

Positive emotional arousal has no effect on speeding intention

Chloe Jones, Catherine Ferguson*, Ken Robinson
Edith Cowan University, Joondalup, W.A.

*Tel: +61 6304 2845 or Mobile 0418 936 147

Fax: +61 6304 5834

Email: c.ferguson@ecu.edu.au

Abstract

Background: The Theory of Planned Behaviour (TPB) has been used successfully in the investigation of driver behaviour. However the theory has been criticised for not accounting for emotion and this deficiency may be responsible for unaccounted for variance in behavioural intention. Prior research has suggested that speeding behaviour has an emotional component.

Aim: The aim of this research was to extend the TPB by incorporating a measure of emotional arousal which was based on an intention to exceed the speed limit by more than 20 Km/ph.

Sample: A convenience sample of 176 drivers (43% male; 57% female) aged between 18 and 61 years (53% aged less than 25 years; 47% over 26 years) was recruited.

Method: An online questionnaire was developed based on the TPB and included measures of arousal based on Bradley and Lang (1999), and a measure of past speeding behaviour. Questionnaires were completed anonymously with respondents being directed through social networking sites to the questionnaire web link.

Results: The traditional TPB model accounted for 53.2% of variance in speeding intention, with past behaviour increasing this by 6.5%, and arousal accounting for an additional 0.01%. Past behaviour, attitude, and perceived behavioural control were the most influential predictors of intention.

Conclusion: There appears to be considerable challenges in finding an appropriate measurement of emotion for inclusion in TPB research for speeding intention. However the TPB variables (including past behaviour) accounted for a good proportion of the variance in intention.

Introduction

The examination of intention to speed is important to road safety, as speeding is often perceived as a normalised and tolerable behaviour^{1,2}, with drivers tending to cite appropriate speed as higher than the posted speed limit³, despite awareness that excessive speed heightens the likelihood of having a crash, increases the severity of the resultant crash and increases the potential of injury if a crash occurs^{2, 4-9}. Speeding is considered to comprise two distinct behaviours, 'exceeding the speed limit' and 'excessive speeding'^{10,11}. '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 offence¹² and "excessive speeding" has been described as >20k over the posted limit¹³. Excessive speeding is considered a deliberate act, based on motivation; therefore the factors underlying speeding intention must be examined to determine potential aspects that may be amenable to change⁸.

The Theory of Planned Behaviour (TPB)¹⁴ has been utilised for the examination of a range of traffic violations and driving behaviours including speeding¹⁵⁻¹⁷ and the results of previous research are shown in Table 1. Some of these results are from basic TPB research and some have included additional variables. In the TPB intentions are a function of underlying attitude, subjective norm (SN) and perceived behavioural control (PBC), represented diagrammatically in Figure 1. The TPB has been criticised for emphasising cognition as opposed to emotion, with the predictors in the TPB traditionally ascertained using cognitive measures, suggesting that intentions of behaviour are reasoned and planned, whilst overlooking and not explicitly defining and examining emotion^{15,19, 20-24}.

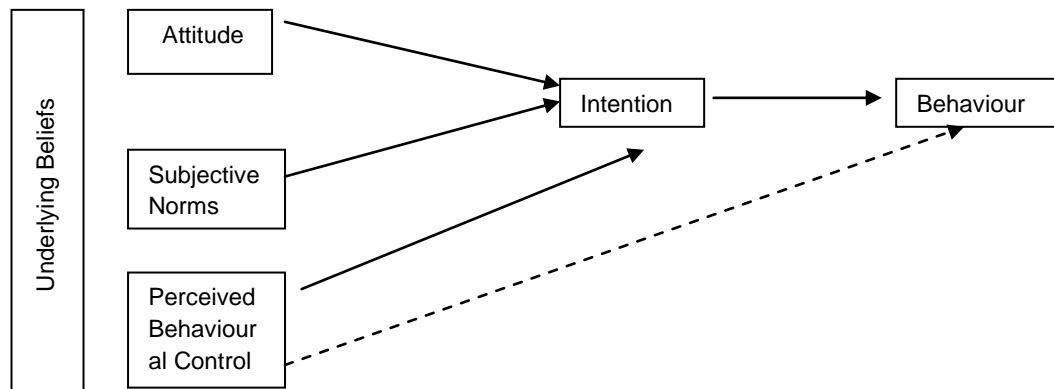


Figure 1 Theory of Planned Behaviour adapted from Ajzen (1991)

