



Intention to speed in a rural area: Reasoned but not reasonable

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ABSTRACT

To disregard the speed limit is the most frequently reported violation. High speed has been related to road traffic accidents and is the main reason for people being killed or seriously injured. There is evidence to suggest that speeding is related to beliefs which minimize the perception of risk. The aim of the following study was therefore to determine what motivates drivers to speed. An extended version of the Theory of Planned Behaviour was used to examine the role of attitudes, subjective norms, perceived behavioural control and descriptive norms. The participants were randomly selected from the general public. The results demonstrated the value of TPB in the prediction of speeding on a rural road and that positive beliefs had a stronger link to intention than negative ones. It was also able to demonstrate the significant effect of descriptive norm and distinguish between two different groups of intenders; one low in ambivalence and one high. The latter group is relatively unknown and future research is required to explore their needs and motives in some more depth. Finally, the role of gender was assessed and the results showed that driving experience and age were important factors explaining women's lower intention to violate. Furthermore, the model was able to predict male and female intentions equally well and the unique effect of the various constructs within the TPB was also very similar. The findings from this study call for more tailored interventions.

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1. Introduction

During 2003 approximately 47,000 people were killed in traffic and 1.8 million injured in 14 of the European Union countries (Safetynet., 2005). Speeding is considered to be an important factor in road crashes (French, West, Elander, & Wilding, 1993) and it is estimated that in around 30% of all fatal accidents speed is the essential contributing factor (The European Road Safety Observatory, n.d). Speeding is also the most frequently reported road violation (Gras, Cunill, Sullman, Planes, & Aymerich, 2004).

There is evidence to suggest that car drivers are aware of the link between speeding and crash risk but do not believe that they themselves are at risk. For instance, Brown and Cotton (2003) found that drivers who speeded believed that they could do so but still drive safely. It could therefore be argued that speeding is closely related to the persons own attitudes. Indeed studies have found that speeding is related to beliefs which can minimize the perception of risk (Brown & Cotton, 2003; Christensen, Moran, & Wiebe, 1999). More specifically this can be a belief that speeding takes them to the destination quicker, is more comfortable and more in tune with the surrounding traffic (Forward, 2009a; Parker, Manstead, Stradling, & Reason, 1992a). Studies comparing male and female drivers have found that women are more negative about breaking traffic rules than men (Parker et al., 1992a; Weseman, 1989). The difference is especially prevalent between young men and women: Young men have been found to be more optimistic than young females (DeJoy, 1992; McKenna, Stanier, & Lewis, 1991).

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and they also believed themselves to be more invulnerable than female drivers (Harré, Field, & Kirkwood, 1996). In the study by McKenna et al. (1991) it was assumed that the differences between men and women could be due to driving experience. In their study, women who used the car regularly lacked the kind of poor self-confidence that typically described women with less experience of driving.

In recent years the research looking at driving violations has greatly benefited from a more systematic approach and the adaptation of theories aimed to predict behaviours. One such theory, namely the Theory of Planned Behaviour (TPB) (Ajzen, 1988) and its predecessor Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) have been used to predict a range of different transport related behaviour (e.g. Budd, North, & Spencer, 1984; Elliot, Armitage, & Baughan, 2003, 2005; Forward, 2009b; Letirand & Delhomme, 2005; Parker, Manstead, Stradling, Reason, & Baxter, 1992b; Stasson & Fishbein, 1990; Wallén Warner & Åberg, 2008).

The Theory of Planned Behaviour predicts that personal decisions (intention) are based on a combination of attitude toward the behaviour, subjective norm and perceived behavioural control. Demographic factors such as age and gender are, according to the theory, more distal predictors of behaviour through the individual's beliefs.

According to the TPB, a decision to react, or not to react, is regarded as the product of an evaluation of the positive and/or negative consequences of an action. Thus actions are regarded as reasoned although this is not to say that they always are reasonable.

Despite the success of the model there still remain some reservations. For instance it has been suggested that attitudes are bi-dimensional rather than uni-dimensional. Attitudes are usually described as positive or negative although it is quite possible for the same person to evaluate an object as both positive and negative. In this instance the attitudes can be described as 'ambivalent'. An increasing number of studies have found that people hold ambivalent attitudes towards a range of different behaviours; pro-environmental behaviour (Costarelli & Colloca, 2004), eating habits (Berndsen & van der Pligt, 2004), smoking (Lipkus et al., 2005), condom purchase (Dahl, Darke, Gorn, & Weinberg, 2005), capital punishment (Newby-Clark, McGregor, & Zanna, 2002), abortion (Newby-Clark et al., 2002) and gay and lesbian rights (Craig, Martinez, Kane, & Gainous, 2005).

