

Driver perceptions of police speed enforcement: differences between camera-based and non-camera based methods: results from a qualitative study

David Soole¹, Alexia Lennon¹ and Barry Watson¹

¹ Centre for Accident Research and Road Safety – Queensland (CARRS-Q)

Abstract

Prior research has highlighted the relationship between speeding and increased frequency and severity of traffic crashes. There is evidence to suggest that police speed enforcement, in particular speed camera operations, can be an effective tool for reducing traffic crashes. This qualitative study used focus groups with Queensland drivers (n=39) to investigate knowledge, support, and impact on self-reported speeding behaviour of a variety of police speed enforcement methods. A number of interesting themes emerged. There were many incongruities regarding participants perceptions of current police speed enforcement policies and practices. While participants perceived police speed enforcement as a revenue-raising tool for the Government, paradoxically they also reported it as serving a road-safety benefit. Non-camera based methods, such as on-road traffic patrols, received stronger support and was associated with greater self-reported compliance to speed limits than camera-based methods. Support for camera-based methods, such as mobile speed camera vans and fixed cameras, was contingent upon overt operations and greater perceived transparency in criteria used for choosing camera locations. There was also variation in the impact of camera-based methods on self-reported speeding with some participants reporting greater compliance, either site-specific or network-wide, while others reported no or little impact on speeding behaviour. Potential policy implications and directions for future research are discussed.

Keywords

Police speed enforcement, speeding, speed cameras, fixed cameras, routine traffic patrol, overt enforcement, covert enforcement, legitimacy, focus groups.

Background

Trauma resulting from road traffic crashes is a significant problem worldwide. Some proponents have estimated that, given current trends, traffic crashes may be the third leading cause of death and morbidity by the year 2020 (Murray & Lopez, 1997). Road traffic crashes, whether speed-related or otherwise, have significant economic and social costs. In 2003 road traffic crashes cost Australia an estimated \$17 billion (Connelly & Supangan, 2006). Excessive speed is one issue that typically dominates discussions regarding illegal high-risk driving behaviours contributes to road crashes.

Empirical research has highlighted a positive relationship between vehicle speed and crash risk and crash severity (Aarts & van Schagen, 2006; Kloeden, McLean, & Glonek, 2002; Kloeden, McLean, Moore, & Ponte, 1997). Further, the relationship between speed and crash risk has been identified as exponential and more pronounced on open roads than urban roads (Fildes, Rumbold, & Leening, 1991; Kloeden, et al., 1997; 2002). However, the actual impact of speed as a contributing factor in traffic crashes is difficult to quantify. Reports have suggested that between 16% and 30% of all road fatalities and approximately 5% of traffic crash injuries in Queensland are speed-related (Queensland Government, 2005; Queensland Transport, 2005, 2007a). The finding that speed contributes to a greater extent to the number of fatal crashes supports the argument that speed is positively associated with crash severity.

Introduction

Given the relationship between speed and increased crash risk and severity, the development of road safety initiatives designed to reduce driver speeds is essential. One of the major methods of speed management is police speed law enforcement through the use of speed enforcement technologies such as cameras and radars. Typically, the effectiveness of speed law enforcement has been evaluated through studies investigating the impact of such methods on traffic crashes and speeding recidivism. This study seeks to extend on the current literature by examining driver perceptions and self-reported behaviour associated with police speed enforcement. Specifically, this paper investigates the differences between perceptions towards camera-based and non-camera-based speed enforcement methods and the differential impact of these approaches on self-reported speeding behaviour.

There is widespread use of speed enforcement technology throughout the world. Australia has embraced this method of speed enforcement wholeheartedly, with the first implementation of speed cameras

occurring in Victoria in 1985 and speed cameras operational in all Australian jurisdictions by 1997 (Delaney, Ward & Cameron, 2005). Automated, camera-based speed enforcement methods, such as mobile speed camera vans and fixed cameras¹, are widely used across all Australian jurisdictions. In addition, other forms of manually operated or non-camera-based technologies, including hand-held and moving mode radars (radar devices attached to a police vehicle), are also commonly used, as is general routine traffic patrol.

Mobile speed cameras were first introduced in Queensland in May 1997. More recently, a small number of fixed cameras were introduced in December 2007. Routine traffic patrols, as well as hand-held and moving-mode radars, are also used throughout the state. The speed camera program in Queensland is based on the theoretical underpinnings of deterrence theory, in particular general deterrence, and thus speed camera operation is inherently overt. Speed camera zones are chosen on the basis of crash history and public complaints, and cameras are randomly scheduled within these zones. Zones are one kilometre in diameter in urban areas and five kilometres in diameter in rural areas. Speed camera sites are the locations within a zone where a speed camera will operate, and there are currently over 4000 speed camera sites located throughout the state. Speed cameras are operated day and night by uniformed police officers and operated with an unspecified enforcement tolerance (Queensland Police Service Traffic Camera Office, 2007).

