

Cycling stereotypes and identity

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Abstract

In recent years a substantial amount social science research has sought to find out why so many more people use their cars rather than sustainable forms of transport, such as public transport, walking and cycling. Perceived advantages of using the car (such as speed), and disadvantages (such as being exposed to all weather conditions) and barriers (such as distance) of using other modes (e.g. walking and cycling) have been the focal point of previous research. Why people use other modes of transport instead of a car has received relatively little research attention. This includes cycling research, especially from a psychology perspective.

A sample of two hundred and forty-four randomly selected respondents were asked their views on cycling and cyclists. The participants made judgements on behavioural, motivational, background and personality features of a typical cyclist and oneself as a cyclist. Results demonstrate that people do indeed make judgements about the cyclists they see. Further, these judgements can be grouped four different types of cyclist. The study found that non-cyclists relied on the 'die-hard cyclist' stereotype more than cyclists. Whereas cyclists had a more varied view about the typical cyclist they see. The study also found that people perceive themselves as a number of different cyclist types. Again, cyclists were more varied in the way they perceive themselves as cyclists, whereas non-cyclists were only comfortable describing themselves as a 'functional' cyclist. Implications of these differences, when encouraging cyclists to cycle more and non-cyclists to take up cycling are discussed. This study also found that concept of self-identity as a cyclist had the strongest influence on intentions to cycle, over and above the Theory of Planned Behaviour and personal norm constructs. The findings of this study add to the shift in travel mode research as being more than a means to an end. This may help to explain why some people cycle and why some people do not.

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1 Introduction

Today we live in a society where the car plays a prominent role in everyday life. Cars have brought changes and advances, though they have been accompanied by problems. These problems can be seen at a local level with the noise, traffic congestion and fatalities caused by the car, as well as at global levels, with problems such as pollution and resource depletion. Bicycles, on the other hand, are a sustainable alternative mode of travel to the car (Lumsdon and Tolley, 2001). However, the number miles cycled per person per year has decreased in recent decades from 51 (in 1975) to 37 (in 1995) miles (Department of the Environment Transportation and the Regions, 1996). Moreover, efforts from the government to increase cycling have failed. The National Cycle Strategy (Department of Transport, 1996) launched by the government in 1996, aimed to double the number of cycle trips by the end of 2002 (based on 1996 figures), and quadruple the number by 2012. However, 1998/2000 to 2003 figures show a reduction of 12%, from 39 miles per person per year, to 34 miles per person per year (Department for Transport, 2003). This target was clearly not going to be reached and therefore the government reduced the target to the goal of increasing cycling traffic to 6% by 2010 (Transport 2000, 2000).

This current paper takes a social psychological perspective to examine who cycles, and why they do so. This could lead to suggestions of how the cycling figures could be increased. The paper specifically examines the concepts of identity and stereotyping in relation to cycling. It will not only explore to what extent people identify as a cyclists in general, it will also examine whether different types of cyclists can be distinguished with which people identify with. Moreover, it will be studied how cyclists as well as non-cyclists perceive cyclists. Finally, these identities (general and specific) will be incorporated into an extended version the Theory of Planned Behaviour. Its aim is to see if these new variables can explain cycling intentions over and above the existing variables which are usually used in research examining intentions, such as attitudes, norms and perceived behavioural control.

1.1 Previous research into cycling

To increase cycling figures, reasons that contribute to a consistent decrease in cycling in Great Britain must be explored. A considerable amount of research looking at varying aspects of cycling has grown over the years. This helps to create a picture of who

cycles and who does not, what the barriers are to cycling leading to effective solutions. Previous research has consisted of both qualitative (e.g. Davies et al, 1997) and quantitative studies (e.g. Davies et al, 2001; Dickinson et al, 2003), with focus on attitudes, intentions to cycle and behaviour. Moreover, cycling research usually focuses on general to attitudes towards cycling, with respondents expressing (often physical) motivators and inhibitors to cycle use (e.g. Atkins, 1989; Newby, 1993; McClintock and Clearly, 1996; Pooley and Turnbull, 2000). For instance, Dickinson, Kingham, Copsey and Pearlman Hougie (2003) found that cycle facilities and distance, emerged as important facilitators to encourage people to cycle. Low cost, flexibility and fitness have been quoted as reasons for cycling by Pooley and Turnbull (2000). It has been found that cyclists and non-cyclists say that safety improvements (e.g. creating more cycle lanes) are important to increase the numbers of people cycling. However, making cycling safer does not necessarily lead to an increase in cycling according to Davies, Gray and Harland (2001). This suggests that other things influence cycling, such as attitudes and perceptions. Early research provides descriptive accounts of cycling opinions and is not adding to theoretical or methodological knowledge to the approach to cycling. Moreover, policies that have been implemented on the basis of this research are not altogether successful (Davies et al, 2001). Therefore an alternative approach is required to establish, at a deeper level, what makes a cyclist a cycle, and what does it mean to be a cyclist.

Within environmental psychology research, travel mode choice has been dominated by the utilitarian aspects of private car use (e.g. Bamberg, 1995, 1996, 2002; Bamberg and Ludemann, 1996; Bamberg and Schmidt, 1993, 2001, 2003). There has been a recent shift giving attention to the non-instrumental and more affective and symbolic motives for private car use (e.g. Steg, Vlek and Slotegraaf, 2001; Steg, 2005). A further shift has occurred with focus on image playing an important role on motives for driving and choice of car (e.g. Choo & Mokhtarian, 2004; Steg, 2005). Cycling, however, has received relatively little research attention with both its instrumental and non-instrumental features. Identity needs fulfilled by the car has grown in popularity in that cars are believed to say something about people (e.g. Choo & Mokhtarian, 2004; Steg, 2005). However, cycling related identity, has received comparatively scarce attention leading to the assumption that there is a gap in the present research regarding cycle use and identity issues. In addition to how people view themselves as cyclists, how

outsiders perceive individuals who cycle is also an area of research that has received minimal attention. Parallels between self and other perceptions have not been investigated. Thus the present study wishes to look at these gaps by exploring how cyclists and non-cyclists perceive cyclists.

Jensen (1999) was one of the first researchers to touch on transport mode as being more than just a mode for commuting. She made distinctions between car driver and cyclists/public transport users, and further created typologies for each category. She found three types of car drivers (passionate, everyday and leisure) and three types of cyclists (those of the heart, convenience and economics). This suggests that people either choose to cycle because they love it, because it is the most convenient or because that is what they can afford.

It is not only the physical barriers (e.g. traffic, risk perception) that discourage non-cyclists from cycling, but other factors, such as personal image and status, can act as an attractive, or unattractive features of cycling (Davies, Halliday, Mayes and Pocock, 1997). In a qualitative investigation, cyclists were often associated with negative images, which Davies et al (1997) claim has the most effect on attitudes towards cycling. Some drivers saw cyclists' behaviour as being irresponsible with recounts of cyclists on the roads without lights. Responsible cycling behaviour is something that has been deemed important by the UK government, stating that cyclists must recognise the influence of "*poor cycling behaviour on perceptions of cycling amongst other road users and amongst potential cyclists*", (The National Cycle Strategy, 1996, 6.3.2). Further, negative perceptions of cyclists by drivers can lead to implications on driver behaviour. For example, if drivers perceive cyclists as being of low status, they may be less considerate towards them on the road (Basford, Reid, Lester, Thomson and Tolmie, 2002).

Davies et al (1997) also proposed five types of cyclists based on respondents' experiences and images: practical, idealist, fair-weather lifestyle and mainstays cyclists. Practical cyclists are usually young male, who view cycling as the most efficient way to commute. Idealist cyclists are highly anti-car and socially and ecologically aware. For these people, the bicycle represents a symbol for the modern day ills. Fair-weather cyclists generally prefer a car, and do not cycle for social or leisure purposes. Lifestyle

cyclists see cycling as an enjoyable activity off-road, and they focus on the non-utilitarian aspects of cycling and cycle purely for leisure use. Mainstay cyclists are those who do not have access to a car, similar to Jensen's cyclist for economics.

The trend in travel mode choice research has been shifting from utilitarian motivations for choosing a particular mode (e.g. Bamberg, 1993), to a more non-utilitarian approach focussing on non-instrumental motives (e.g. Steg, 2005). This approach to travel mode research needs to be maintained, and further extended to focus on other travel modes than just the car. Few attempts (e.g. Davies et al, 1997; Jensen, 1999) have looked at different typologies of cyclists. Though no research, to date, has incorporated these specific, or even the more general, cyclist identities within a theoretical framework to explain cycling intentions or behaviour.

1.2 The Theories of Reasoned Action and Planned Behaviour

The Theory of Planned Behaviour (henceforth TPB) is the most widely used and most influential model of the attitude-behaviour relationship (Eagly and Chaiken, 1993; Mannetti, Pierro and Livi, 2004). According to the Theory of Reasoned Action (Ajzen and Fishbein, 1977) and its successor the TPB (Ajzen, 1991), behaviour is the endpoint of cognitive decisions. Behaviour is directly influenced by intentions to the specific behaviour in question (e.g. intentions to use bicycle). The TRA and the TPB state that intention is influenced by attitudes towards target behaviour and subjective norms (what specific others think of the behaviour). The TPB adds the concept of perceived behavioural control. This is the degree an individual believes they can perform the behaviour. It can influence behaviour directly or via intentions. The TPB is immensely varied and popular in wider psychology (for recent reviews see Ajzen, 2001; Armitage and Conner, 2001). Within environmental psychology the TPB has been successfully applied (for an overview of pro-environmental behaviour studies using the TRA/TPB, see Vining and Ebreo, 2002; Staats 2003). It is also a popular theory within travel mode choice research (e.g. Bamberg, 1995, 1996, 2002; Bamberg and Ludemann, 1996; Bamberg and Schmidt, 1993, 2001, 2003).