Subjective norms have also been questioned and some would argue that it is too narrow (Rivis, Sheeran, & Armitage, 2006) and that other norms should be included, such as descriptive norms (e.g. Conner & McMillan, 1999; Forward, 2009b; Grube, Morgan, & McGree, 1986; Heath & Gifford, 2002; McMillan & Conner, 2003; Norman, Clark, & Walker, 2005; Rivis & Sheeran, 2003a; Rivis et al., 2006; Sherran & Orbell, 1999). In a meta-analysis based on 14 studies it was found that the variable was generally successful and increased the variance with 5% over and above the variables already in the model (Rivis & Sheeran, 2003b). This variable is different from subjective norms since it deals with *is done* rather than something which *ought* to be done (subjective norm). This has also been confirmed by a number of studies (Cialdini, Reno, & Kallgren, 1990; Conner & McMillan, 1999; Grube et al., 1986) and at times descriptive norm is a better predictor of intention than subjective norm (Forward, 2009b; Rivis et al., 2006). In the study by Forward (2009b), the strongest link to descriptive norm was with regard to a behaviour described as very risky (dangerous overtaking) which supported the assertion made by Rivis and Sheeran (2003b) that the contribution of descriptive norm is larger when the behaviour is risky.

To date few studies have used the TPB to assess speeding in a rural area making it very difficult to draw any firm conclusions about this behaviour. The present study will therefore test the theory in this specific context. Furthermore, by including a large sample, this study will be able to elaborate on the effect of gender by also controlling for age and annual mileage. It will assess the effect of social pressure in more detail by treating subjective norm and descriptive norm as separate constructs. Finally it will take a closer look at drivers' belief and determine how they evaluate the object.

The main goals of this study are as follows:

The first goal is to determine the effect of TPB and descriptive norm in the prediction of intention. The second is to examine attitudes towards the behaviour in more detail, including the possibility of distinguishing two different groups; low and high ambivalence. The third is to compare and contrast male and female drivers controlling for both age and annual mileage.

2. Method

2.1. Participants

Participants were 1798 drivers randomly selected and drawn from the public driving licence records, 603 were female (33.5%) and 1195 were male (66.5%). This can be compared with the most recent Swedish national travel pattern survey (RES 2005–06) where it was estimated that 31% of the total traffic mileage was performed by women (SIKA, 2007). Fourteen percent ($n = 250$) had previous convictions for speeding, 47% would drive in rural areas on a daily basis, 26% several times a week, 16% two times a week, 7% two times per month and 4% very rarely. The annual mileage was on average 2.095 km in the last 12 months (range 1–22,000 km) which is slightly more than the national average of approximately 1400 km (SIKA, 2007). The respondents were stratified according to four different age groups, see Table 1.

The largest number of people were 52 years and older followed by 42–51 years. Eleven of the participants did not want to indicate their age. The distribution of men and women in each category was roughly the same.

Table 1

Age of the respondents.

Age group	n	%	Women (%)	Men (%)
52 years and older	660	36.9	35.9	37.5
42–51 years	466	26.1	26.2	26.0
32–41 years	365	20.4	23.7	18.8
31 years and younger	296	16.6	14.2	17.8
Total	1787	100.0	100.0	100.0

2.2. Procedure

A questionnaire was sent out to 3000 drivers, aged 18–70 years, in the county of Västra Götaland and completed by 1.798 (response rate = 60%). In the survey a driving scenario was presented and according to the principle of compatibility, target context and time were clearly specified (see Ajzen & Fishbein, 2005). The description included a photo of a fairly narrow rural road without a hard shoulder (approx. 9 m wide). The visibility was reduced by a sharp curve. In the photo three cars travelled on the road, two in one lane and one in the other. The text underneath the photo asked the respondent to imagine themselves to be driving on this road. The speed limit was 90 km/h but they were driving at a speed of 110 km/h, see Fig. 1.

