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Neighbourhood expectations and engagement with new cycling infrastructure in Sydney, Australia: Findings from a mixed method before-and-after study

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ABSTRACT

Background: Cycling infrastructure in car-orientated societies is largely unevaluated. This mixed method study aimed to evaluate initial impacts of new cycling infrastructure by investigating changes in community perceptions, expectations and interaction with a new cycleway.
Method: In a multiphase mixed method design, qualitative interviews with local residents and retailers were conducted before and after the construction of a new cycleway, in 2013 and 2014 respectively. Six months later, intercept surveys with 783 cyclists using the cycleway and 207 pedestrians in the vicinity were also conducted to determine how the cycleway was being used and received by the community.
Results: Residents were in general supportive of the cycleway perceiving it to have a positive impact on their quality of life and on the neighbourhood. Retailers initially believed the cycleway would hinder productivity and impact parking, a view that dissipated after construction of the cycleway. Observation and dialogue with participants revealed some confusion as motorists, pedestrian and cyclist learnt to adapt and interact with the new infrastructure. Survey findings revealed 63% of users were local, despite initial community perceptions that the local community would not use it. The cycleway was being used mainly for commuting (59%) consistent with neighbourhood perceptions, however as cyclists learnt to interact with the cycleway other trip purposes were emerging. Barriers to use appeared to be due to physical barriers (e.g., bike ownership), and perceptions about the path, rather than attitudinal barriers.
Conclusion: New cycling infrastructure provides opportunity for community growth and wellbeing. Community engagement, information and road education is needed to reduce barriers to allow car-orientated cultures to learn to interact with new cycling infrastructure.

1. Introduction

There has been a growing investment in bicycle infrastructure internationally in recent years, partially in response to environmental and population health concerns generated by heavy reliance on motorised transport. Rising levels of physical inactivity in the population, air pollution and greenhouse gas emissions from urban traffic are compounding already unsustainable transport systems, signifying an alternative to personal motor vehicles is overdue (Woodcock et al., 2009; World Health Organization WHO, 2011). Bicycle infrastructure has a key role in promoting cycling in the general population, and encouraging active commuting as an alternative to passive transport modes (Yang et al., 2014; Pucher et al., 2010).

Separated cycleways, as opposed to bicycle lanes in mixed traffic, offer greater segregation between cyclists and motor traffic, and hence greater protection for the cyclist. This has been shown to be an important factor in encouraging cycling participation in urban environments in both hypothetical and observational contexts. Hypothetically, stated preference (SP) studies have consistently indicated that the availability of cycleways would encourage greater cycling participation across a range of countries and contexts (Fernández-

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Heredia et al., 2014; Buehler and Pucher, 2012; Akar and Clifton, 2009; Hunt and Abraham, 2007). Observationally, cross-sectional evidence in the form of count data supports the role of cycling infrastructure in increasing cycling participation (Buehler and Pucher, 2012; Krizek et al., 2009; Cohen et al., 2008; Troped et al., 2001; Monsere et al., 2014; Dill, 2009). Additionally, a limited, but growing body of quasi-experimental evidence indicates that cycling infrastructure has some causal effect on the uptake of cycling and physical activity outcomes, although time and proximity to new infrastructure are important prerequisites (Goodman et al., 2014; Parker, 2013; Burbidge and Goulias, 2009; Fitzhugh et al., 2010; Keall et al., 2015).

What is not yet understood is the impact new bicycle infrastructure has on neighbourhoods at large. Indeed, very little research has investigated the impact of cycling infrastructure on communities beyond an evaluation of physical activity and bicycle counts of users. In car-oriented societies the impact of cycling infrastructure on cycling may be a secondary outcome; the first may be to overcome pre-conceptions about cycling.'Car-culture' can dominate neighbourhood voice and create NIMBYism (Not in My Backyard) opposition to bicycle infrastructure. This can be a major barrier to changing social norms about cycling. It is therefore important to know how community perceptions about new infrastructure might influence intention to cycle, and the health of the community in a broader sense. It is possible that changes in physical activity and shifts away from motor car transport for commuting take so long to eventuate because of residual community perceptions. Some evidence suggests that 'if you build it' cyclists 'will come' (Dill and Carr, 2003). Yet it takes time for a cyclist 'to be born', or to be ready to switch modes and take up cycling as a means of transport (Badland et al., 2013), and part of this process may involve shifting individual and community perceptions around cycling and cycling infrastructure. For instance, in a study in Austria, Stronegger et al (2010) proposed that satisfaction with local infrastructure for walking and cycling could determine residents' engagement in active transportation (Stronegger et al., 2010). In a number of other studies, neighbourhood perceptions about walking and cycling infrastructure have been found to be a major determinant of their use (Van Dyck et al., 2013; Ma et al., 2014; Hoehner et al., 2005). One study in the UK qualitatively evaluated the reaction of a local community to a new bicycle and walking path, finding that the lack of path use by residents was due in part to a low sense of community ownership of the infrastructure (Coulson et al., 2011).