Despite the vast support it has received, researchers have suggested that the TPB can be extended to increase its predictive value. Ajzen (1991) acknowledges that the model is not an exclusively sufficient predictor of the attitude-behaviour relationship and that it

is “*open to the inclusion of other predictors*” (p. 199). Papers have supported the inclusion of other variables, such as affective beliefs, habit, self-identity and moral norms (Eagly and Chaiken; 1993; Conner and Armitage, 1998). For example, studies have shown that the personal norm measure (Schwartz, 1977) significantly improves the explanation of intentions within pro-environmental and ethical consumption research (Hopper and Nielsen, 1991; Harland, Staats and Wilke, 1999; Sparks and Guthrie, 2000; Hunecke, Blobaum, Matthies and Hoeger, 2001,; Hunecke, Blobaum, Matthies and Hoeger, 2001; Shaw and Shui, 2002; Bamberg and Schmidt, 2003). This suggests that a moral obligation for the sake of the environment is an important factor of intentions to cycle.

The rationale for the inclusion of self-identity to the TPB comes from the suggestion that the issue in focus becomes central to an individual’s self-identity, behavioural intentions and behaviour follows accordingly. Early inclusions of the self-identity construct have successfully shown when identity is added to the TPB, it improves explanation of school performance (Biddle, Bank and Slavings, 1987) and blood donation (Charng, Piliavin and Callero, 1988). Sparks and Shepherd (1992) found that identification as being a ‘green’ consumer independently predicted intentions to buy organically grown vegetables. Pronk (1999) found that self-identification as environmental action group volunteer predicts intentions to remain as a volunteer within the group over and above the TPB and Schwartz’s personal norm. Terry, Hogg and White (1999) found self-identity, via intention, and independent of past behaviour had an indirect relationship on behaviour. Also, self-identity emerged to be a significant predictor of intention (but not behaviour), beyond which was predicted by the TPB.

Mannetti, Pierro and Livi (2004) extended the TPB to include personal identity and propose the “*self-expressive behaviour model*”. Using the concepts of “idealized people” (Wright, Claiborne and Sirgy, 1992) and “prototype” (Gibbons et al, 1995, 1998) they propose that behaviours have a symbolic meaning and are associated with “idealized people” or with the “prototype” of the persons who perform these behaviours. They suggest that people behave in ways that are congruent with one’s self-image. For example, buying a sports car is associated with the kind of person who is young, sexy, attractive and socially outgoing (Wright et al, 1992). It is suggested that, before people buy merchandise, an individual assesses the match between the

image associated with the product and his/her self-image. Mannetti et al (2004) examined the extent to which perceived similarity between one's own personal identity and the image (the prototype) of recycling influenced intentions to recycle over and above the TPB variables. Assessing the nearness/distance between the image of the typical person who recycles and the participant's self-image, a number of steps were involved. Firstly, a small sample of recyclers provided traits of a typical recycler leading to the most frequently cited adjectives or short definitions. Respondents were then asked to rate how a typical recycler corresponds to these adjectives (prototypes) and how well they themselves were described by each of the same prototype (personal identity). The final aspect of this subtle investigation is the "identity similarity" index then used a questionnaire to examine whether, and to what extent, a person's perceived similarity between his/her personal identity and the identity of the typical person who recycles influences behavioural intentions beyond the TPB constructs. Results showed a large size effect of identity similarity, which was the strongest predictor of intentions to recycle. Comparing their findings, with findings using just the TPB, Mannetti and colleagues (2004) concluded that the self-expressive behaviour model performed better.

The present paper will use the Mannetti et al (2004) approach, in addition to a regular self-identity measure to see how each of these add to the predictive power of the TPB and personal norm measures.

1.3 Social psychology research into identity and stereotypes

Self-identity theory (Stryker, 1980, 1987) views the self as a "collection of identities that reflects the roles that a person occupies in the social structure" (cited in Terry et al, 1999). Stryker's (1987) identity theory postulates that people have distinct parts of self for each role they fill. In other words, people have a collection of identities that reflects the roles, such as a parent or a worker. Performing the role is linked to validating one's role and self-esteem. Within environmental psychology research, it has been suggested that if a person views themselves as being a recycler, they gain satisfaction in carrying out recycling, and therefore are more likely to engage in the behaviour more frequently (Hornik, Cherian, Madansky and Narayana, 1995). Furthermore, it is suggested that the social norm of an important reference group also maintains this behaviour (Terry, Hogg and White, 1999). This is something that is also postulated by Stryker, in that

commitment to a social role makes norms of the behaviour to the specific behaviour salient, and therefore leads to behaviour that is congruent with the roles.

Perceptions of other people have been given extensive attention throughout the history of social psychology (e.g. Katz and Braly, 1933; Allport, 1954). Perceptions of certain groupings can lead to stereotyping of the said group, particularly if they are a minority group. This has been defined as the belief that certain groups hold certain traits, and these beliefs have been known to lead prejudices (Katz and Braly, 1933, cited in Chrysochoou, 2003). One such early study, found that stereotypes of individuals who act pro-environmentally were widely shared (Sadalla and Krull, 1995), and conclusions about the individuals were drawn. With the use of vignettes, people performing energy consuming behaviours were regarded to have higher status and to be more sexually attractive than people performing energy conserving behaviours. Another study concludes that the role model of the recycler was largely negative (Lyons, Uzzell and Storey, 2001). In this study, people described a recycler as an “old man in his fifties with a beard” or “a woman in a tie-dyed shirt and dungarees” or “boring” (p. 10). Some kind of disassociation and negative stereotyping is apparent. Negative appraisals, such as these, led Sadalla and Krull (1995) to suggest that self-presentational issues may act as barriers to energy conservation behaviours, and that eco-friendly behaviour was inhibited by the link between excessive consumption and high status. Hormuth (1999) notes that people are fearful of being mocked if they purchased certain goods or refused gift-wrapping in a shop, for environmental reasons. Mannetti, Pierro and Livi (2004) echo this by concluding that “if the identity associated with this behaviour [recycling] becomes a prestigious one, and, at the same time, the identity associated with anti-environmental becomes an ‘out-of-fashion’ identity’ (p. 234)”, recycling may become more widespread. Therefore, a key question in this present research is the public image of cyclists attractive enough for people to take up the activity?

1.4 Conclusion

So it seems that there are gaps in travel mode research on many levels. Firstly, research into cycling has been neglected comparatively with the attention car use receives. In today’s climate for the need of increasing sustainable mode of transport, cycle research ought to be just as importance as car use, because if policy makers wish to increase cycle use it is not feasible to just focus on car use. Moreover, symbolic motives

associated with car use have been researched (Steg et al, 2001; Steg, 2005), yet how this is reflected in cycle use is something that has never been looked at . The interplay between the symbolic status desired, and that which is reached in relation to cycle use has not been explored either.

1.5 Present study: Research questions and objectives

Examining the previous research, it is concluded that there are a number of gaps within the area of cycling research. Firstly, there is a need to identify types of cyclists that people perceive (cyclists and non-cyclists), and identify with as a cyclist – this will be the first objective of the study. Also, the differences in perceptions of the self and the typical cyclist between cyclists and non-cyclists will be examined. Another objective is to examine the disparities between perceived cyclist types, and actual cyclist identities. Finally, in terms of empirical research, there have been no studies linking the position of identity to cycling, within or outside the umbrella of established attitudes-behaviour theories. This study will examine the extent to which general identity as well as the perceived similarity between one's own personal identity and the image (or prototype) associated with a cyclist influences the intention to cycle beyond the influence of the TPB.

Establishing identities of the typical cyclist and the self

i) What do people perceive to be the behavioural and motivational characteristics of the typical cyclists that people usually encounter on their daily travel, and can different types of cyclists be distinguished?

The meaning of cyclist Identity

i) What behavioural, motivational, personality and background characteristics do people attribute to different types of cyclists?

ii) To what extent are different cyclist types, which may emerge from the study, relate to general cycling identity?

Examining the differences

i) Is there a significant difference, between cyclists and non-cyclists, in their perceptions of the typical cyclist?

ii) Is there a significant difference between cyclists and non-cyclists in how they (would) see themselves as a cyclist?

iii) Is there a difference between how people view the typical cyclist and how they see themselves as cyclists?

iii) Do the views of how people see themselves as a cyclist and how they see the typical cyclist vary depending on whether they are a cyclist themselves or not?

The TPB, personal norm and identity

i) Does general self-identity as a cyclist predict cycling intentions, over and above the TPB and personal norm?

ii) Do any cyclist personal identity types, which may emerge from the study, predict intentions of cycling over and above the TPB and personal norm?

iii) Does a measure of cyclist identity similarity predict cycling intentions, over and above the TPB and personal norm?

2 Method

Exploratory qualitative interviews were held with six people, consisting of three cyclists and three non-cyclists. They were asked to discuss their views and images of cyclists. Each interview lasted 20 minutes. These interviews helped to form the basis of the questionnaire.