Responses to the items included in the Theory of Planned Behaviour were measured on a unipolar (+1 to +7) scale. Intention was measured by one item: *I intend to drive in 110 km/h on a 90 km/h road within the next month* (1 = very likely to 7 = very unlikely). Behavioural beliefs were measured by eight items, five positive towards the offence and three negative (1 = strongly agree to 7 = strongly disagree). Outcome evaluations included the same set of beliefs but were judged on how important or serious they were (1 = Very serious/important to 7 = Not very serious/important). The combination of behavioural beliefs and outcome evaluation (bb * oe) presented a Cronbach's α of .73. Subjective norm was measured by one item referring to people close to themselves (1 = completely acceptable to 7 = completely unacceptable). Perceived behavioural control was measured by one item: *For me to (commit the offence) is very easy* (1 = very easy to 7 = very hard). Two items were used to measure control beliefs: *I would be more likely to drive in 110 km/h if I was in a hurry* and *I would be more likely to drive in 110 km/h if I felt irritated* (1 = very likely to 7 = very unlikely). Cronbach's α was .81. One item assessed descriptive norm *People close to me would usually drive 110 km/h* (1 = strongly agree to 7 = strongly disagree). In accordance with the guidelines provided by Ajzen all the salient beliefs were elicited through a pilot study. At the end of the survey the respondents' age, sex and annual mileage were recorded. Table 2 presents age, sex and annual mileage.

Analytical methods used in this study were descriptive statistics (mean, SD), Pearson's product–moment correlation, Principal Component Analysis, hierarchical multiple regression analysis, *t*-test and ANOVA.

3. Results

Table 3 reports the average scores of the constructs as measured by an extended version of the TPB. The table also presents the intercorrelation between items.



Fig. 1. Scenario.

Table 2

Age, sex and annual mileage.

Age group	Annual mileage					
	<=500 km		501–1,499 km		>1,500 km	
	Men <i>n</i>	Women <i>n</i>	Men <i>n</i>	Women <i>n</i>	Men <i>n</i>	Women <i>n</i>
52 years and older	18	50	135	83	281	69
42–51 years	12	19	49	62	237	66
32–41 years	10	12	40	45	169	63
31 years and younger	8	8	40	25	152	35
Total	48	113	264	215	839	233

Table 3

Means, (SD) and zero-order Pearson correlations among the various components.

Study variable	M	SD	ATT	SN	PBC	CB	DN
Attitude	7.16	3.57	–				
Subjective norm	4.30	2.00	.59	–			
Perceived behavioural control	5.66	1.48	.33	.40	–		
Control beliefs	4.22	1.69	.26	.32	.26	–	
Descriptive norm	4.09	1.87	.55	.70	.40	.32	–
Intention	4.40	2.31	.61	.59	.44	.42	.55

Note: A high mean value indicates attitude, intention and subjective norm in favour of the violation. For perceived behavioural control a high mean indicates that the behaviour is easy to perform and for control beliefs that it is more likely. Attitude scores range from .75 to 21.88; subjective norm, perceived behavioural control, control beliefs and intention from 1 to 7. All correlations are significant at the 0.01 level.

The relatively high mean values presented in Table 3 indicates that speeding in a rural area is not considered as very dangerous, that it would be accepted by others and easy to do. In addition to this the participants also believed that others would speed. In fact 52% of the sample indicated that they intended to violate (scoring > 4) and 79% that it was very easy to do. Fifty-one percent believed that others would accept the behaviour and 45% that it was a common behaviour amongst their friends. Sixty-two percent of the participants stated that speeding would be more likely if they were in a hurry and for 34% that it would be more likely if they felt irritated (scoring > 4).

According to the Pearson's correlation coefficients all the TPB variables were significantly associated with intention and, as the theory suggests, more strongly related to intention than to each other. Attitudes and subjective norm were most highly correlated with intentions ($r = .61$ and $.59$, respectively). This meant that those who intended to speed, also held positive beliefs about its outcome and felt support from others. The relationship between the direct and the indirect measure of perceived behavioural control demonstrated a rather weak relationship ($r = .26$). Descriptive norm was significantly correlated with all the TPB variables although the relationship was strongest between descriptive norm and subjective norm ($r = .70$, $p < .001$). To clarify if this would indicate multicollinearity a separate analysis was carried out. The results showed that the level of tolerance for subjective norm and descriptive norm was .5 and VIF 2 which in turn indicate that multicollinearity was not a problem. Furthermore it was found that 53% of the sample did not respond in the same way to both questions.

3.1. The prediction of the intention to speed in a rural area

The aim of this study was to assess an extended version of the TPB and to ascertain how effectively it could explain the intention to speed on a major road. In the relevant analyses, a hierarchical multiple regression analysis was used, where intention represents the dependent variable. Attitude, subjective norm, perceived behavioural control and control beliefs were entered on step 1, descriptive norm on step 2 and age, sex and annual mileage on step 3.