Table 1
Summary of Findings in Previous Research Applying TPB to Speeding Intention

Author	Accounted for Variance	Most Important Predictor
1 Parker et al. (1992b) ¹	47.2% - 49%*	PBC
2 Gordon and Hunt (1998) ²³	43-46%	Attitude/ PBC
3 Conner, Smith and MacMillan (2003) ²⁴	45%*	Past Behaviour
4 Newnam Watson and Murray (2004) ¹⁶	15%* - 27%*	Anticipated Regret
5 Stead et al. (2005) ²⁵	47%- 53%	PBC
6 Conner et al. (2007) ²⁶	76%*	Past Behaviour / Attitude
7 Forward (2009) ²⁷	47%- 71%*	Past behavior/ PBC
8 Elliott (2010) ²⁸	42-44%	Attitude
9 Elliott and Thomson (2010) ²⁹	55%-68%*	Past Behaviour/ Attitude
10 Forward (2010) ³⁰	53%- 55%*	Attitude

* Denotes studies that used additional predictors in addition to traditional TPB model

It appears that the role of emotion may have been underestimated in the TPB, with no differentiation being made between evaluations and feelings³¹. Ajzen and Fishbein (2000)³¹ acknowledge that it is likely emotion is involved in TPB processes, and cite arousal as a potential influence. It has been suggested that incorporating an improved measure of emotion, in addition to valence (i.e. evaluation) type measures

could enhance the TPB's predictive utility especially as emotion has been linked to speeding and risky behaviour in general^{32,33}.

It has been suggested that positive emotion overrides negative cognition in the performance of risk taking behaviour³⁴. Furthermore positive emotion in regards to risky driving behaviours, including speeding, has been found to be predictive of behaviour frequency, whereas negative emotion has not been found to reduce the frequency of behaviour³⁴. Positive and negative emotions are a well recognised construct in psychology³⁵ and at a general level are representative of an individual's feeling good or feeling bad. Incorporating an explicit measure of emotion should increase the TPB's predictive utility^{15,16,19,33}, enhancing prediction of intention, and surpassing the predictive utility of the traditional TPB variables¹⁸⁻²². Additional predictors may be added to the TPB as separate constructs^{14,29} with suggestions that emotion should be viewed as a separate construct directly predicting intention²², consistent with Triandis' work (1977)³⁶.

Emotion Definition and Measurement

It is agreed that emotion involves feelings and physiological reactions³⁷. In emotional situations the recognition of these physiological reactions, such as heart pounding, sweat secretion, muscle contraction and facial expressions, among others, guide us to make inferences, and evaluate our responses to objects³⁷. Emotion can be considered motivational, in which the interpretation of objects and possible outcomes can lead to specific behavioural activation³⁸. Lang (2010)³⁷ proposes motivation may be appetitive or defensive measured by the pleasantness-unpleasantness and the intensity of arousal. Furthermore the psychological examination of emotions has revealed two theoretically distinct dimensions; valence and arousal^{39,40}.

The definition of valence is the positive or negative evaluation of a specific emotion⁴¹. Valence is measured by rating an item where positive and negative poles represent the ends of a scale, determining the magnitude of pleasantness and unpleasantness^{40,42}. This measure of valence appears consistent with measures used in the TPB's attitude measure⁴³.

Arousal is measured using a unipolar dimension, ranging from neutral to highly arousing, determining the magnitude of calmness, excitement and agitation⁴⁰. Arousal level influences the semantic evaluations, and can be considered an invigorating power that directs the avoidance or approach of behavioural execution³⁸. Bradley and Lang (1999)⁴⁴ have further suggested that arousal may be the principal dimension of emotion and the primary motivator of intention to execute behaviour, thus emotional components in the TPB may be inadequately measured by instruments focusing solely on valence.

