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Identifying beliefs underlying pre-drivers' intentions to take risks: An application of the Theory of Planned Behaviour

Richard Rowe[a,*], Elizabeth Andrews[b], Peter R. Harris[c], Christopher J. Armitage[d], Frank P. McKenna[e], Paul Norman[a]

[a] Department of Psychology, University of Sheffield, UK
[b] Bradford Institute for Health Research, UK
[c] School of Psychology, University of Sussex, UK
[d] Manchester Centre for Health Psychology, School of Psychological Sciences, Manchester Academic Health Science Centre, University of Manchester, UK
[e] University of Reading, UK

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ABSTRACT

Novice motorists are at high crash risk during the first few months of driving. Risky behaviours such as speeding and driving while distracted are well-documented contributors to crash risk during this period. To reduce this public health burden, effective road safety interventions need to target the pre-driving period. We use the Theory of Planned Behaviour (TPB) to identify the pre-driver beliefs underlying intentions to drive over the speed limit ($N = 77$), and while over the legal alcohol limit ($N = 72$), talking on a hand-held mobile phone ($N = 77$) and feeling very tired ($N = 68$). The TPB explained between 41% and 69% of the variance in intentions to perform these behaviours. Attitudes were strong predictors of intentions for all behaviours. Subjective norms and perceived behavioural control were significant, though weaker, independent predictors of speeding and mobile phone use. Behavioural beliefs underlying these attitudes could be separated into those reflecting perceived disadvantages (e.g., speeding increases my risk of crash) and advantages (e.g., speeding gives me a thrill). Interventions that can make these beliefs safer in pre-drivers may reduce crash risk once independent driving has begun.

1. Introduction

Road traffic crashes are a serious challenge to public health. On UK roads there were 1754 fatalities and 23 039 serious injuries during 2012 (Department for Transport, 2013). Novice drivers are over-represented in crash statistics, with particular vulnerability during the first few months of driving (McCartt et al., 2009). While skill deficits are likely to contribute to this crash risk among young drivers, propensity to take risks and violate safe driving laws and conventions also make strong contributions (Blows et al., 2005; Rowe et al., 2015). Road traffic violations are more strongly correlated with crash involvement in younger than older drivers (de Winter and Dodou, 2010).

The concept of violations includes a number of separate, though correlated, risky behaviours (e.g., Reason et al., 1990). Evidence shows that speeding is a risk factor for crash involvement (Aarts and van Schagen, 2006). Desire to drive faster than is safe for road conditions is a component of many other violations including tailgating, crossing red lights and dangerous overtaking. Other well documented risk factors include driving under the influence of alcohol (Fell and Voas, 2014), while using a mobile phone (Ferdinand and Menachemi, 2014) and while sleepy (Garbarino et al., 2001). Young drivers are particularly likely to engage in violations (Reason et al., 1990). Their sleep is more commonly disturbed (Lyznick et al., 1998) and their driving may be more vulnerable to sleep disruption (Groeger, 2006).

A recent study applied growth curve modelling to violation data repeatedly measured over the first three years of driving (Roman et al., 2015). This study identified three latent classes of driver who followed trajectories of consistently high, medium or low levels of violations across the study period. This suggests that the key determinants of risky driving behaviour develop very early in driving or are in place before driving starts.

A number of sources of evidence highlight that the attitudes underlying violating behaviour develop during pre-driving. Pre-driving is defined here as the period before independent driving on public roads. In the UK pre-drivers include people without a

* Corresponding author at: Department of Psychology, University of Sheffield, Western Bank, Sheffield S10 2TN, UK.
E-mail address: r.rowe@sheffield.ac.uk (R. Rowe).

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driving licence and provisional licence holders who can only drive on public roads for the purposes of training, under the supervision of a fully licensed driver. Waylen and McKenna (2008) showed that correlates of risky attitudes among 11–16 year old pre-drivers were similar to those in independent drivers in that they were riskier in males than females and were related to social deviance and sensation seeking. Longitudinal studies show pre-driving attitudes predict post-licence behaviour. Mann and Sullman (2008) found pre-driving speeding intentions predicted violation behaviours ($r = .28$) when the sample was driving independently 12 months later. Rowe et al. (2013b) reported that violations were predicted by attitudes to speeding in learners ($r = .33$) and non-drivers ($r = .13$) measured three years earlier.

Effective pre-driving interventions are required to reduce the elevated crash rates observed in the first few months of driving. This may offer the opportunity to influence driving behaviours before they become automated (Harre et al., 2000). A further advantage is that intervention participation can be mandatory in the licencing process. Current evidence indicates that: (a) attitudes to speeding become riskier during the transition from pre-driver to full driver, a tendency that interventions must counter; and (b) attitudes to other violations (e.g., using the horn to indicate displeasure) are safer in independent drivers than pre-drivers, a trend that interventions must enhance (Helman et al., 2013; Rowe et al., 2013a,b).