The regression model presented in Table 4 shows that attitudes, subjective norm, perceived behavioural control and control beliefs had significant beta coefficients and accounted for 53% of the variance. At the second step descriptive norm was entered increasing the variance with 0.7%. After the introduction of descriptive norm the beta value of subjective norm made the greatest drop as compared with the other variables within the TPB. At the third step age, sex and annual mileage were entered accounting for another 2% of the variance.

Furthermore, if intenders (scored > 4) were compared with non-intenders (scored < 4) then it was shown that 92% of the intenders and 60% of the non-intenders would argue that it was easy to drive at 110 km/h. Seventy-three percent of the intenders believed that others would accept their chosen behaviour whereas the same only applied to 23% of the non-intenders.

3.2. Behavioural beliefs and attitudinal ambivalence

The eight behavioural beliefs were subjected to principle-components factor analysis (PCA). Before performing the test the data was inspected. The Kaiser–Meyer–Olkin measure of sampling adequacy was accepted (.82; Bartlett's Test of

Table 4

Summary of hierarchical regression analysis for variables predicting the intention to speed in a rural area.

Step/predictor	R^2	R^2_{change}	B	β	F_{change}
<i>Step 1</i>					
Attitude			.17	.36	
Subjective norm			.29	.25	
Perceived behavioural control			.26	.17	
Control belief	.53	.53	.28	.21	454.52
<i>Step 2</i>					
Attitude			.16	.33	
Subjective norm			.22	.19	
Perceived behavioural control			.24	.15	
Control belief			.26	.20	
Descriptive norm	.54	.07	.15	.12	23.90
<i>Step 3</i>					
Attitude			.15	.31	
Subjective norm			.19	.16	
Perceived behavioural control			.22	.14	
Control belief			.24	.18	
Descriptive norm			.16	.13	
Age			.29	.06	
Sex			.23	.11	
Mileage	.55	.20	.00	.07	23.76

Note: R^2 = adjusted R square; B = unstandardized regression coefficients. β = standardized regression coefficients. All R^2_{change} , β weights and F values are significant at $p < .001$.

Sphericity $p < .001$). The principle-components analysis produced 2 factors with eigenvalues greater than 1.0 and a scree test (Cattell, 1966) indicated a 2 factor solution. In the next step the two components were subject to PCA analysis and since the factors were not independent ($r = -.33$) an oblique rotation was used. The two rotated factors accounted for 60% of the total variance. Table 5 presents the factor loadings for the 2 components.

The eight behavioural beliefs were subjected to a principal component analysis for factor extraction. All the items were entered and an Oblique method of rotation was used (see Table 5). Results of this analysis identified two factors which could be interpreted as positive and negative outcomes.

Table 5 demonstrates two factors explaining 60% of the variance. The first one explained 44.5% and the second 15.6% of the variance. All positive beliefs loaded on factor 1 with a value between .60 and .87. The negative beliefs loaded on factor 2 with a value of roughly the same magnitude as factor 1 (.71–.82). A mean score of each factor was computed and the relationship between the two factors and intention to violate was assessed using a multiple regression analysis. The results showed that the contribution of positive beliefs to the prediction of intention was greater than for negative beliefs ($\beta = .50$, $p < .001$, $\beta = -.23$, $p < .001$, respectively). Each behavioural belief was then subjected to a multiple regression analysis, entering intention as the dependent variable and the eight beliefs as the independent variables. The results showed that seven beliefs explained 42% of the variance $F(8) = 155.643$, $p < .001$. The two most important ones were “make the driving more pleasant” ($\beta = .23$, $p < .001$) and “adjust my driving to other drivers” ($\beta = .23$, $p < .001$). “Increase my perception making me more alert” was not significant. It was therefore decided to remove this last item from further analysis.

Table 5

Oblique rotation of two factor solution for behavioural beliefs items.

Item	Component 1: positive outcomes
<i>To drive 110 km/h will:</i>	
Adjust my driving to other drivers	.71
Increase my perception making me more alert	.72
Take me to the destination quicker	.67
Makes the driving more pleasant	.82
Makes the driving more enjoyable	.79
% of variance explained	44.48%
Item	Component 2: negative outcomes
<i>To drive 110 km/h will increase my own:</i>	
Risk of being fined	.73
Risk of being involved in an accident	.80
Risk of losing control over the car	.75
% of variance explained	15.65%

Note: Only loadings above .3 are displayed.