2.1 The Questionnaire

After piloting the questionnaire on a number of participants, the final version was available online as well as in printed format. The questions were presented in 7 different sections (one section, on cycling habits, was not relevant for this paper), and in random order within each section. The questions of interest to the present paper will be briefly described below, with preliminary analyses results in the first part of the *Results*. All of the questions were measured on 7-point scales. A copy of the full questionnaire can be found in Appendix 1.

In section A respondents were about their travel and cycling behaviour.

Section B asked participants to respond to the statements regarding the behaviour, motivations, personalities and background variables of the typical cyclist that they see on their daily travels. Section C asked respondents to respond to the same statements but this time in relation to how they (would) see themselves as cyclists. The list was made on the basis of research by Davies et al, 1997; Basford et al, 2002 and interview with cyclists and non-cyclists.

Twenty-six statements were behaviour related statements e.g. “The typical cyclist, I tend to see on my daily travels, cycles on the pavement”. Eight statements were concerned with motivational aspects of cycling e.g. “The typical cyclist, I tend to see on my daily travels, cycles to get/keep slim”. Eight statements were background related e.g. “The typical cyclist, I tend to see on my daily travels, is a vegetarian”. And the final ten statements were taken from Eysenck’s Big 5, to measure personality traits e.g. “*The typical cyclist, I tend to see on my daily travels, tends to be lazy*”. All statement responses were measured from 1 = No, definitely not to 7 = Yes, definitely.

Following this series of statements, seven types of cyclists were presented to the respondents and again they were asked to what extent they describe the typical cyclist and to what extent they describe themselves as a cyclist. These seven cyclist types emerged from the interviews - the types were die-hard cyclist, health cyclist, enjoyment cyclist, thrill-seeking cyclist, functional cyclist, racing cyclist and environmental cyclist. All statement responses were measured from 1 = No, definitely not to 7 = Yes, definitely. For clarity reasons these cyclist types will be termed *presented typical cyclist* and *presented personal identities*. This in contrast to the cyclist types that were created on the basis of the behavioural and motivational items described above (see Results section).

In section D respondents answered questions regarding their general identity as a cyclist. Six statements measured the extent to which respondents identified with being a cyclist in general. Three items assessed the extent to which cycling was an important component of the person's self-identity. These items were adapted from Terry et al (1999). These items were: 'Cycling is an important part of who I am', 'I would feel at a loss if I were forced to give up cycling', and 'I am the type of person who would cycle'. Furthermore, three negatively phrased statements, which were later recoded, were added: 'I think of myself who would feel weird on a bicycle', 'I would feel awkward on a bicycle' and 'I would feel embarrassed on a bicycle'. All statements were measured from 1 = strongly disagree, to 7 = strongly agree.

In section E respondents were asked to answer a series of TPB and personal norm questions.

Attitudes

Three items measured attitudes towards cycling: 'In general my attitude towards cycling is (1 = strongly unfavourable to 7 = strongly favourable)', 'I think cycling is something that is (1 = very bad to 7 = very good)', 'For me, generally speaking using a bicycle would be (1 = extremely unpleasant to 7 = extremely pleasant).

Subjective Norm

Two items measured subjective norm: 'Most people who are important to me would approve of me cycling', 'If I use a bicycle, most people who are important to me would

support this'. All statements were measured from 1 = strongly disagree, to 7 = strongly agree.

Perceived Behavioural Control

Four items assessed respondents' level of perceived behavioural control; 'If I wanted to I could easily cycle whenever I desired', 'There is nothing to stop me from cycling is I wanted to', 'It is easy for me to use a bicycle as a transport mode'. One item was reversed scored; 'There are many obstacles to prevent me from cycling'. Participants indicated the extent to which they perceived they could cycle using a Likert Scale 1 = strongly disagree, to 7 = strongly agree.

Intention

Three items assessed intention to cycle; 'My intention to use a bicycle is' (1 = very weak to 7 = very strong), 'I intend to cycle in the next two weeks' and 'I intend to use a bicycle in the future'. The latter two items were measured 1 = strongly disagree, to 7 = strongly agree.

Personal Norm

Three items measured Schwartz's personal norm construct; 'I feel a personal obligation to use a bicycle, instead of a car, for the sake of the environment', 'I feel morally obligated to use a bicycle, rather than a car, for the sake of the environment' and 'I feel it is my duty to the environment to use a bicycle as much as possible'. All statements were measured from 1 = strongly disagree, to 7 = strongly agree.

The final section of the questionnaire (Section H) gathered information regarding demographics such as sex, age, location, education and income.

2.2 Participants

Participants were approached directly with a printed questionnaire, or via email with information and the web link to the online questionnaire. The two versions were identical. Emails were sent to various departments within the University of Surrey, Guildford. Further, emails were sent to various organisations (including a county library and an architectural firm), as well as a posting on an Internet cycling notice board.

The total number of respondents who participated in the study was two hundred and forty-four, of which one hundred and forty-nine (61%) completed the questionnaire online and ninety-five (39%) completed a paper version. Of the sample, there were one hundred and nineteen males (49%) and one hundred and nineteen females (49%), and six (2%) respondents did not disclose their gender. One hundred and thirteen (46%) respondents said they were cyclists (of which 58 were male, and 51 female) and one hundred and thirty-one (54%) said they were not cyclists (61 of which were male and 68 female). The mean age was 38 (age range 18 to 69, SD = 13.18). Location wise, about 36% were from Surrey, 29% from Norfolk, 8% were from Greater London and 23% were from various other parts of the UK. About 4% of respondents did not fill in this question. Income was broad and normally distributed in the sample, ranging from £1,000 per calendar month to £3,500 and over.

About 20% of the respondents lived alone, 2% were single with children who live at home, about 30% lived as a couple without children, about 20% were a couple with children and about 20% lived in shared accommodation. About 8% either described themselves as other, or did not answer the question. Most people (71%) said they had access to a car, and 27% said they did not. The remaining 2% did not answer this question. Very few people (6%) said that they were a member of a cycling club or organisation, with most (89%) responding no to this question. (5% of respondents did not answer this question).

Education levels were across the board. Sixty-two people (25%) said that they had been educated up to a higher national diploma level (including GCSEs, A-levels and HND). 74 people (33%) said that they had a degree or equivalent. Eighty-three people (34%)

said they were postgraduate level educated. Thirteen people (5%) specified other, and twelve 12 people (3%) did not answer this question.

Almost half of the sample, 46%, used a car as their main mode of transport, 24% used a bicycle, 15% walked, 7% used the train and 5% used the bus. The remaining 3% used a combination of the modes or did not answer the question. In an ideal situation, 33% of the respondents said they would prefer to use a bicycle, 27% said they would prefer to walk, 21% said they would prefer to travel by car, 8% would prefer to use the train, 5% would prefer to use a bus, 4% would prefer to use other modes of transport alone or in combination, and 2% of respondents did not answer this question.

When asked to what extent would the respondent like to use a bicycle for their daily commute (1 = not at all to 7 = very much so), 26% said they would like to very much, with 15% saying they would not like to use a bicycle at all ($M = 4.19$, $SD = 2.22$, $N = 244$).

All respondents participated voluntarily and no incentives, such as cash, were used. The questionnaire took 20 minutes to complete.

3 Results

3.1 Data transformations and scale constructions

Before any meaningful analysis could take place, checks for normality, recoding, transformations, factor analyses, reliability and the creation of the variables were carried out.

3.1.1 Checks for normality and recoding

Checks of normal distributions were carried out on all items. These included items from the behavioural, motivational, background and personality traits, as well as the general self-identity, TPB and personal norm measures. Preliminary analysis of the original data set showed that several variables were normally not distributed. Variables considered to violate the assumptions of normality (with a Skew or Kurtosis greater than plus or minus one) were either transformed to establish a normal distribution, or discarded if transformation did not help (See Appendix 2 for detailed list).

3.1.2 Data Reduction; Factor analyses and Reliability

All of the negative variables were recoded following the factor analysis, so they were all positively coded. Each factor analysis discussed below was done twice, once with only normally distributed variables (some transformed) and once using the raw untransformed data. This was done because factor analysis requires the items to be normally distributed. However, it is meaningless to calculate mean scores of variables when the levels of measurement are different. The mean scores, therefore would have to be calculated on the basis of the raw data, but this can only be done if both factor analyses suggest that meaningful scales can be constructed on the basis of the data. Below are the results for the factor analyses using the transformed variables. However, factor analyses with untransformed showed very similar results. The results of these can be found in Appendix 3.

Factorising the identities of the typical cyclist

It was examined whether different types of cyclists could be distinguished on the basis of respondents' views of behaviour and motivations of the typically seen cyclist. The 25 normally distributed or transformed behavioural and motivational items were entered into an explorative principal components analysis. To aid interpretation of these four components a Quartimax rotation was performed, though originally a Varimax rotation

was performed, but rotation did not occur. The results and labelling of the rotation can be seen in Table 1. The analysis extracted nine components with Eigenvalues over 1, explaining 60.63% of the variance. An inspection of the Screeplot, however, revealed a clear break after the fourth component, suggesting a four factor solution is most appropriate. Therefore only the first four components were examined. Together these accounted for 36.05% of the variance.

Reliability analyses were conducted on the existing items in order to test the degree of internal consistency within the four factors extracted from the factor analysis, and to justify use of the items for future purposes. As the new scales were calculated on the basis of the untransformed data these data were also used to calculate reliabilities. All reliability scores obtained of each factor is high and can be found at the bottom of Table 1.

