

# AN EXPLORATION OF PERCEPTIONS OF OVERT AND COVERT SPEED ENFORCEMENT, RELATED ATTITUDES AND BEHAVIOURS

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One thousand respondents were surveyed via telephone in order to explore perceptions of overt and covert aspects of speed enforcement, risk of detection, and speed-related skills, attitudes, and behaviours. Agreement ratings on a 0-10 scale requested for a series of items. Initial factor analyses identified 14 factors. A second-order factor analysis extracted five factors: risk of detection, beliefs about speeding, speeding behaviours, driving skills and speed awareness, and beliefs about the overt or covert nature of speed enforcement. Cluster analysis identified four driver profiles based on these factors. A first group perceived speed camera enforcement as overt, believed personal risk of detection as high, and were the least inclined to speed. A second group believed camera enforcement was somewhat covert, personal risk of detection low, and were also less inclined to speed. A third group perceived all enforcement as overt, personal risk of detection as low, and reported speeding behaviour. A final group was the most inclined to speed. While they perceived camera enforcement as overt, personal risk of detection was considered high. Age and sex differences across groups and road safety implications are discussed.

## BACKGROUND & METHOD

Victoria Police are examining ways to develop a more covert speed camera program. As public response to such a program will be evaluated, a telephone survey was conducted in order to measure baseline attitudes and behaviours. The survey of 1,000 drivers in metropolitan Melbourne included up to 3 callbacks. To maximise the representativeness of the sample, interviewers asked to speak to the driver in the household whose birthday was next. The survey had six sections. For Section I-V items (see Table 3), participants were asked to rate how strongly they agreed with the item on a 0-10 scale, where 0 = do not agree at all, 10 = agree very strongly, and 5 = agree somewhat. Section VI measured enforcement experience (see Table 2) and demographic statistics. The final sample consisted of 561 females (56%) and 439 males, and age groups: under 20 ( $n = 30$ ), 20-29 ( $n = 161$ ), 30-39 ( $n = 222$ ), 40-49 ( $n = 212$ ), 50-59 ( $n = 166$ ), and 60+ years ( $n = 206$ ); (3 refusals).

## RESULTS AND DISCUSSION

### Underlying response patterns

#### First order factor analyses

Factor analyses were performed for each set of items in Sections I-V, using Principal Components Analysis to extract factors for eigenvalues  $\geq 1$ . If a scree plot indicated a smaller set of factors with superior alpha coefficients that did not substantially decrease explained variance, this solution was adopted and subject to oblique rotation. Final pattern matrices appear in Table 1.

Three factors were identified for Section I (50.1% explained variance). The first factor grouped all items concerning conscious decision-making processes, with high scores indicating a perception that these aspects of driving are largely automated. The second factor showed all items concerning personal driving ability were positively related, while the third factor had a distraction theme. Low scores on this factor would indicate the driver is not prone to daydreaming, worrying about crashes when driving or about being at fault in a crash.

Section II was comprised of three factors (40.5% explained variance). Low scores on the first factor would indicate positive speed behaviour, high scores on the second factor would represent positive speed choices and awareness, while low scores on the third would reflect a belief that speeding is wrong, causes accidents, and that the respondent was uncomfortable speeding.

**Table 1: Summary of factor solutions (correlation coefficients  $\geq .4$ ) for Section I-V items**

Item		I	Factor		
			II	III	IV
<u>Section I</u>	<u>General factors influencing decision-making processes when driving</u>				
Factor I	I do not have to think consciously about using the indicators	.82			
(5 items)	I do not have to think consciously about using the accelerator	.81			
	I do not have to think consciously about looking out for hazards	.76			
	I do not have to think consciously about steering the car	.74			
	I do not have to think consciously about how fast I am driving	.69			
Factor II	I am a safer driver than other people my age		.85		
(4 items)	I am a safer driver than most other drivers		.84		
	I often respond to hazards before I really notice them		.47		
	I drive within the road rules		.44		
Factor III	I worry about crashing when I am driving			.77	
(3 items)	If I have a crash it is likely to be my fault			.66	
	I daydream or think about other things when driving			.46	
<u>Section II</u>	<u>Specific factors influencing speed choice decisions</u>				
Factor I	I often drive a little over the speed limit	.75R			
(5 items)	I often drive 10 km an hour or more over the speed limit	.65R			
	I sometimes change my speed without making a conscious decision	.60R			
	I slow down at locations where there are sometimes speed cameras	.58R			
	I become frustrated when people around me are driving too slowly	.56R			
Factor II	I am always aware of the speed limit	-.40	.60		
(6 items)	I often check my speed when driving		.55		
	I make conscious decisions to speed up or slow down		.51		
	Current road conditions influence my speed		.49		
	I drive more slowly when it's raining		.47		
	I choose a speed and stick to it		.40		
Factor III	Speeding causes accidents			-.75	
(3 items)	Speeding is wrong			-.71	
	I am comfortable driving fast			.49	
<u>Section III</u>	<u>Perceived risk of detection while driving in general</u>				
Factor I	I see very few Police cars on the road when I drive	.83			
(2 items)	The Police catch very few of the people who disobey traffic rules	.82			
Factor II	Overall, the penalties for breaking the law while driving are severe		.80		
(2 items)	If I break the law while driving, I will most likely be caught		.65		