To assess the participant's level of ambivalence a method similar to Kaplan (1972) was used in so far as the positive and negative beliefs were assessed separately. A person was described as high in ambivalence if the separate measures of positive beliefs and negative beliefs were less than or equal to 3.9 (on a scale from 1 to 7) indicating that the person agreed with both the positive and negative statements. A person low in ambivalence scored from 5 to 7 on the positive factor and less than or equal to 3.9 on the negative factor indicating that the person agreed with the positive ones but disagreed with the negative ones. This method would ensure that they were ambivalent and not merely indifferent.

The first group (low in ambivalence) consisted of 311 people (17% of the total sample) and the second group (high in ambivalence) consisted of 156 people (9% of the total sample). In the first group 93% intended to speed (score > 4) and in the second 71%. Table 6 summarises the results from a *t*-test which compares drivers low and high in ambivalence who intend to violate. Only results significant at the level of $p < .05$ or less are reported.

Table 6 shows that drivers high in ambivalence perceived less support from others and were more likely to violate if they were in a hurry or felt irritated. However, as compared with drivers low in ambivalence they perceived the behaviour as less easy and they also associated themselves with people who themselves would not violate. As indicated by the effect size (Cohen's *d*) the magnitude of the differences in the means were small to medium (eta squared from .22 to .43). The smallest overlap was with regard to subjective norm and one of the control beliefs (irritated).

3.3. Male and female drivers

The results from the multiple regression analyses showed that the persons' sex made a significant contribution to the prediction of speeding. A *t*-test, ANOVA and a multiple regression analysis were therefore used to assess the difference between men and women in some more detail. A significant difference between men and women was found with men ($M = 4.67$, $SD = 2.27$) being more likely to speed than women ($M = 3.85$, $SD = 2.29$) $t(18) = 7.17$, $p < .001$. The number of women who intended to violate was 245 women (41%) whereas for men this figure was slightly larger 687 (57%). Further analysis using the ANOVA assessing the effect of exposure and age showed that those who were driving >15,000 km per year were more likely to speed than drivers who used the car less $F(2) = 118.47$, $p < .001$ and those aged 31 years and younger were also more likely to speed $F(3) = 65.525$, $p < .001$. Hence the effect of annual mileage and age was controlled for when assessing the difference between men and women. When men and women within the same age group and annual mileage was assessed the results became non-significant in all but one condition: Men and women aged 31 years and younger who were driving > 15,000 km per year differed significantly from each other with men ($M = 6.97$, $SD = 1.57$) being more likely to speed than women ($M = 5.38$, $SD = 1.91$) $t(18) = 2.20$, $p < .05$.

The predictive utility of TPB was evaluated separately for men and women using a multiple regression analysis. Attitude, subjective norm, perceived behavioural control and control beliefs were entered as the independent variables and intention as the dependent variable. For women the model explained 50% of the variance in the intention to speed and for men the same applied to 53%. The variable within the TPB with the largest contribution in both groups was attitude (women $\beta = .33$, $p < .001$; men $\beta = .34$, $p < .001$). This was then followed by subjective norm (women $\beta = .25$, $p < .001$; men $\beta = .28$, $p < .001$). However, the effect of perceived behavioural control and control beliefs were slightly different. Amongst the women perceived behavioural control was a better predictor of intention than control beliefs ($\beta = .19$, $p < .001$; $\beta = .18$, $p < .001$ respectively), whereas for men it was the opposite ($\beta = .21$, $p < .001$; $\beta = .15$, $p < .001$, respectively).

An additional multiple regression analysis on intention was carried but this time only the eight items measuring behavioural beliefs was included. The results showed that for both men and women the belief that speeding on a major road was more pleasant made the greatest contribution to the prediction of intention (women $\beta = .19$, $p < .001$; men $\beta = .25$, $p < .001$). This was then followed by a belief that speeding on a major road was better adjusted to other drivers (women $\beta = .26$, $p < .001$; men $\beta = .23$, $p < .001$). However, some difference was revealed since the belief that speeding would increase the risk of being involved in an accident only predicted the intention amongst the women ($\beta = .12$, $p < .01$). This would then indicate that the women who intended to violate did not believe to the same extent as those who had not the same intention that speeding could result in an accident. The belief that they would be fined for the offence and that speeding would take them to the destination quicker predicted the intention amongst the men but not amongst women, although its contribution was very small ($\beta = .08$, $p < .05$; $\beta = .09$, $p < .05$, respectively).

