CHANGING SPEEDING ATTITUDES AND BEHAVIOUR IN SCOTLAND

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1. INTRODUCTION

In Scotland there were 298 road deaths in 2003. Across the planet annually around 1.2 million people die and around 50 million are injured or disabled in road traffic collisions (Peden et al, 2004). Measures to reduce the speed of traffic are seen as essential to reducing road casualties (Crombie, 2002; Pilkington & Kinra, 2005).

For car drivers in highly motorised societies levels of speeding behaviour vary systematically with driver gender, with driver age, with driver exposure measures such as reported annual mileage, with trip purpose and time pressure, with vehicle performance and size and with indices of driver personality (see Lancaster and Ward (2002), Stradling et al (2003) for reviews).

Research has also shown that road traffic accident (RTA) involvement is associated with having been detected speeding for both car drivers (Rajalin, 1994; Cooper, 1997; Stradling *et al*, 2000, 2003; Gebers and Peck, 2003) and powered two wheeler riders (Ormston *et al*, 2003; Stradling and Ormston, 2003). In Scotland, around 181,000 speeding offences were recorded by the police in 2003.

This paper combines data from two recent studies of Scottish car drivers, one conducted for the Scottish Executive and one for the Strathclyde Safety Camera Partnership. Both surveys involved in-home interviews with quota samples of drivers conducted by NFO Social Research (now TNS). Details of sampling strategy and sample demographics are given in Stradling et al (2003) and Campbell and Stradling (2003). Data from 1088 drivers from the first survey and 1101 from the second, who held a current driving licence, had driven within the previous year and who cited ‘car’ as their main vehicle when driving are combined here to give a picture of the current speeding behaviours and collision involvement of Scottish drivers.

The paper concludes by suggesting that Speed Awareness Courses will prove the most enduring remediation for drivers detected speeding.

2. DETECTED SPEEDERS

2.1 How many drivers had been detected exceeding the speed limit?

Respondents on both surveys were asked how many times they had been stopped by the police for speeding during their driving career and how many times they had been flashed by a speed camera in the previous three years. The police had stopped 27% for speeding during their driving careers and

20% had been flashed by a speed camera. Overall 37% had been stopped or flashed or both and were labelled ‘detected speeders’.

2.2 Does having been detected speeding vary with gender and with age?

The final column of Table 1 shows that half of the male drivers and a quarter of the female drivers had been detected speeding. Table 1 also shows how the proportion of detected speeders varies across the age range, separately for male and female drivers.

	Age in years	17-24	25-34	35-44	45-54	55-64	65+	Total
Male	% Detected speeders	32	54	56	66	52	44	49.9%
Female	% Detected speeders	13	35	33	26	23	18	25.4%

Table 1. Proportions of speeders by age group, separately for male and female car drivers

2.3 Does having been detected speeding vary with reported annual mileage?

Table 2 gives the proportions of speeders amongst those currently driving different annual mileages. For both male and female drivers the proportion that are speeders increases as annual mileage increases, and within each mileage band the proportion of male speeders exceeds that of female speeders. The proportions that had been detected speeding varies from 13% of those female drivers currently driving less than 5,000 miles per annum to 62% of those male drivers currently driving more than 12,000 miles per annum.

	Annual miles driven	< 5,000	5,000-9,999	10,000-12,000	> 12,000	Total
Male	% Detected speeders	30	44	53	62	49.9%
Female	% Detected speeders	13	24	28	46	25.4%

Table 2. Proportions of speeders by annual mileage group, separately for male and female car drivers

2.4 Does having been detected speeding vary with current engine size?

Table 3 shows the variation in proportion of speeders with engine size of car currently driven. Chi-square analysis shows that for both males and females the proportion who are speeders tends to increase as current engine capacity increases, while the proportion of males who have been detected speeding exceeds that for females in each engine size band (all $p < .001$). Approaching two thirds of males (64%) currently driving large cars of 2 litres or above had been detected speeding, compared to below 1 in 5 (18%) of females currently driving small cars.

	Engine capacity (litres)	-1.3	1.3-1.6	1.6-1.9	>2.0	Total

Male	% Detected speeders	39	45	57	64	49.9
Female	% Detected speeders	18	28	29	39	25.4

Table 3. Proportions of speeders by engine capacity group, separately for male and female car drivers

3. SPEEDING AND RECENT COLLISION INVOLVEMENT

3.1 Does having been detected speeding covary with having a recent collision history?

15% of the sample (18% of the male drivers and 13% of the female drivers) reported having been involved in one or more road traffic accidents as a driver within the last three years.

Table 4 shows that while overall half (50%) of males and a quarter (25%) of female drivers in the sample were detected speeders, these proportions were significantly elevated ($p < .001$), to 64% for males and 41% for females, amongst those who reported recent collision involvement.

