



Why are cyclists the happiest commuters? Health, pleasure and the e-bike

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ABSTRACT

Introduction: This paper explores the reasons why cyclists are the happiest commuters. Cyclists are consistently shown to have the highest levels of satisfaction with the trip to work, yet the reasons for this contentment remain understudied. Exercise science points to the critical role that pleasure plays in motivating people to engage in and sustain physical activity, and we argue that efforts to 'bring back the bike' will rely as much on a keen appreciation of its pleasures as its perils.

Methods: We explore the emergent science of cyclist mode satisfaction: calling upon ethnographic research, transport psychology, exercise science, and in-depth interviews with 24 e-cyclists in Auckland, New Zealand.

Results: We conclude that research points to four important components of high commute satisfaction amongst cyclists: 1) A high degree of commuting control and 'arrival-time reliability'; 2) Enjoyable levels of sensory stimulation; 3) The 'feel better' effects of moderate intensity exercise; and 4) Greater opportunities for social interaction.

Conclusion: We conclude that cycling planning and promotion should move beyond merely focusing on safety to explore how cycling infrastructure can protect and enhance the physical, social and psychological pleasures of cycling. Specific recommendations include designing cycling environments in ways that support sociable riding and relaxed engagement with natural landscapes and urban design features.

1. Introduction

Cyclists are time and again found to be the most satisfied commuters (Avila-Palencia et al., 2017; Gatersleben and Uzzell, 2007; Martin et al., 2014; Paige Willis et al., 2013; Singleton, 2018; Smith, 2017; St-Louis et al., 2014). And it is not the case that the happy are merely more likely to cycle. Switching from a car or public transport to a bike for your commute appears to provide a noticeable boost to most people's psychological wellbeing (Martin et al., 2014; Schneider and Willman, 2019). Yet there has been minimal exploration of the reasons for these elevated levels of travel satisfaction (de Kruijf et al., 2018). While explorations of the reasons why people choose to drive are common, the experiences of active transport users have received much less attention (Brown, 2017; LaJeunesse and Rodríguez, 2012). We attempt to address this gap by bringing together existing research on cycling experience with qualitative interviews with e-cyclists in Auckland, New Zealand, in order to investigate the reasons why cyclists are the happiest commuters.

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2. The marginalisation of active transport pleasures

Transport planning remains dominated by models of transport ‘efficiency’, that traditionally treat travel in negative terms as “dead time” that people seek to minimize (Hannam et al., 2006, p. 12; Jain and Lyons, 2008). In the last decade we have witnessed the emergence of interest in transport pleasure within the work of the transport researchers utilizing psychological theories of travel satisfaction, affect, subjective well-being and life satisfaction to examine transport experience (Anable and Gatersleben, 2005; Ettema et al., 2010; Friman et al., 2017). However, this work is still described as ‘in its infancy’ (Morris and Guerra, 2015, p. 28), and its reliance on quantitative survey research has resulted in greater attention to the experience of motorists and public transport users, due to regular difficulties securing sufficient sample sizes for the active modes in general, and cyclists in particular (Legrain et al., 2015; Morris and Guerra, 2015). Even where clear evidence of higher travel satisfaction or enhanced mood amongst cyclists is shown, these researchers acknowledge lack of understanding around why this might be occurring. In their recent review of the state of travel satisfaction research De Vos and Witlox (2017) identify the lack of qualitative research on the experiences of active transport users in particular as a key reason for this paucity of knowledge around why cyclists have higher travel satisfaction.

Yet cycling researchers point out that the enduring focus on efficiency within transport planning continues to make it difficult to secure support for qualitative research on active transport pleasures. Cycling researchers, argues Rachel Aldred, have been encouraged to “rebrand” cycling as “a serious mode of transport, necessary, efficient and rational rather than discretionary, fun and frivolous.” (Aldred, 2015:691). Health researchers have also tended to neglect cycling enjoyment. The vulnerability of cyclists to injury, abuse and marginalisation often dominates the cycling research agenda.

