



Why adolescents don't bicycle to school: Does the prototype/willingness model augment the theory of planned behaviour to explain intentions?

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ABSTRACT

The theory of planned behaviour (TPB) has been used to analyse a range of travel behaviours including car use, bicycle helmet use and the switching of travel modes. The prototype/willingness model (PWM) has been used to predict adolescent behaviour in relation to risky behaviour such as smoking and drinking. This study uses both these models to predict intention to cycle to school and aims to determine the contribution of variables from the prototype/willingness model after variables of the theory of planned behaviour have been taken into account. A further purpose of this study is to determine which variables have the greatest influence over whether or not adolescents cycle to school. In addition, the study considers whether differences exist between males and females. This research uses the results of surveys of 331 students at seven secondary schools in Christchurch, New Zealand. Regression analysis showed prototype, and descriptive norms, from the prototype/willingness model did little to enhance the predictive validity of the theory of planned behaviour in relation to cycling to school. It also showed perceived social pressure by friends (subjective norm-friends) had the greatest influence over whether or not students intended to cycle to school, closely followed by perceived social pressure by parents (subjective norm-parents) and subsequently what students believe and their overall evaluation of cycling to school (attitudes). It is concluded there is little difference between the TPB and PWM variables that influence girls and boys, and that more adolescents will cycle to school if changes to societal attitudes and norms occur in favour of cycling. This will only be achieved through change at multiple levels, targeting individuals, social environments, physical environments, and policies.

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1. Introduction

Since the 1940s in many countries around the world 'automobile cities' have replaced 'transit cities' (Newman, 2003). This has been particularly true of the majority of cities in the United States, Canada, Australia and New Zealand and is also true of some European cities such as Coventry in the United Kingdom (Hubbard & Lilley, 2004). As a consequence, these cities and countries 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 (Goodman & Tolley, 2001; Litman, 2015).

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Correspondingly, cycling rates have dropped significantly, particularly among school children (McDonald, Brown, Marchetti, & Pedroso, 2011; Pooley, Turnbull, & Adams, 2005; van der Ploeg, Merom, Corpuz, & Bauman, 2008). This change in transport mode has consequences in terms of increasing the rate of climate change, accelerating the exhaustion of fossil fuel supplies, increasing urban sprawl, increasing air pollution, adversely affecting the health of people, increasing congestion, limiting the rights of children and decreasing social capital (Pucher & Buehler, 2012).

The New Zealand Census shows decreases in the number of people cycling to work on census day between 1991 and 2013 for all age groups with by far the greatest drop (from approximately 18% down to 4.2%) for the 15–19 year old age group (Statistics New Zealand, 2014; Tin Tin, Woodward, Thornley, & Ameratunga, 2009). The Census also shows, more males than females cycling in all age groups, with 18% of males and 11% of females aged 15–19 cycling to work in 1991, and 5.9% and 2%, respectively in 2013. Similarly the New Zealand Household Travel Survey (NZHTS) indicates a drop in the number of 13–17 year-olds cycling to school from approximately 28 journeys per person per year in 1989/90 to 7 journeys per person per year in 2009–2013 (Ministry of Transport, 2013a). It also shows in 2013 the percentage of people aged 13–17 years who cycled at some stage in the last year to be 62% for males and 44% for females (Ministry of Transport, 2013b).

The NZHTS also indicates changes in the use of all forms of transport by the population in general since 1989/90. Vehicle hours driven per person per year have increased, with peak levels reached in 2005/2009, followed by a slight decrease. In contrast, hours per person per year by walking, passenger transport (bus/train) and bicycle have fallen since 1989/90 (Ministry of Transport, 2015). Associated with this, despite a slight decrease in car use since 2001, four out of five New Zealanders aged 15 years and over indicated they used a car as their main mode of transport to get to work in 2013 (Statistics New Zealand, 2014). Consequently, compared to other countries (Bassett, Pucher, Buehler, Thompson, & Crouter, 2008), the percentage of trips taken by car in New Zealand is among the highest in the world.

Many researchers have undertaken studies to determine the reasons for the decline in cycling rates for school children in the developed world. Reasons given include environment and parental concerns (Kerr et al., 2006), the need for cycle safety programs (Grize, Bringolf-Isler, Martin, & Braun-Fahrlander, 2010), and environmental factors, parental encouragement, student comfort with cycling and perceived distance (Emond & Handy, 2012). Ecological models have been used as a framework for some of this research (e.g. Emond and Handy (2012)). Ecological models generally recognise the influence of multiple levels of factors on behaviours. An example of such as model is the Ecological Model of Four Domains of Active Living, Sallis et al. (2006). This model includes active recreation, active transport, household activities and occupational activities and recognises seven groups of factors that influence active living: Intrapersonal (demographics, biological, psychological and family situations), perceived environment, behaviour settings (access and characteristics), policy environment, information environment, social cultural environment and natural environment.

Behaviour change theories examine the intrapersonal factors that influence decision-making. They have been used to examine a wide range of behaviours around the world including those related to health, education, energy, criminology and climate change. A behaviour change theory that has been widely applied in relation to travel behaviour is the theory of planned behaviour (TPB). The prototype/willingness model (PWM) has been used in relation to predicting teenage behaviour, but not in predicting travel behaviour. However, given it has been widely used in relation to teenage behaviour, it may be useful in understanding the variables that influence teenage travel behaviour in relation to cycling to school.

1.1. The theory of planned behaviour

The theory of planned behaviour (Ajzen, 1991) asserts that behavioural intentions determine behaviour, and intentions are determined by three independent variables: attitude, subjective norm and perceived behavioural control (PBC). Attitudes are defined as what a person believes and their overall evaluation of a given behaviour; subjective norms (what one ought to do) as perceived social pressure to act in a certain way; and PBC as the perceived ease or difficulty of engaging in a behaviour. PBC may be further divided into behaviours related to control and self-efficacy (Conner & Sparks, 2005). Control refers to the degree of control a person perceives they have over performing a behaviour, and self-efficacy refers to their perception of the difficulty of performing a behaviour (Gummesson, Jonsson, & Conner, 1997). Consideration of both control and self-efficacy in relation to cycling is appropriate as questions concerning control take into account the amount of control students themselves have over whether or not they cycle to school (as in some cases parents may control whether a student cycles to school), and questions concerning self-efficacy refer to a student's perception of how capable they are of riding a bicycle to school.

The TPB has been used to analyse a range of behaviours including maintenance of physical activity (Armitage, 2005), explaining pro-environmental intention and behaviour (Harland, Staats, & Wilke, 1999) and examining young adults' social drinking (Zimmermann & Sieverding, 2010). It has also been used to analyse a range of travel behaviour (sometimes in association with other behaviour change models), including car use (Abrahamse, Steg, Vlek, & Gifford, 2009), the prediction of travel behaviour (Bamberg & Schmidt, 2003; Forward, 2000), the choice of travel mode and the roles of past behaviour, habit and reasoned action (Bamberg, Ajzen, & Schmidt, 2003), bicycle helmet use by teenagers (Lajunen & Räsänen, 2004), the identification of people who might switch their travel mode away from individual car use (Anable, 2005), and people's willingness to bike (Forward, 2014). General research on transport can be applied to cycle use, however, due to the unique characteristics of different travel modes, people's intention to use different travel modes will at times be affected by different factors. Examples of this include the importance of descriptive norms for behaviours that are not socially approved (Manning, 2009) and the importance of descriptive norms and intentions for travel by bus and cycle (but not by car)

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