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Self-reported likelihood of speeding: The effects of attitudes, personality, and perceived legitimacy of enforcement

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Abstract

The positive relationship between speed and crash risk and severity is robust and well-established. While excessive speeding is typically regarded by the public as a common contributing factor in road crashes, speeding remains a common traffic infringement and an arguably socially acceptable behaviour, particularly at low levels over the speed limit. This suggests that other factors potentially contribute to this disparity between crash perceptions and actual behaviours. Previous work has described associations between perceptions of the legitimacy of speed enforcement, attitudes, and how they relate to the likelihood of speeding. This study sought to more closely examine the nature of the relationships between these variables. In total, 293 Queensland drivers participated in a study that examined how demographics, personality variables, attitudes, and perceptions of the legitimacy of enforcement contributed to drivers' self-reported likelihood of speeding. Results suggested that positive attitudes towards speeding had the greatest impact on likelihood of speeding behaviours. Being younger and higher levels of the personality trait of extraversion were also associated with greater levels of self-reported likelihood of speeding. Attitudes were found to mediate the relationship between perceived legitimacy of speed enforcement and self-reported likelihood of speeding. A subgroup analysis of participants with positive and negative attitudes towards speeding revealed that a differential set of variables were predictive of self-reported likelihood of speeding for the two subgroups. This highlights the potential importance of attitudes in understanding the influence of perceptions of legitimacy of speed enforcement on speeding behaviour, and the need for targeted rather than a 'one size fits all' approach to changing attitudes and ultimately behaviour. The findings of the current study help to further understand why some drivers continue to speed.

Introduction

A number of improvements have been made to reduce risky driving behaviours. These improvements have resulted in substantial decreases in the amount of fatalities and trauma from road crashes. The improvements have partly been brought about by education campaigns, improvements in vehicle and road engineering, and increased enforcement practises. Nonetheless, a number of safety problems still persist and no jurisdiction should be content with their current road safety performance. In particular, speeding (i.e., driving over the posted speed limit or driving too fast for the conditions) still remains a prominent risky driving behaviour that warrants examination.

A substantial amount of research has shown that increases in vehicle speed are positively related to crash risk and severity. As vehicle speed increases, there are five major outcomes: the driver has less time to react to a hazardous situation (Lay, 1986; Shinar, 2007); other road users also have less time to react to the speeding vehicle (Keall, Povey, & Frith, 2001; Lay, 1986); a vehicle becomes less stable for manoeuvres (Carseldine, 2003; Evans, 2004); greater stopping distances are required (Mountain, Hirst, & Maher, 2005; Vaca, 2006); and the severity of any consequent collision increases (Goldenbeld & van Schagen, 2005; Hirst, Mountain, & Maher, 2005). The first four factors attest to findings that speeding increases the likelihood of crashing. However, the last factor is perhaps the most critical factor when considering the severity of speed related collisions. An increase of 1% in speed can increase the fatality risk by 4-12% (Evans, 2004).

Drivers' perceptions regarding the risks associated with speeding may be incongruent with their actual behaviours. Surveys of drivers reveal that speeding is usually cited as the most common risky

46 driving behaviour in terms of crash risk (e.g., Pennay, 2008; Vanlaar, Simpson, Mayhew, &
47 Robertson, 2008). However, this perception is not always reflected in low incidence rates of
48 speeding. For instance, observational studies of various roads with differing posted speed limits
49 across a number of jurisdictions suggest that approximately half (44.6%) of the drivers observed
50 were exceeding posted speed limits (Glendon, 2007). Similar prevalence rates have been noted in
51 other studies (Glendon & Sutton, 2005; Radalj & Sultana, 2009). Younger drivers (Oltedal &
52 Rundmo, 2006; Williams, Kyrychenko, & Retting, 2006) and male drivers (Iversen & Rundmo,
53 2002; Stradling, Meadows, & Beatty, 2004) are recognised to engage in speeding more frequently.
54 The disparity between perceptions of the risks associated with speeding and their actual on-road
55 behaviours suggests that other factors could influence drivers' speed choice.

56 The effects of personality constructs also have the potential to influence the likelihood of speeding.
57 Personality traits can be defined as the individual differences in the tendency to show consistent
58 patterns of thoughts, feelings and behaviours (Goldberg, 1999; McCrae & Costa, 1995). The
59 personality construct of extraversion has been found to have a positive relationship with speeding
60 behaviours (Dahlen & White, 2006). Other studies have shown that personality constructs of
61 conscientiousness and agreeableness have a negative association with speeding behaviours (Arthur
62 & Graziano, 1996; Sümer, Lajunen, & Özkan, 2005). A meta-analytic study found that the
63 personality construct of extraversion was also positively associated with traffic crashes, while
64 conscientiousness and agreeableness were negatively associated (Clarke & Robertson, 2005). These
65 studies suggest that personality constructs can be an important predictor of whether someone will
66 engage in speeding behaviours or not.