We acknowledge the critical importance of reducing the disproportionate levels of traffic stress (Aldred, 2016), injury and death (Twisk et al., 2017) experienced by cyclists, and note also that the health gains from active transport, which in almost all populations are much greater than the injury risks, are unevenly distributed across sub-groups. For instance, among young adults who already have high levels of physical activity the additional disease-prevention benefits from cycling may be less than the acute risks of injury (Woodcock et al., 2014). However greater attention to and promotion of cycling pleasures is likely to play a key role in changing the way that cycling is framed, and in rebalancing levels of ‘perceived risk’ in line with actual cycling risk (Götschi et al., 2016). We argue that research on cycling experience, including our own research with e-cyclists, provides important insights into the reasons for high mode satisfaction amongst commuter cyclists.

3. The Electric City project: exploring cycling experience

3.1. Introduction

In this paper, we explore the emerging science of cyclist mode satisfaction, using the narratives of 24 e-cyclists who participated in qualitative interviews for the Electric City research project at the University of Auckland. The Electric City project explored the experiences of cyclists who use an electric bicycle for commuting or everyday travel in Auckland, New Zealand.

3.2. E-biking as cycling experience

In a New Zealand context an electric bicycle, or ‘pedelec’ is defined as a bicycle that has an auxiliary electric motor, but is still designed to be ‘primarily propelled by the muscular energy of the rider’ (NZ Transport Agency, 2013). In this paper we explore the experience of using an electric two-wheeled cycle, however the term e-bike can also include electric-assist tricycles or hand-cycles. In most ways the experience of using an e-bike is similar to the experience of using a traditional pushbike. Or it would be more accurate to say that in general e-biking provides a new combination of existing elements of cycling experienced by different groups of pushbike riders.

Like road or sports cyclists, e-bikers tend to travel at slightly higher average speeds than other cyclists (Langford et al., 2015; Schepers et al., 2014). E-bikes (like sports bikes) also tend to be relatively expensive. In other ways e-bikers are more similar to traditional slower cyclists: they are more likely to ride European-style upright, step-thru bikes; are more likely to be new to cycling; more likely to be women; and more likely to favour low-moderate exercise intensity (Intelligent Energy Europe, 2010). Some aspects of e-biking experience differ: in particular the bikes tend to be heavier (avg 25–27 kg), which presents particular safety challenges and opportunities. The experience of effortless acceleration, the so called ‘zoom’ effect when starting off on an e-bike is akin to the experience of other motorized transport users.

3.3. Methods

Electric City was an exploratory research project designed to increase understanding of aspects of travel experience about which there is little existing knowledge, so we used open-ended, semi-structured qualitative interviews (Clifton and Handy, 2003). A ‘dialogical’, participatory interview approach was used. A participatory interviewing approach utilizes techniques designed to empower interviewees to take a more equal role in setting the research agenda: emphasizing interviewer communication skills over large numbers of structured questions, leaving plenty of time for participants to share what they consider to be important to them, and including regular prompts for interviewees to have input into the priorities for the interview (Fontana and Frey, 2003; Salmon, 2007). The participants were asked to reflect on the best and worst things about using an e-bike, as well as prompted to share details about how, why and where they use their bike, accidents and near misses, impacts on fitness, and their ideas about how to support and

promote e-bike use. The interviews were approximately one hour long, and took place between March and July 2017. Thematic analysis of interview data was completed using a mix of inductive and deductive coding based on the initial literature review. The interviews were analysed using NVivo 11.

The participants were recruited through local bike shops and online cyclist social media networks. The study was approved by the University of Auckland Human Participants Ethics Committee. All the cyclists in this study were using their bike in Auckland, one of New Zealand's typically hilly, spread out cities. The participants were using their bike in a range of conditions, including a mix of on-road riding and separated cycleways. All of the participants were required to mix with car traffic for some of their trip. All but two of the participants were using their bike to commute to work (two were retired); however, the majority also used their bike for other types of everyday travel, particularly leisure and shopping. Of the 24 e-cyclists, thirteen were women, and eleven were men. Twenty of the participants identified as NZ European/Pakeha, one person also identified as Samoan, one as Indian, and four as other European. The biggest age category was 35–44 years.

