuals moved in and out of bicycling behaviour across years but also from month to month and week to week, depending on the weather and other factors, including social influence. This means that categorizing someone as a ‘new regular bicyclist’ as we did in this research, for those who started bicycling within the last eighteen months, does not mean that they have not bicycled in the past. They could have been a regular or non-regular bicyclist. In some cases, a returning bicyclist might have been a better categorization.

In the analysis it emerged that the different levels of social influence could have an impact on decision making across time. So, for example, one female interviewee recounted a very positive experience of bicycling with her boyfriend many years ago in London (direct social influence) and she clearly articulated that bicycling for her at the current point in time was about rediscovering this past. Others mentioned past exposure to a different cultural context (indirect social influence) which had influenced their current bicycling behaviour.

“We spent a year in Norway and the kids cycled there because there were excellent cycle and ski tracks so taking yourself independently to school at the age of five was the norm”. **Female, new regular bicyclist living with her partner and two children, York**

The availability of infrastructure was important in her bicycling but in the context of

Norway it was the 'norm' to bicycle, indicating the importance of both the physical and social/cultural environment.

In the analysis it was noticeable that four of the non-regular bicyclists recounted in some detail negative bicycling incidents in the past, either their own or that of someone in their social network (a sibling or friend) and these incidents framed the choice of bicycling in a negative way for them (Tversky and Kahneman 1974). The past experience of those in their social network appeared to be influencing their present behaviour, again illustrating that social influence can work across time. It was notable that similar negative bicycling experiences were not recounted by any new regular bicyclists.

5.2 Bicycling for Different Purposes

Just as the frequency of bicycling varied over time, so did the purpose and extent of bicycling, so for example an individual might have bicycled for all their journeys at college but at another stage of life simply bicycled occasionally for leisure or fitness. In the sample of 30 new regular bicyclists, a third bicycled for leisure purposes only (bicycled as an activity in itself rather than as a means of getting to a location to undertake another activity).

A future analysis could look at how the levels of social influence vary according to whether bicycling is perceived as a 'transport mode' or a 'leisure activity'. Leisure bicycling for some was seen as a 'fitness' activity for themselves or a way of being 'alone', but for others the stimulus was a shared activity with others, i.e. a social activity. These interviewees would not bicycle alone. It is important to note that the variation in types of bicycling behaviour amongst the new regular bicyclists was considerable. One interviewee talked about bicycling on a machine indoors in the winter and outdoors in the summer. Another bicycled once a week for twenty minutes around her housing estate while another regularly made 20 kilometre journeys.

These first two sections make clear the difficulty of categorizing or defining a 'bicyclist' and what the practice of 'bicycling' means. The interviews showed that individuals moved in and out of bicycling and in and out of different types of bicycling behaviour.

5.3 Direct Social Influence

In Figure 1, direct social influence is shown as the influence of those in the immediate household or family and the role of this is now discussed. In the sample there was only one non-regular bicyclist who lived alone and two new regular bicyclists (see Table 2). It was notable that amongst new regular bicyclists the majority mentioned partners and other family members who bicycled. A third of the non-regular bicyclists articulated that they did not have anyone in their household who bicycled with two interviewees stating that they did not have anyone with whom to bicycle. A further third made no mention of the bicycling behaviour of others in the household and the remainder who did bicycle for leisure occasionally mentioned other family members who bicycled in their household.

5.3.1 Significant Others

The quotes highlighted below illustrate how individuals articulated the role of others in their household in their decision to start bicycling. In a few cases, it was clear that the interviewee would not have considered bicycling if another member of the household had not bicycled.

“I think if it wasn't for the fact that my wife and my son enjoy bicycling I probably wouldn't take such a, well I wouldn't take a part in it, because I wouldn't, I'd be out in the garden” **Male, new regular bicyclist married with two children, Southend**

In another case the presence of the husband who was a keen bicyclist in the household presented bicycling in a positive light.

“You could get lazy as you get older couldn't you, and having him being enthusiastic about getting out on his bike, it does rub off” **Female, new regular bicyclist, Woking**

When her youngest child started school, she had more opportunity and time to bicycle, her partner's enthusiasm prompted her to try it and she discovered the benefits of bicycling for herself as she could make the same journeys but faster.