Table 1 Rotated factor loadings and Cronbach's alpha of behaviours and motivations of typical cyclist people see on their daily travels (factorised identity of the typical cyclist)

	Factor 1 Responsible road user	Factor 2 Die hard	Factor 3 Fun	Factor 4 Necessity
Abides by the rules of the road	.84			
Courteous to other road users	.82			
Responsible cyclist	.75			
Stops at red lights	.69			
Uses bike lights when dark	.60			
Cycles on the pavement	-.40			
Has expensive equipment		.67		
Wears lycra		.64		
Wears regular clothing		-.57		
Cycles as fast as possible		.57		
Wears a helmet		.57		
Uses the bicycle to go shopping		-.53		
Has a shopping basket		-.49		
Wears clip in shoes		.48		
Cycles for fun			.77	
Cycles to enjoy the scenery			.76	
Gets an adrenaline rush			.64	
Cycles to get/keep slim			.61	
Cycles in mountainous terrain			.51	
Views the bicycle as a mode of transport				.75
Commutes to work				.73
Cycles in all weather				.68
Cronbach's alpha	.76	.71	.78	.67

Based on these results, four new variables were constructed reflecting different types of cyclist people typically see: ‘the responsible road user’ accounts for 10.34% of the variance and consists of 6 items (Mean = 4.47, SD = 1.13), the ‘die-hard cyclist’, accounts for 9.43% of the variance and has 8 items (Mean = 4.04, SD = 0.85), the ‘fun cyclist’, comprises of 5 items and accounts for 9.16% of the variance (Mean = 3.37, SD = 1.08) and finally the ‘commuter cyclist’, comprising of 3 items and explains 6.73% of the variance (Mean = 4.66, SD = 1.16). Henceforth these types of typically seen cyclists will be termed as the *factorised identity of the typical cyclist*.

Factorising personal identity

To aid interpretation of these four components a Varimax rotation was performed, and the results and interpretation of which can be seen in Table 2. The analysis extracted nine components with Eigenvalues over 1, explaining 62.11% of the variance. An inspection of the Screeplot shows a clear break after the fourth component, suggesting a four factor solution is most appropriate. Therefore it was decided to retain four components for further analysis, together accounting for 37.97% of the variance.

The new variables constructed reflects how people see themselves are: ‘necessity cyclist’, accounts for 10.63% of the variance and comprised of five items (Mean = 3.85, SD= 1.45): the ‘hippy-go-lucky cyclist’, accounts for 10.44% of the variance with four items (Mean = 4.83, SD = 1.52), the ‘responsible cyclist’ comprises of four items and accounts for 8.62% of the variance (Mean = 2.45, SD = 1.21) and finally the ‘mountain biker’ comprises of seven items, explaining 8.28% of the variance (Mean = 2.45, SD = 1.21). From now on these new scales will be referred to as *factorised personal identities*.

Table 2 Rotated factor loadings and Cronbach's alpha of behaviours and motivations how people see themselves as cyclists (factorised personal identity)

	Factor 1	Factor 2	Factor 3	Factor 4
	Necessity	Hippy-go-lucky	Responsible	Mountain biker
I cycle as mode of transport	.78			
I use the bicycle to commute	.77			
I cycle in all weather	.73			
I use the bicycle for shopping	.60			
I cycle because I can't afford a car	.32			
Cycle for fun		.80		
I enjoy the scenery		.79		
I ride in the countryside		.69		
I cycle for environmental reasons		.36		
I am a responsible cyclist			.82	
I am courteous to other road users			.77	
I abide by the rules of the road			.75	
I stop at red lights			.51	
I wear lycra				.77
I have clip in shoes				.64
I have expensive cycle equipment				.59
I wear regular clothing				-.52
I cycle in mountainous terrain				.41
I cycle to get an adrenaline rush				.33
Cronbach's alpha	.72	.76	.83	.71

Identity Similarity 1 (IS1): General Identity similarity to the typical cyclist

Different scales were constructed using the identity similarity method. First for each behavioural and motivational questionnaire item new variables were made representing the discrepancy (or similarity) between the typical seen cyclist and oneself as a cyclist by subtracting one variable from the other. This was done twice, once using untransformed data only and once using normally distributed variables only.

The first identity similarity measure included all of these behavioural and motivational items. The Cronbach's alpha for this scale, using only normally distributed variables, was .82 (mean = -.02, SD = .66). The scale using the raw data had a slightly lower alpha (Cronbach's alpha .67), but for reasons mentioned before a new scale could only

be constructed using these items (Mean = -.07, SD = .74). This measure of general identity similarity and henceforth will be referred to as *general identity similarity*.

Identity Similarity 2 (IS2): Factorising Identity similarity

The scores of difference (between the typical and the self) were also analysed with factor analysis to see if there are any underlying dimensions or components that made up the measure. The analysis revealed ten components with eigenvalues over 1, explaining 63.09% of the variance. An inspection of the Screeplot revealed a clear break after the fifth component, suggesting a five factor solution is most appropriate. To aid interpretation of these four components, Quartimax rotation was performed. The five factors account for 40.41% of the variance. The first factor accounted for 11.9% of the variance and refers to the 'responsible road user', consisting of 6 items (Mean = -1.47, SD = 1.54). The second factor is labelled as the 'commuter/necessity cyclist' and accounts for 8.58% of the variance and had 5 items (Mean = 0.28). These people appear to commute because they have to. The third factor, labelled as the healthy/fun cyclist, comprises of 5 items and accounts for 8.30% of the variance (Mean = .80, SD = 1.27). The fourth factor, the 'racing cyclist' comprises of 3 items, explaining 6.39% of the variance (Mean = .80, SD = 1.27). The fifth factor, 'antisocial cyclist' comprises of 3 items, explaining 5.23% of the variance (Mean = .80, SD = 1.27).

Reliability analyses were conducted in order to test the degree of internal consistency within the five factors extracted from the factor analysis, and to justify use of the items for future purposes. Two of the five factors (factors 4 and 5) were deemed unsuitable to use for further analyses due to obtaining a low reliability score (both < .50). For this reason they will be omitted from any future analysis. The reliability scores for all five factors, including those not used can be viewed bottom of Table 3. In future, these constructs are identity similarity measures of various cyclist identities, and will be referred to as *identity similarity types*.

Table 3 Rotated factor loadings and Cronbach's alpha behaviours and motivations identity similarity types

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
	Responsible road user	Commuter /necessity	Health/ fun	Racer	Anti-social
Abides by the rules of the road	.80				
Responsible cyclist	.77				
Courteous to other road users	.76				
Uses bike lights when dark	.74				
Wears reflectors when it's dark	.72				
Stops at red lights	.72				
Commutes to work		.76			
Cycles in all weather		.74			
Views the bicycle as a mode of transport		.71			
Uses the bicycle to go shopping		.61			
Cycles as fast as possible		.46			
Cycles to get/keep fit			.78		
Cycles to get/keep slim			.73		
Cycles to enjoy the scenery			.66		
Cycles for fun			.64		
Cycles for environmental reasons			.56		
Wears regular clothing				-.68	
Wears lycra				.67	
Wears clip in shoes				.61	
Listens to music when cycling					.60
Smokes when cycling					.57
Has a BMX (trick bike)					.54
Cronbach's alpha	.85	.71	.76	.40	.40

General Cyclist Self- Identity, The Theory of Planned Behaviour and personal norm

Also in the questionnaire were measures of cyclist self-identity, TPB constructs (attitudes, subjective norms, perceived behavioural control and intentions) and Schwartz's personal norm. The following scales were computed on the basis of the questionnaire items: attitude towards cycling (Cronbach's alpha .83), subjective norm (Cronbach's alpha .88), perceived behavioural control (Cronbach's alpha .85), intentions (Cronbach's alpha .89), personal norm (Cronbach's alpha .94), and cyclist self-identity (Cronbach's alpha .89). The mean scores and standard deviations of these variables can be seen in Table 4. This table also shows correlations between the

variables and as can be seen these tend to be very high, especially between attitude and intention and between identity and attitude and identity and intention suggesting that the variables might measure very similar underlying constructs rather than different

Table 4 Descriptive data for measures TPB, personal norm and self-identity measures (means, standard deviations, Cronbach's alpha coefficient and bivariate correlations)

Variables	Mean	SD	1	2	3	4	5	6
1. Attitude	1.49	.42	(.83)					
2. Subjective norm	1.68	.45	.40***	(.88)				
3. PBC	3.81	.85	.39***	.32***	(.85)			
4. Intention	4.45	2.00	.71***	.49***	.56***	(.89)		
5. Personal norm	3.61	1.97	.54***	.42***	.58***	.58***	(.94)	
6. Identity	4.96	1.59	.66***	.36***	.47***	.77***	.52***	(.89)

Note: N = 242; *** p < 0.001 level; Reliabilities (Cronbach's α) are on the diagonal. psychological constructs.

3.2 Assessing typical and self identities

3.2.1 Background and personality traits of the seven presented cyclists

The six *presented* types of cyclists were entered into a stepwise regression to assess what behaviours and motivations are associated with them.

Die-hard cyclists

According to the results, it appears that die-hard cyclists are typically seen as having expensive equipment, get an adrenaline rush from cycling, not using bike lights when it is dark and wears reflectors when dark and cycles in mountainous terrain (Table 5).

Furthermore, background and personality variables were conducted in a similar way.

Die-hard cyclists are typically seen as being a member of a cycling organisation, good looking and neurotic (Tables 6 and 7).