67 Another relevant aspect of personality is the construct of risk taking. Risk taking has been found to
68 be positively associated with self-reported likelihood of engaging in speeding behaviours (Machin
69 & Sankey, 2008). Higher levels of risk taking have also been shown to be associated with
70 retrospective on-road driving crashes (Iversen & Rundmo, 2002; Patil, Shope, Raghunathan, &
71 Bingham, 2006). Moreover, aspects of risk taking have been associated with risky on-road driving
72 behaviours that were observed by global positioning systems (GPS) mounted to drivers' vehicles
73 (Greaves & Ellison, 2011). It has also been noted that younger drivers are more likely to engage in
74 risky driving behaviours (Hatfield & Fernandes, 2009). Therefore, examining the influence that risk
75 taking has on self-reported speeding behaviour appears worthwhile.

76 Driver attitudes are also a potentially salient factor in the decision to engage in speeding behaviours.
77 For example, more favourable attitudes towards speeding would likely lead to the individual
78 speeding more. As many drivers choose to drive at speeds that are slightly higher than the posted
79 speed limits (Fleiter & Watson, 2006), it has been argued that speeding, at least at low levels over
80 the limit, is a socially acceptable behaviour (Corbett, 2001; Vaca, 2006), with speeding by small
81 amounts over the posted speed limit not perceived as a genuine traffic offence (Corbett, 2001;
82 Fleiter & Watson, 2006). Positive attitudes towards speeding may be reinforced by the relatively
83 low occurrence of having a crash. That is, when an individual exceeds the speed limit and no
84 negative outcome occurs (i.e., a crash), this can diminish the perception of increased crash risk
85 associated with increased travel speed. Similarly, a number of studies have suggested that
86 avoidance of punishment does more to reinforce behaviour than the experience of punishment does
87 to deter it (Stafford & Warr, 1993). It is possible that repeated experiences of engaging in speeding
88 behaviour without detection and punishment decreases an individuals' perceived risk of getting
89 caught. Lack of negative consequences (crash or penalty) of speeding may serve to reinforce
90 positive attitudes towards speeding.

91 The cited literature describes several factors that can affect the likelihood of engaging in speeding
92 behaviours. Another factor that is starting to receive an increasing amount of research interest is the
93 effects of the legitimacy of police enforcement for illegal traffic behaviours. If an individual
94 believes that an illegal traffic behaviour does not represent a substantial crash risk, and/or has

95 positive attitudes towards engaging in the behaviour, then it follows that they may also perceive the
96 enforcement of that behaviour as less legitimate (Watling & Leal, 2012). This belief system could
97 then result in the individual not complying with the traffic laws (McKenna, 2007b).

98 Perceptions of the legitimacy of speed enforcement could also be a salient issue for compliance
99 with speed limits. Previous work has shown that perceptions of legitimacy of traffic enforcement,
100 attitudes, and self-reported likelihood of engaging in illegal driving behaviours are moderately
101 associated (Watling & Leal, 2012). However, some studies have measured attitudes with items that
102 potentially are measures of perceptions of legitimacy. It has been argued that perceptions of
103 legitimacy and attitudes are separate but related constructs (McKenna, 2007a, 2007b). That is,
104 attitudes surrounding speeding behaviour are, by definition, different from perceptions of
105 enforcement of speeding laws. However, scant research has been conducted regarding their
106 associations and how these two constructs affect likelihood of speeding in a multivariate analysis.
107 Examining the potential influence of perceptions of the legitimacy of speed enforcement on
108 speeding behaviour may enhance our understanding of why speeding remains a relatively
109 widespread traffic behaviour problem.

110 *The Current Study*

111 The aim or ‘*vision*’ of the current study was to examine the associations between self-reported
112 speeding behaviours and a number of individual factors that have been identified as being predictors
113 of speeding behaviour. These individual factors included: demographics; personality constructs;
114 attitudes; and perceptions of the legitimacy of speed enforcement. As there is scant research that has
115 examined how attitudes and perceptions of enforcement affects the likelihood to engage in self-
116 reported speeding behaviours, the second aim was to perform a subgroups analysis. This subgroups
117 analysis examined individuals that have negative attitudes versus positive attitudes and how these
118 two groups differed with respect to the study variables. Enhancing our understanding of the factors
119 that predict the likelihood of engaging in speeding behaviour can potentially lead to the
120 identification of appropriate targets (i.e., ‘*actions*’) for intervention strategies designed to reduce
121 speeding behaviour and associated road trauma (i.e., ‘*results*’).