	RTAs last 3 years	None	Some	Total
Male	% Detected speeders	47	64	49.9%
Female	% Detected speeders	23	41	25.4%

Table 4. Proportions of drivers collision-involved in the last three years who were speeders, separately for male and female car drivers

Table 5 recasts this data to show that while 13% of male and 11% of female non-speeders reported recent RTA involvement, the proportions reporting recent crash involvement were significantly elevated ($p < .001$) to 22% of both male and female detected speeders.

	RTAs last 3 years	None	Some
Male	% Not detected speeders	87	13
	% Detected Speeders	78	22
Female	% Not detected speeders	89	11
	% Detected Speeders	78	22

Table 5. Proportions of speeders who were collision-involved in the last three years, separately for male and female car drivers

Thus, using data from two recent large-scale surveys of Scottish car drivers and defining ‘detected speeders’ as drivers who had been ever stopped by the police for speeding or had been flashed by a speed camera in the previous three years, that twice as many male as female drivers are detected speeders, that the incidence varies with age, with annual mileage and with engine size, and that approaching twice as many detected speeders had been recently involved in a road traffic accident as a driver.

4. SITUATIONAL INFLUENCES ON SPEED CHOICES

4.1 Under what circumstances do drivers vary their speed on the road?

Respondents were asked to indicate whether they would drive faster, slower or the same as usual in a number of situations. They rated 18 scenarios as to how they would drive 'Compared to how I normally drive on my own …', on a 7-point scale from 1 'Much slower', through 4 'Much the same as usual' to 7 'Much faster'.

Table 6 shows the distribution of responses collapsed to Slower (scale points 1-3), Same as Usual (4) and Faster (5-7), with the situations arranged in descending order of percentage of drivers saying they would drive faster.

[Row percents]	Under this condition, I drive…		
	Slower	Same as usual	Faster
When you are late for a meeting or appointment	1	44	55
When the traffic ahead is moving faster than you normally drive	3	67	30
When feeling stressed	23	56	21
When someone is driving close behind you	34	54	12
When listening to music	4	88	8
When the weather is hot	10	85	6
With people your own age in the car	6	90	4
When the traffic is moving more slowly than you normally drive	69	27	4
When driving under streetlights	34	65	1
When driving in the dark	66	33	1
On unfamiliar roads	88	11	1
With older people in the car	37	62	0
When driving in light rain	42	57	0
With children in the car	57	42	0
When you see speed camera warnings	58	41	0
When you spot a speed camera	65	35	0
When driving in heavy rain	96	4	0

When driving in fog	98	2	0

Table 6. Influence of journey conditions on car driver speed choices

Half of drivers (55%) say they would speed up when late and a third (30%) would speed up if the traffic around them were moving faster than they normally drive. Almost all drivers would slow down when driving in fog (98%) and heavy rain (96%). Many drivers indicated they would make 'no change' in their speed choice in many of the circumstances.

Most of the variables were skewed to one pole or the other (faster or slower) with only two variables showing substantial bi-polar differentiation: 1 in 4 (23%) would drive more slowly when feeling stressed while 1 in 5 (21%) would drive faster; 1 in 8 (12%) of drivers would speed up when someone was driving close behind them, while one third (34%) say they would slow down when being tailgated.

The data was submitted to principal components analysis. Table 7 gives the resultant varimax rotated factor structure and loadings.

Situational influence on driver speed	Factor 1	Factor 2	Factor 3
Driving in heavy rain	.71		
Driving in the dark	.59		
On unfamiliar roads	.57		
Driving in fog	.56		
Driving in light rain	.55		
Driving under streetlights	.54		
Traffic slower than you normally drive	.34		
You spot a speed camera		.79	
You see speed camera warnings		.73	
With older people in the car		.58	
With children in the car		.55	
Late for meeting or appointment		-.52	.39
People your own age in the car			.62
Driving when weather is hot			.60
Listening to music			.59
Feeling stressed			.42
Someone is driving close behind you			.36
Traffic faster than you normally drive			.35

Table 7. Factor structure of influence of journey conditions on car driver speed choices (display criterion .32)

The three factors were labelled Adverse driving conditions, Responsibilities to others, and Arousal.

Factor 1 involves variables that have *adverse driving conditions* as a common link, with driving in heavy and light rain, in fog, on an unfamiliar road, in the dark and under streetlights loading positively on this factor. Driving in traffic

moving more slowly than you normally drive also loads on this factor. Table 6 showed that all the variables in this factor would tend to make the respondent drive more slowly than their usual speed and they may all thus be seen as constraining the driver's opportunity to speed.