Health cyclists

Health cyclists were viewed to cycle to get/keep slim, for charities, in mountainous terrain and for environmental reasons (Table 5). Background variables typically

associated with a health cyclist include belonging to a cycling club or organisation, being good looking, having no children and being environmental friendly (Table 6).

Personality traits associated with a health cyclist were being neurotic and conscientious (Table 7).

Table 5 Stepwise regression results for each presented typical cyclist, based on behavioural and motivation traits

	Die-hard Beta	Health Beta	Enjoy Beta	Thrill Beta	Funct'l Beta	Environ'l Beta
Behavioural & Motivation	Adjusted R ² = .23, F = (5, 219) = 14.73, p < .001	Adjusted R ² = .22, F = (4, 221) = 17.18, p < .001	Adjusted R ² = .13, F = (2, 224) = 17.46, p < .001	Adjusted R ² = .25, F = (5, 221) = 16.03, p < .001	Adjusted R ² = .13, F = (3, 223) = 12.38, p < .001	Adjusted R ² = .25, F = (3, 223) = 26.31, p < .001
Has expensive cycle equipment	.299***					
Gets an adrenaline rush	.166**			.29***		
Uses bike lights when it's dark	-.257***			-.21***		
Wears reflectors	.180**					
Cycles in mountainous terrain	.148*	.15**		.23***		
Gets/keeps slim		.28***				
Cycles for charities		.32*		.13*		
Environment al reasons		.13*				.42***
Cycles for fun				.32***		
Stops are red traffic lights			.14*			
Gets an adrenaline rush			.32***			
Has a shopping basket				-.12*		
Commutes to work					.231***	.19**
Wears Lycra					-.20**	
Can't afford a car					.18**	
Enjoys the scenery						.17**

Note: * p< 0.05, **p<.01, *** p<.001

Table 6 Stepwise regression results for each presented typical cyclist, based on background traits

	Die-hard Beta	Health Beta	Enjoy Beta	Thrill Beta	Funct'l Beta	Environ'l Beta
Background	Adjusted R ² = .16, F(2, 226)= 22.50, p < .001	Adjusted R ² = .20, F = (4, 225) = 15.54, p < .001	Adjusted R ² = .14, F = (3, 227) = 13.25, p < .001	Adjusted R ² = .17, F = (3, 226) = 16.10, p < .001	Adjusted R ² = .14, F = (3, 227) = 13.25, p < .001	Adjusted R ² = .26, F = (2, 227) = 41.74, p < .001
Member of a cycling club	.356***	.243***	.184**	.24***		
Is good looking	.163*	.20**		.22***		
Has no children		.14*	.15*	.175**		
Is environmentall y friendly		.143*	.23***			.48*
Is well- educated					.22*	.125*
Is young					.15*	

Note: * p< 0.05, **p<.01, *** p<.001

Enjoyment cyclists

Enjoyment cyclists were perceived to cycle for fun and stop at red traffic lights (Table 5). Those who are perceived to cycle for enjoyment purposes are seen to be environmentally friendly, a member of a cycling club or organisation and has no children (Table 6). Personality wise they are seen to be conscientious but not agreeable (Table 7).

Thrill seeking cyclists

The thrill seeking cyclist is seen to get an adrenaline rush from cycling, cycles in mountainous terrain, not use bike lights when its dark cycles for charity and does not have a shopping basket (Table 5). Background and personality factors associated with the thrill-seeking stereotype include they are a member of a cycle club or organisation, good looking, have no children and are neurotic (Tables 6 and 7).

Table 7 Stepwise regression results for each presented typical cyclist, based on personality traits

	Die-hard Beta	Health Beta	Enjoy Beta	Thrill Beta	Funct'l Beta	Environ'l Beta
Personality	Adjusted R ² = .11, F (1, 232)= 22.95, p < .001	Adjusted R ² = .09, F = (2, 232) = 12.38, p < .001	Adjusted R ² = .11, F = (2, 233) = 16.20, p < .001	Adjusted R ² = .10, F = (1, 234) = 25.27, p < .001	Adjusted R ² = .05, F = (1, 234) = 13.16, p < .001	Adjusted R ² = .08, F = (2, 233) = 10.60, p < .001
Neurotic	.30***	.25***		.32***		.17**
Conscientious		.17**	.195**		.23***	
Agreeable			-.213**			-.23***

Note: * p< 0.05, **p<.01, *** p<.001

Functional cyclists

The typically seen functional cyclist is viewed as using the bicycle to commute to work, someone who does not wear Lycra and cycling because they are not able to afford a car (Table 5). These people are perceived to be well educated, young and conscientious (Tables 6 and 7).

Environmental cyclist

The typically seen environmental cyclist is viewed to cycle for environmental reasons, uses the bicycle to commute to work and enjoys the scenery (Table 5). Background variables associated with this stereotype is that they are environmentally friendly and a member of a cycling organisation (Table 6). Agreeable and neurotic personality types were associated with the environmental cyclist (Table 7).

3.2.2 Assessing the predictive power of various identities on general self-identity

Three multiple regressions were carried out using the various identities as dependent variables to assess the relationship between general cycling identity the different cyclist identities. First the factorised personal identities, then the presented identities and finally the identity similarity measure.

Table 8 shows that the factorised personal identity accounts for 36.7% of the variance in general identity. Each of the predictors included in the analysis make a significant contribution to the equation. It can be seen that the more someone identifies as a necessity cyclist, the more they identify as a cyclist in general. The type of responsible cyclist was automatically excluded from the SPSS analysis, it is not clear why.

Table 8 Regression analysis predicting general cycling identity using the factorised personal identities

Step/Predictor	R	Adjusted R ²	F	df	Beta
Commuter/necc	.61	.37	47.69	3, 239	.37***
Hippy-go-lucky					.22***
Mountain biker					.27***

Note: * p< 0.05, **p<.01, *** p<.001

Multiple regression using the various presented cycling identities as predictor variables towards cycling identity in general explained 26.2% of the variance. As Table 9 shows, identifying as a die-hard cyclist is the strongest predictor of general cyclist identity, followed by identifying as a thrill seeking cyclist, the only two statistically significant single contributions. Suggesting that the more someone identifies as a die-hard or thrill seeking cyclist, the more they identify as being a cyclist in general.

Table 9 Regression analysis predicting general cycling identity using the presented identities

Step/Predictor	R	Adjusted R ²	F	df	Beta
Die hard	.53	.26	14.99	6, 231	.42***
Health					.12
Enjoyment					-.01
Thrill seeking					.18**
Functional					-.10
Environmental					-.05

Note: * p< 0.05, **p<.01, *** p<.001

The multiple regression using the three identities as established by the identity similarity measure explained 26% of the variance in general cycling identity. As shown by Table 10 identity as a commuter cyclist makes the largest unique contribution, although identity as a fun cyclist also made a statically significant contribution. The more someone identifies as a commuter cyclist the less they identify as a cyclist in general. Similarly with the fun/healthy cyclist.

Table 10 Regression analysis predicting general cycling identity using the identity similarity

Step/Predictor	R	Adjusted R ²	F	df	Beta
Responsible	.52	.26	29.00	3, 239	.11
Commuter					-.43***
Fun/Healthy					-.18**

Note: * p< 0.05, **p<.01, *** p<.001

3.3 Examining the differences

T-tests were carried out to examine whether cyclists and non-cyclists viewed the identity of the typically seen cyclist significantly differently. The results in Table 11 suggest that cyclists are more likely to view the typically seen cyclist as a responsible cyclist than non-cyclists. Furthermore, non-cyclists are more likely to view the typically seen cyclist in their everyday travels as being a die-hard cyclist. MANOVAs were not carried out here because they scales were not the same.

Table 11 Table of means, SD and t-test results for cyclists and non-cyclists on factorised identities of the typical cyclist

Factorised Type	Cyclists		Non-cyclists		t	df	Sig.
	Mean	SD	Mean	SD			
Responsible	4.77	1.00	4.21	1.17	4.04	242	.000***
Die-hard	3.85	.83	4.20	.84	-3.22	242	.001**
Fun	3.45	1.07	3.30	1.09	.933	242	.322
Commuter/Nes	4.63	1.11	4.68	1.21	-.321	242	.748

Note: * p< 0.05, **p<.01, *** p<.001

The next set of analyses focuses on the differences in the perception of the presented types of cyclist, both as the typically seen cyclist identity and one's own personal identity. A series of six 2x2 MANOVAs were performed. There was one between subjects dichotomous factor, being cyclists and non-cyclists. There was one within subjects factor - the difference between the typical and personal identities – and an interaction effect was also examined, in how the two factors relate.

Die-hard

For die-hard cyclists a significant main effect was found for both the between subject factor and within subject factor. The interaction effect did not reach statistical significance. The means score in Table 12 show that non-cyclists are more likely to perceived the typical cyclists as a die-hard cyclist than cyclists. Looking at Table 13, it can be seen that the die-hard presented identity was given a higher score for the typical cyclist, than ones own cycle identity.

