

Emotion and Speeding Intention: Predicting intention and differences between intenders and non-intenders

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Abstract

Introduction: Speeding behaviour has a direct link to crash involvement and crash severity, and speeding behaviour has been shown to be underpinned by intention to speed. Several researchers have suggested that emotional response facilitates speeding behaviour, although others have suggested that reasons for speeding are based on more practical aspects such as running late for an appointment. The Theory of Planned Behaviour has been applied to a range of road safety knowledge including that for speeding. Therefore this research which included a measure of arousal with TPB measures adds to the existing knowledge about speeding intention.

Methods: An on-line questionnaire which could be completed anonymously was presented to members of the community through Facebook. One hundred and eighty one respondents aged between 18 and 61 years (M= 30.80, SD = 12.63) were categorised into intenders or non-intenders of speeding 20 kilometres above the posted speed limit. Past speeding behaviour was included.

Results: The survey provided both sensitivity and specificity of around 80% in accounting for the prediction of speeding intention which is an excellent result. The components of the TPB and an extended model of the TPB that included past speeding behaviour were analysed to determine the potential predictors of speeding intention for each group. Effect sizes for these differences ranged from 0.32 to 1.43 (Cohen, 1992).

Conclusion: Speeding intention is based on an individual's attitude, perceived behavioural control and sense of arousal. Understanding these individual differences and providing an opportunity to predict speeding intention may facilitate the development of interventions to encourage drivers to slow down.

Key words: Speeding behaviour; Theory of Planned Behaviour; prediction

1. Introduction

Speeding behaviour has a direct link to crash involvement and crash severity¹⁻⁶ and speeding behaviour has been shown to be underpinned by intention to speed⁷⁻⁹. Several researchers have suggested that emotional response facilitates risky behaviours such as speeding behaviour¹⁰⁻¹², although others have suggested that reasons for speeding are based on more practical aspects such as running late for an appointment¹³, maintaining progress with the traffic¹⁴, or unintentionally¹⁵.

Speeding comprises two distinct behaviours, 'exceeding the speed limit' and 'excessive speeding'^{13,16}. 'Excessive speed' has not been formally defined, however it has been suggested that speeding under 20km/h above the speed limit was considered a minor offence¹⁷ and "excessive speeding" has been described as >20k over the posted limit¹⁸. In this research the requirement was that the level of speeding could be the result of arousal rather than simply an error or misjudgement on the part of the driver; however the researchers were aware of the Western Australian Road Traffic Amendment (impounding and Confiscation of Vehicles) Act 2004 under which

speeding in excess of 44 kilometres per hour can result in the impoundment of a vehicle. Therefore, it was considered that speeding in excess of 20 kilometres per hour over the posted limit should be sufficient to test the relationship of arousal to the intention to speed.

The Theory of Planned Behaviour¹⁹ has been applied to a range of road safety behaviours including speeding^{8, 20-22}. In the TPB intention to undertake a particular behaviour is based on the individual's underlying attitudes, subjective norms (SN), and perceived behavioural control (PBC). The TPB has been criticised for not including emotion^{20, 23-27}. Past behaviour has been implicated as an important predictor of future behaviour^{23, 28-29}, and as a predictor of behavioural intention³⁰ and was therefore included in the current research together with a measure of arousal to address the aforementioned criticism regarding the role of emotion within the TPB. The role of emotion on driving behaviour has recently received attention in research considering the effects of both positive and negative emotion-based anti-speeding messages³¹. In this research, appeals based on fear, pride and humour were used with results indicating a greater emotional response to pride (mean of 3.23) and humour (mean 3.07) compared to fear (mean 2.91). Analysis of the effect sizes for these differences³² indicated that the differences are small (pride and fear, 0.24; humour and fear, 0.13). Other recent research has indicated that emotional arousal may affect attention to driving tasks³³ and inattention has been linked with crash involvement³⁴.