**Table 1: Summary of factor solutions (correlation coefficients  $\geq .4$ ) for Section I-V items (cont.)**

	Item	I	II	III	IV
<u>Section IV</u>	<u>Perceived risk of detection by all types of speed enforcement</u>				
Factor I	It's easy to avoid being caught speeding	.71			
(6 items)	Even if you're caught speeding, you can still avoid being fined	.61			
	Speed enforcement only happens during the day	.61			
	There's not much chance of being caught speeding	.58			
	I rarely see any Police cars doing speed enforcement	.54			
	The penalties for speeding are not severe at all	.54			
Factor II	Enforcing the speed limit helps lower the road toll		.69		
(2 items)	It's hard to know where there is speed enforcement happening		.62		
<u>Section V</u>	<u>Perceived risk of detection by speed camera enforcement only</u>				
Factor I	Speed cameras are usually well hidden	-.71			
(4 items)	It's hard to predict where there are the speed cameras	-.70			
	Speed cameras are easy to see	.62			
	Speed cameras always operate at the same locations	.52			
Factor II	There's not much chance of being caught speeding by a speed camera		.66		
(6 items)	I don't see as many speed cameras these days as I used to		.58		
	Even if a speed camera catches you, you can still avoid being fined		.57		
	Enforcement with a speed camera only happens during the day		.54		
	I rarely see any cameras doing speed enforcement		.54		
	My experience tells me that it's easy to avoid being caught speeding by a speed camera		.47		
Factor III	I think speed cameras would slow people down more effectively if they were in full view			.68	
(3 items)	Enforcing the speed limit with speed cameras helps lower the road toll			.67	
Factor IV	Speed cameras are often used from different types of cars	-.42			.65
(4 items)	I know of some locations where speed cameras are often set up				.58
	I have never seen a speed camera				-.54
	I think speed cameras would catch more people if they were completely hidden				.45

While only comprising four items, Section III clearly divided into two factors (61.4% explained variance). The first represented perceptions of the amount and effectiveness of general traffic enforcement. Given that the items were correlated in the same direction, this indicated a belief that Police catch few traffic offenders was associated with a belief that there are few Police on the roads. The second factor indicated that a belief that penalties were severe was positively related to a belief that personal detection was likely.

Section IV was comprised of two factors (40.9% explained variance). The first focused on the possibility of avoiding speed detection and included the item "I rarely see any Police cars doing speed enforcement". As all of the items were positively related, this again indicated a belief that low Police visibility equates to low risk and therefore low enforcement. The second factor revealed that a belief that speed enforcement helped lower the road toll was positively related to a perception that it was difficult to know where such enforcement was operating.

Four factors comprised Section V (42.5% explained variance). The first concerned the predictability of camera locations, such that high scores would indicate a perception the program is overt. The second revealed that ability to locate cameras was positively related to perceiving detection as avoidable. The third showed a belief that cameras would reduce speeding more effectively if in full view was positively related to believing camera enforcement helps lower the road toll. The fourth factor associated a belief that camera programs were more overt with the belief that cameras would detect more speeding drivers if completely hidden, that is, more covert.

Second order factor analysis

Overall, meaningful themes were identified with positive associations for both overt and covert enforcement. Therefore, the issue was examined further. A second or higher order factor analysis of the 14 factors was performed, and profiles of different types of drivers identified. Where appropriate, factors were reverse coded so that higher scores indicated more positive responses (e.g. speeding behaviour items). Five factors were identified with a combined explained variance of 57.2%. The pattern matrix is presented in Table 4.

