



# An examination of the construct and predictive validity of the self-reported speeding behavior model



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## ABSTRACT

The present study deals with the problem of speeding behavior on rural roads. The purpose of the paper is to examine the construct validity and the internal consistency and reliability of a questionnaire that measures the determinants of speeding behavior. In addition, it aimed to test the predictive validity of a modified theoretical framework of a theory of planned behavior (TPB) in relation to speeding behavior. A total of 546 car drivers from five local communities in the Republic of Srpska successfully completed the questionnaire after reading the scenario. The principal component analysis revealed seven components interpreted as: personal norm, perceived behavioral control, affective attitude toward speeding, subjective norm, habit, descriptive norm, and cognitive attitude toward speeding. A speeding behavior model was developed by structural equation modeling. Personal norm, subjective norm, and affective attitudes were shown to be important variables within the modified TPB in understanding speeding behavior. Overall, the present findings provide significant support for the concept of the modified theoretical framework of TPB in relation to speeding behavior on rural roads. Implications for a speeding behavior model and interventions are discussed.

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## 1. Introduction

Traffic injuries are the eighth major cause of death in the world. Speeding is one of the most influential factors that lead to the occurrence of road traffic accidents (WHO, 2013) and one of the three major factors that influence risky driving behavior in Europe (Adminaite et al., 2015). Between 2003 and 2012 in the United States, excessive speed was a contributing factor in about a third of all fatal crashes (National Center for Statistics and Analysis, 2014). In 2014 in the Republic of Srpska (an administrative entity within Bosnia and Herzegovina), speeding was the contributing factor in 29% of road traffic accidents (Ministry of Internal Affairs of Republic of Srpska, 2015). Speed-related crashes on rural roads are more severe than those on urban roads. In 2013 in the United States, 54% of traffic accidents that were caused by speeding occurred on rural roads (National Center for Statistics and Analysis, 2015). In the European Union, around 33% of all road accidents and 57% of all fatal accidents took place on rural roads in 2012 (EC, 2013). This

problem is even more pronounced in France, where 72% of the total number of traffic deaths occurs on rural roads (DEKRA, 2013). Many studies have shown that driving above the speed limit is a common traffic violation (Haglund and Åberg, 2000; Elliott et al., 2005; Letirand and Delhomme, 2005; Goldenbeld and van Schagen, 2007; Stanojević et al., 2013).

### 1.1. The theory of planned behavior (TPB)

Understanding modifiable determinants of speeding behavior is a prerequisite for developing evidence-based interventions aimed at changing drivers' speeding behavior. For the purposes of prediction and understanding of risky health behaviors, one of the most frequently applied theories is the TPB (Ajzen, 1985, 1991), which represents the continuation of the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980). It is a model firmly grounded on a rational decision-making approach. According to the TPB, influence of three basic determinants (attitude toward the behavior, social norms, and perceived behavioral control) on behavior is mediated by intention. The TPB holds that behavior is also directly determined by perceived behavioral control (PBC). The individual's attitude toward behavior is a personal factor that can be defined as the overall evaluation of behavior and its consequences, that is,

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the evaluation of engaging in the behavior in question. Subjective norms reflect social influence and can be defined as the perception of an individual about how much other people who are important to him or her approve or do not approve of the behavior in question. The third determinant, called perceived behavioral control, reflects an individual's perceived ease or difficulty in performing the behavior in question.

The results of different meta-analyses suggest that the TPB model provides good predictions of self-reported behavior and intentions and that the TPB can have a wider scope of application in behavioral analysis. According to the research, intention mostly accounts for variance in behavior in the range between 19% and 38% (Ajzen, 1991; Sheeran and Orbell, 1998; Armitage and Conner, 2001). Meta-analyses on the TPB studies indicated that attitudes and subjective norms together accounted for between 33% and 55% of the variance in intention (Sheeran and Taylor, 1997; Armitage and Conner, 2001). Perceived behavioral control accounted for an additional 5% to 12% of the variance in intention (Sheeran and Taylor, 1997; Armitage and Conner, 2001) and 2% to 12% of the variance in behavior (Godin and Kok, 1996; Armitage and Conner, 2001).

The previous research has applied the TPB concept specifically to speeding behavior. Results of this research showed that the traditional TPB model explained between 36% and 55% of variance in drivers' speeding intention on urban roads (Paris and Van den Broucke, 2008; Warner and Åberg, 2008; Forward, 2009; Elliott and Thomson, 2010) and between 33% and 53% of variance in drivers' intention to speed on rural roads (Letirand and Delhomme, 2005; Warner and Åberg, 2008; Forward, 2010; Cristea et al., 2013).