Table 12 Table of means, SD and t-test results for cyclists and non-cyclists between subjects main effects on the means scores of each of the presented types for both the typically seen cyclist and oneself

Type	Cyclists		Non-cyclists		F	df	Sig.
	Mean	SD	Mean	SD			
Die-Hard	2.39	1.28	2.86	1.37	6.20	1, 230	.000***
Enjoyment	4.53	1.44	4.06	1.50	6.24	1, 233	.01**
Functional	5.12	1.62	4.49	1.48	12.66	1, 232	.000***
Environmental	4.31	1.62	3.56	1.47	12.24	1, 233	.001**

Note: * p< 0.05, **p<.01, *** p<.001

Table 13 Table of means, SD and t-test results for cyclists and non-cyclists within subjects main effects

Types	Typical		Self		F	df	Sig.
	Mean	SD	Mean	SD			
Die-Hard	3.18	1.87	2.10	1.86	37.95	1, 230	.000***
Health	3.86	1.64	4.26	1.947	21.41	1, 232	.000***
Enjoyment	3.83	1.70	4.71	1.96	43.67	1, 233	.000***
Thrill-seeking	2.52	1.50	2.19	1.71	4.28	1, 231	.04*
Environmental	3.76	1.69	4.05	2.14	5.52	1, 233	.02*

Note: * p< 0.05, **p<.01, *** p<.001

Health

For health cyclists a significant interaction between typical-self and cyclist-non-cyclist was obtained (Figure 1 and Table 14). Further, a significant main within subjects effect but not main between subjects effect are not significant. A typical cyclist is rated higher (by both cyclists and non-cyclists) than as how people describe themselves. Figure 1 shows the interaction effects, that cyclists and non-cyclists are equally likely to think that the typical cyclist is a health cyclist. However, cyclists are significantly more likely than non-cyclists to say that they themselves are (or would be) health cyclists (Table 13).

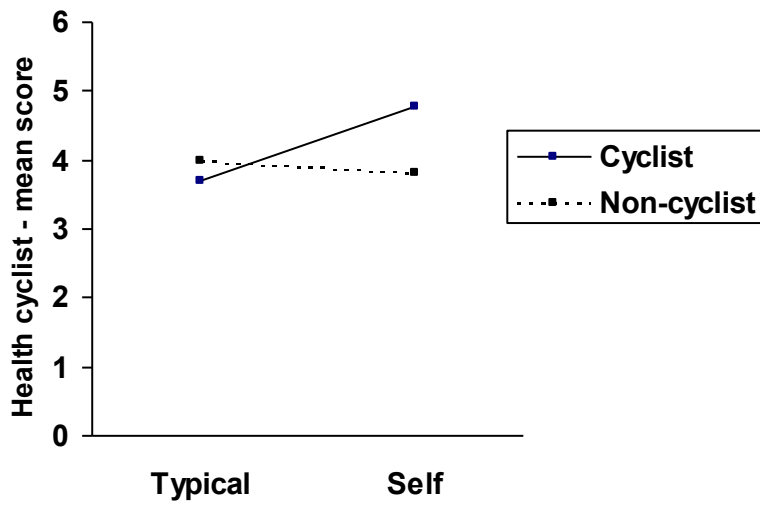


Figure 1 Interaction between cyclists and non-cyclists on typical and self health cyclist

Table 14 Means, standard deviations, and significant results of within subjects interaction effect

Types	Cyclists		Non-cyclists		Within Subjects Interaction Effects			
	Mean	SD	Mean	SD	df	M Sq	F	Sig.
Health								
Typical	3.70	1.70	4.00	1.64	1, 232	46.73	21.41	.000***
Self	4.77	1.90	3.81	1.87				
Enjoyment								
Typical	3.80	1.72	3.85	1.70	1, 233	32.38	14.20	.000***
Self	5.25	1.81	2.25	1.97				
Functional								
Typical	4.90	1.90	4.88	1.66	1, 232	56.30	24.34	.000***
Self	5.36	1.98	3.95	1.93				
Environ								
Typical	3.84	1.78	3.69	1.60	1, 233	34.31	14.25	.000***
Self	4.72	2.13	3.38	1.99				

Note: *** p< 0.001 level

Enjoyment

For enjoyment cyclists a significant main effect was found for both the between subject factor and the within subject factor. Cyclists rated the enjoyment cyclist as the typical cyclist and themselves, higher than non-cyclists (Table 12). Further, people were more likely to describe themselves as an enjoyment cyclist than they would the typical cyclist (Table 13). A significant interaction between typical-self and cyclist-non-cyclist was obtained (Figure 2 and Table 14). Figure 2 shows that cyclists and non-cyclists are equally likely to think that the typical cyclist is an enjoyment cyclist. However, cyclists are significantly more likely than non-cyclists to say that they themselves are (or would be) enjoyment cyclists.

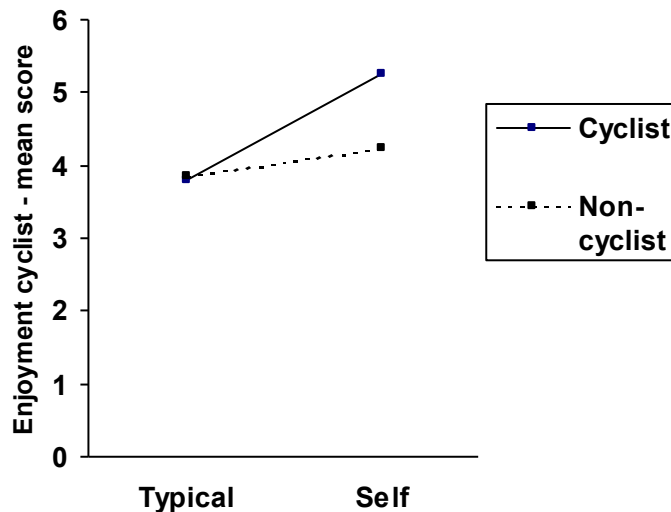


Figure 2 Interaction between cyclists and non-cyclists on typical and self enjoyment cyclist

Thrill seeking

For thrill-seeking cyclists a significant within main effect was found. Table 13 shows that the typical cyclist received a significantly higher thrill seeking score than the self. There were no significant between main effects or an interaction effect.

Functional

For functional cyclists, there was no significant main effect. Though there were significant between subject effects (Table 12), and a significant interaction effect.

Figure 3 and Table 14 shows that cyclists and non-cyclists are equally likely to think that the typical cyclist is a functional cyclist. However, cyclists are significantly more likely than non-cyclists to say that they themselves are (or would be) functional cyclists.

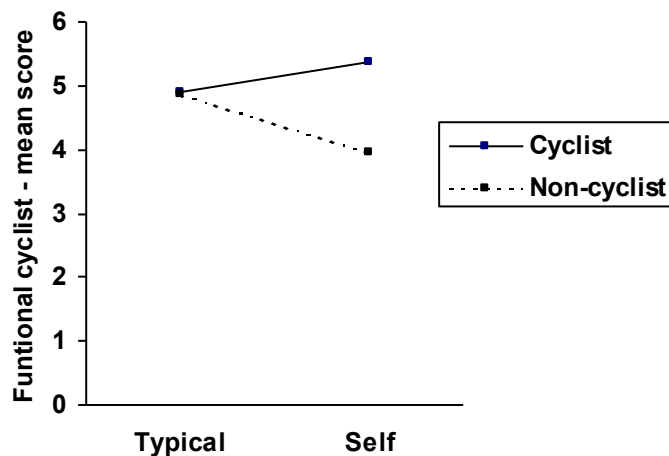


Figure 3 Interaction between cyclists and non-cyclists on typical and self functional cyclist

Environmental

For environmental cyclists a significant interaction effect was found (Figure 4 and Table 14) in that cyclists are more equally likely to view the typical cyclist as an environmental cyclist, but non-cyclists do not see themselves as an environmental cyclist. Further, a significant main effect was found for both between, and the between subject factor. Cyclists gave higher scores for the environmental cyclist as a whole, than non-cyclists (Table 12). Also both cyclists and non-cyclists described themselves more as an environmental cyclist than the typical cyclist (Table 13).

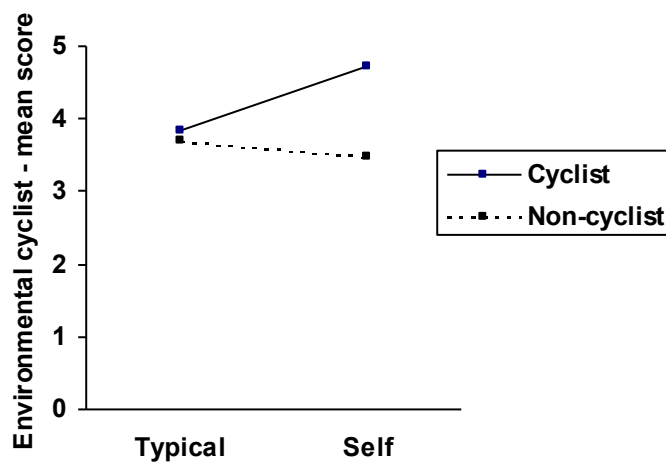


Figure 4 Interaction between cyclists and non cyclists on typical and self environmental cyclist

3.4 TPB, Personal Norm and Identity

A series of hierarchical regressions analyses predicting intention was conducted to determine if self-identity, general and in its varying forms, as a cyclist emerged as a significant predictor after control of the components of the TPB and personal norm.

3.4.1 General cyclist self-identity

As shown in Table 15, there is great support for the TPB. The association between the independent variables (TPB and personal norm variables) without the inclusion of self-identity, and the dependent variable (intentions) was strong ($R = .80$), accounting for 64% of the variation in cycling intentions. With closer inspection of the Beta weightings, it shows that the attitude variable is the most strongly related to intentions (Beta = .45). Partial correlations indicate that the percentage of variance in intentions that are uniquely explained by attitudes is almost 36%. The results of the model before identity can be found in step 1 of Table 15.