Table 6

Means, (SD), *t*-score and Cohen's *d* on TPB variables for high and low ambivalence drivers who intend to speed on a rural road.

Factors	Low ambivalence ($n = 288$)	High ambivalence ($n = 110$)	<i>t</i>	<i>d</i>
Subjective norm	5.89 (1.25)	5.25 (1.53)	-4.33***	.46
Descriptive norm	5.51 (1.45)	5.18 (1.38)	-2.03*	.23
Perceived behavioural control (easy)	6.41 (.96)	6.19 (1.06)	-1.94*	.22
Control belief (more likely if in a hurry)	5.12 (1.82)	5.63 (1.50)	2.59**	-.31
Control belief (more likely if irritated)	4.09 (1.78)	4.71 (1.69)	3.15***	-.36

Note: High scores indicate that the person agrees with the statement.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

The same procedure as above was then used entering outcome evaluations as the dependent variable. The results showed that the items predicting intention for men and women were relatively similar. The most important factor predicting the intention to speed was that for them getting to the destination quickly was very important (women $\beta = .27$, $p < .001$; men $\beta = .28$, $p < .001$). This was then followed by fines and accidents which would imply that intenders did not regard these consequences as serious as the others (women $\beta = .22$, $p < .001$; men $\beta = .23$, $p < .001$; women $\beta = .15$, $p < .001$; men $\beta = .18$, $p < .001$, respectively). However, one difference between men and women was presented. In the male group the question about pleasantness predicted the intention ($\beta = .14$, $p < .01$) whereas for women it was the question of the importance of having fun whilst driving ($\beta = .10$, $p < .01$).

4. Discussion

The results from the present study showed that the TPB was successful in predicting the intention to speed on a major road. The variance explained was 53%, which is more than presented in another Swedish study by Wallén Warner and Åberg (2008) (41%).

The best predictor, according to the beta weights, was attitudes suggesting that drivers who intended to speed evaluated this behaviour positively. This was then followed by subjective norm, control beliefs and perceived behavioural control. In contrast, Wallén Warner and Åberg (2008) showed that the most important factor was control beliefs followed by subjective norms and then attitudes. One possible reason for the discrepancy between the two studies could be that in the study by Wallén Warner and Åberg (2008) the questions focused on rural environments in general whereas in the present study a specific road with a specific speed limit was assessed.

As compared to other studies assessing the intention to speed in an urban area the contribution of perceived behavioural control was rather weak (e.g., Elliot et al., 2003; Forward, 2009b; Parker et al., 1992b). One explanation for this could be that speeding in an urban area was perceived as more difficult as compared to speeding on a major road and therefore not differentiating intenders and non-intenders to the same extent. In the present study two aspects of perceived behavioural control was employed; one direct measure, dealing with ease and difficulty, and two more specific ones, dealing with being irritated and in a hurry. The results showed that both added to the prediction of intention. It has been argued that the first, also described as self-efficacy, closely resembles attitudes (Kraft, Rise, Sutton, & Røysamb, 2005; Leach, Hennessy, & Fishbein, 2001) although this was not confirmed by this study. In fact, perceived behavioural control bears a stronger relationship to intention ($r = .44$) and subjective norm ($r = .40$) than to attitudes ($r = .33$). However, the relationship between the direct and the indirect measures of perceived behavioural control was rather weak ($r = .26$) which would support Ajzen (1991) who argued that the relationship has only been partly supported.

The study also showed that the intention to speed was relatively strong with 52% (scoring > 4) indicating that they intended to violate. This would be in accordance with two studies based on observed speed which showed that approximately 50–57% of drivers exceeded the speed limit on roads in rural areas (Bergdahl, 2007; Swedish National Road Administration, 1999).

Behavioural beliefs were examined in some more detail and evidence from a principal component analysis (PCA) resulted in two different factors explaining speeding in a rural area. All the variables dealing with positive outcomes of the behaviour loaded strongly on the first component and all the negative ones on the second one. A multiple regression analysis was then carried out entering the two components as the independent variable and intention as the dependent. The results showed that positive beliefs were superior in its prediction of intention as compared to negative beliefs. Furthermore, when all the behavioural beliefs were entered separately the results showed that three of the eight beliefs accounted for 40% of the variance (the total variance explained was 42%). The largest contribution was made by the belief that speeding would make the driving more pleasant ($\beta = .23$, $p < .001$) and this was then followed by speeding being better adjusted to other drivers ($\beta = .23$, $p < .001$). This would then imply that the real difference between intenders and non-intenders lies in their belief in positive outcomes. These results would support findings of other studies in this area, which report that speeding is related to positive feelings (Rothengatter, 1988), that speeders derived more pleasure from driving (McKenna, 2005), that it would take them to the destination quicker, be more comfortable and more in tune with the surrounding traffic (Forward, 2009a; Parker et al., 1992a).