For many non-regular bicyclists there were no other members in the household bicycling so there was perhaps less encouragement to 'try' bicycling.

5.3.2 Gift Giving and the Availability of a Functioning Bicycle

In the interviews there were several mentions of the giving and sharing of bicycles between family members or the acquisition of bicycles through social networks. In the case of gift giving, it not only removes a practical barrier but also sends a strong symbolic signal to encourage bicycling. It places an expectation that the recipient will use it, perhaps even bicycle with the person who has given it and the recipient may feel obliged to bicycle in order to sustain the relationship, whether he or she truly wants to bicycle or not (Mauss 1990).

“I had already had a bike that my husband had given me previously for a birthday present and my husband is quite a keen bicyclist, he's a lot keener than I am” **Female, new regular bicyclist, Colchester**

The woman quoted above not only was given a bicycle by her husband but she also articulated a clear intrinsic motivation to get fit. She had bicycled as a child and at college and many of her present wider social network - colleagues and neighbours - also bicycled (less direct social influence). In other words, there were a number of contributing factors to her decision to bicycle and not just the encouragement afforded by the gift.

5.3.3 Shared or Family Activity

In both sample groups, families with children between 5 and 18 predominate (Table 2).

In the new regular bicyclist group, the presence of children in a family could prompt bicycling for very different reasons: to escape children; to build exercise into a busy life; to provide a shared family activity; to act as a second car; and a feeling that children ought to be taught to bicycle as a rite of passage.

Bicycling was perceived as a good family activity allowing them to spend more time together.

“It’s probably them (the children) who encouraged us to get out on bikes to be fair. I mean the idea behind it was that we would spend more time together although fitness wise it was a good way to be with the kids. Then my wife got her bike so she could come with us and not miss out on the fun. They are the reason that we went for the push-bikes in the first place.” **Male, new regular bicyclist living with a wife and two children, Stoke**

“My son was starting to get into his bike and my husband enjoys bicycling, so I thought I might as well, it’s years since I got on a bike.” **Female, new regular bicyclist living with her husband and 6 year old, Shrewsbury**

In this family the husband’s means of transport was a bicycle but it was only when the son got interested in bicycling that the mother decided to get on her bicycle too so she could bicycle with both of them.

In the non-regular bicyclist group there were many participants without other family members who bicycled, making it difficult for it to be a family activity.

“My son is dyspraxic, so he’s never learnt to ride a bike, my 15 year old daughter has got a bike and can ride a bike (..) but as a family we wouldn’t go bicycling because my husband and son don’t ride bikes.” **Female, non-regular bicyclist living with her husband and two children, Shrewsbury**

Often a lack of bicycling was a result of trying to juggle the varying ages and needs of different children as well as other contextual factors. One mother with four children had bicycled with her daughter when she was able to fit into a bicycle seat but had stopped once she had outgrown it.

“It was nice for my daughter, she enjoyed going on the back of the bike and then suddenly now I think it is easier, more convenient to jump in the car”. **Female, non-regular bicyclist living with her husband and four children, Woking.**

Three in the non-regular bicyclist group mentioned that they no longer bicycled because their children had grown up and therefore it ceased to be a family activity. One articulated her guilt at not bicycling in the context of other family members.

“My sister and her husband are great bicyclists, they both cycle to work, the girls cycle with them, I mean her husband has cycled to work since he was 18 (..)my sister works in town now and she cycles into town, it makes me feel terribly guilty cause I work over there and I’m going in my car, I pass her on the bike sometimes.” **Female, non-regular bicyclist living with her husband and 16 year son, Chester**

5.4 Less Direct Social Influence

5.4.1 Workplace and Colleagues

Nearly a half of the new regular bicyclists bicycled to work and most mentioned either the UK Government's Cycle to Work Scheme (offering discounted bicycles through employers) or encouragement from colleagues (less direct social influence). A very small minority in this group found their workplace unsupportive. There was a clear sense of comraderie amongst bicyclists at work as well as competition and the swapping of information.