Factor 2, *Responsibilities to others*, has instances of responsibility or duty linking the variables. Running behind schedule loads negatively on this factor, which is consistent with the suggestion that the connection between these variables is changing speed according to feelings of duty or obligation, whether towards vulnerable present others (children, old people in the car), enforcement authorities and the law, or to distant others at one's destination. Running late for a meeting or appointment tends to make drivers increase their speed, while the other items tend to make respondents drive slower than their usual speed (see Table 6).

The variables which load significantly on Factor 3 are having people of the driver's age in the car, driving when the weather is hot, driving while listening to music, when feeling stressed, being late, when someone is driving close behind you and when the traffic ahead is faster than the respondent's usual speed, all situations in which feelings of *arousal* or stimulation are likely to be present. This factor differs from the first two as it consists almost wholly of variables tending to make respondents drive faster than their usual speed (Table 6).

These three factors may be seen as sorting influences on car driver in-journey speed choices into three major groupings: those influencing – by constraining - the opportunity to speed, those influencing obligation to refrain from speeding, and those driving the inclination to speed. This pattern of results is consistent with the claim that transport choices are driven by the interaction of opportunity ('Can I do it?'), obligation ('Should I do it?') and inclination ('Do I want to do it?') (Stradling, 2002; 2003).

4.2 Speed choices and speeders

Are any of these speed choices – driving faster or slower than normal – more prevalent amongst those drivers who have been detected speeding?

Table 8 shows there are statistically significant differences ($p < .10$) between speeders and non-speeders on 7 of the 18 speed choice scenarios.

	% Faster		% Slower		p for chi-square
	Detected Speeder	Not	Detected Speeder	Not	
Late for meeting	64	49			.000
Traffic ahead faster	35	26			.005
Feeling stressed	24	18			.091

Traffic ahead slower	6	3			.009
On unfamiliar roads			86	89	.000
Spot a speed camera			74	59	.000
Speed camera signs			63	56	.001
Older passengers			44	34	.000

Table 8. Significant differences in speed choices for car drivers detected speeding and not

More of those drivers who have been detected speeding say they drive faster when late, when the traffic ahead is moving faster or slower than they normally drive, and when feeling stressed. Fewer of them drive slower on unfamiliar roads, and more of them drive slower when they spot a speed camera or speed camera warning signs and when they have older passengers in the car.

4.3 Speed choices and recent RTA involvement

Are drivers who have been recently collision-involved more likely to speed up or slow down under any of these scenarios?

Table 9 shows there were significant differences in behaviour ($p < .10$) on 6 of the 18 speed choice scenarios.

	% Faster		% Slower		p for chi-square
	No RTAs	Some RTAs	No RTAs	Some RTAs	
Late for meeting	53	65			.000
Listening to music	7	15			.000
Feeling stressed	19	28			.005
Traffic ahead faster	29	34			.038
Spot a speed camera			64	71	.001
Children in the car			56	65	.083

Table 9. Significant differences in speed choices between collision-involved and non collision-involved car drivers

More of the recently collision-involved car drivers say they would drive faster compared to how they normally drove when late for an appointment, while listening to music, when feeling stressed, and when the traffic ahead was moving faster than they normally drove. More also say they would drive more slowly when they spot a speed camera, suggesting they know they will likely be exceeding the speed limit, and with children in the car, suggesting they

know their normal rate of progress would be inappropriate when transporting child passengers.

5. CONCLUSIONS AND SUGGESTIONS

From a large survey of car drivers in Scotland a group designated ‘detected speeders’ were identified. 37% of Scottish car drivers had ever been stopped by the police for speeding or had been flashed by a speed camera within the past three years. Membership of the detected speeder group varied with driver gender (M: 50%; F: 25%), age, reported annual mileage and current car engine size.

Respondents indicated whether they would drive faster, the same as usual, or slower compared to how they normally drove on their own for 18 journey scenarios. Half said they would speed up when late for a meeting or appointment, and a quarter when the traffic flow was faster than they normally drove. Almost all would slow down in fog and in heavy rain. Many indicated there were situations in which they would not vary their speed. Factor analysis identified three groupings: situations where the opportunities for fast driving were constrained by inclement weather conditions, darkness, or unfamiliar roads; situations where obligations to present or distant others would bring speed change; and circumstances where situational arousal tended to increase the inclination to vary speed.

Those who had been detected speeding were significantly more likely to slow down for speed cameras and camera warning signs, on unfamiliar roads and with older passengers, but to drive faster when late for a meeting or appointment, when feeling stressed, or if the traffic around them was driving faster or slower than they normally drove.

More of those drivers who had crashed within the previous 3 years indicated they would slow down for a speed camera and when driving with children in the car, and more of the crash involved said they would drive faster when late, when feeling stressed, when listening to music and when the weather was hot.