Crash involvement has also been identified as an issue for occupational health and safety³⁵. Therefore the identification of those who are likely to exceed the speed limit has a range of potential applications: that of saving lives and reducing road trauma and reducing the cost of workplace safety through improved driver behaviour.

2. Method

2.1. Research design

This research employed a cross-sectional survey design that investigated the speeding intention of individuals based on the predictor TPB variables, (attitude, SN and PBC), along with past behaviour, age, gender and a series of arousal questions based in the context of speeding. Speeding intention was defined in this research as 20 kilometres or more above the speed limit; and the intention variable was dichotomous.

2.2. Participants

One hundred and eighty one drivers who have or have had a provisional or full license participated in the study. A convenience sample was obtained through distribution of the questionnaire on the social networking site *Facebook*, and further snowballing. Seventy six males and 103 females, with 2 participants failing to disclose demographic information participated. Participants were aged between 18 and 61 ($M = 30.80$, $SD = 12.63$). Examination of frequencies indicated that 95 (53%) participants were aged between 18 to 25; and 84 (47%) participants were aged 26 or over, providing a good range of young and mature drivers. The sample included 119 (65%) non-intenders and 62 (35%) intenders.

2.3. Materials

The questionnaire was developed using the strategies promoted for the construction and presentation of a TPB questionnaire³⁶ and an arousal scale³⁷. The TPB part of the questionnaire included six standard TPB attitude measures, two subjective norm and one motivation to comply, two PBC measures and one question measuring past behaviour. Eight arousal measures were chosen based on arousing words from Bradley and Lang that were considered by the researchers to be useful in the context of driving behaviour. How these were determined is described in Jones, Ferguson and Robinson (2011)³⁸. Intention to exceed the speed limit was represented by one question 'In the future I will exceed the speed limit by more than 20 kilometres per hour'. This was measured dichotomously by responding either 'yes' or 'no'. All other questions were scored on a scale of one to nine as this was the standard used by Bradley and Lang. The questionnaire is shown in the Appendix at the end of this paper.

2.4. Procedure

A convenience sample was obtained by distributing the questionnaire link to the 'Intention to speed' questionnaire (using Qualtrics™ survey software) on the social networking site, Facebook. A short description of the study was posted on the news feed to invite people to participate as well as the attached link. Participants followed the link, accessed the information letter, instructions to complete the questionnaire, the questionnaire, and the demographics sheet, with the data collected stored within the secure Qualtrics™ survey software website.

2.5. Research Questions and Statistical Analysis

The following research questions were examined in this research. First, the use of the TBP as a predictor of speeding intention was examined using logistic regression for both the basic TPB model, including past behaviour and demographic variables of age and gender and an extended model that included arousal using words considered arousing by Bradley and Lang (1999)³⁷. Second, the rates of prediction were produced. Third, differences in the variables that were useful for prediction for those who intended to speed and those that did not intend to speed were examined through *t* tests.

The analyses were based on intention to exceed the speed limit by more than 20kph as the criterion and in the first logistic regression the predictors were attitude (developed from the seven individual questions); the two subjective norm questions and motivation to comply; the three PBC questions and the demographic variables of age and gender. In the second logistic regression arousal (developed from the eight individual questions) was included in the model.

As the Bradley and Lang (1999) process used a range of nine points, the TPB questions were also placed on a similar scale, apart from intention to speed and past behaviour which were dichotomous measures.

3. Results

Data was downloaded from Qualtrics™ to PASW version 19 for analysis. Examination of the descriptive data for all participants evidenced high scores for all variables indicative of generally low arousal ($M = 6.46$, $SD = 1.93$) negative attitude towards speeding ($M = 7.17$, $SD = 1.66$). The internal validity of the items used to

develop attitude and arousal were assessed using Cronbach's alpha. Results are shown in Table one.