The present study used an extended version of the TPB and the results showed that the contribution of descriptive norm was significant and increased the variance with of 0.7% after the variables within the TPB had been taken into account. The contribution of descriptive norm was less than previously reported (5%) by Ravis and Sheeran (2003b). One possible reason for the discrepancy could be that speeding on a rural road is not regarded as risky, a factor which is believed to increase the variance of descriptive norm (Forward, 2009b; Ravis & Sheeran, 2003b). Indeed, in the study by Forward (2009b) descriptive norm contributed 10% to the prediction of dangerous overtaking, a behaviour perceived as very risky. Another explanation could be the high relationship between descriptive norm and subjective norm in this study ($r = .70$) which could indicate that subjective norm, which was entered first, also accounted for descriptive norm. So, in this instance, what people ought to do and what is done is fairly similar.

The second aim of this study was to examine attitudes towards the behaviour in more detail including the possibility of distinguishing two different groups, low and high ambivalence. So far no consensus has been reached with regard to the method used to measure this concept (Conner, Povey, Sparks, James, & Shepherd, 2003). In this study a similar method

proposed by Kaplan (1972) was therefore used assessing positive and negative beliefs separately. A person high in ambivalence evaluated speeding as both positive and negative whereas a person low in ambivalence evaluated it as positive, disbelieving the negative ones. This would then suggest that attitudes towards speeding are bi-dimensional rather than uni-dimensional, something which also has been demonstrated in different studies (Berndsen & van der Pligt, 2004; Costarelli & Colloca, 2004; Dahl et al., 2005; Lipkus et al., 2005; Newby-Clark et al., 2002).

However, this study was not only able to identify low and high ambivalence – it was also able to relate it to their intention. Results showed that 71% of the people defined as high in ambivalence intended to speed and the same number amongst the people low in ambivalence was 93%. Furthermore drivers high in ambivalence were more likely to speed if they were in a hurry or if they felt irritated. This group of drivers felt less support from others and believed that a smaller proportion of them would behave in the same manner. It could therefore be concluded that amongst the speeders exist a group who would speed when under pressure even if they are not convinced that the behaviour will result in a positive outcome.

Demographic variables are said to act indirectly on intention via the variables already included in the model. However, this was not confirmed by the present study since age, sex and annual mileage increased the explained variance with 2%. This would also be in agreement with other results within the field of transportation, although the effect is generally rather low, around 1–4% (Forward, 2009b; Parker et al., 1992b).

This study was relatively large and in contrast to many studies it was able to make a more thorough examination of male and female drivers. The results showed that women drivers in general were less likely to speed as compared to men which are consistent with other studies (Parker et al., 1992a; Weseman, 1989). However, it would be wrong to treat men and women as two distinct groups since both age and annual mileage are important factors explaining some of the difference. For instance, studies comparing young and old drivers have found that young men are more likely to underestimate risks (DeJoy, 1992; McDonald, Ingham, Hall, & Rolls, 1991; Tränkle, Gelau, & Metker, 1990) and that annual mileage can explain why women underestimate their own driving skills (McKenna et al., 1991). Indeed, the results from the present studies were able to confirm that both age and mileage are important factors and account for some of the differences between men and women. The younger age groups were more likely to violate and the tolerance for speeding increased when the use of the car increased. Hence, when both annual mileage and age was controlled for the difference between men and women became non-significant except for the youngest age group who were driving more than 15,000 km annually. In this group the men were more likely to violate than the women.

A multiple regression analysis was then able to demonstrate that the TPB was able to predict both men and women's intention to violate equally well. The model explained 50% of the variance for women and 53% for men. The variable within the TPB with the largest contribution in both groups was attitudes followed by subjective norm. However, the effect of perceived behavioural control and control beliefs were slightly different. Amongst the women, perceived behavioural control was a slightly better predictor of intention than control beliefs whereas for men it was the opposite, although the differences were very small.