5.1 Remediation: combining enforcement and education to change speeding behaviour

Whilst there is no guarantee that changing these particular on-road responses to in-journey situational exigencies would reduce the future speeding behaviour of drivers, or their future RTA involvement, there is a prima facie case for incorporating these research findings into the curricula of post-qualification retraining courses for speeding or for crash-involved drivers. Recently in some jurisdictions in the UK courses have been made available as diversions from prosecution for drivers charged with driving without due care and attention (Driver Improvement Courses) or detected exceeding the speed limit by up to 20 mph (Speed Awareness Courses).

5.2 Four functions for a speed camera

Safety cameras on UK roads, whose deployment and operation are undertaken by partnerships between the police, local authorities and the courts, currently serve three main purposes but could serve a fourth.

5.2.1 Hazardous location indication. In the UK today most automatic safety cameras for detecting speeding motorists are located at crash hot spots. The deployment criteria being followed by Safety Camera Partnerships across the UK require speed cameras to be placed where there are elevated levels of recent, and speed-related, RTAs. The cameras are also highly visible being painted, in Scotland, with yellow and red diagonal stripes. Their first function is thus to signal to the approaching driver 'Look out! Take extra care! This has lately proved to be a dangerous stretch of road.' They do not, however, provide any further site-specific hazard information ('What, exactly, should I be looking out for?') beyond this general alerting function.

5.2.2 General deterrence. Speed cameras slow down speeding drivers. In one study of newly installed speed cameras in built-up areas in Glasgow (Campbell and Stradling, 2002a) baseline data showed 64% of passing motorists in excess of the speed limit. Installing speed camera housings reduced this to 37%. When the camera units went operational three months later the figure reduced further to 23%. Thus the number of speeders at the camera sites was reduced from two-thirds to one quarter in six months.

5.2.3 Specific deterrence. A recent study using the conviction and crash records of a large sample of drivers in Ontario, Canada (Redelmeier et al, 2003) concluded that "The risk of a fatal crash in the month after a [driving] conviction was about 35% lower than in a comparable month with no conviction for the same driver .. [but] The benefit lessened substantially by 2 months and was not significant by 3 – 4 months" (p. 2177), suggesting that conviction – detection and punishment – for a driving offence has only a brief and temporary effect on changing driver behaviour.

In a study of 500 car drivers surveyed two months after receiving a speeding ticket in Glasgow, Campbell and Stradling (2002b) found that speeding tickets changed the behaviour of some, but not all, drivers, reporting a mixture of speed sensitive drivers ('I now pay more attention to my speed while driving'), camera sensitive drivers ('I now keep more of a look out for speed cameras') and insensitive drivers, doing neither. Around half had become more sensitive to their speed and were driving more slowly, but one third reported only slowing down for speed cameras, and one sixth reported themselves unremediated, despite paying £60 and receiving 3 penalty points on their licence (where 12 points brings temporary disqualification from driving), and not slowing down at all.

Another recent study of Scottish drivers (Stradling et al, 2003) found that 23% of male and 15% of female Scottish car drivers had been flashed by a speed camera in the previous 3 years but when asked 'What happened the last time you were flashed by a speed camera?' 4 out of 5 of those (79%) replied 'Nothing' (typically because a smaller number of cameras are rotated amongst

a larger number of housings, which still flash with no film inside). Detection without consequence is unlikely to be a powerful behaviour change agent.

5.2.4 Detecting drivers in urgent need of help. We have long known that speed kills. The laws of physics inexorably dictate that the higher the speed at impact the more energy must be rapidly absorbed by hard metal, soft flesh and brittle bone. From the data reported here we have also seen that those drivers who had been stopped by the police for speeding or had been flashed by a speed camera had almost double the incidence of recent crash involvement. 22% of the detected speeders versus 12% of those who had not been detected speeding reported having been involved in an RTA as a driver in the previous 3 years.

The kinds of drivers who have been detected speeding are more likely to have been recently collision-involved. These people pose more risk to themselves and to other, usually more vulnerable, road users. They need help with changing their driving styles. There is support amongst the UK motoring public for such an approach. The 2002 RAC Report on Motoring (RAC Foundation, 2002) reported 57% of a large, nationwide sample of drivers agreeing with the statement that 'All drivers should receive periodic refresher training'. Such driver refresher training could be duration-based (and be more frequent for young and old drivers) or incident-based following involvement in Road Traffic Accidents or speeding infractions.

Driver retraining courses, where drivers pay for their own remediation, and pay more than the fixed penalty fine, combining classroom sessions ('Why to change') and on-road guided practice ('How to change') offer the possibility of undoing old habits and facilitating integrated, sustainable changes in driving style. Speed cameras spot 'crash magnets' in need of change. Changing KSA, addressing the knowledge, skills and attitudes of drivers, offers a potentially powerful route to changing KSI, and reducing the numbers killed and seriously injured on the roads.

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