4. Findings: why does cycling boost travel satisfaction?

4.1. Introduction

In their paper, *Uniquely satisfied: Exploring cyclist satisfaction*, Paige Willis et al. (2013) point out that different transport modes have quite different effects on our nervous systems. Driving, particularly in congested conditions, is highly stimulating, but motorists tend to experience a degree of 'overarousal' that they commonly experience as 'stressful'. Cyclists on the other hand are the most likely to experience their commute as 'pleasant' and 'exciting'. Public transport users experience a degree of 'underarousal' that leads them to more frequently describe their commute as 'boring'; while those on foot are most likely to report that they find their commute 'relaxing' (Gatersleben & Uzzell, 2007).

Based on a synthesis of existing research and our interview data, we argue that there are four reasons why cyclists are most likely to characterise their commute as 'pleasant' or 'exciting':

- A high degree of commuting control and 'arrival-time reliability';
- Enjoyable levels of sensory stimulation;
- The 'feel better' effects of moderate intensity exercise; and
- Greater opportunities for social interaction.

4.2. Commuting control and arrival-time reliability

Cyclists commonly report enjoying the sense of freedom and independence associated with using a flexible and relatively 'undisciplined' transport technology (Aldred, 2010; Jones, 2012). Cycling offers opportunities for creativity and 'polite deviance' in the ways that people use streetscapes (Jones, 2005, 2012). Cyclists report enjoying the challenge of maintaining the 'ideal conditions' of continuous movement, playfully "carv (ing) a route out of both pedestrian and vehicle spaces" in pursuit of this goal (Spinney, 2011). The fact that cycling is a nimble form of transport means cyclists can maximise opportunities to maintain free-flow conditions, and achieve high levels of 'arrival-time reliability' as well as a heightened sense of personal 'self-efficacy'. This is what transport psychologists call perceived "commuting competence" (LaJeunesse and Rodríguez, 2012).

Cyclists in our Electric City research project reported that heightened commuting control, and high arrival-time reliability in particular, is one of the key reasons why they use an e-bike. This reliability was particularly valued by people who have tight time budgets due to multiple responsibilities (e.g. care and work responsibilities):

"At the moment the North-Western motorway is such a dog that I can get more reliably home on the bike than I can in a car. The car varies between 45 minutes and 2 hours depending on what's happening with traffic, whereas a bike I know it'll be an hour. I will be home in an hour." (E-cyclist 9)

"So the bike is not always quicker, it is often quicker but not always. But I justify it in that it is always exactly the same. You are plus or minus five minutes. So I can do it in 40 minutes or 45 minutes. ... You could leave for work [in a car] and sometimes it is 15 minutes and sometimes it is 45 minutes, and if you are going to pick the kids up you can't be plus or minus an hour." (E-cyclist 5)

Consistent with research showing that commuting by car in congested conditions has a negative effect on mental health, the participants commonly cited one of the pleasures of biking as a sense of relief from, as well as a sense of pride in having found an alternative to, the stresses of car commuting:

"It is much more pleasant as an experience. ... [D]riving a car in Auckland is a desperately stressful experience, even when it goes well and when it goes badly it is really dreadful." (E-cyclist 7)

"I think if you've ever heard of a woman going mental on the North-Western, it would've been me. Cos, there's serious road rage. ... So, now I don't have any road rage." (E-cyclist 19)

E-cyclists who had previously used a pushbike report that one of the reasons they like their e-bike is that it 'smoothes out' variations in their daily commuting conditions, such as wind or tiredness, that affect their arrival-time reliability. Thus it appears that

e-bikes may enable cyclists to achieve even higher levels of perceived 'commuting control', one of the key contributors to high mode satisfaction amongst those who travel by bike.