Table 15 Hierarchical regression using the TPB, personal norm and the additional variable of general identity as a cyclist

Step/Predictor	Adjusted		R ²	F	df	Beta
	R	R ²	ch.			
1. Attitude	.80	.64	.64	106.43	4, 237	.45***
Subjective norm						.15***
PBC						.27***
Personal norm						.18**
2. Attitude	.85	.72	.08	125.41	5, 236	.25***
Subjective norm						.14**
PBC						.19***
Personal norm						.10*
General Self-Identity						.42***

Note: * p<0.05, **p<.01, *** p<.001

Entering identity into the equation adds a further 8.4% of the variance in cycling intentions. Table 15 shows that all variables make a statistically significant contribution to the final model. Identity now becomes the strongest predictor (Beta = .42) of cycling intentions, with attitudes being reduced to the second best (Beta = .25). The variance uniquely explained by identity is 29%, attitudes adjusted to 17.8%. The more people said they identified as a cyclist in general, the more they are likely to say they intend to cycle in the future.

3.4.2 Identity similarity 1: General Cyclist Self- Identity

Another hierarchical regression was carried out to see if identification to the typical cyclist (identity similarity 1) would increase cycling intentions, over and above the TPB and personal norm measures. Table 16 shows that the TPB and personal norm measures are a significant predictor of cycling intentions. Entering identity similarity 1 (general identity similarity) adds a further 0.2% to the variance of intentions, which is not a statically significant addition to the model.

Table 16 Hierarchical regression using the TPB, personal norm and the additional variable of general identity-similarity (IS1) as a cyclist

Step/Predictor	R	Adjusted R ²	R ² ch.	F	df	Beta
1. Attitude	.80	.63	.64	106.43	4, 237	.45***
Subjective norm						.15**
PBC						.27***
Personal norm						.18***
2. Attitude	.85	.63	.002	85.38	5, 236	.46***
Subjective norm						.14**
PBC						.28***
Personal norm						.18***
General Identity Similarity						.04

Note: * p< 0.05, **p<.01, *** p<.001

3.4.3 Factorised Personal Identities, TPB and personal norms

A third hierarchical regression analysis was conducted using the four factorised personal identities that emerged as a result of the factor analysis on self behaviour and motivation items. This was to see whether the more specific identities emerge as a significant predictor to cycling intentions. From looking at Table 17, it appears that the TPB and personal norm variables provide a significant model in predicting intentions to cycle. The addition of the factorised personal identities only adds 0.3% to intentions to cycle, with no additional variables significantly adding to the predictive power of the model.

Table 17 Hierarchical regression using the TPB, personal norm and the factorised personal identities

Step/Predictor	R	Adjusted R ²	R ² ch.	F	df	Beta
1. Attitude	.80	.63	.63	100.54	4, 234	.44***
Subjective norm						.16***
PBC						.28***
Personal norm						.18***
2. Attitude	.80	.62	.003	57.39	7, 231	.45***
Subjective norm						.17***
PBC						.27***
Personal norm						.19***
Commuter						.00
Hippy-go-lucky						-.06
Mountain biker						.03

Note: * p< 0.05, **p<.01, *** p<.001

3.4.4 Presented Identities, TPB and personal norms

A hierarchical regression analysis was conducted on the presented personal identities in addition to the TPB and personal norm variables. The TPB and personal norm variables were shown to provide a significant model in the predictions of cycling intentions.

Table 18 shows that the addition of the presented personal identities adds 1.2%. The model as a whole is significant. However, the only presented personal identity with a significant influence in the additional model is the environmental cyclist. The direction of the relationship suggests that for every unit of increase in someone responding positively to identifying as an environmental cyclist, intentions to cycle is likely to go *down* by .16. This does seem to be an interesting finding, as one would assume that a higher identification, with any category of cyclist, would lead to an increase in behavioural intention with cycling in general. This result could be interpreted as someone who scores higher on describing themselves as an environmental cyclist, is inadvertently describing themselves as an environmental travel mode user, and would therefore walk in addition to cycle.

Table 18 Hierarchical regression using the TPB, personal norm and the presented personal identities

Step/Predictor	R	Adjusted R²	R² ch.	F	df	Beta
1. Attitude	.80	.64	.64	105.19	4, 235	.44***
Subjective norm						.14**
PBC						.28***
Personal norm						.18***
2. Attitude	.81	.64	.01	1.33	10, 229	.43***
Subjective norm						.12***
PBC						.24***
Personal norm						.26***
Die hard						.05
Health						.00
Enjoyment						.04
Thrill seeking						.03
Functional						.03
Environmental						-.16*

Note: * p< 0.05, **p<.01, *** p<.001

3.4.5 Identity similarity 2: Identity similarity types, TPB and personal norm

The final assessment of identity and TPB and personal norm used the three measures of various identity similarities. These were put into a hierarchical regression analysis to see if they played a role in the prediction of intentions to cycle, along with the TPB and personal norm variables. As Table 19 shows, after the TPB and personal norm variables were controlled for, the model is significant. The addition of the three identities adds 1.7% to the predictive power of the model. Only one of the identities made a significant contribution to the model, being the responsible road user. In other words, if people are more likely to identify as a responsible cyclist, they are more likely to intend to say they intend to cycle in the future.

Table 19 Hierarchical regression using the TPB, personal norm and identity similarity types

Step/Predictor	R	Adjusted R²	R² ch.	F	df	Beta
1. Attitude	.80	.64	.64	106.43	4, 237	.45***
Subjective norm						.15**
PBC						.27***
Personal norm						.18***
2. Attitude	.81	.66	.02	64.63	7, 234	.43***
Subjective norm						.15**
PBC						.25***
Personal norm						.15**
Responsible						.11**
Commuter						-.05
Fun/Healthy						-.07

Note: * p< 0.05, **p<.01, *** p<.001

4 Discussion

The present paper has sought to investigate cyclists and non-cyclists' stereotypes of cyclists. The concept of the cyclist stereotype, or more specifically, the perception(s) of the typically seen cyclist were examined. It was found that perceptions of cyclists by cyclists and non-cyclists differed. In addition to this, the research used different measures to explore the concept of identity in relation to cycling. Two general cyclist identity measures were used: one measuring cyclist self-identity and the other measuring identity similarity to the typical cyclist. Moreover, different cyclists personal identities were found, and the extent to which cyclists and non-cyclists identified to each of these were examined. Finally, the role that self-identity (both general, specific and identity similarity) plays in the theory of planned behaviour was investigated.

Cyclist types: typical cyclists and self identity

In the current study, respondents made judgements on the behavioural and motivational features of a typical cyclist, and themselves as a cyclist. The responses were reduced into meaningful typologies of typical and personal identities. When focussing on the typical cyclist, both the pre-questionnaire interviews and the quantitative questionnaires demonstrate that people make clear judgements about the typical cyclist they see. Also background and personality features associated with the cyclist could be drawn. These types are not the same types as previous research has found (e.g. Davies et al, 1997; Jensen, 1999; Davies et al 2001.). Four different perceptions of the typical cyclists emerged in the present study: those who are responsible on the road, those who invest money and time into the activity, those who just like the fun of it and those do it because they have no other travel mode choices available. Jensen's (1999) three types of cyclists were those of the heart, convenience and economics. They do resemble some similarities to the fun and necessity type that was found in this present study. For Jensen, these types are based on motivational aspects of cycling. Interestingly in this study the responsible road user and the die-hard cyclist seem to be viewed on *behavioural* features. Whereas the fun and necessity cyclists, are clearly cyclists judged on the perception of what *motivates* the cyclist. This suggests that people make judgements about the typical cyclist that they see based on behavioural and motivational evaluations.

When people were asked to describe themselves as a cyclist, different types of cyclists based behaviour and motivation features also. These are people who cycle because they have to, enjoy the fun and green aspects of cycling, people who cycle responsibly on the road, and finally people who cycle for the thrill in the mountains. Again, similarities to Jensen's (1999) work include the necessity cyclist which are those who cycle because they have no other choice. The hippy-go-lucky and the mountain biker type could be interpreted as people who cycle because they enjoy it, which then again mirror Jensen's of the heart cyclist. The measure examining the similarity between the typically seen cyclist and the self-cyclist, show three types of cyclist again. These were those who ride on the road and are responsible, those who cycle because they have to, and those who cycle for the sheer fun of it. Again, the necessity and passion motives are prominent here.

Similarities between how people perceive the typical cyclist and how people describe themselves can be seen from the present findings. It ultimately appears that cyclists are driven by the love of it or the fact they have no other choice because it is easier or cheaper (Jensen, 1999). All methods employed consistently show that responsible cyclists are perceived, suggesting that there are responsible cyclists on the roads and people notice them. Previous research by Basford, Reid, Lester, Thomson and Tolmie (2002) found that car drivers saw cyclists to be irresponsible and erratic. The present finding seems to contradict this.

This also goes against the findings of Sadalla and Krull (1995). They suggest that the stereotypical image of environmentally friendly behaviours is a negative one. The various cyclist images presented here are not necessarily positive or negative views of cyclists – they are simply views of how people see the typical cyclist in their daily travels. Perceived personal and background characteristics are varied depending on the 'type' of cyclist presented. Suggestions for research regarding each type include perceptions of socio-economic status, demographics, fashion-sense and questions concerning other environmental behaviours. Furthermore, the findings of the present study could also be furthered by, in future, exploring the perceptions of other travel mode users, or other environmentally friendly behaviours.