## 1.2. Modified theoretical framework of the TPB

A number of studies were carried out to explain and predict speeding behavior based on a modification of the traditional TPB approach. (De Pelsmacker and Janssens, 2007; Forward, 2009; Elliott and Thomson, 2010; Dinh and Kubota, 2013; Cristea et al., 2013). These studies have mainly been driven by the attempts to broaden the TPB model and achieve a better explanation of behavior by further refining the core TPB constructs and by adding other individual difference variables.

### 1.2.1. Dimensionality of the attitudinal and normative components of the TPB

Attitude towards a behavior is traditionally measured as a single concept, that comprises two specific subcomponents (Ajzen, 2006). The attitude construct is hypothesized to be composed of instrumental (e.g., beneficial/harmful) and affective (e.g. enjoyable/unenjoyable) evaluations towards a behavior. In recent years, however, several researchers have raised critical concerns in this respect (Manstead and Parker, 1995; Sheeran and Orbell, 1999; Abraham and Sheeran, 2003; Conner et al., 2015). They have argued that in the standard TPB model, affective variables are not explicitly taken into account. The majority of this research seems to support the idea that attitude is a multidimensional construct that consists of two separate, but related components. Accordingly, with respect to excessive speed, some empirical research conceptualized attitudes as cognitive (instrumental) and affective (emotional) components (Lawton et al., 2007; Elliott and Thomson, 2010). These studies have consistently shown the importance of affective in addition to purely cognitive determinants of drivers' intention to speed and subsequent speeding behavior.

Traditionally, in the TPB model, the social influence is represented by the concept of the subjective norm. Armitage and Conner's (2001) meta-analysis of TPB studies found that the subjective norm was a weaker predictor of intention and behavior than attitude and PBC. The less important role of subjective norms in

the TPB has been ascribed to a narrow conceptualization and measurement with emphasis solely on the social pressures placed on individuals when making decisions to act (Rivis and Sheeran, 2003). The lack of strong support for subjective norms in the previous speeding behavior studies highlights the importance of considering a broader conceptualization of normative influence in the modified TPB.

Offering a broader perspective on normative influence Cialdini et al. (1990) distinguished between subjective and descriptive norms. They have argued that Attitude towards a behavior is traditionally norms should be seen as conceptually and motivationally distinct, and it is important for a proper understanding of normative influence to keep them separate, especially in situations where both are acting simultaneously. Subjective norms are considered to reflect perceived social pressures in relation to perform or not perform behavior in question. Descriptive norms, however, reflect the opinion of an individual about other people's behaviour. They further argue that the focus of an individual's attention—on culture, situation or self—will determine which specific normative influence will be dominant.

With regard to driving above the speed limit, a considerable number of prior studies have supported the distinction between subjective and descriptive norms (De Pelsmacker and Janssens, 2007; Forward, 2009, 2010; Elliott and Thomson, 2010; Dinh and Kubota, 2013; Cristea et al., 2013). The evidence from these studies suggests that both subjective and descriptive norm make a unique contribution towards the prediction of drivers' intention to speed and subsequent speeding behavior. Some of these studies have found that descriptive norm is a better predictor of speeding intention than subjective norm (Forward, 2009; Elliott and Thomson, 2010).

### 1.2.2. Additional predictor variables

It has been shown that extension of the TPB model with additional predictor variables as personal norm and habit formation increases the amount of explained variance in intention to speed. The unexplained variance in intention and subsequent behavior can be ascribed to methodological and conceptual factors (Sutton, 1998; Conner and Armitage, 1998).

Schwarz (1977) claims that personal norms are experienced as feelings of moral obligation and can be defined as self-expectations that are based on internalized values. According to Ajzen (1991), the individual's moral norm reflects his or her perception of the moral correctness or incorrectness of performing a particular behavior. Closely related to the construct of moral norms is the concept of anticipated regret. Rivis et al. (2009) have stated that anticipated affect refers to the prospect of feeling positive or negative emotions (e.g., guilt, regret) after performing or not performing the behavior in question. The two concepts, moral norm and anticipated regret, are interrelated because often feelings of regret and guilt arise from breaking a moral rule.

Some studies specify moral norms and anticipated emotions as different aspects of an individual's personal norm (Parker et al., 1995; Harland et al., 1999; De Pelsmacker and Janssens, 2007). These studies do not distinguish between these anticipated emotions and personal norms and identify these emotions as part of a process in which personal norms affect behavior. Other study, however, suggested that moral norm and anticipated emotions are separate constructs that have different roles in predicting intention and action for a range of health behaviors (Godin et al., 2005; Rivis et al., 2009; Elliott and Thomson, 2010; Onwezen et al., 2013).

According to the Norm Activation Model (NAM; Schwarz, 1977), personal norm is the key determinant of individual social behaviors that may be distinguished from other social norms. In addition, Manstead (2000) has argued that moral norm should be considered distinguishable from the standard constructs included in the

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