4.3. Sensory activation and time outdoors

Amongst commuters, cyclists come to inhabit a unique sensory profile, characterized by high levels of 'multi-sensory' activation, arising simultaneously from both inside and outside the body: combining internal sensations of muscular effort with sensory input from the landscape. Cycling ethnographies document the "intensely sensual" nature of cycling: the ways that cyclists talk about "seeing, smelling, feeling, hearing and adapting devices, bodies and bikes in response to a changing environment" (Jungnickel and Aldred, 2014, p. 245). Different types of urban cycling tend to facilitate different types of sensory engagement: with slower commuter cycling, typically on bikes that facilitate more upright posture tending to promote greater enjoyment of visual stimuli, while road cycling is characterized by "a kinaesthetic world of greater speed, exhilaration and reduced visibility." (Spinney, 2007, p. 35). Given the variety of conditions most cyclists experience within a journey, however, it is likely that they inhabit a mix of these so-called "sensespaces" (Spinney, 2007).

Of course, if road conditions are too dangerous or taxing, then cyclists start to suffer from a degree of 'sensory overload' that makes it difficult for them to engage with their surroundings. Nick Moore (2017, p. 66) describes how the experience of riding in heavy traffic requires a "minutely focused state" that "shrink(s)" the cyclist's world down to a "space just a few inches wide and a million miles long, outside which nothing exists". All the same, cyclists commonly report enjoying the way that cycle commuting makes their "sensory hairs stand on end" (Spinney, 2007). Mental health researchers point out that the combination of exercise-induced alertness with high levels of sensory input from the environment also tends to reduce 'rumination'. Rumination, or the tendency for us to obsessively chew over thoughts, is a significant cause of poor mental health (Papageorgiou and Wells, 2004). Exercise-induced reduction in rumination combined with time spent outdoors means that cyclists experience high levels of "commuting attunement", a state of relaxed observation and appreciation of one's surroundings (LaJeunesse and Rodríguez, 2012).

The e-cyclists in our study made this point: spending time outdoors is an important part of cyclist mode satisfaction:

"[Y]eah general wellbeing of being out in the sun and in the wind, and you know that kind of thing psychologically probably, it does feel good yeah absolutely on a nice day, it feels good." (E-cyclist 15)

"I think it is good for you mentally to be out and whizzing around in the sunshine." (E-cyclist 6)

This emphasis on the value of time spent outdoors is consistent with findings from the 'green exercise' literature that shows improvements in mental health associated with exercise in natural settings (Pretty et al., 2005; Rogerson et al., 2016). The participants also talked about how much more they noticed their surroundings when they switched from a car to an e-bike:

"I realised that when you are on your bike, even though the road you went on is just there and you are cycling just here, and it is maybe just 5–20 m away from the road that you have driven on for years, actually you see things because you are on a bike and you are slower and you can stop and look to the side and not crash into someone. ... So I saw these things, just like trees and greenery and hills and little reserves and little picnic tables and then I see plaques, little historic plaques." (E-cyclist 23)

Time spent outdoors was perceived to result in a positive sense of loss of time:

"Yeah. It's weird cos I'm not really in the nature but I feel like I'm in nature. I'm going past a tree and I'm just like, oh so pretty. Yeah, and you go past the water and oh so pretty. So, I feel like it's nice. It's a pleasant journey, I suppose. Yeah. I keep saying to my friend it takes me 40 minutes but it feels like a 10 minute bike ride." (E-cyclist 18)

The journey was also positioned as important time on one's own when you can enjoy your thoughts:

"You're outside, nobody can bother you, you're just pedalling along thinking about stuff." (E-cyclist 9)

As another participant pointed out, the attention required to cycle means that it facilitates thinking without allowing for rumination:

"With cycling you have time to think, but not dwell, because you have to pay attention." (E-cyclist 16)

The ride as a break from busyness was another key theme amongst participants, most of whom were employed professionals:

What I like the most is that I actually get time out. I'm not very good at taking time and that 40 minutes riding there or riding home is just time to myself. As I said, I wasn't very good at taking time out so while I'm cycling it's not intense exercise but I'm getting fitness benefits but I'm also getting time where I'm not sitting around or rushing from one thing to the next. (E-cyclist 10)