While the accuracy of speed camera technology has been questioned elsewhere in Australia, Queensland has high standards of operation including regular device calibration and annual servicing. In Queensland, there is no legislation prohibiting the use of speed cameras on downhill grades, provisions are made allowing officers to breach sections of the Traffic act (such as parking on footpaths, or in 'no standing' areas), and while it is a Service requirement for the '*Speed Camera in Use*' sign to be in place there is no legislative requirement for its use. Given the life-threatening nature of speeding behaviour, there are no provisions from speed legislation on the basis of good driving history or extenuating circumstances in Queensland (Queensland Police Service Traffic Camera Office, 2007).

Despite the widespread use of speed enforcement technology, there is still much debate regarding the perceived effectiveness of such speed management efforts. While much of the empirical evidence suggests speed cameras are an effective tool for reducing road crash fatalities and casualties a number of significant methodological shortcomings are present in many studies. For instance, studies typically review enforcement programs at a macro level making it extremely difficult to disentangle the impact of various aspects of programs, and thus difficult to make recommendations regarding what works, or does not work, in police speed enforcement (Harrison, 2001; Pilkington & Kinra, 2005). Nonetheless, much can be learned about the various aspects of speed law enforcement by reviewing the available research.

In an evaluation of overtly operated speed cameras in Queensland, Newstead and Cameron (2003) found reductions in a number of outcome measures, including fatal crashes within close proximity of the camera site (45%), injury crashes (19%) and non-injury crashes (21%). Operational variables were reported to strongly influence the effectiveness of the speed camera program, with effects greatest at times when more camera sites were operational and true randomness of camera deployment was achieved. However, it has been suggested that the highly visible nature of Queensland speed camera enforcement can lead to time and distance halo effects surrounding camera locations (Champness, Sheehan, & Folkman, 2005).

Studies evaluating speed enforcement programs in Victoria, where programs tend to be more covert in nature, have also reported reductions in crash frequency and severity (D'Elia, Newstead, & Cameron, 2007; Delaney, Diamantopoulou, & Cameron, 2003). Specifically, the full implementation of covert mobile speed cameras was found to produce a significant reduction of 10% in casualty crashes and 27% in fatal crashes (D'Elia et al., 2007). In addition, fixed cameras were found to reduce vehicle speeds (Delaney et al., 2003).

Non-camera based speed enforcement methods have also been evaluated, but not as extensively as camera-based methods. Diamantopoulou, Cameron and Shtifelman (1998) evaluated the effectiveness of hand-held and moving mode lasers and found that hand-held laser operation was associated with

¹ Data collection for this study was conducted in October to mid-December in 2007, in the months prior to the implementation of fixed speed cameras in Queensland.

reductions in crash frequency, but not severity. Again, the overt nature of this type of enforcement was found to be associated with relatively localised effects on vehicle speeds. Moving mode radar devices were found to be effective in reducing casualty crashes on open roads in rural areas, however their effect in more metropolitan areas was reported to be negligible. Newstead, Cameron and Leggett (1999) evaluated the Random Road Watch Program in Queensland, which involved random and highly visible routine traffic policing. While not solely restricted to speed enforcement, the program was found to produce a number of positive effects on crash outcomes, including reductions in fatal crashes (33%), injury crashes (25%) and non-injury crashes (22%).

A number of reviews have attempted to outline guidelines for best practice in police speed enforcement. The following recommendations have been made with consideration to the methodological shortcomings of the current literature and operational differences across jurisdictions. Firstly, speed enforcement should focus primarily on increasing the risk of detection rather than levels of apprehension for offending (Zaal, 1994). That is, general deterrence should be the underlying philosophy of any speed enforcement package, in order to maximise its impact on community-wide behaviour. Secondly, public support for speed camera operation will be greatly improved if site locations are chosen on the criteria of prior documented speed-related crash history at those sites (Zaal, 1994).

A number of operational recommendations have also been made. Specifically, a mixture of overt and covert operations and stationary and mobile operations is argued to be likely to result in the greatest road safety benefit (McInerney, Cairney, Toomath, Evans, & Swadling, 2001; Zaal, 1994). However, the precise optimal combination of approaches is difficult to ascertain. In addition, strategies should allow for a wider implementation of speed enforcement efforts across the entire road network (McInerney *et al.*, 2001; Zaal, 1994). Finally, enforcement tolerances should be set at the minimal practical level while considering device accuracy and accidental driver speed inconsistencies (Harrison, 2001; McInerney *et al.*, 2001; Zaal, 1994).