122 **Method**

123 *Participants*

124 Recruitment invitations were sent electronically via email distribution lists of the Queensland
125 University of Technology (QUT), social networking sites and a research participation link on the
126 website of the Centre for Accident Research and Road Safety – Queensland (CARRS-Q). The
127 eligibility criteria for the study included having a current Open driver’s licence and currently
128 driving on Queensland roads. In total, 293 valid responses were received. The mean age of the
129 participants was 39.06 years ($SD = 14.96$; range = 20-84 years) with over half of the sample being
130 female (59.1%). Participants were offered the opportunity to enter a draw to win one of six \$50
131 AUD petrol vouchers as a small thank you gift for their time and participation.

132 *Measures*

133 *Demographic information*

134 The demographic information collected included participant age, gender and current employment
135 status. Traffic-related demographic data, such as the duration of licensure and a measure of driving
136 exposure (i.e., number of hours driven per week), was also collected.

137 *Likelihood of speeding*

138 Self-reported likelihood of speeding was measured via four custom written items. These items

139 measured how likely participants reported they would be to engage in four different speeding
140 situations (i.e., drive over the posted speed limit when alone, with passenger/s, when there is little
141 traffic, or on highways) in the next month. These items were measured on a 5-point Likert scale
142 scored from 1 (extremely unlikely) to 5 (extremely likely). The four items were averaged to create a
143 scale score.

144 ***Personality***

145 Personality was measured via the 50 item International Personality Item Pool (IPIP) (Goldberg,
146 1999). The IPIP measures personality with a five-factor model that includes: extraversion;
147 conscientiousness; agreeableness; emotional stability; and intellect/imagination. Each of these
148 factors is assessed by 10 items, which are summated for each personality factor score. Specifically,
149 participants rated how accurately a series of statements described them on a 5-point Likert scale
150 scored from 1 (very inaccurate) to 5 (very accurate). Examples included: “Don’t mind being the
151 centre of attention” (Extraversion), “Pay attention to details” (Conscientiousness), “Feel little
152 concern for others” (Agreeableness; reverse scored item), “Get stressed out easily” (Emotional
153 stability), and “Have difficulty understanding abstract ideas” (Intellect/imagination; reverse scored
154 item). The IPIP is a reliable (Socha, Cooper, & McCord, 2010) and valid (McAbee & Oswald,
155 2013) measure of personality.

156 ***Risk taking***

157 Risk taking was measured with eight items that specifically focused on the driving context
158 (Donovan, 1993). Participants rated how often they would engage in the behaviours using a 4-point
159 Likert scale scored from 1 (never) to 4 (very often); for example “Drive dangerously because you
160 enjoy it”. Item scores were averaged to create a risk taking scale score. The scale has shown good
161 reliability (i.e., Cronbach’s alpha = .83) (Donovan, 1993) and has demonstrated predictive and
162 construct validity (Bingham, Elliott, & Shope, 2007).

163 ***Attitudes***

164 The attitudes of participants towards speeding were measured using the definitions component from
165 Akers’ social learning theory (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979). Participants
166 indicated their agreement with two positive (e.g., “People who exceed the speed limit are generally
167 more careful on the road”), two neutral (e.g., “It’s okay to exceed the speed limit, as long as no one
168 gets hurt”), and two negative (e.g., “There is no excuse for speeding”) statements using a 5-point
169 Likert scale scored from 1 (strongly disagree) to 5 (strongly agree). The negative items were
170 reversed scored and then the six item scores were averaged to create a scale score.

171 ***Perceived legitimacy***

172 The perceived legitimacy of speed enforcement was measured via seven items that described
173 enforcement activities in seven different situations. Participants indicated their agreement with the
174 statements using a 5-point Likert scale scored from 1 (strongly disagree) to 5 (strongly agree).
175 Example items included: “It is fair to enforce speeding laws using fixed speed camera devices” and
176 “It is fair to enforce speeding laws anywhere on the road network”. The format of the items was
177 based on the phrasing used by Poulter and McKenna (2007). The seven item scores were averaged
178 to produce a scale score.