Cyclists and non-cyclists views of the typical and self cyclist

One of the focuses of the research has been to investigate the relationship between how people perceive the typical cyclist how they perceive themselves, from both cyclists and non-cyclists. Comparing the perceptions of the various typical cyclists, between cyclists and non-cyclists bring interesting results. With regards to the personal identities of the typical cyclist, which emerged from a series of behaviour and motivational statements, two of the four had significant differences. These were the responsible road user and the die-hard cyclist.

It was found that cyclists and are more likely to think that the typical cyclists is a responsible road user than non-cyclists. On the other hand, non-cyclists are more likely to think that the typical cyclist is a die-hard cyclist. Such differences in perceptions between cyclists and non-cyclists were not found for the fun cyclist and the commuter cyclist. The fact that cyclists are more likely to perceive the typical cyclists in positive terms (e.g. law abiding) can be explained the context of the social identity theory (Tajfel and Turner, 1986). The theory states that individuals view members of their own group (the ingroup) more positively than members of different groups (the outgroup). This would explain why cyclists have a more positive view of the typical cyclist (a member of the ingroup) than non-cyclists. Perhaps the reason why the 'responsible cyclist' always emerged is because both cyclists and non-cyclists were included in this study. Previous research, only asking drivers' perceptions of cyclists, has found that drivers tend to have a negative view regarding cyclists these views could then lead to cyclists being treated unfairly on the roads by non-cyclist car drivers (Basford et al, 2003).

The difference in perceptions of the die-hard cyclist, in that cyclists are more likely to perceive these people are the typical cyclists than non-cyclists, could be explained by exposure to cyclists. For instance, people who do not cycle frequently may notice the apparent 'die-hard' cyclist more (e.g. with the Lycra, and the expensive cycle equipment), than those who do cycle. Perhaps the concept of the availability heuristic (Kahneman and Tversky, 1973) could be used to explain the why non-cyclists refer 'die-hard' image as being the typically seen cyclist, as opposed to the other types of cyclist. For instance, the image a die-hard cyclist brings to one's mind is perhaps stronger than the image of, say, and enjoyment or functional cyclist. So if someone is a

cyclist, their view is modified to realise that cyclists are just ordinary people, wearing ordinary clothes, being responsible on the roads.

When participants responded to the six types of cyclists that emerged from the qualitative interviews, the 'die-hard' type again was view as the more typically seen cyclist than by non- cyclists than cyclists. Whereas cyclists were more likely to see the 'enjoyment', functional' and 'environmental' types as being the typically seen cyclist.

With focus on one's own cycling identities, cyclists were more likely than non-cyclists to see themselves as health, enjoyment, and environmental cyclists. Whereas non-cyclists were just as likely to see themselves as functional cyclists, as cyclists perceived themselves.

Both cyclists and non-cyclists were happy to describe themselves as functional cyclists. Research has also been carried out into employers' roles in implementing cycle initiatives to increase cycling as the daily commute (e.g. Dickson, Kingham, Copsy and Hougie, 2003). This needs to continue and further encouragement by employers and policy makers needs to continue.

More insight into how individuals describe themselves as a cyclist, or how they would be as cyclists, could make it easier to target non-cyclists directly, explaining what they can get from cycling. For example, in this study non-cyclists (if they were to cycle) would see themselves as functional cyclists. Cyclists tended to rate themselves as enjoyment cyclists, which supports previous findings of cyclists saying that cycling is enjoyable in itself (e.g. Davies et al, 2001). Non-cyclists, on the other hand, do not appear to believe that they may cycle for enjoyment only.

The TPB, personal norm and identity

The TPB model, accompanied with the personal norm variable, explains a substantial proportion of variance in intentions to cycle. The most important predictor of intentions is attitudes, and the weakest is personal norm. Previous research (e.g. Hunecke, Blobaum, Matthies and Hoeger, 2001) has shown that personal norm and external costs influence travel mode choice. They also found that the influence of subjective norm is lower than personal norm, with personal norm explaining more of

the variance in behaviour. The current results, however, show that subjective norm performs better than personal norm. Bamberg and Schmidt (2003) found that personal norm is the lowest predictor in car use among students, which the current results support - all of the TPB variables here performed better than personal norm.

When identity is added to the equation, this then becomes the most important predictor of cycling intentions, with the influence of attitudes being reduced considerably. Perceived behavioural control also influences behavioural intentions a great deal. Examination of the qualitative comments show that lack of adequate cycle facilities were often referred to as a deterrent for not cycling by non-cyclists. This is something that has been stated in the past (e.g. McClintock and Clearly, 1996).

After control of the components of the TPB and personal norm, self-identity emerged as an independent predictor of intention. This means that participants who regarded cycling as an important component of their self-identity were more inclined to cycle than those who did not. This finding is consistent with previous research on the TPB being extended to include self-identity (e.g. Biddle et al 1987; Charng et al, 1988; Sparks and Shepherd, 1992; Pronk, 1999; Terry et al, 1999). This research therefore supports the view that it is important to incorporate self-identity in the TPB (see Eagly and Chaiken, 1991). Identities have scarcely been studied in transport research (see Davies et al, 1997 and Jensen, 1999 for exceptions), but the current findings suggest that it is useful to take into consideration when assessing behaviour.

In previous research, identity has been shown to increase the percentage of behavioural intention from 1% (Conner and Armitage, 1998) to 2% (Terry et al, 1999). This study increases the variance of intentions by 8%. Why such a high increase in this study in comparison to previous studies needs to be asked, as it is an interesting finding. Perhaps it is the nature of the behaviour in question. Terry et al's (1999) study looked at recycling. Perhaps cycling is a more complex behaviour than recycling. The uptake of cycling, as part of one's self-identity and maintaining it as such perhaps requires more cognitive and physical effort than recycling does. Therefore, the influence self-identity in a person's decision to *cycle* is stronger than to *recycle*. It would, however, be fruitful to measure actual cycling behaviour in addition to cycling intentions. This current study only looked at behavioural intentions.

The results, on the whole, did not confirm more specific identities were important in influencing behavioural intentions to cycle. When specific identities are measured relationship was between identity and intentions is much weaker. This may be because cycling is such a multi-purpose and multi-functional activity, people will cycle because of varying reasons. Measuring more specific identities may, therefore, be hard to quantify and influence intentions because it could be that not one specific identity is more prominent than another. Whereas general cyclist self-identity is an amalgamation of the more specific personal identities, and when measured as a whole their influence is more visible. The only type of personal identity to add slightly to the TPB and personal norm model was the 'environmental cyclist'. If someone identified more as this kind would be less likely to intend to cycle. This is very interesting.

Mannetti, Pierro and Livi's (2004) measure of general identity similarity, which measured the similarity between personal identity and identity of the typical cyclist, was explored in the TPB and personal norm framework. The data of the current study did not support the use of this to cycling research. When the data was reduced to focus on the different identity similarity types of cyclists, one of the three types – 'responsible cyclist' – was an important addition to the TPB and personal norm variables. This suggests that the more someone identifies as being similar to the typically seen responsible cyclist, the more they are likely to cycle. However, as already stated, how similar someone views herself or himself to be to the typical cyclist does influence whether they cycle or not. This is something different from Mannetti et al's findings, in which they found identity similarity adds a further 6% to the variance of intentions to recycle – this current study found the measure added .02% to the variance of cycling intentions. One suggestion in the disparity of both findings is perhaps the method employed by Mannetti and colleagues is more suited to a single function activity, such as recycling, rather than a multi-functional activity, such as cycling. This may make the measure inapplicable to study cyclist identity similarity. Perhaps creating a more obvious measure would be more appropriate to cycling research, as to tune into the various possible types. One suggestion is to measure the level of identity similarity to a specific behaviour would be to have an item directly measuring similarity e.g. 'This person is similar – not similar to me'. This may not be a subtle measure as preferred by Mannetti and colleagues, but it may establish a more robust measure of identity similarity.

What can be done to increase cycling now that we know that self-identity is the most important thing that influences whether somebody cycles or not? Future policies may need to take this into account to make them more effective in increasing cycle use. Previous policies have been more aimed towards reducing car use, but it may be more fruitful to design policies that increase cycle use, which are also directed at the non-instrumental motives. Employing a more affective approach in policy making is something that has been suggested in relation to car use by Steg (2005). Self-identity is not an affective motives per se, but it is more non-instrumental and than utilitarian. Offering a broader range of persuasion campaigns, which for some (e.g. Mannetti et al, 2004) should contain a stronger connection between pro-environmental behaviour and positively evaluated typical identities, is a worthy course of action to take for those wishing to encourage cycle use. Consumer marketers have already exploited the link between enhancing self-image and buying a product. This method needs also to be applied to sustainable modes of transport, leading to a shift from the car-culture, to a bicycle-culture, presenting it as a 'cool' thing to do. The current study has shown that cycling and being a cyclist does not necessary have negative stereotypes. Such as the broad types (typical and self) of cyclists, the images can be sold to both cyclists – to increase cycling trips, by possibly re-affirming someone's self-identity; and non-cyclists by presenting an image which is appealing. If riding a bicycle is advertised in a similar way in mainstream media, people who do not cycle may be a) more exposed to the idea of cycling, b) more likely to take it up and c) be proud to make it part of their self-identity, leading to a sustained behaviour change.

In sum, the application of psychology theory has proven valuable in understanding why people cycle, and just as importantly, why people do not. The research has given an insight into how people perceive cyclists, how cyclists perceive themselves and how the perceptions are similar. The identity needs fulfilled by cycling should be further examined, to aid initiatives to persuade more people to cycle.

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