*Table 1
Cronbach alphas*

	Cronbach's alpha
TPB attitude	.92
Arousal measure	.93

For the basic TPB model (including demographics and past behaviour, there was a good model fit for all predictors χ^2 (10. N = 181) = 107.345, $p = .000$; Cox & Snell R^2 was .451 and Nagelkerke R^2 .624. These latter statistics relate to the amount of variance accounted for in the model and are similar to Pearson's r^2 in parametric statistics³⁹. The Hosmer and Lemeshow Test revealed χ^2 (df8) = 3.735, $p = .880$ representing a good fit^{40,41}. The significant variables in the regression were attitude, past behaviour, the opportunity to speed and age of the driver.

For the extended TPB model including arousal, there was a good model fit for all predictors χ^2 (11. N = 181) = 108.319, $p = .000$; Cox & Snell R^2 was .454 and Nagelkerke R^2 .628. The Hosmer and Lemeshow Test revealed χ^2 (df8) = 9.040, $p = .339$ representing a good fit^{40,41}. The significant variables in the regression were again attitude, past behaviour, the opportunity to speed and age of the driver. The inclusion of the arousal measures did not significantly increase the accounted for variance in the whole population.

The results of the logistic regressions indicate that almost 63% of the variance in intention to speed was accounted for by the variables used in the analysis.

The logistic regression analyses revealed that the questionnaire was both sensitive and specific with prediction rates as shown in Tables two and three.

Table 2 – Prediction rates for TPB model including demographics

Observed	Predicted yes	Predicted no	Percentage correct
Intenders	47	14	77.0
Non intenders	16	102	86.4
Overall percentage			83.2

Table 3 – Prediction rates for expanded TPB model including arousal

Observed	Predicted yes	Predicted no	Percentage correct
Intenders	48	13	78.7
Non intenders	16	102	86.4
Overall percentage			83.8

Participants were then categorised as intenders or non-intenders and between groups *t* tests were conducted to investigate differences between these groups. Descriptive data and the results of the *t* test are shown in Table four. This analysis revealed significant differences between intenders and non-intenders of speeding for the variables shown in Table four including arousal. Cohen's (1992)³² effect sizes are also cited to indicate the strength of the difference. Age of intenders was significantly younger for intenders (intenders 25.26 years; non-intenders 33.80 years).

Table 4 – T-test results including descriptive data for the tested variables

Variable	Intender mean/sd (n = 62)	Non-intender mean/sd (n = 119)	<i>t</i> -test values*	Effect size (Cohen, 1992)
Attitude	5.91/ 1.62	7.82/ 1.26	-8.117	1.33
Arousal	5.44/ 2.01	6.98/ 1.73	-5.358	0.82
People whose opinions I value	3.03/ 2.13	2.33/ 2.31	1.997	0.32
Most people important to me	7.66/ 1.80	8.58/ 0.99	-3.734	0.66
Motivation to comply	6.95/ 2.35	8.17/ 2.04	-3.454	0.55
PBC 'possible'	2.27/1.78	4.16/ 2.65	-5.672	0.85
PBC 'easy'	2.37/ 1.60	4.65/ 2.53	-7.373	1.10
PBC 'Opportunity to speed'	4.05/ 2.08	6.83/ 1.79	-9.373	1.43

*(Only variables with significant differences between the groups have been included)

4. Discussion and Conclusion

The findings strongly support the TPB in predicting intention to speed by 20km/h in excess of the posted limit. The traditional TPB model including demographics and past behaviour in the current study accounted for 62.4% of variance in speeding intention, which alone accounted for greater variance than models in many standard TPB studies investigating speeding behaviour (see Jones, Ferguson & Robinson, 2011)³⁸. This provides support for the predictive validity of the traditional TPB model predictors, accounting for statistically significant variance in intention, and which according to Cohen (1992)³² is a large effect size. The inclusion of arousal increased the accounted for variance in intention to speed by an additional .004%. This increase was unexpectedly low and may be the result of the large number of non-intenders in the sample and the dispersed age of respondents (18 to 61 years). The descriptive data indicated that the total sample was low in arousal and had a negative attitude towards speeding.