“People coming from Whitchurch, people coming from Warmley and they're like doing 12 , 15 some even do 20 miles and I think well, if they can do it I can do 4 miles you know. (...)I think if they can do it, I can do it, so it does influence me in that way. I would cycle more if I wasn't such a lazy git”. **Male, new regular bicyclist living with his wife and three children, Bristol**

“there's certainly two people who regularly cycle into the office all the time, I mean one guy is a proper sort of hardcore bicyclist (..), so there's that encouragement, it certainly helped, you got more encouragement and you can go to people with problems with the bike” **Male, new regular bicyclist living with his wife and 5 year old daughter, Bristol**

A few non-regular bicyclists were also aware of the Cycle to Work Scheme but had not taken advantage of it, illustrating the potential of this type of scheme to become at least part of the conversation at the workplace if not a stimulus for starting bicycling to work.

5.4.2 Friends and Social Networks

Friends had encouraged some interviewees to start bicycling but also the shared activity was important in sustaining bicycling.

“I had a bike and my friend kept asking me ‘have you been bicycling?’, (...) and she actually bought a bike so that we could go bicycling together, which was nice. I think I probably wouldn't have pushed myself to go out as much as I have, if I hadn't been bicycling with a friend”. **Female, new regular bicyclist living with her partner, York**

“Lots of my friends live in villages around here, I often cycle there and I cycle to the shops... my friends cycle in the summer and if we are going out somewhere it is much nicer to cycle” **Female, new regular bicyclist living with her mother and brother, Cambridge.**

Conceptualising behaviour dynamically as in Figure 1 and 2 suggests that interactions will not just flow in one direction. Social influence is no exception and several interviewees articulated that they felt their new bicycling behaviour was influencing others.

“I’ve encouraged others actually, cause lots of the children said to their parents ‘Oh I want to come to school on the bikes’, so it kind of started a few people doing it.” **Male, new regular bicyclist 53 year old male living with partner and 4 year old, Chester**

A mother who started bicycling in Shrewsbury found that this encouraged her mother to bring her bicycle to Shrewsbury and start bicycling too, partly so that she could join in a family activity with the son as well.

“Because I started bicycling my mother said, ‘Oh, but you’ve got all these areas you can go’. Because she lives in Wales and it’s so hilly, she’s never used her bike” **Female, new regular bicyclist living with her husband and 10 year old, Shrewsbury**

As suggested in the discussion of the literature in section 2 of this paper, social interaction in the form of practical support, and in the form of word of mouth information, are likely to be important in both encouraging and sustaining bicycling. Amongst the new regular bicyclists there were several mentions of this type of social support.

“I’ve got a friend round the corner, he knows everything about bikes, he’s a proper bike nut, it’s his hobby and he knows everything about repairing him, so I go there and I’ll pick his brain, because I haven’t got the tools to do all of them, he’s got all the tools to do it, so if I’ve got any problems I ask him and he does it”. **Male, new regular bicyclist living with his mother and Aunt, Colchester**

“My neighbours recommended part of the route, folks at work recommended parts of the route, so there is a certain amount of tribal knowledge that gets spread around in terms of which way to go” **Male new regular bicyclist living with his wife and 5 year old, Cambridge**

5.5 Indirect Social Influence

In a short paper it is not possible to do justice to the bicycling cultural context in 12 places or the many facets of indirect social influence. In one town there were only two interviewees and the largest number of interviewees in any town was eight. One interview illustrates the difficulty of disentangling the interactions of the many factors, including indirect social influence, that influence the decision to start or stop bicycling.

5.5.1 Disentangling the many influencing factors

As reported in our previous paper (Chatterjee et al. 2013b), life events such as moving can prompt a change in bicycling behaviour. In one case, a house move from Lancaster to Shrewsbury prompted a woman to start bicycling. She articulated that moving to Shrewsbury had made bicycling more visible to her (indirect social influence) and throughout the conversation she talked about seeing others bicycling.

“You see people on their bikes, you see all ages from young to really old people on their bikes(..) I quickly worked out that I could get to the shops on cycle lanes without

going on a road, so I started going out on my bike”

This was her perception and figures do confirm a slightly greater proportion of individuals in Shrewsbury bicycle to work (5.7% compared with 4.3% in Lancaster) but Lancaster’s own estimate of bicycling overall mode share is 4% as compared to a lower level in Shrewsbury of 3 – 3.5% (Bicycling England 2010). Whatever the actual levels and whether the difference in percentages actually makes a visual difference, it was her perception.