Researchers have outlined a number of typical public criticisms of speed enforcement (Delaney, *et al.*, 2005; McKenna, 2005). The credibility of speed enforcement methods have been called into question, with some drivers perceiving it as used more as a revenue-raising mechanism than to serve a road safety benefit. Drivers often cite perceptions of inappropriate criteria for choosing site locations of cameras and covert operations as evidence of this. Drivers have also questioned the legitimacy of speed enforcement approaches, arguing that enforcement tolerances should allow an acceptable leeway for inconsistencies in speedometer calibrations and simple driver error and that automated technologies do not allow for extenuating circumstances to be properly accounted. Finally, the reliability of speed enforcement technology has also been criticised by many drivers. (Delaney, *et al.*, 2005).

The current study forms part of a larger program of research examining driver perceptions and self-reported behaviour associated with police speed enforcement. This paper reports the results of focus group discussions with a group of Queensland motorists which explored the differences between perceptions towards camera-based and non-camera-based speed enforcement methods and the differential impact of these approaches on self-reported speeding behaviour. This qualitative method was chosen to enable personal, in-depth descriptions by individual participants as well as allow for group interaction. While participants were drawn from both urban (metropolitan Brisbane and Gold Coast) and rural (Mackay and Toowoomba) areas analysing the findings by region was beyond the scope of this paper. Thus, findings are reported in an aggregate fashion only.

Method

Participants

A total of 39 drivers participated in seven focus group sessions conducted with drivers from throughout Queensland. Participants were recruited using two strategies: a university student participation program (n=14); and media advertising in local newspapers (n=25). Student participants received course credit and non-students were offered \$20 cash as reimbursement for their participation. Participants were required to hold a current Queensland drivers licence (Provisional or Open) for a car, motorcycle or truck to be eligible for participation.

Procedure

The focus group sessions were conducted throughout south-east Queensland (Brisbane suburbs, Gold Coast and Toowoomba) and a small session was also conducted in north Queensland (Mackay). All

sessions were held in suitable rooms on university or TAFE campuses at designated times. Participants made contact with the first author prior to the session and nominated their desired session to attend. Participants provided written consent and demographic details as per university ethical requirements. Each focus group session involved a 90-minute discussion on issues relevant to police speed enforcement. The first author facilitated each session and all sessions were audio-recorded and later transcribed verbatim. Fifteen standardised questions were asked in each session and a number of a priori prompts were used to generate further clarification and discussion where needed (see Appendix A for questions and prompts used in the focus group sessions). The specific issues addressed included knowledge of current speed enforcement policies and practices, perceived effectiveness of and support for camera-based and non-camera-based enforcement approaches and overt versus covert operations, and the importance of legitimacy in speed enforcement policy and practice. The focus groups consisted of two to ten participants in each session.

Analysis

A thematic analysis was conducted to investigate the themes arising from the focus group sessions (Sivesend, 1999). Major themes were identified in early focus group sessions and analysed concurrent to the continuation of the data collection process. In the findings presented below, participants are denoted by their gender, age and residence (e.g., Male, 35, Mackay).

Results

Sample characteristics

The sample consisted of 51.3% females. The mean age of the sample was 41.97 years (sd = 18.62 yrs, range 18-79 yrs). There was an even split of participants from urban and rural areas (53.8% urban) and the majority of drivers held an open licence (82.1%). A quarter of drivers (25.6%) reported having been involved in a crash in the previous three years, however no driver reported having been involved in more than one crash during that time. Almost a third (30.8%) reported having received a speeding ticket in the past three years, with the maximum number reported by any one individual being eleven.

Prominent themes

Incongruities regarding current policy and practice

From an early stage it became apparent that there were incongruities between the perceptions participants had regarding speed enforcement legislation and policy and their perceptions of actual speed enforcement practice in Queensland. Most incongruities centred on operational issues and the legal requirements binding police on issues such as signage, visibility and enforcement tolerances. Some drivers also questioned the technological reliability of speed cameras:

“They [police] park a 4WD with a sign sitting directly up the front [of the speed camera vehicle] which they are obliged by law to state and nobody sees that [sign]” (Female, 54, Mackay).

“I think everybody knows that you can go up to 9 K’s over the limit [on an open road] and you generally don’t get a fine” (Female, 59, Mackay)

“I mistrust speed cameras and radars. They may not be set right, they may not be working right or they may be deliberately set wrong” (Male, 68, Mackay)

These issues highlighted a perceived sense of trickery or lack of transparency in speed enforcement operations and the purpose of speed enforcement efforts:

“I know they [the police] are not supposed to be at the bottom of hills. I see them there all the time. It’s where they are going to catch people” (Female, 53, Toowoomba)

“Breaking the law ... I get annoyed when I see them [police vehicles] park on the footpath and yet you can’t do that” (Male, 49, Brisbane)

“Hiding in bushes, I heard they’re not allowed to do that but they [the police] still do it ... they need to be out in plain sight before you even approach them” (Female, 18, Brisbane)