It may be that emotional arousal is linked to speeding given speeding's evidenced relationship with sensation seeking: the inclination to obtain diverse, new, intense feelings and experiences coupled with the readiness to take risks in order to do so⁴⁵. Sensation seekers execute behaviours, such as speeding that heighten the stimulation they feel, and may be undertaken to produce higher levels or optimise arousal⁴⁶.

Although the road safety literature suggests that positive emotion is a useful predictor for speeding, no road safety researcher has managed to capture the emotional aspect of attitude. Emotionally phrased dimensions such as *pleasant-unpleasant* or *enjoyable-unenjoyable* used within TPB research have continually failed to demonstrate the emotional aspect of attitude. A useful strategy to account for arousal within speeding behaviour may be the use of Bradley and Lang (1999)⁴⁴ instructions regarding the completion of arousal questions, thereby moving the emotional measure away from attitude to a separate additional variable. Bradley and Lang's (1999)⁴⁴ Affective Norms for English Words, (normative and standardised ratings of emotion, including arousal) and Self Assessment Manikin (SAM) arousal measure allow for emotions to be described and measured, and is simplistic in presentation⁴⁷.

The present research was designed to test the TPB in a speeding context. The researchers aimed to test the predictive utility of an extended version of the TPB to examine the intention to speed in excess of 20km/h over the limit. This intention was chosen as it appears that excessive speeding behaviour might be driven by emotion³³. It is apparent that the current scales used in TPB are not appropriately capturing emotion¹⁸. A separate emotional predictor of arousal has yet to be incorporated in extensions of the TPB, and arousal has been linked to risky behaviour³⁹, of which excessive speeding is one such behaviour³³. It was hypothesised, based on Bradley and Lang's (1999)⁴⁴ theory that the incorporation of an additional measure of emotion utilising arousal, would account for increased variance associated with intention to speed, compared to the traditional valence TPB measures.

Method

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.

Participants

One hundred and seventy seven 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 five males and 99 females, with 3 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 94 participants were aged between 18 to 25; and 83 participants were aged 26 or over, providing a good range of young and mature drivers.

Materials

The questionnaire utilised in this study was developed using the strategies promoted by Ajzen (2006)⁴⁸ for the construction and presentation of a TPB questionnaire and an arousal scale based on Bradley and Lang (1999)⁴⁴. The TPB part of the questionnaire included seven standard TPB attitude measures, two subjective norm and one motivation to comply, two PBC measures and one question measuring past behaviour. Eight arousal items, measured using Bradley and Lang's Self Assessment Manikin (SAM) pictorial representations were used. SAM is shown in Figure 2. Instructions to participants were "Please place a cross in the manikin that best indicates your level of arousal to the descriptions of driving "at speed". Driving "at speed" in this research is defined at 20 kilometres or more above the speed limit".

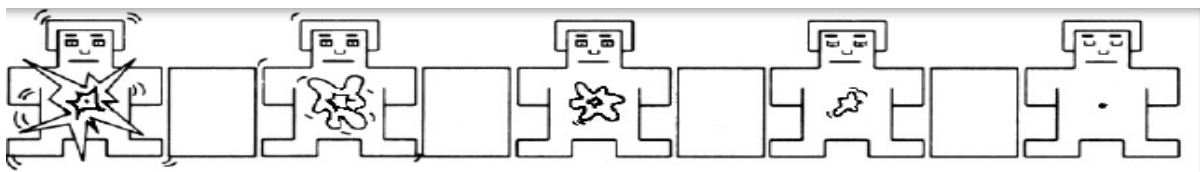


Figure 2 – The Self Assessment Manikin (SAM) for arousal from Bradley & Lang (1999)

Positive descriptive words were selected based on rating high arousal scores, as this serves as an indicator of emotion. The words chosen were; rollercoaster, thrill, win, excitement, sexy, fun, adventure, and power. Words were also chosen on basis of their appropriateness for the speeding context and positive words were chosen based on the presumed greater affiliation between positive emotion and speeding^{25, 30}. Higher scores reflected lower arousal associated with speeding statements. Two of the researchers independently chose appropriate words and the final words were based on agreement that the chosen words measured the highest arousal and were relevant to speeding intention.