New cycling infrastructure could potentially have an indirect impact on the health of a community, particularly on quality of life (QoL). Cycleways form part of the tangible built environment of an area. It is well known that the way a neighbourhood is designed can significantly impact the physical and mental health of its residents (Renalds et al., 2010; Anderson and Jane-Llopis, 2011). For example, suburbs which are designed as car-dependent may discourage social interaction. In contrast, neighbourhoods which are more walkable, with less through traffic, have higher social capital and potentially a more positive impact on residents' quality of life (Leyden, 2003; Hart and Parkhurst, 2011; Gundersen et al., 2013). Infrastructure which helps to encourage greater cycling over the use of the private car should in theory help to improve the quality of life of residents, by creating a more conducive physical environment for commuting and moving about the neighbourhood (Novaco and Gonzalez, 2009).

While much of the focus around the impacts of new cycling infrastructure has been on residential users, an emerging and increasingly important area of focus is that of small businesses along the route. In general, the reaction of small businesses to cycling infrastructure has been one of caution, and in some cases strong objection, largely because of the perceived threat to parking (Drennen, 2003), which reflects the perceived importance of car access. However, there may be a tendency for businesses to overestimate customers car use (Susilo et al., 2013; Gehl and Gemzøe, 2003; Sztabinski, 2009; Lee and March, 2010) and the impact of reduced parking on revenue. For instance, recent research in the USA suggests that cyclists (and for that matter pedestrians) tend to be more frequent shoppers, spending similar amounts of money to shoppers who travelled by car (Clifton et al., 2012). There may be a tendency to assume customers desire car parking however, in an evaluation of new bicycle infrastructure on a retail centre in Australia, Lee and March (2010) observed that customers drove not because they could not walk or cycle, but because public space was dominated by car parking making driving easier (Lee and March, 2010).

A number of theories have been used to describe changes in behaviour in response to physical activity interventions (Hagger et al., 2002; Bauman et al., 2002). The Theory of Planned Behaviour (TPB) (Ajzen, 1991) framework has been commonly used to explain travel behaviour (Panter and Jones 2010). The intention to cycle and the decision to commute by car is however a more complex relationship between beliefs, values, habits and environmental barriers or enablers (Panter and Jones, 2010; Guell et al., 2012; Titze et al., 2008). For example, life events such as changing jobs, or moving house are often triggers for changes in travel or cycling behaviour and may explain some of the conflict between someone identifying as a transport cyclist but commuting by other modes (Chatterjee et al., 2013). Understanding how perceptions in the neighbourhood change in response to the development of new cycling infrastructure, and how these changes affect health and transport choices, is therefore important for future policy development.

The aim of this multiphase mixed methods study was to explore changes in neighbourhood perceptions and attitudes in response to a new cycleway in Sydney, Australia, both from the resident and the (often-neglected) small business perspective, and investigate the affect it has on a neighbourhood community and in influencing cycling participation.

2. Materials and methods

2.1. Setting

A new separated 2.4 km cycleway was constructed in the inner Sydney suburbs of Redfern and Waterloo between June 2013 and June 2014. The cycleway is bi-directional, separated from road traffic by raised kerbs and from pedestrian thoroughfares (Figs 1 and 2). It was complemented by new speed restrictions (40 km/hr), one-way traffic flow sections, improved footpaths, pedestrian crossings and tree coverage. Shared environments were created at intersections with low traffic use streets (Fig. 3). Shared walking/cycling paths also existed within recreational parks facilities.

The cycleway connects new high density housing developments, mixed density and mixed business areas and public housing estate through to the city centre. The local neighbourhood includes residential, retail and small business and factories. At the time of the study, the area was being rezoned and industry relocated to accommodate new high density development which will in future house an estimated 2000+ new apartments plus retail and offices in the area.

2.1.1. Before-and-after qualitative interviews

In August 2013, all retail shops and service businesses located along the length of the cycleway and within 50 m along intersecting streets were invited to participate in a two-stage interview about the impact of the new cycleway. Residents living along the length of the cycleway and the surrounding streets were recruited though letterbox advertising, and then purposefully recruited at busy community localities by the interviewer (MC). Both male and female residents were recruited, across age ranges and household structure to achieve maximal variation sampling on basic demographic characteristics reflective of the area. Recruitment continued until information obtained in the first round of interviews was saturated. There was no prior relationship between the interviewer and participants.