179 ***Procedure***

180 Ethical and health and safety approvals were obtained prior to the distribution of electronic
181 invitations to participate in the study. The electronic invitations were distributed via university
182 research participation webpages, university mailing lists, and a social networking site (i.e.,
183 Facebook). When participants navigated via their web browser to the survey webpage, they were

184 presented with information about the study before completing the survey. Submission of the survey
185 constituted consent. The survey took approximately 10-15 minutes to complete.

186 Results

187 *Demographic characteristics*

188 The majority of participants (86.4%) were employed in some capacity (i.e., full-time 57.7%, part-
189 time 10.2%, casual 8.9%, self-employed 9.6%) with the remaining sample being unemployed
190 (4.4%) or students (9.2%). The average duration of licensure was 19.68 years ($SD = 14.70$). The
191 majority of the sample drove between 1-10 hours per week (61.1%), while one third (33.1%) of the
192 sample drove 10-20 hours per week and 5.8% drove more than 20 hours per week.

193 The means, standard deviations, and Cronbach's alphas for likelihood of speeding, personality
194 factors, risk taking, attitudes, and perceived legitimacy scales can be found in Table 1. The internal
195 consistency of all scales was adequate (Cronbach's alpha $> .70$). The distribution of risk taking
196 scores was extremely positively skewed and therefore could not be used in the regression analysis.
197 These scores were recoded into a dichotomous variable to those that show some (scores greater than
198 1, 46.90% of sample) or no risk taking propensity (scores of 1, 53.10%) for use in analyses.

199 **Table 1. Means, Standard Deviations, and Cronbach's Alphas for study variables**

Variable	<i>M</i>	<i>SD</i>	Cronbach's α	No. items	Range
Likelihood of speeding	2.94	1.33	.95	4	1-5
IPIP Extraversion	32.63	7.27	.88	10	10-50
IPIP Conscientiousness	33.66	5.30	.80	9 ^a	9-45 ^a
IPIP Agreeableness	40.39	5.23	.79	10	10-50
IPIP Emotional stability	33.68	7.17	.87	10	10-50
IPIP Intellect/imagination	37.59	5.09	.74	10	10-50
Risk taking	1.20	0.36	.90	8	1-4
Attitudes	2.29	0.96	.89	6	1-5
Perceived legitimacy	3.66	0.98	.91	7	1-5

^a Due to a technical error, the data from one item on this scale was not recorded in the database.

200 *Bivariate analysis*

201 Table 2 displays the bivariate correlations between the study variables. A number of the study
202 variables were significantly correlated with the dependent variable of speeding likelihood. The
203 significant correlations between the study variables and the speeding likelihood variable were
204 moderate in their strength of association, except for the correlation with attitudes, which was a large
205 correlation. The largest correlation in the study was between the predictor variables, attitudes and
206 perceived legitimacy.

207 **Table 2. Bivariate correlations between speeding likelihood and study variables**

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Speeding likelihood	-										
2. Age	-.27**	-									
3. Gender (male) ^a	-.04	-.18**	-								
4. IPIP Extraversion	.18**	.17**	-.28**	-							
5. IPIP Conscientious	-.16**	-.17	.02	.11	-						
6. IPIP Agreeableness	-.09	-.04	.36**	.41**	.23**	-					
7. IPIP Emotional Stability	-.09	-.15*	.19**	.16**	.34**	.13*	-				
8. IPIP Intellect Imagination	.03	.07	-.20**	.38**	.13*	.31**	.11	-			
9. Risk taking (some) ^a	.37**	-.15*	-.19**	.06	-.16**	-.08	-.05	.11	-		
10. Attitudes	.64**	-.20**	-.03	.01	-.13*	-.11	.05	.04	.29**	-	
11. Perceived legitimacy	-.40**	.07	.04	-.05	.02	-.03	-.09	-.05	-.24**	-.71**	-

** $p < .01$, * $p < .05$; ^a Point bi-serial correlation

208 **Multivariate analyses**209 **Predicting Self-reported Likelihood of Speeding**

210 A hierarchical regression was performed to examine the predictive utility of the independent
 211 variables in explaining self-reported likelihood of speeding (see Table 3).