Additional multiple regression on behavioural intention were carried out entering behavioural beliefs and outcome evaluations separately. The results showed that the belief which made the greatest contribution towards the prediction of the intention to speed for both men and women was that speeding made driving more pleasant. This was then followed by a belief that high speed was better adjusted to the speed of other drivers. These two beliefs accounted for a substantial amount of the variance. However, the results also presented some differences between men and women albeit rather small. Women who intended to violate believed to a lesser extent than non-intenders that speeding would increase their risk of an accident. On the other hand, for men, fines and getting to the destination quicker were also significant predictors. Hence, men who intended to speed did not to the same extent as the other believe that they would be fined instead they believed that they would get to the destination quicker.

The results assessing the effect of outcome evaluations also showed that more or less the same factors predicted their intention to violate. For men and women the intention to speed was significantly explained by the importance of getting to the destination as quick as possible followed by a perception that fines and accidents were less serious. Finally, for men intention was also explained by the importance that the journey should be pleasant. For women it was the question of the importance of having fun whilst driving which contributed to the prediction of intention to speed.

4.1. *Implication for intervention*

Different campaigns have been developed to prevent, or minimise, the occurrence of driving violations. For instance, some campaigns trying to encourage safe performance of drivers have had little or no success, because most drivers believe that they already are both safe and skilful. To circumvent these problems the target group needs to be carefully studied since behaviour is guided by how the person interprets the situation. In addition, it is usually advisable to use a carefully tested theoretical model which provides clear and consistent statements of what rules the behaviour.

In this study an extended version of the TPB was used, a theory which on numerous occasions been found to be a sound measure of performance. The results demonstrated a strong link between intention and positive beliefs which would suggest that these beliefs need to be targeted for successful change. This can be seen as a great challenge especially if it is based on own experiences. One way forward could be to challenge their views, making them more aware of own bias. This would also be in line with Petty and Cacioppo (1986) who stated that changes in attitudes are more likely to occur if the message questions pre-conceived beliefs.

However, this study was also able to distinguish another target group, one that was ambivalent, believing both in positive and negative outcomes. This would then have some consequences on how messages are framed. Broemer (2002) demonstrated that people who held ambivalent feelings towards an object were more persuaded by negatively framed messages. Studies have also found that the group described as ambivalent have a stronger desire to change their behaviour (Lipkus et al., 2005). It could therefore be argued that they would be more open to information which could re-solve their feelings of inconsistency.

The importance of descriptive norms was established which have some important implications for interventions. For instance, a message highlighting that a certain offence is very common and therefore in need of heavier sanctions could be counterproductive if the influence is descriptive.

The limitations of the present study and suggestions for future research need to be mentioned. The present study only used a measure of intention and no objective measure of behaviour. This could be a problem although a fairly large number of studies suggest that intention is able to predict future behaviour reasonably well (e.g., Albarracín, Fishbein, Johnson, & Muellerleile, 2001; Armitage & Conner, 2001; Sheppard, Hartwick, & Warshaw, 1988; see also Ajzen, 1991 for a review) including driver behaviour (e.g., Elliot et al., 2003; Wallén Warner & Åberg, 2008). Nonetheless, future studies are needed where both intention and behaviour are assessed. By identifying a group of violator's who were ambivalent about the action, it became clear that this group of people is relatively unknown. Thus further research is needed to more fully appreciate the experience of the same and the motives behind their actions.

5. Conclusion

A theoretical model measuring social psychological determinants of behaviour would help us to understand why drivers commit different offences, which in turn could assist in the development of effective means of intervention and prevention.

In this context the present study reveals some important findings. First, it is able to demonstrate the value of TPB in the prediction of speeding in an urban area. Second, it is able to demonstrate a significant effect of descriptive norm. Although the effect of descriptive norm appears to be greater when dealing with more risky behaviour than speeding in a rural area, it is still nonetheless advisable to include it as a separate construct from subjective norm. By doing so the results will better capture the role of subjective influences which in turn can help to improve methods of interventions. It is therefore proposed that this variable should be included in future applications of the theory measuring driving violations. Another finding of the present study is the stronger link between positive beliefs and intention as compared to negative beliefs. The model is also able to distinguish between two different groups of intenders, one low and one high in ambivalence. Although women in general are less likely to violate, this study is able to demonstrate that age and annual mileage account for some of the difference. Furthermore when women decide to violate they are influenced by the same factors as men. It could therefore be concluded that the differences between men and women, presented in some studies, might be due to women's lack of experience but also that some studies fail to consider the effect of age.

Finally, the study was able to show that speeding in a rural area should be regarded as a reasoned behaviour even if it might be biased and at times inaccurate.

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