Procedure

A convenience sample was obtained by distributing the questionnaire link to the 'Intention to speed' questionnaire (using QualtricsTM 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 data collected stored within the Qualtrics survey software.

Results

Data were analysed using PASW version 18. Examination of the descriptive data evidenced high scores for all variables indicative of generally low arousal ($M = 51.68$, $SD = 15.42$) negative attitude towards speeding ($M = 50.20$, $SD = 11.65$), SN disapproval ($M = 23.35$, $SD = 4.08$) and high PBC ($M = 13.29$, $SD = 6.16$).

Internal Consistency

The question items used were assessed using Cronbach's alpha. Table 2 shows the Cronbach alpha results which were excellent apart from subjective norms.

Table 2
Cronbach alphas

	Cronbach's alpha
TPB attitude	.92
SN	.48
PBC	.78
Arousal measure	.93

Association between TPB Predictors and Speeding Intention

A Spearman's (r^s) correlation was conducted given that it is a non-parametric test which is appropriate when data violates assumptions such as normal distribution. As shown in Table 3, all predictors were significantly correlated with speeding intention.

Table 3
Spearman Correlations among TPB predictors and Speeding Intention

Predictor	1	2	3	4	5	6	7	8
1. Intention	1.00	.27**	.26**	.46**	.37**	.33**	.56**	.56**
2. Age	-	1.00	-.030	.18*	.23**	.09	.22**	.39**
3. Gender	-	-	1.00	.32**	.28**	.17*	.33**	.15*
4. Past Behaviour	-	-	-	1.00	.36**	.24**	.49**	.48**
5. Arousal	-	-	-	-	1.00	.14	.51**	.43**
6. SN	-	-	-	-	-	1.00	.44**	.29**
7. Attitude	-	-	-	-	-	-	1.00	.641**
8. PBC	-	-	-	-	-	-	-	1.00

Note.** Correlation is significant at 0.01 level (2-tailed)

* Correlation is significant at 0.05 level (2-tailed)

As the research was designed to test the original TPB model against an augmented model that included arousal to predict intention to speed > 20 kilometres over the limit six logistic regressions using various predictors were conducted. These regressions are summarized in Table 4. Logistic regression was the statistic of choice as intention was dichotomised into 'nil' or 'any'.

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 in the current study accounted for 53.2% of variance in speeding intention, which alone accounted for greater variance than models in many standard TPB studies (see Table 1). This provides support for the predictive validity of the traditional TPB model predictors, accounting

for statistically significant variance in intention, pertaining to a large effect sizes as defined by Cohen (1992)⁴⁹.

*Table 4
Models and results for Logistic Regressions*

Model tested	Variance accounted for	Significant predictors
Traditional TPB model	53.2 %	Attitude ($p = .001$) and PBC ($p = .000$).
Traditional model and arousal	53.21%	Attitude ($p = .006$) and PBC ($p = .000$)
Traditional model and age and gender	56.1%	Attitude ($p = .004$) and PBC ($p = .000$)
Traditional model and past speeding	59.7%	Attitude ($p = .004$), PBC ($p = .000$) and past speeding ($p = .007$)
Traditional model, past speeding, age and gender,	61.6%	Attitude ($p = .005$), PBC ($p = .004$) and past speeding ($p = .010$)
All predictors examined	61.7%	Attitude ($p = .005$), PBC ($p = .004$), past speeding ($p = .009$)

This adds to a growing body of research on the successful application of the TPB to behavioural intentions⁴⁸. The logistic regression analyses indicate that in order of effect, PBC, attitude, and past speeding behaviour were the only significant predictors of intention to speed by 20 km/h. The weaker contribution of SN is common in TPB research^{14, 23} and has been evidenced in speeding contexts^{23, 27}. This study did not measure descriptive norms which may have limited the study as they can have some predictive benefit^{27, 30}. Future studies may wish to incorporate these.

