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Original article

# Implementation of automatic speed enforcement: Covariation with young drivers' reported speeding behaviour and motivations

## *Introduction du contrôle sanction automatisé : covariation avec la vitesse auto-rapportée et les motivations des jeunes automobilistes*

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ABSTRACT

*Introduction.* – Speeding represents one of the main causes of road crashes worldwide, particularly among young drivers who are over-represented in road-crash statistics. For promoting road safety in France, an automatic speed enforcement (ASE) system was introduced late 2002.
*Objective.* – In order to examine its efficiency on speeding and its motivations, we compared young drivers' intentions and beliefs about speeding between the introduction of ASE (T1) and its completion in 2005 (T2) via a large survey based on the extended Theory of Planned Behaviour (TPB). We assumed the introduction of the ASE would covariate with a reduction in intention to speeding between T1 and T2 and a change in the extended TPB factors according to gender and driving experience.
*Method.* – One thousand one hundred and ninety-two young participants (49.7% men) divided into novice, beginner, and more-experienced drivers filled in a questionnaire based on the extended TPB about their driving behaviour and history at T1 and 24 months later (T2).
*Results.* – Men, beginner and more-experienced drivers expressed more intention to speeding within the next 12 months at T1 and showed a higher decrease in intention between T1 and T2 as compared to women and novice drivers. The extended TPB accounted for 59% of the variance in the decrease of the intention to speeding. Its main predictors were: lower perceived behavioural control over speeding, less social pressure, lower perceived similarity with the prototypical deviant driver, and higher comparative optimism. Secondly, slightly more positive behavioural beliefs and more negative outcome evaluations predicted this decrease.
*Conclusion.* – Practical implications of the findings for road safety are discussed.


*Mots clés :*
Sécurité routière
Théorie étendue du comportement planifié
Vitesse excessive
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RÉSUMÉ

*Introduction.* – La vitesse représente une des principales causes d'accidents de transport routier dans le monde entier, en particulier chez les jeunes automobilistes qui sont surreprésentés dans les statistiques d'accidents de la route. Pour promouvoir la sécurité routière en France, le contrôle sanction automatisé (CSA) a été introduit vers la fin de 2002.
*Objectif.* – Afin d'examiner son efficacité sur la vitesse et les motivations, nous avons comparé les intentions de transgresser les limitations de vitesse et les croyances des jeunes automobilistes entre l'introduction du CSA en 2003 (T1) et l'achèvement de son installation en 2005 (T2) via une grande enquête fondée sur la Théorie du Comportement Planifié (TCP) étendue (Ajzen, 1985). Nous postulons que l'introduction du CSA covariera avec une réduction de l'intention de transgresser les limitations de vitesse entre T1 et T2 et un changement dans les facteurs de la TCP étendue selon le genre et l'expérience de conduite.
*Méthode.* – Mille cent quatre-vingt-douze jeunes automobilistes (49,7 % d'hommes), répartis selon qu'ils sont novices, débutants et les plus expérimentés en T1, ont rempli un questionnaire basé sur la TCP étendue qui portait sur leurs comportements de conduite et caractéristiques personnelles en T1 et 24 mois après (T2).

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*Résultats.* – Les hommes, les débutants et les automobilistes plus expérimentés avaient davantage l'intention de transgresser les limitations de la vitesse au cours des 12 derniers mois que les femmes et les automobilistes novices en T1. Une réduction de l'intention de transgresser les limitations de la vitesse entre T1 et T2 a été enregistrée et cette réduction est plus importante chez les premiers que chez les femmes et les novices. La TCP étendue explique 59 % de la variance de la baisse de l'intention de transgresser les limitations de la vitesse chez les jeunes automobilistes. Les principaux facteurs prédictifs de cette réduction sont estimer avoir un contrôle plus faible sur la vitesse, ressentir moins de pression sociale pour transgresser les limitations de la vitesse, s'estimer moins proche du déviant prototypique qui transgresse les limitations de vitesse et manifester un plus grand optimisme comparatif sur le plan des risques liés à la vitesse excessive. Secondairement, des croyances comportementales légèrement plus positives et des évaluations plus négatives des conséquences à commettre de grandes transgressions de vitesses contribuent à prédire cette diminution de l'intention de transgresser les limitations de vitesse entre T1 et T2.
*Conclusion.* – Des implications pratiques des résultats en termes de sécurité routière sont présentées.


## 1. Introduction

Speeding is one of the main contributing factors to road deaths worldwide (e.g., Deen & Godwin, 1985), especially among young drivers (18–25 years). According to the CARE database, young drivers represented approximately 10% of the European Union (EU) population and 25% of the road fatalities in 2004 (CARE, 2006). In France, young drivers comprised 8.9% of the population and accounted for 23% of the road fatalities in 2005 (ONISR, 2006). Their over-representation in road fatalities has frequently been associated with excessive speed (e.g., Harrison, Triggs, & Pronk, 1999).

