Transportation Research Part A 69 (2014) 11–19

Contents lists available at ScienceDirect

Transportation Research Part A

journal homepage: www.elsevier.com/locate/tra

Improving conditions for potential New Zealand cyclists: An application of conjoint analysis

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ARTICLE INFO

Article history:
Received 24 April 2012
Received in revised form 28 July 2014
Accepted 12 August 2014

Keywords:
Cycling
Active transport
New Zealand
Conjoint analysis

ABSTRACT

The New Zealand Government, along with many around the world, has made a commitment to reducing green house gases with its endorsement of the Kyoto Agreement. The Government has also declared war on obesity and is actively encouraging New Zealanders to exercise more. One of the easiest ways to work towards both outcomes is through encouraging people to cycle as a form of transport instead of using their car. With a nationwide survey and conjoint analysis this research investigates the motivations and barriers to using a bicycle for commuting. The perceived attitude of drivers to cyclists is identified as the major factor restricting the adoption of the bicycle for commuting.

1. Introduction: bicycle use as a solution

Given the acknowledged problems of; climate change, peak oil, the obesity epidemic, traffic congestion, and air pollution, cycling offers society a, partial, solution to all these problems in a low cost manner. Many governments (c.f. Bikebiz, 2007; Transport Research Center, Czech Republic, 2005; Austroads Inc, 2005; Federal Ministry of Transport, Building and Housing, 2002), cities (c.f. Blaha, 2008; City of Sydney, Council, 2007; Transport for London, 2004; City of Copenhagen, 2007; Institute for Transportation and Development Policy, 2007; San Francisco Municipal Transport Authority, 2007) and pressure groups (c.f. Canadian Cycling Association, 2008; League of American Bicyclists, 2007) around the world have adopted policies to increase the number of trips made by bicycle instead of motor vehicle.

Although cycling is generally still a minor form of transport, the number of urban trips and/or percentage of people riding a bicycle has increased in Western and Northern Europe as well as the USA and Canada in recent years (Wardman et al., 2007; Pucher et al., 1999; Gatersleben and Appleton, 2007; Nankervis, 1999).

The New Zealand Government has stated, in the Cycle Network and Route Planning Guide, that;

> Promoting walking and cycling is recognized as one of five priority areas because of its contribution to the strategy's [National Transport Policy] vision and objectives. This priority is now enshrined in the Land Transport Management Act 2003, so Transfund New Zealand now funds the promotion of walking and cycling in a separate output class. (Land Transport Safety Authority New Zealand, 2004)

Two thirds of all vehicle trips in New Zealand are shorter than six kilometers (Cycling Advocates' Network of New Zealand, n.d.). Similar to the "48% of trips by all modes in American cities are shorter than three miles, the potential for further growth in bicycling seems enormous" (Pucher et al., 1999, p. 625).

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[1] This research was supported by a University of Otago Research Grant.

http://dx.doi.org/10.1016/j.tra.2014.08.005
0965-8564/

About one quarter of New Zealanders occasionally or regularly use a bicycle (Sullivan and O'Fallon, 2006; Cycling Advocates' Network of New Zealand, n.d.). Cycle import figures suggest that cycling in New Zealand has increased considerably since the turn of the millennium (a 45% increase in bicycle imports and an estimated increase of adult cyclists by 24%) (Cycling Advocates' Network of New Zealand, n.d., FAQ).

This research looks at cycling for transport, with the focus on the work/study commute. The reasons for this focus are; transportation to and from work and/or study represent a significant portion of journeys generally during peak times with congested and slow moving roads, and the place of work and/or study and the place of residence are, in the short to medium term, set points. Recreational cycling is not addressed in this research.

1.1. Benefits of cycling

The previously identified benefits of cycling as a form of transportation include:

- health benefits (c.f. Pucher and Dijkstra, 2003; Saelens et al., 2003; Swinburn and Egger, 2004; Unwin, 1995)
- quality of life benefits (c.f. Banister, 1996; Hillman, 1994; Metz, 2000; Moudon et al., 2005; Sallis et al., 2004)
- road congestion benefits (c.f. Stopher, 2004; Dixon, 1996; Bertolini et al., 2005; Ogilvie et al., 2004)
- pollution reduction benefits (c.f. Martens, 2004; Litman, 2003)
- economic benefits (c.f. Krizek, 2006)

It has also been suggested that,

- The transport sector is the fastest growing source of green house gas emissions. Cycling 10 km each way to work would save 1500 kg of greenhouse gas emissions each year.
- Bicycles offer door to door service and are often quicker than cars over short distances up to five kilometers (Gatersleben and Appleton, 2007).
- For every car trip replaced with a bike ride, the community saves 60 cents per kilometer.
- Up to 20 bicycles can be stored in the space required for one car (Queensland Transport, 2007).

Given the benefits of cycling for transportation to society, this research seeks to discover the importance of the key motivators and barriers to cycling for transport using choice modeling (conjoint analysis) with a nationally representative sample.

2. Deterrents and motivators for cycling

The provision of dedicated, separate cycling paths or cycle lanes on roads is, particularly in Europe, a key aspect of traffic planning and management related to cyclists (McClintock and Cleary, 1996). However, recent studies show mixed results regarding their effectiveness. While cyclists generally perceive segregated cycle paths as an increase in safety, they have been found to lull them into a false sense of security once they do join the road (McClintock and Cleary, 1996). The safety of segregated cycle paths has also come under question with increased accident risks at intersections (Pucher et al., 1999). Cycle lanes also represent increased risks when cars are parked on the street or delivery vans park across them (Pucher et al., 1999), emphasizing the complex nature of cyclists' safety on roads. The provision of cycle paths and lanes has also been found to have a smaller than expected impact on the propensity to cycle (Wardman et al., 2007).

There has been considerable research into cycling as an alternative transportation mode (c.f. Gaarder et al., 1994; Gatersleben and Appleton, 2007; Nankervis, 1999; Wardman et al., 2007) including; reviewing the extant literature on commuting (Heinen et al., 2010), considering the severity of injuries to cyclists in bicycle versus motor vehicle accidents (Kim et al., 2007), estimating the economic benefits of investment in cycling infrastructure (Krizec, 2007), and considering the improvements to safety of cycle lanes (Pucher, 2001).

Wardman et al. (2007) conducted an extensive study to investigate factors influencing the propensity to cycle to work using Revealed Preference as well as Stated Preference data up to 1998. They concluded that a combination of en-route and end of route cycle facilities and direct payments for commuting by bike seem to be most effective.

Noteworthy in previous research is the lack of interventions that address the impact drivers' attitudes have on potential cyclists. As with the vast majority of bicycling research, the focus is almost exclusively on physical infrastructure. Pucher et al. (2010) lists 39 interventions to promote cycling, none of which relate to the culture of the roads, drivers' behavior. Pucher and Buehler (2008) lists 24 key policies and innovations used in Dutch, Danish and German cities to promote cycling. Only three of those relate to drivers and none of the three relate to drivers' attitudes to cyclists. Further, there is no suggestion which measures are most desired by potential cyclists – which are the barriers or motivations to cycling that will have the most impact.

This study seeks to address that gap, focusing on the key factors identified by cyclists and potential cyclists. The research focuses on motivators and barriers that potential cyclists and government can control in the short to medium term. Using a representative sample of the New Zealand population, this research seeks to uncover why potential cyclists are not cycling.