212 **Table 3. Hierarchical regression table for self-reported likelihood of speeding and study variables**

Step and variable	<i>B</i>	SE <i>b</i>	β	<i>r</i> _{ab,c}	<i>r</i> _{a(bc)}
Step 1					
Age	-.03**	.01	-.28	-.28	-.28
Gender (male)	-.23	.17	-.09	-.09	-.08
Constant	4.28**	.38			
Adjusted $R^2 = .07$; $F(2, 253) = 10.56^{**}$					
Step 2					
Age	-.01*	.01	-.16	-.15	-.14
Gender (male)	-.02	.17	-.01	-.01	-.01
IPIP Extraversion	.04**	.01	.20	.18	.17
IPIP Conscientiousness	-.02	.02	-.06	-.06	-.06
IPIP Agreeableness	-.03	.02	-.11	-.10	-.09
IPIP Emotional stability	-.01	.01	-.04	-.04	-.04
IPIP Intellect/imagination	-.02	.02	-.06	-.06	-.06
Risk taking (some)	.83**	.16	.31	.32	-.30
Constant	4.46**	.38			
Adjusted $R^2 = .19$; $F(8, 245) = 8.27^{**}$; Δ Adjusted $R^2 = .12$; $F_{change}(6, 245) = 7.01^{**}$					
Step 3					
Age	-.01**	.01	-.16	-.21	-.15
Gender (male)	.20	.13	.07	.09	.06
IPIP Extraversion	.03**	.01	.18	.22	.15
IPIP Conscientiousness	.01	.01	.01	.01	.01
IPIP Agreeableness	-.02	.01	-.08	-.10	-.07
IPIP Emotional stability	-.02	.01	-.08	-.11	-.08
IPIP Intellect/imagination	-.02	.01	-.09	-.11	-.08
Risk taking (some)	.44**	.13	.16	.22	.15
Attitudes	.84**	.07	.60	.64	.56
Constant	2.11**	.69			
Adjusted $R^2 = .51$; $F(9, 244) = 30.70^{**}$; Δ Adjusted $R^2 = .32$; $F_{change}(1, 244) = 165.64^{**}$					
Step 4					
Age	-.02**	.01	-.17	-.21	-.15
Gender (male)	.22	.13	.08	.10	.07
IPIP Extraversion	.03**	.01	.18	.22	.15
IPIP Conscientiousness	.01	.01	.01	.02	.01
IPIP Agreeableness	-.02	.01	-.07	-.08	-.06
IPIP Emotional stability	-.01	.01	-.08	-.10	.07
IPIP Intellect/imagination	-.02	.01	-.09	-.12	-.08
Risk taking (some)	.46**	.13	.17	.23	.16
Attitudes	.97**	.09	.69	.57	.47
Perceived Legitimacy	.17*	.09	.13	.13	.09
Constant	.98	.88			
Adjusted $R^2 = .52$; $F(10, 243) = 28.39^{**}$; Δ Adjusted $R^2 = .01$; $F_{change}(1, 243) = 4.11^*$					

Note. The minimum sample size to detect a medium sized effect requires $n = 130$ according to S. B. Green (1991).

** $p < .01$, * $p < .05$

213 When the demographic variables of age and gender were entered in the first step of the regression,
 214 the model significantly predicted self-reported likelihood of speeding and accounted for 7% of the
 215 variance. However, age was the only significant predictor. The second step involved adding the
 216 personality factors and risk taking variables. This second step was also a significant predictor of
 217 self-reported likelihood of speeding, now accounting for 19% of the variance. This was a significant

218 increase in the amount of variance explained. Age remained a significant predictor (although its
 219 predictive utility was reduced), with extraversion and risk taking also significantly predicting self-
 220 reported likelihood of speeding.

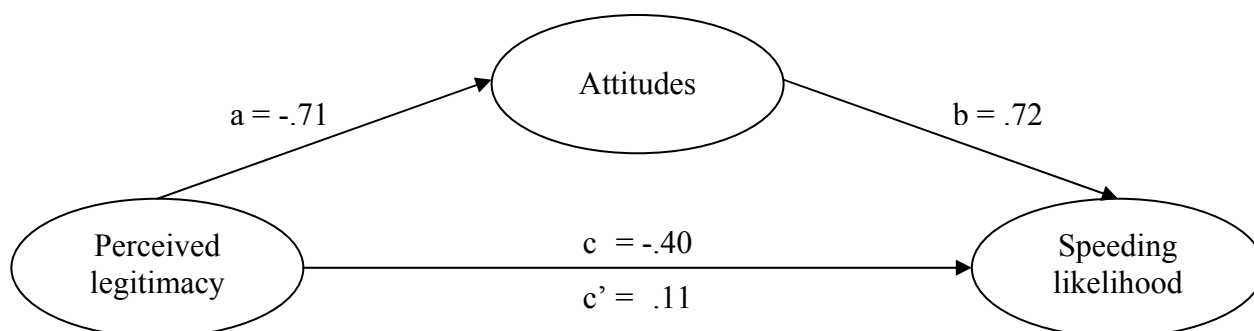
221 The attitudes scores were added at the third step in the model, which now accounted for 51% of the
 222 variance in self-reported likelihood of speeding. This 32% increase in variance explained was
 223 significant. At this step, the attitudes variable was a significant predictor of self-reported likelihood
 224 of speeding, while age, extraversion, and risk taking continued to be significant predictors.
 225 However, the strength of association of the latter two variables in the model decreased. The fourth
 226 and final step involved the addition of the perceived legitimacy variable to the model. The model
 227 significantly predicted self-reported likelihood of speeding, accounting for 52% of the variance.
 228 This was a small (1%) but statistically significant increase in the amount of variance explained.
 229 Age, extraversion, risk taking, attitudes all remained significant predictors of self-reported
 230 likelihood of speeding at this step. Perceived legitimacy was a significant predictor of self-reported
 231 likelihood of speeding, however, the direction of association changed from negative (as found in the
 232 bivariate correlations) to positive.