Prospective studies suggested that police speed enforcement could lead to a 35% reduction of road fatalities across EU (CEMT, 2006). As a result, European authorities have adopted various speed-enforcement measures such as *automatic and mobile speed enforcement* (Belgium, Finland, France, Malta, Norway, Spain, Sweden, and UK), *mobile speed cameras* (Denmark, Estonia, and Netherlands), and *section speed control* (Austria, Czech Republic, and Netherlands). According to the SUPREME project (SUPREME, 2003), the introduction of speed-camera networks led to a significant decrease in deaths and injuries caused by speeding throughout EU. For example, in Malta, injury crashes were reduced by 81% on roads where speed cameras were installed between 2004 and 2006. Similar results were observed in Austria (–33%) and Netherlands (–47%) after the introduction of speed control sections at the end of 2002.

In order to promote road safety in France, the President of the Republic made an announcement in July 2002 about the introduction of an Automatic Speed Enforcement (ASE) system in late 2002, which was largely publicized. The measure consisted of introducing approximately 1000 fixed and 500 mobile radars between late 2002 and 2005, but was also accompanied by a series of legal regulations regarding seat-belt use, the trial period for obtaining a driver's license, drinking and driving, the responsibility of the vehicle's owner and, the use of mobile phones while driving (ONIRS, 2006). As a consequence, a drop of 7.3 km/h in average speed was observed, from 89.5 km/h in 2002 to 82.2 km/h in 2006. In addition, the number of speeding tickets increased from 1.4 million in 2002 to 7.2 million in 2006 (ONISR, 2008). An overall 30% drop in road fatalities was recorded from 2002 to 2005 (ONISR, 2006) and authorities believed that ASE system was responsible for 75% of this reduction. Moreover, for young drivers, fatalities went from 1281 in 2002 to 790 in 2005 (–38.3%).

The aim of the study was to examine young drivers' speeding intentions and their motivations in the new context via a large survey based on the extended Theory of Planned Behaviour (TPB, Azjen, 1985).

TPB states that behavioural intentions can predict behaviours (Abraham, Sheeran, & Johnston, 1998; Gollowitzer & Moskowitz, 1996), while attitudes, injunctive norms, and perceived behavioural control are the moderators of the relationship between intention and behaviour (Ajzen & Madden, 1986; Sheeran, Trafimow, & Armitage, 2003). Attitudes are positive or negative evaluations about a targeted behaviour. Injunctive norms refer to perceived social pressure in terms of adopting or not the targeted behaviour. Perceived behavioural control corresponds to the individual's resources and abilities to perform the behaviour, but also the available opportunities and the importance of achieving one's objectives.

Evidence showed that TPB offers good predictions of behaviour and behavioural intention (Randall & Wolf, 1994). According to a meta-analysis of 185 studies (Armitage & Conner, 2001), TPB explains 27% of behaviour and 39% of the behavioural intention. To increase the prediction power of TPB, additional factors such as behavioural expectations (Sheppard, Hartwick, & Warshaw, 1988), personal identity (Sparks & Guthrie, 1998), moral norm (e.g., Elliott & Thompson, 2010), and past behaviour (Aarts & Dijksterhuis, 2000; Verplanken & Aarts, 1999) have been considered.

In traffic safety research, TPB has been widely used to predict behaviours such as speeding (Forward, 2009, 2010; Letirand & Delhomme 2003, 2005; Warner & Åberg, 2006), drunk driving (Åberg, 1993; Chan, Wu, & Hung, 2010; Parker, Manstead, Stradling, Reason, & Baxter, 1992), and dangerous overtaking (e.g., Forward, 2009; Parker, Manstead, & Stradling, 1995).

Based on the results of a pilot study on young drivers' speeding (Delhomme, 2002), we found several additional TPB factors that could explain young drivers' speeding.

### 1.1. Behavioural norm

Behavioural norm refers to people's beliefs about the actual behaviour of significant others. These beliefs strongly influence young drivers' and may determine them to drive faster (Connor, Smith, & McMillan, 2003; Lin & Fearn, 2003). Behavioral norms predicted risk behaviours (e.g., Grube, Morgan, & McGee, 1986) and dangerous overtaking (e.g., Forward, 2009) better than injunctive ones when they were introduced in the same model.

### 1.2. Frequency of passengers

Young drivers are thought to be more likely to speed and follow closely when travelling with a passenger (Baxter, Manstead, Stradling, Campbell, Reason, & Parker, 1990; Delhomme, 1994; Simons-Morton, Lerner, & Singer, 2005) than older drivers. In addition, young drivers are more prone to adopting risky behaviours when the passenger is a peer (Arnett, Offer, & Fine, 1997; Rolls & Ingham, 1992) as compared to the situations where the passenger is a child or a parent (e.g., Fleiter, Lennon, & Watson, 2010).