The rates of prediction were both sensitive and specific indicating that the survey could predict both intenders and non-intenders, with an overall prediction rate of 83%. This indicates the usefulness of this short survey across a range of ages, suggesting that it might have a general application in a range of situations, for example, in a workplace situation to determine employees who might be at risk of

speeding behavior and therefore a risk for occupational safety and health. Driver behaviour has been acknowledged as an important aspect of occupational safety and health³⁵ and it may be useful for employers to have a tool to identify those employees with an increased risk of speeding behaviour in order to refer them to programs to address this behaviour. The ability to predict employees who are more likely to speed could impact upon resources and funding required by a range of organisations to address speeding behaviour by employees who are required to drive as part of their work. As arousal did not make a large difference to the accounted for variance, nor the prediction of intenders and non-intenders, the questionnaire may be usefully reduced to 14 statements by excluding the first eight arousal statements.

The data revealed significant age differences between intenders and non-intenders and this has been a consistent finding in research with young drivers being noted as being more involved in speeding behavior and in this research the intenders had more positive attitudes toward speeding and higher levels of arousal. The *t* test data indicated significant differences across all the TPB variables and the arousal measure with effect sizes ranging from medium to large³². However, this may be a function of age and further research with a narrower age group may produce different results.

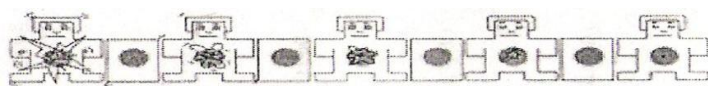
In the analysis of differences between intenders and non-intenders, there were significant differences across attitude, arousal, subjective norms and perceived behavioural control. In relation to attitude a lower score indicates a poorer attitude towards speeding intention. The effect size³² of 1.33 indicated large differences between intenders and non-intenders. The effect sizes across all variables (shown in Table 4) were medium to large³² indicating a range of opportunities to differentiate between intenders and non-intenders. This requires further exploration as the sample of intenders in this research was small and the age range large.

This research was limited by the small sample size and the self-selection of individuals who chose to participate in the research. The use of *Facebook* to collect the data may also have implications for the nature of the participant; with a lesser number of intenders than non-intenders completing the survey.

Implications for road safety organisations suggest that media messages intended to reduce speeding behaviour need to consider the differences between intenders and non-intenders and consider how such messages are presented. The fact that attitude and PBC produced large effect sizes may provide the bases for effective interventions and means that a range of effective media messages and/or behavior change programs may be developed.

5. Appendix - Questionnaire

Please place a cross in the manikin that best indicates your level of arousal to the descriptions of speeding. Speeding in this research is defined at 20 kilometres or more above the speed limit.



(Each part of question 1 included this manikin)

1. For me to drive at speed would be like riding a rollercoaster:

High arousal Low Arousal

Speeding is a thrill:

High arousal Low Arousal

I win if I speed:

High arousal Low Arousal

For me to speed would provide excitement:

High arousal Low Arousal

I feel sexy if when speeding:

High arousal Low Arousal

Speeding is fun:

High arousal Low Arousal

Speeding is an adventure

High arousal Low Arousal

Speeding gives me power:

High arousal Low Arousal

Please indicate by placing an 'x' in the box that best represents your thoughts about driving at speed.

Good Bad

Harmful Beneficial

Pleasant Unpleasant

Enjoyable Unenjoyable

Valuable Worthless

Responsible Irresponsible

Please indicate by placing an 'x' in the box that best represents your beliefs about driving at speed.

2. The people in my life whose opinions I value would disapprove/ approve of me speeding

Disapprove Approve

3. Most people who are important to me think that I should speed

Should Should not

4. I think that I should speed to comply with the wishes of people who are important to me

Should Should not

5. For me to speed would be:

Impossible Possible

Easy Difficult

6. If I was driving on a public road and I had the opportunity to speed, I would:

Most definitely Most definitely not

I have in the past exceeded the speed limit by more than 20 kilometres per hour YES / NO

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