233 This unexpected change in direction of association appeared to be related to the inclusion of
 234 attitudes scores in the model. When the regression was performed following the stepped procedure
 235 described above, with the exception that perceived legitimacy was entered at step three and the
 236 attitude variable was entered at step four, perceived legitimacy had a negative relationship with self-
 237 reported likelihood of speeding at step three, but the direction changed to positive when attitudes
 238 was entered at step four.

239 *Mediation of Self-reported Likelihood of Speeding*

240 As the bivariate correlations in Table 2 and the results of the hierarchical regressions described
 241 above suggest a relationship between perceived legitimacy, attitudes, and self-reported likelihood of
 242 speeding, a mediation effect is possible (Baron & Kenny, 1986) and was further investigated.

243 The relationship between perceived legitimacy and self-reported likelihood of speeding was found
 244 to be significant $\beta = -.40, p < .001$. A second bivariate regression was performed with the perceived
 245 legitimacy and attitudes variables and a significant relationship was found $\beta = -.71, p < .001$. To
 246 evaluate the significance of the relationship between attitudes and self-reported likelihood of
 247 speeding, when controlling for the association of perceived legitimacy of speed enforcement with
 248 likelihood of speeding, a multivariate regression analysis was performed. A significant association
 249 was found between attitudes and self-reported likelihood of speeding when controlling for the
 250 association of perceived legitimacy with speeding likelihood, $\beta = .72, p < .001$. The relationship
 251 between perceived legitimacy and self-reported likelihood of speeding decreased to $\beta = .11, p = .11$
 252 when controlling for the effect of attitudes. To determine the significance of the mediation
 253 relationship (shown in Figure 1), the unstandardised coefficients were used in Sobel's (1982) test.
 254 Sobel's (1982) test was significant ($Z = -9.03, p < .001$), indicating that attitudes mediate the
 255 relationship between perceived legitimacy and speeding likelihood.



256
 257

Figure 1. Mediation model of perceived legitimacy, attitudes, and speeding likelihood

258 **Subgroup Analysis: Predicting likelihood of speeding for attitude groups**

259 A set of regressions were performed to examine whether different attitudes towards speeding
 260 resulted in a differential set of predictors of speeding likelihood. The sample was separated into two
 261 groups using a mean split, with the groups labelled as those who held negative and positive attitudes
 262 towards speeding. The descriptive statistics for the study variables and the results of the multiple
 263 regressions performed on each subgroup are reported in Table 4.

264 **Table 4. Subgroups multiple regression results for self-reported likelihood of speeding**

	Negative attitude group (n = 151)				Positive attitude group (n = 133)			
	M (SD)	b	SE b	β	M (SD)	b	SE b	β
Speeding likelihood (DV)	2.31 (1.17)	-	-	-	3.64 (1.12)	-	-	-
Age	39.22 (15.04)	-.02**	.01	-.31	38.84 (15.16)	-.01	.01	-.09
Gender (male)	31.33%	.01	.21	.01	50%	.25	.22	.11
IPIP Extraversion	32.68 (7.08)	.02	.02	.11	32.78 (7.31)	.04*	.02	.24
IPIP Conscientiousness	34.45 (5.16)	-.01	.02	-.04	32.78 (5.40)	.01	.02	.05
IPIP Agreeableness	41.17 (4.75)	-.03	.02	-.14	39.70 (5.68)	-.01	.02	-.07
IPIP Emotional stability	33.64 (6.90)	-.02	.02	-.09	33.70 (7.50)	-.01	.02	-.07
IPIP Intellect/imagination	37.56 (5.05)	-.05**	.02	-.23	37.64 (5.08)	.03	.02	.14
Risk taking (some)	35.57%	.47*	.20	.19	58.46%	.40	.21	.18
Perceived Legitimacy	4.14 (0.68)	-.29*	.14	-.17	3.12 (0.98)	-.15	.10	-.13
Constant	-	7.92**	1.30		-	1.97	1.18	
Adjusted R ² =		.25; F(9, 121) = 5.69**				.15; F(9, 106) = 3.24**		

265 *Note.* The minimum sample size to detect a medium sized effect requires $n = 122$ according to S. B. Green (1991).