Her husband was a keen bicyclist (direct social influence). She mentioned that her son’s school actively promoted bicycling and that a number of his friends bicycled to school (less direct social influence). She started bicycling using off road cycle paths to the shops but later took up bicycle training offered as part of the government investment program to gain confidence in order to bicycle on the road to work. After this training she bicycled to work for a while in the summer but then stopped. Her experience of bicycling to work on the road was not always positive. She described being ‘cut up’ when bicycling to work but she vocalized more subtle social factors in her decision such as the negative attitudes and culture towards bicycling at her workplace (less direct social influence).

“it’s a different ethos that if you’re late because of traffic, because of your car or you’ve had to park your car miles and miles away and walk in, that’s acceptable, but it’s not on the bike”

When pressed she continued

“they all drive fancy cars and they wouldn’t, they’d rather go to the gym or do something else, it’s a different culture,.... it is a different culture, you have to have your nails painted”

It was difficult in the interview to specifically identify why she had ceased to bicycle. There was the alternative of using the bus to go to work which she mentioned allowed her to walk her son to school. Winter weather may have been a factor but the distinct impression was that primarily it was not a positive experience and her colleagues were not supportive.

“it’s colleagues, it’s like me walking in, in all my gear, you have to carry around all your files and stuff, so you’ve got quite a lot of hefty stuff, people dress up to the nines round here”

Although she was aware that one or two other colleagues did bicycle, she talked about the lack of shower facilities. As an individual she had changed her behaviour but the physical transport environment was not supportive as well as the social context at work. She was conscious of a wider culture in Shrewsbury of being well presented and this did not fit in with her own image of bicycling or her own self presentation.

In this interviewee’s case, at first she perceived that it was more normal to bicycle in Shrewsbury but the social context at her particular workplace was not supportive. She mentioned that her own experience of bicycling with a friend as a child was positive and that her husband was a keen bicyclist with both these contributing to her decision

to start bicycling. So, it is evident in this case that the different levels of social influence interact across time to influence the decision to bicycle, as well as the transport and physical context, i.e. the availability of the bus, the actual bicycling experience and the weather.

5.5.2 Place

The small numbers of interviewees in each place (Table 2) make it difficult to make broad generalizations but conducting the interviews in different settlements has revealed that place is a factor although unlikely to be the sole influence. There is considerable variation across the settlements in the percentage of the population bicycling to work and the overall bicycling mode share (Table 1) with Cambridge having the highest levels. Cambridge is probably the one place in England where bicycling has moved beyond a marginal activity and reached a critical mass (Rogers 2003) and bicycling is part of the identity of the place. How an individual answers the question – is bicycling normal in Cambridge? – will also depend on their own direct and less direct social context. So, for this new regular bicyclist in Cambridge her perception was that Cambridge was all about bicycling but she acknowledged there were others who did not see it in those terms.

“I know people from less privileged backgrounds that it is just part of their sub-culture that doing very simple things seems un-cool (everything has to be more butch). I have a friend who won’t cycle because he thinks it is “lame”. I don’t understand it but it is something that they have grown up being told and it’s part of their sub-culture” **Female, new regular bicyclist living with her mother and brother, Cambridge**

Undoubtedly, sheer numbers of bicyclists increases the visibility of the activity which can influence individuals to try it.

“It was walking with my oldest in the pushchair and seeing a lot of other people on bikes and thinking I quite fancy getting back on my bike again, sort of thing, so I’d inherited a bike from my father-in-law and just started riding around again and it’s great, I really enjoy it”. **Male, new regular bicyclist living with his wife and two small children, Shrewsbury**

5.5.3 Bicycling Identity

Throughout all the interviews there were references that illustrated either the positive or negative identities associated with bicycling.

“The girls, they’d rather be seen dead than bicycling. Their Mum often has a go at them to cycle.....Boys they don’t care, they’ll just go out and that’s how they meet up. (..)Girls, its not the, not trendy to cycle. So they won’t do that” **Male, new regular bicyclist, living with his wife and three children, Bristol**

“ my bike is quite fun, cause it’s a kids bike, everyone looks at it and says oh look at that it’s a rally chopper, I can meet people by talking about my bike as well” **Female, new regular bicyclist, living in a flatshare, Chester**

For most of the participants, being a bicyclist was one of many identities and individual attributes like gender and age are likely to be important in construction of identities as well as the particular place, time and social context. Identity and social norms are inextricably linked as suggested in Section 2 and social norms will be constantly changing and interacting with an individual's own changing norms of behaviour.

