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A tale of two New Zealand cities: Cycling to school among adolescents in Christchurch and Dunedin

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ABSTRACT

This study examined intrapersonal factors related to cycling to school among adolescents in two New Zealand cities based on the Theory of Planned Behaviour and the Prototype Willingness Model. Data were collected from 803 adolescents (Christchurch: n = 373, Dunedin: n = 430; age 13–18 years; living ≤4 km from school; non-boarders). Despite similar attitudes towards cycling to school, Dunedin adolescents had lower prevalence of cycling to school (2% versus 19% in Christchurch) and also scored lower for all measures of injunctive norm, descriptive norm, self-perceived cycling capability and autonomy, and behavioural intention with respect to cycling to school compared to their Christchurch counterparts. The dominant influence on the intention to cycle to school was subjective norm in Christchurch and attitude in Dunedin. Future initiatives for encouraging adolescents to cycle to school should consider the contributions of intrapersonal factors, the social needs of adolescents, and the need to increase adolescents' cycle skills.

1. Introduction

Since 1960 developed countries, including New Zealand, have seen an increase in the kilometres travelled using private motor vehicles and a decrease in the use of other forms of transport such as walking, cycling and public transport, with

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the rates of cycling decreasing significantly both for the wider population (Ministry of Transport, 2015b; Tin Tin, Woodward, Thornley, & Ameratunga, 2009) and for children travelling to school (Black, Collins, & Snell, 2001; Buliung, Mitra, & Faulkner, 2009; McDonald, 2007; Ministry of Transport, 2015b; van der Ploeg, Merom, Corpuz, & Bauman, 2008). The increased use of motor vehicles has many adverse consequences including increases in transport emissions with subsequent increases in the quantity of greenhouse gases in the atmosphere and climate change, adverse health effects due to increases in air pollutants, increased number of road accidents and traffic congestion, reduction in physical activity, decreased levels of social capital, and reduced children's rights due to limits placed by adults on their travel choices (Newman & Kenworthy, 1989).

As adolescence is a time when identity, self-esteem and peer relationships are very important (Aldous, 1983), these factors can influence adolescents' choices regarding travel including cycling to school. Lower rates of cycling to school have been reported for girls (Horspool, 2006; Ministry of Transport, 2013, 2015b; Panter, Jones, van Sluijs, & Griffin, 2009; Timperio et al., 2006), older adolescents (Carver, Watson, Shaw, & Hillman, 2013; Horspool, 2006) and adolescents from high socioeconomic status (SES) families (Davison, Werder, & Lawson, 2008; Evenson, Huston, McMillen, Bors, & Ward, 2003) compared to their counterparts. However, some studies reported higher rates of cycling can be associated both with low SES and high SES (Rice, 2008; Steinbach, Green, Datta, & Edwards, 2011).

Peers and parents also influence whether adolescents cycle to high school, and parents continue to influence older children's travel choices throughout adolescence (Hunter & Youniss, 1982; Mitra & Buliung, 2015). Compared to peers, parents can have greater influence on the rates of cycling to high school (Emond & Handy, 2012). In addition, adolescents may be less likely to cycle if they are not comfortable having different views to their peers, and have not developed strong defence mechanisms against peer pressure (Orsini, 2005).

Other factors such as the media (Penalosa, 2011; Rimano et al., 2015) and the physical environment (i.e. distance (Centers for Disease Control & Prevention, 2005; McDonald, Deakin, & Aalborg, 2010; Sirard & Slater, 2008; Thornton, Bunt, Dalziel, & Simon, 2010), traffic safety (including bike infrastructure, traffic volume and speed) (Centers for Disease Control & Prevention, 2002; Pikora, Giles-Corti, Bull, Jamrozik, & Donovan, 2003; Thornton et al., 2010; Villanueva et al., 2012), and continuity and connectedness of the streets (Pikora et al., 2003)) have also been shown to affect whether children and adults cycle. Finally, factors such as having too much to carry to school, after-school schedules (e.g. sports practices, part-time work), not having a bicycle or a 'nice' bicycle, lacking cycle skills and/or skills to cycle on the road, facilities provided at school (such as cycle stands and lockers), the existence of cycle teams and encouragement by school policies or practices may also influence whether students cycle to school (Frater, Kuijer, & Kingham, 2017; Hopkins & Mandic, 2016; Mandic, Hopkins, et al., 2017; Mandic et al., in press).

In New Zealand, rates of walking to school in adolescents have remained relatively stable (26% in 1989/1990; 28% in 2010–2014) while the rates of cycling to secondary school have declined from 19% in 1989/1990 to 3% in 2010–2014 (Ministry of Transport, 2015a). Low rates of cycling to school among adolescents in the South Island of New Zealand have been reported previously (Mandic, de la Barra, et al., 2015; Mandic, Hopkins, et al., 2017). Dunedin and Christchurch are the two most populated cities in the South Island of New Zealand. Using the data collected as a part of two distinct but coordinated research projects, this study examined intrapersonal factors related to adolescent cycling to school in these two cities using the Theory of Planned Behaviour (TPB) (Ajzen, 1991), and descriptive norm (what people do) as used in the Prototype Willingness Model (PWM) (Gibbons, Gerrard, Blanton, & Russell, 1998). The TPB has been used to predict a range of travel behaviours (Abrahamse, 2007; Anable, 2005; Bamberg, Ajzen, & Schmidt, 2003; Bamberg & Schmidt, 2003; Forward, 2004; Lajunen & Räsänen, 2004). The PWM has been used predominantly in relation to risky teenage behaviours such as smoking and alcohol use (Gibbons et al., 1998), and to predict health-promoting behaviours such as exercise and breakfast consumption (Rivis, Sheeran, & Armitage, 2006). This study compared rates of cycling to school, past behaviour, attitudes, injunctive norms (what people ought to do), descriptive norms (parents and friends), perceived behavioural control and intentions with respect to cycling to school among adolescents in Christchurch and Dunedin who lived within 4 km from school.

2. Method

2.1. Locations

The city of Christchurch (population: 348,459) is located in the Canterbury region of New Zealand (Statistics New Zealand, 2015), and has predominantly flat topography and a dry, temperate climate (mean annual temperature 1971–2000, 12.1 °C) (Climate Conversation Group, 2016). The city of Dunedin (population: 120,249) is located in the Otago region of New Zealand (Statistics New Zealand, 2015) and has predominantly hilly topography. Due to its higher latitude, Dunedin experiences slightly lower average temperatures than Christchurch (mean annual temperature 1971–2000, 11.0 °C (Climate Conversation Group, 2016)).

2.2. Participants

Adolescents from Christchurch and Dunedin were surveyed about cycling to school as a part of two distinct but coordinated research projects: the Christchurch Secondary School Travel Survey (2012) (Frater et al., 2017) and the Built