PBC as the strongest predictor is consistent with previous research on speeding intention^{1,23,25,27} and the large positive correlation to speeding intention suggests that higher PBC is related to greater speeding intention^{25,28,30}, rather than feelings of low PBC associated with speeding intention¹. This suggests speeding intention is related to feelings of control and capability over the driving task and that speeding intention is related to feelings of self efficacy and controllability, in which capability and opportunities are in agreement with performance of the behaviour¹⁴. Attitude as a significant predictor is also consistent with findings from previous research (see Table 1) as well as general examinations of the TPB¹⁴. The correlations indicate that positive attitudes have a positive association to speeding intention. Therefore it appears speeding is linked to favourable attitudes towards speeding, indicating that those who intend to speed perceive more positive outcomes from speeding.

The hypothesis that a measure of emotional arousal would account for increased variance in intention to speed was not supported. This may have been the result of

the measure used; it remains possible that negative emotions associated with speeding may be predictive. Arousal associated with positive emotions accounted for a non-significant 0.01% of variance in intention to speed in the current population sampled. It must be noted however that any TPB findings are very specific to the particular sample and behaviour, therefore this does not necessarily indicate that arousal would not contribute to intention under different circumstances, in different samples, or using different intentions⁴⁸.

The implications of this research for road safety practice are that positive emotional arousal may not add to existing TPB models of intention to speed 20 km over the limit, but further research is required to support the initial findings reported in this paper. Application of the TPB to media campaigns to address speeding behaviour may be developed from the suggestion that drivers feelings of self efficacy and sense of control in relation to driving at speed may be successful. Attitudes towards speeding may also be a target for public education campaigns to address this behaviour.

References

1. Parker, D., Manstead, A. S. R., Stradling, S. G., Reason, J. T., & Baxter, J. S. (1992). Intention to Commit Driving Violations: An Application of the Theory of Planned Behavior. *Journal of Applied Psychology, 77*(1), 94 - 101.
2. Stradling, S., Broughton, P., Kinnear, N., O'Dolan, C., Fuller, R., Gormley, M., & Hannigan, B. (2008). *Road safety research report 93. Understanding inappropriate high speed: A quantitative analysis*. Department for Transport: London.
3. Silcock, D., Smith, K., Knox, D., & Beuret, K. (2000). What limits speed? Factors that affect how fast we drive. Farnborough (UK): AA Foundation for Road Safety Research downloaded 30th June 2010 from http://www.iam.org.uk/images/stories/Policy_Research/Historic_reports/AA_foundation_FDN27.pdf.
4. Aarts, L., & Van Schagen, I. (2006). Driving speed and the risk of road crashes: A review. *Accident Analysis and Prevention, 38*, 215-224.
5. Brown, S. L., & Cotton, A. (2003). Risk-mitigating beliefs, risk estimates, and self-reported speeding in a sample of Australian drivers. *Journal of Safety Research, 34*, 183-188.
6. Fernandes, R., Job, R. F. S., & Hatfield, J. (2007). A challenge to the assumed generalizability of prediction and countermeasure for risky driving: Different factors predict different risky driving behaviors. *Journal of Safety Research, 38*(1), 59-70 doi:10.1016/j.jsr.2006.1009.1003.
7. Fuller, R., Bates, H., Gormley, M., Hannigan, B., Stradling, S., Broughton, P., et al. (2008). *The Conditions for Inappropriate High Speed: A Review of the Research Literature from 1995 to 2006*. London: Department of Transport. Downloaded 12th January 2010 from www.dft.gov.uk/pgr/roadsafety/research/rsrr.
8. Fuller, R., Hannigan, B., Bates, H., Gormley, S., Stradling, P., Kinnear, N., & O'Dolan. (2008). *Road safety research report 94 understanding inappropriate high speed: A qualitative analysis*. Department for Transport: London.
9. Mountain, L. J., Hirst, W. M., & Maher, M. J. (2005). Are speed enforcement cameras more effective than other speed management measures? The impact of speed management schemes on 30 mph roads. *Accident Analysis and Prevention, 37*, 742-754.
10. Cooper, P. J. (1997). The relationship between speeding behavior (as measured by violation convictions) and crash involvement. *Journal of Safety Research, 28*(2), 83 - 95.