This section has shown, as is suggested by the conceptual model in Figure 1, that different levels of social influence interact with each other and indirect social influence is probably the most difficult to isolate. This is further complicated by the interactions with other non-social factors illustrated in Figure 2 – the physical, transport and journey context of each individual and place.

6. Conclusions

This qualitative exploration illustrates the varied circumstances of those that had recently started bicycling. The conceptual frameworks introduced in Section 2 helped to interpret the interview responses as it allowed recognition of the multiple types of interacting influences on bicycling behaviour. Many different 'pathways' to bicycling emerged and there was evidence that social influence played a part in most cases, to a lesser or greater degree. In a minority of cases it was the predominant factor but in most cases it was just one of many influencing factors. There were those who would be unlikely to bicycle without the influence of a partner, another person or the surrounding visibility of bicycling and others who would bicycle regardless of direct, less direct or indirect social influence. Social influence was often a factor but intertwined with other more tangible factors across time, for example the availability of infrastructure as found by Skinner and Rosen (2007).

The findings suggest that at any one time, those engaged in bicycling in England will be a mixture of persistent bicyclists, as well as those who are bicycling for that period of their lives but will stop and possibly start again. It may therefore be important to concentrate bicycle promotion on sustaining bicycling behaviour as well as creating new 'bicyclists'. Each additional person who sustains their bicycling behaviour has the potential to promote bicycling through their social networks and the relatively recent widespread use of social media offers the opportunity to speed up this process. The availability of bicycles through social networks was also shown to be important for a number of new regular bicyclists and this knowledge could be incorporated into future promotional programmes.

The impact of bicycle promotion that recognises the importance of a social element is likely to increase over time. The change may be slow at first, but then accelerate as people see their colleagues and neighbours changing their travel behaviour (Jones and Sloman 2003). As Rogers (2003) would argue, the idea of bicycling can diffuse through the population and the change to bicycling behaviour will develop new social norms (Jackson 2005). Promotional programs that can reinforce and harness the social processes described in the interviews are likely to be effective.

These findings and the difficulty of measuring social influence raises the question of how to conduct further research on the role of social influence in bicycling behaviour.

In this exploratory study we have illustrated how a longitudinal research methodology (retrospective biographical interviewing) enables the role of social influence to be revealed at different times in the life course. Future research could develop methods to capture information about social networks at specific time points and their influence on changes to behaviour as they occur over the life course. But, as we have noted, it is important that other influences are also considered (for example, physical environment). As an example, a recent study used life history calendars to explore intra-individual change in walking and bicycling over the whole life course and the influences on this (Jones 2013). This represents a promising basis for identifying how social influence interacts with other factors in behaviour change over time.

We suggest that future research could try to go beyond looking at the individual level and map their social networks, the direction and relative strength of the different levels of social influence and other interacting factors. As was shown in the interviews, the purpose and extent of bicycling varied considerably and therefore investigating to what extent the importance of social influence varies, relative to whether an individual perceives bicycling as a ‘transport mode’, ‘fitness activity’ or ‘leisure activity’, would be important. Social networks and their influence are likely to vary according to type of bicycling behaviour. Equally, the relative importance of past social influence and present social influence merits further investigation, as would an exploration of the importance of physically present social interaction as opposed to that through social media.

Another possible research approach would be to recruit participants who belong to the same social networks (e.g. families, local neighbourhoods, work colleagues, leisure clubs) and examine commonalities/differences and interactions/influence within networks and between networks. Multi-stage cluster sampling could assist this approach. For example, a two-stage cluster sampling approach would first sample a set of small geographical areas and then sample a set of households within these areas (with all household members sought for participation in the research). This would enable examination of the social influence of the local neighbourhood and of the household. Questionnaire surveys could be used to measure attitudes and behaviour towards bicycling among the full sample of participants and statistical analysis (for example, multi-level modelling) used to examine the strength of association at different levels (e.g. local neighbourhood, household). Interviews could also be conducted to carefully probe influences at the local neighbourhood and household level.

The role of social influence found in this research challenges the rational approach to explaining travel decision making and suggests that there is an opportunity to harness social processes to improve the efficacy of future bicycling promotion programmes.

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