266 The regression model for the negative attitudes group was a significant predictor of self-reported
 267 likelihood of speeding and accounted for 25% of the variance. Age, intellect/imagination, risk
 268 taking, and perceived legitimacy variables were all significant predictors. The regression for the
 269 positive attitudes group was a significant predictor of self-reported likelihood of speeding,
 270 accounting for 15% of the variance. However, only one study variable (extraversion) was a
 271 significant predictor for this group.

272 **Discussion**

273 The ‘*vision*’ or aim of this study was to examine the relationships between self-reported likelihood
 274 of speeding and a number of individual factors identified as predictors in the literature, including
 275 age, gender, personality characteristics, attitudes towards speeding, and perceived legitimacy of
 276 speed enforcement. This study also aimed to more closely examine the relationships between
 277 attitudes, perceived legitimacy of speed enforcement and likelihood of speeding to better
 278 understand the inter-relationships between these variables, and inform effective interventions
 279 (‘*action*’) designed to reduce speeding behaviour (‘*results*’).

280 **Factors Associated with Likelihood of Speeding**

281 Consistent with previous research, the bivariate correlations in this study showed that age (e.g.,
 282 Harrison, Fitzgerald, Pronk, & Fildes, 1998; Oltedal & Rundmo, 2006; Williams, et al., 2006),
 283 extraversion (e.g., Clarke & Robertson, 2005; Dahlen & White, 2006), conscientiousness (e.g.,
 284 Arthur & Graziano, 1996; Sümer, et al., 2005), risk taking (e.g., Iversen & Rundmo, 2002; Machin
 285 & Sankey, 2008; Patil, et al., 2006), attitudes towards speeding (e.g., Corbett, 2001; De Pelsmacker
 286 & Janssens, 2007; Fleiter & Watson, 2006) and perceived legitimacy of speed enforcement (e.g.,
 287 Watling & Leal, 2012) were significantly related to self-reported likelihood of speeding. In this
 288 study, increased likelihood of speeding was associated with lower ages, high extraversion scores,
 289 low conscientiousness scores, some propensity for risk taking, positive attitudes towards speeding
 290 and low perceived legitimacy of speed enforcement. The strongest relationships with self-reported
 291 likelihood of speeding were moderate relationships with attitudes towards speeding, and perceived

292 legitimacy of speed enforcement. However, there was a strong relationship between these two
293 predictors, and small to moderate relationships between a number of other pairs of study variables.

294 When the relationships between the study variables and self-reported likelihood of speeding were
295 examined in a hierarchical regression analysis to control for the relationships between predictor
296 variables, the model significantly predicted self-reported likelihood of speeding, explaining just
297 over half of the variance. Variables were entered into the model according to their theoretical
298 interest to this study, such that demographic variables (age and gender) were entered first, followed
299 by the personality (including risk taking) variables, attitudes, and finally perceived legitimacy of
300 speed enforcement. Attitudes towards speeding was the strongest predictor in the model, however
301 an interesting result was the *positive* association between perceived legitimacy of speed
302 enforcement and the dependent variable when attitudes towards speeding were included in the
303 model. That is, individuals who perceived speed enforcement as legitimate reported *greater*
304 likelihood of engaging in speeding behaviour in the next month.

305 Although perceived legitimacy was a significant predictor in the multivariate model, its importance
306 was much lower than would be expected (given its bivariate relationship with likelihood of
307 speeding) when attitudes towards speeding was already included in the model, as evidenced by the
308 beta value and small increase in additional variance explained. This is presumably explained by the
309 strong correlation with attitudes towards speeding, suggesting these variables are sharing the
310 variance in likelihood of speeding they explain. Further evidence of the influence of attitudes on the
311 relationship between perceived legitimacy of speed enforcement and likelihood of speeding was the
312 shift from a negative to a positive relationship between perceived legitimacy and the dependent
313 variable when attitudes were included in the model.