11. Kanellaidis, G., Golias, J., & Zarifopoulos, K. (1995). A survey of drivers' attitudes toward speed limit violations. *Journal of Safety Research*, 26(1), 31 - 40.
12. Laapotti, S., Keskinen, E., Hatakka, M., & Katila, A. (2001). Novice drivers' accidents and violations - a failure on higher and lower hierarchical levels of driving behavior. *Accident Analysis and Prevention*, 33(6), 759 - 769.
13. Stradling, S., Gormley, M., Fuller, R., Broughton, P., Kinnear, N., O'Dolan, C., et al. (2007). *A typology of speeding drivers: extent of, and motives for, exceeding the speed limit*. Paper presented at the Behavioural Research in Road Safety 17 downloaded 25th January 2010 from <http://www.dft.gov.uk/pgr/roadsafety/research/behavioural/seventeenthseminar/17thseminar.pdf>.
14. Ajzen, I. (1991). The Theory of Planned Behaviour. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
15. De Pelsmacker, P., & Janssens, W. (2007). The effect of norms, attitudes and habitats on speeding behaviour: Scale development and model. *Accident Analysis and Prevention*, 39(1), 6-15.
16. Newnam, S., Watson, B., & Murray, W. (2004). Factors predicting intention to speed in a work and personal vehicle. *Transportation Research Part F: Psychology and Behavior*, 7, 287 – 300.
17. Elliott, M. A., Armitage, C. J., & Baughan, C. J. (2004). Applications of the theory of planned behaviour to drivers speeding behaviour. *Behavioural research in road safety 2004: Fourteenth seminar*, 157-169
18. Manstead, A. S. R., & Parker, D. (1995). Evaluating and extending the Theory of Planned Behavior. *European Review of Social Psychology*, 6, 69 - 95
19. Conner, M. & Armitage, C. J. (1998). Extending the Theory of Planned Behavior. A review and avenues for further research. *Journal of Applied Social Psychology*, 28(15), 1429-1464.
20. Fishbein, M. (2001). Project safer: Using theory to identify critical target for HIV prevention interventions. *Psychology, Health & Medicine*, 6(2), 137-138.
21. French, D. P., Sutton, S., Hennings, S. J., Mitchell, J., Wareham, N. J., Griffin, S., et al. (2005). The importance of affective beliefs and attitudes in the Theory of Planned Behavior: Predicting intention to increase physical activity. *Journal of Applied Social Psychology*, 35 (9), 1824 – 1848.
22. Mohiyeddini, C., Pauli, R., & Bauer, S. (2009). The role of emotion in bridging the intention-behaviour gap: The case of sports participation. *Psychology of Sport & Exercise*, 10, 226 - 234.
23. Gordon, C., & Hunt, M. (1998). *The Theory of Planned Behaviour applied to speeding, drink-driving and seat-belt wearing*. Paper presented at the Road Safety Research, Policing Education Conference, New Zealand.
24. Conner, M., Smith, N., & McMillan, B. (2003). Examining normative pressure in the Theory of Planned Behaviour: Impact of gender and passengers on intentions to break the speed limit. *Current Psychology: Developmental, Learning, Personality, Social*, 22(3), 252-263.
25. Stead, M., Tagg, S., MacKintosh, A. M., & Eadie, D. (2005). Development and evaluation of a mass media Theory of Planned Behaviour intervention to reduce speeding. *Health Education Research*, 20(1), 36-50.
26. Conner, M., Lawton, R., Parker, D., Chorlton, K., Manstead, A. S. R., & Stradling, S. S. (2007). Application of the theory of planned behaviour to the prediction of objectively assessed breaking of posted speed limits. *British Journal of Psychology*, 98, 429-453.
27. Forward, S. E. (2009b). The theory of planned behaviour: The role of descriptive norms and past behaviour in the prediction of drivers' intention to violate. *Transportation Research Part F*, 12, 198-207.