Many interventions using different forms of delivery and targeting various attitudes and behaviours have been applied to pre-drivers with little evidence of efficacy. The literature contains reports of interventions with little or no effect or that had unintended negative consequences (Glendon et al., 2014; Poulter and McKenna, 2010; Roberts and Kwan, 2006). This problem is not peculiar to pre-drivers; interventions for drivers are also often ineffective (Ker et al., 2003). Road safety interventions are often based on presenters' intuitions rather than psychological theory, although theory-based interventions are likely to be more effective than atheoretical ones (Michie et al., 2007). A recent meta-analysis of internet-based interventions across a range of health behaviours (Webb et al., 2010) found that those based on the Theory of Planned Behaviour (TPB; Ajzen, 1991) showed larger effects than interventions based on other theories and those without theoretical foundation.

The TPB has often been employed to understand the psychological antecedents of health related behaviours to inform intervention design (Ajzen, 2013). For example, a recent meta-analysis reported that the TPB accounted for 44% of the variance in intentions and 19% of behavioural variance across 237 prospective empirical tests (McEachan et al., 2011). The TPB proposes that intention is the most proximal determinant of behaviour and that intentions are themselves based upon (1) attitudes (positive/negative evaluations of the behaviour), (2) subjective norms (perceived social pressure regarding the behaviour) and (3) perceived behavioural control (perceived ease/difficulty of controlling the behaviour). Each of these components is posited to summarise sets of salient beliefs. Underlying attitudes are behavioural beliefs about likely behavioural consequences; for example believing that speeding means quicker journeys might be one of a set of behavioural beliefs underlying a positive attitude towards speeding. Similarly, sets of normative beliefs about the perceived opinions of significant others are proposed to underlie subjective norms, and sets of control beliefs about factors that facilitate or inhibit behaviour to underlie perceived behavioural control.

Studies have demonstrated that TPB components effectively predict driving violations. For example, the TPB components have been found to predict speeding intentions in drivers and motorcyclists (e.g., Chorlton et al., 2012; Conner et al., 2007; Elliott et al., 2007; Parker et al., 1992). Longitudinal data have shown that change in the TPB components predicts change in speeding intentions, providing increased confidence that the TPB components cause intentions (Elliott, 2012). The TPB components have also been shown to underlie intentions regarding other violations including drink-driving (Moan and Rise, 2011; Parker et al., 1992) and mobile phone use (Gauld et al., 2014; Nemme and White, 2010).

A subset of TPB studies has examined drivers' beliefs regarding speeding (Chorlton et al., 2012; Elliott et al., 2005; Parker et al., 1992) and drink-driving (Parker et al., 1992). Across these studies important behavioural beliefs have included arriving at destinations more quickly, feeling exhilarated, greater fuel usage, and increased crash likelihood. Identified normative beliefs include disapproval from family, friends, police and other road users. Salient control beliefs have addressed road conditions, time pressure and the behaviour of other drivers. Two studies have developed effective interventions to change the beliefs identified via the TPB, thereby reducing violation intentions in drivers with a range of experience (Elliott and Armitage, 2009; Parker et al., 1996).

This paper applies the TPB to guide identification of pre-driver beliefs underlying intentions to drive over the speed limit, while over the legal alcohol limit, talking on a hand-held mobile phone and feeling very tired. The TPB has not previously been applied to identify the beliefs underlying risky intentions in pre-drivers. Given that pre-drivers cannot actually violate, we focus on intentions to violate as our outcome measure. This approach is supported by evidence that intentions are strong predictors of behaviour. In a meta-analysis of 185 studies, the intention-behaviour correlation was .47 (Armitage and Conner, 2001). A meta-analysis of 47 experimental studies showed that manipulating intentions has a significant impact on subsequent behaviour ($d = .36$, Webb and Sheeran, 2006). Drivers' speeding intentions correlate with self-reported behaviour, $r = .67$–$.76$ (Elliott et al., 2003, 2007) and with speeding in both real driving, $r = .41$, and in a simulator, $r = .48$ (Conner et al., 2007).

The present study has two phases. In a qualitative belief elicitation study, pre-drivers identified behavioural, normative and control beliefs underlying violations. Next, a quantitative study assessed the extent to which the modal salient beliefs identified in phase 1 were associated with components of the TPB, and which TPB components were most strongly associated with intentions to engage in the risky driving behaviours once a licence was awarded.

2. Method

2.1. Elicitation study

Sixty students from a Yorkshire sixth form college participated in the elicitation study. They completed the study in a classroom session under the supervision of a college tutor. Their mean age was 16.6 years (range 16–18 years), 53% were female and 85% reported their ethnic origin as White British. Fifty-three per cent had no driving licence, which means they were prohibited from driving on public roads under any circumstances and 47% held a provisional licence that allows supervised driving for training purposes. Students were randomised to answer questions about behavioural, normative and control beliefs regarding one of *driving over the speed limit* ($N = 17$), *driving while talking on a hand-held mobile phone* ($N = 16$), *driving whilst feeling very tired* ($N = 12$) and *driving while over the legal alcohol limit* ($N = 15$).

Following the standard method for TPB belief elicitation studies (Ajzen, 2013; Conner and Sparks, 2015) we elicited behavioural beliefs in questionnaires that asked the participants what they believed (a) to be the advantages, (b) to be the disadvantages, (c) they would like or enjoy and (d) would dislike or hate about a target behaviour. Normative beliefs were elicited by asking (e) "Which individuals would approve (i.e., think it was a good idea)?",