4.4. The 'feel better' effects of exercise

There is no scientific consensus on why exercise has a 'feel better' effect, but we do know that moderate-intensity exercise is experienced as the most pleasurable by the majority of people, and is associated with stronger exercise motivation and more time spent exercising (Ekkekakis, 2003; Ekkekakis et al., 2011). Moderate exercise is also optimal for increasing mental alertness (Lambourne and Tomporowski, 2010) and improving mood (Ekkekakis, 2003; Paolucci et al., 2018). Daily opportunities for

'pleasant' levels of gentle exercise were positioned as a key part of cycling pleasure for the e-cyclists within our research:

"It is a healthy level of exercise. When my joints allowed me to run I used to enjoy running because it's meditative and there is that pleasant level of exercise. You can get that on a bike. Particularly an e-bike because the unpleasant levels of exercise involved in getting up a steep hill are removed." (E-cyclist 17)

In our research there was considerable variation in how much participants felt they were exerting themselves when they used their bikes. Research shows e-bike users typically experience lower levels of physical activity per km compared to traditional cyclists, but they also tend to travel further and to spend more time cycling (Fyhri and Fearnley, 2015; Langford et al., 2013). Thus e-bike use generally provides enough physical activity to meet moderate intensity exercise guidelines, even when users are employing the highest levels of electrical assistance (Gojanovic et al., 2011). By providing cyclists with the ability to achieve 'moderate-intensity' exercise levels, e-bikes not only provide cyclists with access to the 'feel better' effects of exercise, but importantly, they provide them with the opportunity to control their level of exertion to keep it within the moderate intensity range that is experienced as most pleasurable by most people.

4.5. Opportunities for social interaction

There are social gains associated with cycling, including greater levels of social interaction and neighbourhood satisfaction (Gatersleben et al., 2013; van den Berg et al., 2017). This is because slower speeds and the 'open air' nature of active transport use enables people to make more eye contact more frequently, and to gather more information about social situations, both of which tend to increase social trust and feelings of familiarity with and affection for neighbourhoods and other people (Gatersleben et al., 2013). British cycling sociologist Rachel Aldred (2015) points out that cyclists particularly value the way that their commute provides opportunities for 'flexible' social interaction that they could take or leave depending on their need for autonomy or interaction.

Like cyclists in other studies, social interaction was often positioned as one of the most valued things about cycle commuting:

"Yeah me and my friend we had a lovely ride last week, we just meandered along and talked, and all these different people were out there, someone was walking a dog and someone was jogging, and you just say hello." (E-cyclist 3)

In general fellow cyclists were portrayed as a fairly social group:

"Oh, I like chatting with the other bikers. My car's really old, it's got no radio. Silence. Fifty minutes of silence thinking in my own head, it's really not fun. I went past some guy yesterday and he had a high viz with "Dad" printed on the back. I was like "so cool". My fluorescent jacket is the pinkiest thing you've ever seen with a flashing light in it at the back. And, he says, "You think my high viz is cool?!" You just don't get that in the car. Yeah, so I think that's probably one of my favourite things. (E-cyclist 19)

One participant echoed Aldred's findings about the ways that cycling provides 'flexible' opportunities for socialising, compared to other transport modes:

"[I]n terms of commute I could either drive, take the train or cycle. Driving is horrendous, it makes me really anxious, no one is very friendly. The train is pretty good, you can read, but when people are, sometimes other people aren't having a good day and they're a bit in your face. ... And [with cycling] it's actually quite social if you want it to be, and I often chat to people at the lights because I'm chatty, but you don't have to if you don't want to, and you can also go fast or not go fast depending on how you're feeling, like it's quite adjustable." (E-cyclist 16)

5. Discussion

The experience of e-cyclists within this project touches on a number of themes arising out of previous research, including the mood-boosting combination of moderate exercise, time outdoors and positive absorption in surroundings provided by commuter cycling. These descriptions are consistent with LaJeunesse and Rodríguez (2012) findings that cyclists experience higher levels of 'commuting atunement', or a commuting experience that is both engaging and relaxing. This type of mental state is described elsewhere as an experience of 'flow' (Csikszentmihalyi, 1990), or focused, relaxed absorption. Other themes that emerged from the Electric City interviews included the ways that cycling is a 'place-making activity' (Larsen, 2014) that gives people opportunities to explore and create a greater sense of ownership of their neighbourhood and their city.