**Table 4: Second order factor analysis solution (correlation coefficients  $\geq .4$ )**

Item	I	II	III	IV	V
<u>Factor I</u>					
Section IV, Factor I	.87				
Section V, Factor II	.80				
Section III, Factor I	.59				
<u>Factor II</u>					
Section IV, Factor II		.72			
Section V, Factor III		.65			
Section II, Factor III		.60			
<u>Factor III</u>					
Section II, Factor I			-.80		
Section I, Factor III			-.70		
<u>Factor IV</u>					
Section I, Factor II				.65	
Section III, Factor II				.63	
Section I, Factor I				.55	
Section II, Factor II				.44	
<u>Factor V</u>					
Section V, Factor IV					.82
Section V, Factor I					.61

The first factor indicated that the two themes of ability to avoid speed detection (general and speed camera) were positively related to perceptions of general enforcement effectiveness, such that high scores on this factor would present a belief that detection is easily avoided, few Police cars are seen on the road, and that Police catch very few traffic offenders. The second factor combined value judgements of speeding with the two themes concerning the road toll. High scores would represent a belief that speed enforcement helps lower the road toll, in general is somewhat covert, would be more effective in slowing down drivers if more overt, that speeding is wrong, causes accidents, and that the respondent is uncomfortable driving fast. The third factor combined the themes of speed-related behaviours and distractions. Low scores would represent negative speed-related behaviours, concern with crashing and being at fault in a crash, and daydreaming when driving. The fourth factor combined perceptions of personal driving ability, personal risk of detection, general and speed-related decision making. High scores would reflect a positive perception of one's driving ability, a belief that traffic offence penalties are severe and personal risk of detection high, that general driving decision-making processes are largely automated, and that the respondent makes positive decisions concerning speed choice and speed awareness. The final factor concerned judgements of overt and covert speed camera programs. High scores would present a view that the programs are overt, but would be more effective in detecting speeders if they were more covert.

## Types of respondents

### Cluster descriptions

A cluster analysis was performed using standardised scores according to Ward's hierarchical method, using squared-Euclidean distance as the similarity-dissimilarity measure. The initial solution was then refined using a *k*-means relocation technique (quick cluster). The number of clusters was chosen after examination of the dendrogram, and confirmed by discriminant analysis. The analyses indicated a four cluster solution was evident in responses, confirmed by the presence of four discriminant functions with a combined  $\chi^2_{(3)} = 552.47, p < .000$ , for which 96.3% of cases were correctly classified. Oneway ANOVAs were performed using Scheffé comparisons to identify the sources of differences between clusters. The results appear in Table 6.

**Table 6: Means and ANOVA results of second order factor scores by cluster membership**

Factor: Central themes	Total ( <i>N</i> = 999)	Cluster I ( <i>n</i> = 215)	Cluster II ( <i>n</i> = 271)	Cluster III ( <i>n</i> = 234)	Cluster IV ( <i>n</i> = 280)	<i>F</i> statistics ( <i>p</i> = .000)
Factor I: General detection avoidance, effectiveness	5.10	4.22 <sup>a</sup>	6.43 <sup>b</sup>	5.37 <sup>c</sup>	4.25 <sup>a</sup>	$F_{(3, 978)} = 193.29$
Factor II: Attitudes, generally covert, overt reduce speeds	7.22	7.82 <sup>a</sup>	7.76 <sup>a</sup>	5.61 <sup>b</sup>	7.59 <sup>a</sup>	$F_{(3, 987)} = 230.98$
Factor III: Speed-related behaviours, role in crashes	5.55	7.15 <sup>a</sup>	5.99 <sup>b</sup>	5.30 <sup>c</sup>	4.11 <sup>d</sup>	$F_{(3, 996)} = 304.46$
Factor IV: Personal driving ability, detection avoidance	6.28	6.54 <sup>a</sup>	6.09 <sup>b</sup>	5.63 <sup>c</sup>	6.81 <sup>a</sup>	$F_{(3, 989)} = 56.99$
Factor V: Cameras overt, covert increase detection	6.21	6.93 <sup>a</sup>	5.05 <sup>b</sup>	6.83 <sup>a</sup>	6.28 <sup>c</sup>	$F_{(3, 959)} = 116.77$

Note: Identical superscripts indicate means are not significantly different from each other

*Cluster I: Positive profile* (79M, 136 F). These drivers who perceived general risk of detection as low, but personal risk of detection as high, reported positive speed-related attitudes and behaviours (well above average), and rated their driving ability as somewhat above average. While they perceived general speed enforcement as covert, camera enforcement was perceived as more overt. They believed that more overt speed enforcement would slow down drivers more effectively, and that more covert speed camera use would detect more speed offenders.