28. Elliott, M. A. (2010). Predicting motorcyclists' intentions to speed: Effects of selected cognitions from the theory of planned behaviour, self-identity and social identity. *Accident Analysis and Prevention*, *4*, 718 - 725.
29. Elliott, M. A., & Thomson, J. A. (2010). The social cognitive determinants of offending drivers' speeding behaviour. *Accident Analysis and Prevention*, doi:10.1016/j.aap.2010.1003.1018.
30. Forward, S. E. (2010). Intention to speed in a rural area: Reasoned but not reasonable. *Transportation Research Part F*, *13*, 223-232.
31. Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. *European Review of Social Psychology*, *11*(1), 1-33.
32. Boyer, T. W. (2006). The development of risk-taking: A multi-perspective review. *Developmental Review*, *26*, 291-345 doi:10.1016/j.dr.2006.05.002.
33. Lawton, R., Parker, D., Manstead, A. S. R., & Stradling, S. G. (1997). The role of affect in predicting social behaviours: The case of road traffic violations. *Journal of Applied Social Psychology*, *27*(14), 1258-1276.
34. Lawton, R., Conner, M., & McEachan, R. (2009). Desire or Reason: Predicting Health Behaviors from Affective and Cognitive Attitudes. *Health Psychology*, *28*(1), 56 - 65.
35. Watson, D., & Tellegen, A. (1985). Toward a Consensual Structure of Mood. *Psychological Bulletin*, *98*(2), 219 - 235.
36. Triandis, H. C. (1977). *Interpersonal Behavior*. Monterey, CA: Brooks Cole Publishing Company.
37. Lang, P. J. (2010). Emotion and motivation: Toward consensus definitions and a common research purpose. *Emotion Review*, 1-5.
38. Bradley, M. M. (2000). Emotion and motivation. In J. T Cacioppo, L. G Tassinary & G. G. Bernston (Eds.), *Handbook of Psychophysiology* (pp. 602 – 642). USA: Cambridge University Press.
39. Barrett, L. F. (2006). Solving the emotion paradox: Categorization and the experience of emotion. *Personality and Social Psychology Review*, *10*(1), 20-46.
40. Lewis, P. A., Critchley, H. D., Rotshtein, P., & Dolan, R. J. (2007). Neural correlates for processing valence and arousal in affective words. *Cerebral Cortex*, *17*, 742-748.
41. Colombetti, G. (2005). Appraising valence. *Journal of Consciousness Studies*, *12*(8), 103-126
42. Gianotti, L. R. R., Faber, P. L., Schuler, M., Pascual-Marqui, R. D., Kochi, K., Lehmann, D. (2008). First valence, then arousal: The temporal dynamics of brain electric activity evoked by emotional stimuli. *Brain Topographer*, *20*, 143-156.
43. Giner- Sorolla, R. (2004). Is affective material in attitudes more accessible than cognitive material? The moderating role of attitude basis. *European Journal of Social Psychology*, *34*, 761-780.
44. Bradley, M. M., & Lang, P. J. (1999). *Affective norms for English words (ANEW): Instruction manual and affective ratings*. Technical report C-1, The Center of Research in Psychophysiology, University of Florida.
45. Yagil, D. (2001). Reasoned action and irrational motives. A prediction of drivers' intention to violate traffic laws. *Journal of Applied Social Psychology*, *31*(4), 720-740.
46. Roberti, J. W. (2004). A review of behavioral and biological correlates of sensation seeking. *Journal of Research in Personality*, *38*, 256-279 doi:10.1016/S0092-6566(1003)00067-00069.
47. Morris, J. D., Woo, C., Geason, J. A., & Kim, J. (2002). The power of affect: Predicting intention. *Journal of Advertising Research*, 7-17.
48. Ajzen, I. (2006). Constructing a TPB questionnaire: conceptual and methodological considerations Retrieved 27th July 2009, from <http://people.umass.edu/ajzen/pdf/tpb.measurement.pdf>
49. Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155 - 159.