Participants discussed the ways that commuter cycling gives them greater control over their lives and their time, helping them to avoid the delays and unpredictability associated with congestion, and enabling them to meet their responsibilities at home and at work. Finally, consistent with Aldred's (2015) characterization of cycling as a travel mode that enables us to balance needs for social engagement and autonomy, the participants talked a lot about the social joys of cycling, and the possibilities for flexible social interaction that they could take or leave: contrasting this to the perceived 'loneliness' of car travel and the 'in your face' social demands of public transport.

It is important to note that these findings, based on the experiences of commuter e-cyclists, are largely consistent with previous research on commuter cycling enjoyment, that has primarily explored pushbiking experience. This supports our conclusion that in many ways e-biking largely represents a new mix of existing types of commuter cycling experience, rather than a wholly new type of cycling experience: being outdoors, avoiding congestion, social interaction, and exercise seem to be key pleasures identified by a diverse range of cyclists (e-bikers as well as a diverse range of pushbike users, slow and faster riders, etc.). We have also argued that

the evidence suggests that e-cycling, in particular, may further heighten, as well as ‘democratise’, specific components of cycling satisfaction: most markedly through further improving commuting control, and secondly through giving people greater control over cycling intensity, enabling them to keep exercise intensity within a ‘pleasurable’ zone.” These findings are also consistent with previous research on e-cycling experience (Johnson and Rose, 2015; Jones et al., 2016).

It is also interesting to reflect on the issue of how high mode satisfaction amongst cyclists often coexists with inhospitable traffic conditions that result in regular experiences of near misses and traffic stress. The research shows that cyclists are the happiest commuters across a range of countries and contexts, so we must assume from this that high satisfaction occurs in spite of these discomforts, or amongst those who have a higher tolerance for them. It seems likely that there is a survivor effect here, i.e. those for whom the discomforts outweigh the benefits do not continue to cycle. This issue is not explored in the transport satisfaction literature cited, and the issue of cycling ‘resilience’ or how commuter cyclists find ways to successfully negotiate stressful and ‘unsupportive’ traffic environments is identified as a priority for future research (Caldwell and Boyer, 2018).

6. Conclusion

Promoting the health benefits of cycling requires a move beyond seeing cycling as a ‘virtue’ or a healthy habit, towards a keener appreciation of the physical, psychological and social pleasures of everyday cycling and the role that it can play in improving quality of life in our cities. The interviews reported here support the call from urban designers Forsyth and Krizek (2011) for a new era of cycle infrastructure planning that moves beyond simple attention to safety and access to considerations of the “experience of the network” and the ways that we can protect and indeed enhance the pleasures inherent within everyday cycling. This could entail for instance “providing routes where cycling is uncomplicated enough to permit cyclists to spend time viewing the scenery. Or, it might involve focusing routes where the level of detail of the context is such that it can be easily perceived from the speed of a bicycle—less detail needed than for a pedestrian but more than for a motorist.” (Forsyth and Krizek, 2011, p. 535).

This new era of bike planning should also enhance the possibilities for socialising on a bike. Rachel Aldred (2015) in particular points to the ways that the model of the ‘rational’, ‘purposeful’ commuter in Western societies has stigmatised riding abreast and socialising while riding, despite the fact that, like the participants in our study, it is reported to be a key source of enjoyment for everyday cyclists. We note that although the majority of private motor vehicles on Auckland roads in the rush hours contain only the driver, cars are still built for two people to travel side by side, and roads are designed to accommodate companionable driving, however uncommon it may be. Given the increasing contribution that loneliness and isolation are making to levels of physical and psychological illness within Western societies, this research reinforces the important role that active transport can play in improving levels of social interaction and neighbourhood satisfaction.

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