*Cluster II: Very positive profile* (108 M, 163 F). This group believed general risk of detection was high, but personal risk low. They reported positive speed-related attitudes and behaviours, and rated their driving ability somewhat below the average. They believed speed enforcement, especially by camera, was covert, and that more overt programs would reduce speeds, but did not agree that more covert programs would detect more speed offenders.

*Cluster III: Negative profile* (124 M, 110 F). These respondents perceived enforcement (including camera), as very overt, general risk of detection as higher than average, but personal risk as below average. They reported negative speed-related attitudes and behaviours, and a below-average rating of their driving ability. While these drivers did not believe that more overt speed enforcement would slow down drivers more effectively, they did believe that more covert speed camera use would detect more speeding drivers.

*Cluster IV: Very negative profile* (128 M, 152 F). This group perceived enforcement levels and risk of detection generally as quite low, while rating personal risk and driving ability quite high. They reported positive speed-related attitudes, yet the most negative behaviours. Enforcement was viewed as generally covert, but cameras as somewhat overt. They believed more overt camera operations would slow down drivers more effectively, and that more covert programs would detect more speeding drivers.

### Profiles of the four groups of drivers

Sex and age were both found to differ across the groups. Chi-squared analyses revealed that these differences were significant: Sex  $\chi^2_{(3)} = 14.50, p < .01$ ; Age  $\chi^2_{(15)} = 78.21, p < .000$ . Standardised adjusted residuals (*Res*) were examined to identify the source of differences. Cluster I drivers were more likely to be female (*Res* = 2.4) and far more likely to represent drivers 60+ years (*n* = 68, *Res* = 4.5). Cluster II, somewhat equally represented males and females and most age groups, although was less likely to represent 20-29 year olds (*n* = 29, *Res* = -2.8). Cluster III, was more likely to represent males (*Res* = 3.2) and much more likely to represent 20-29 year olds (*n* = 57, *Res* = 3.9). Cluster IV, somewhat equally represented males and females and was more representative of drivers under 20 years (*n* = 16, *Res* = 3.1) and 20-29 years (*n* = 58, *Res* = 2.5). The groups did not differ on the number of times they had seen cameras in the past four weeks or times detected speeding, in general and by speed camera, over the past two years.

### **CONCLUSIONS AND IMPLICATIONS**

Results indicated that more overt and more covert enforcement programs were both perceived as potentially generating positive outcomes. In relation to general speed enforcement, it was believed that more overt programs would slow people down more effectively. In relation to speed camera enforcement, it was believed that more covert programs would detect more speeding drivers.

Of particular importance was the finding that low visibility of Police vehicles was related to perceptions that enforcement levels were low, rather than covert. This implies Police may be perceived as detecting many offenders when they are more visible, supporting general deterrence theory and also that, during a covert operation, issuing of fines would need to be high, at least initially, in order for the specific deterrence approach to be effective.

Four differing groups of drivers were identified. The first was considered a positive group. They perceived speed camera enforcement as more overt, personal risk of detection high, and reported positive attitudes and the most positive behaviours. This group was more likely to represent females and drivers of 60+ years of age.

A second group was a very positive group. They perceived speed enforcement (general and speed camera) as covert, personal risk as low, and reported positive speed-related attitudes and behaviours. This suggests these drivers did not fear detection as they perceived their driving to be within the road rules. It is significant that this group represented both male and female drivers and every age group except that of 20-29 year olds. This age group was most represented by the third cluster, also a predominantly male cluster. This group believed that speed enforcement was overt, that it was possible to avoid detection, and reported negative speed-related attitudes and behaviour – therefore a negative group. It is probable that these drivers would be the most likely to change their speeding behaviour if speed camera operations became more covert and if they experienced greater risk of detection. This age is a significant one, given that this usually covers the period when probationary drivers receive a full licence, increasing their legal BAC from .00 to .05g/100ml. The interaction of both speed and drink driving issues for this age group generates a need for further research in this area.

The fourth and final cluster identified a very negative safety profile. While this group reported positive speed-related attitudes, their behaviour ratings were the most negative of all the groups (averaging only 4.1 from a possible rating of 10.0). These drivers were prone to speeding behaviour even though they perceived their personal risk of detection as high. It is possible that this group represented the type of driver previously identified in the literature as prone to speeding regardless of safety or penalties. This group was equally comprised of males and females, and was predominantly representative of participants under 20 years and 20-29 years of age. This confirms the learner and probationary period is an important one to target on the personal dangers of speeding, and that methods other than enforcement (e.g. targeted emotive advertising) may be necessary to achieve behavioural change.