314 To better understand the relationships between attitudes towards speeding, perceived legitimacy of
315 enforcement and likelihood of speeding, a mediation analysis was performed and found that the
316 relationship between perceived legitimacy of speed enforcement and self-reported likelihood of
317 speeding was mediated by attitudes towards speeding. When the sample was divided into two
318 groups based on a mean split of attitudes scores, separate regressions showed that perceived
319 legitimacy of speed enforcement is only a significant predictor of likelihood of speeding for
320 individuals who hold negative attitudes towards speeding. Among individuals with a negative
321 attitude towards speeding, lower ages, low intellect/imagination scores, some propensity for risk
322 taking and low perceived legitimacy of speed enforcement were significant predictors of likelihood
323 of speeding, although the model explained only one quarter of the variance in the dependent
324 variable.

325 Among individuals with a positive attitude towards speeding, only high extraversion scores were
326 associated with increased likelihood of speeding, in a model explaining only 15% of the variance in
327 the dependent variable. These subgroup results show how critical attitudes towards speeding are in
328 understanding likelihood to engage in the behaviour in future, but also for understanding the
329 relationship between other predictors and likelihood of speeding. For those who hold a positive
330 attitude towards speeding, other variables seem largely irrelevant, suggesting it is these attitudes
331 that must be targeted for this group. However, for individuals that have a more negative attitude
332 towards speeding, their perceptions of the legitimacy of speed enforcement may be an additional
333 target to further reduce their likelihood of speeding. Previous work has shown that speeding
334 interventions targeting attitudes increases an individuals' perceived legitimacy of speed
335 enforcement (McKenna, 2007a). As a result, this may be a promising '*action*' for future
336 interventions, such as when developing educational campaigns to reduce speeding. However, the
337 subgroup analysis results show that tailored advertising campaigns to certain groups rather than
338 utilising a 'one size fits all' approach is required. For example, different types of speeding
339 advertising campaigns (e.g., pride, humour, or fear-based campaigns) can have differential

340 effectiveness for message acceptance for different audiences (Lewis, Watson, & Tay, 2007; Lewis,
341 Watson, & White, 2010).

342 ***Future Research***

343 There are several limitations of the current study that require consideration when interpreting the
344 results and developing future research projects in this area. Firstly, the use of a convenience
345 sampling methodology has the potential to result in self-selection bias and influence the results.
346 Another limitation was the use of a self-report measure for the outcome variable of likelihood of
347 speeding. Self-report data can be influenced by the effects of social desirability (Wählberg, Dorn, &
348 Kline, 2010) which is especially true when assessing data of a sensitive nature, such as speeding.
349 However, given speeding (particularly at low levels above the speed limit) is generally considered
350 socially acceptable, and many participants in this study were willing to report risky attitudes and
351 behaviours, social desirability bias may not have been a significant problem in this study.
352 Moreover, the current study utilised an online questionnaire where participant anonymity was
353 assured, with prior research suggesting the effect of social desirability is diminished when the data
354 is collected in private environments versus public environments (Lajunen & Summala, 2003;
355 Sullman & Taylor, 2010).

356 Future research should seek to more thoroughly examine the dynamics between perceptions of the
357 legitimacy of speed enforcement and attitudes towards speeding, and methods of influencing these
358 variables with the aim of reducing the likelihood of speeding. Future research should also examine
359 the influence of these variables on actual on-road speeding behaviours to complement the observed
360 relationships with self-reported likelihood of speeding. Although the relationship between self-
361 reported intentions to commit illegal behaviours and actual behaviour is quite strong ($r = .79-.83$: D.
362 E. Green, 1989; Kim & Hunter, 1993), an examination of actual on-road behaviours (e.g., via GPS
363 tracking) would provide more robust evidence of the associations between the individual factors
364 examined in the current study and speeding behaviours.

365 ***Conclusion***

366 Despite strong evidence of the risks associated with speeding, some drivers continue to exceed the
367 speed limit. While a number of factors have been identified in previous research studies as
368 influential in the decision to speed, there is relatively little evidence of the effect of perceived
369 legitimacy of speed enforcement on likelihood of speeding, and the extent to which this construct is
370 independent of attitudes towards speeding. The '*vision*' of this study was to better understand the
371 inter-relationships between attitudes towards speeding and perceived legitimacy of speed
372 enforcement and their utility in predicting likelihood of speeding. Understanding how these
373 constructs influence speeding behaviour will assist in identifying appropriate '*actions*' for different
374 groups of drivers to achieve the '*results*' of reducing speeding behaviour and associated road
375 trauma.

376

377

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