There was also much conjecture regarding the perceived criteria used to choose speed camera deployment sites. Specifically, drivers argued that there were incongruities between the criteria they understood police to be officially bound by and what they believed was actually occurring:

“The police say they put them in accident black-spots and are purely motivated by saving lives but I’m cynical about it” (Male, 45, Brisbane)

“I don’t know how they choose them, but I don’t think they choose them based on where they could be most effective” (Male, 40+, Brisbane)

“They [speed cameras] are always near our place ... and you think, ‘Is this a black spot?’ No it’s not! We have lived there for 30 years. There’s never been an accident in that spot” (Female, 53, Toowoomba)

Paradoxical views regarding the purpose of speed enforcement

Consistent with prior research (Fleiter & Watson, 2005) drivers held paradoxical views regarding the purpose of speed enforcement efforts. While many claimed that speed enforcement served a revenue-raising function they also acknowledged the role of speed enforcement in producing a road safety benefit, as this series of answers in one focus group suggests:

“To raise revenue” (Male, 24, Brisbane)

“Yeah a bit of government funding” (Female, 23, Brisbane)

“To keep people safe” (Female, 18, Brisbane)

“To prevent accidents, save lives” (Male, 49, Brisbane)

It appeared that perceptions of the purpose of speed enforcement efforts were significantly affected by issues such as the perceived appropriateness and transparency of camera deployment locations and other operational issues:

“I would say a big part is revenue raising because of the places they put the cameras” (Female, 46, Brisbane)

“The prime object of the activity is fundraising. If they were really serious about looking after the public and seeing they didn’t smash themselves up and kill themselves, they [the police] would have much more presence on the road, and clearly visible presence, not just hiding behind bus shelters” (Male, 56, Toowoomba)

Perceptions and behavioural impact of non-camera based speed enforcement approaches

Non-camera based speed enforcement methods received both strong support as well as positive self-reported impacts on speeding behaviour. That is, many participants reported a greater willingness to slow down and comply with speed limits in reaction to non-camera-based methods. Most discussions focused on routine traffic patrol. Many participants commented on their typical behavioural reaction to observing a police vehicle amongst the traffic flow:

“If you see a police car, you are going to slow down or check your speed” (Male, 51, Toowoomba)

“When you do see a police car along the highway, you do see – everybody doesn’t speed. Nobody wants to speed past the police car. So that really does enforce the speed limit” (Female, 29, Gold Coast)

However, it was also acknowledged that observing a police vehicle in the traffic flow could impact a driver at a more cognitive level:

“I think just seeing police around makes you more aware of the road rules” (Female, 46, Brisbane)

It appeared that visibility and a greater perceived police presence were associated with the perceived effectiveness of non-camera-based approaches. The non-stationary nature of routine patrols and hand-held lasers appeared to be perceived as having a more network-wide impact than stationary, camera-based methods:

“I think patrols that are highly visible and use recognisable police vehicles are very, very effective” (Male, 54, Toowoomba)

“If there were more police out there pulling over more people in more spots, then it would be more effective” (Female, 24, Brisbane)

In addition, many drivers highlighted the immediacy of punishment, the face-to-face contact with a police officer and the subsequent embarrassment associated with non-camera-based methods as a major deterrent:

“If there’s marked cars pulling over people or radars pulling over people ... cars are going past, seeing it all happening. I think that has a much bigger deterrence than seeing a speed camera on the side of the road. That makes people think for a lot longer” (Male, 51, Toowoomba)

“They [non-camera-based methods] have got an extra bit of humility when you get pulled over by someone ... for some people I guess that has a bit more benefit, rather than just getting a letter in the mail” (Male, 25, Brisbane)

A number of indirect advantages associated with non-camera-based methods were also reported. It was consistently argued that speeding was but one traffic offence contributing to traffic crashes. Many participants highlighted the ability for routine traffic patrol to manage not only speeding drivers but also to police other traffic offences:

“I think it [more police on the road] would be more effective because the police are able to experience the frustrations that everyday drivers experience on the roads, like people going too slow, people acting stupid, people tailgating” (Female, 25, Brisbane)

“When they’re [the police] driving in traffic or something and they see a hoon ahead that’s dodging traffic ... they can go up behind them and pull them over. Because they’re [hoons] the people that cause the trouble” (Female, 23, Brisbane)

Further, participants argued that the discretion offered to police officers using non-camera-based methods would allow for extenuating circumstances to be taken into account and give officers the ability to issue warnings rather than fines, which some believed could have the same impact as more formalised punishments:

“I think it [police patrols] helps because it gives the policeman some discretion ... and if you conduct yourself in a good manner they might take that and give you a discretionary warning and let you move on and that can do the same job as a fine” (Male, 49, Brisbane)

In fact, a number of participants even directly compared the deterrent impact of non-camera-based approaches to camera-based approaches:

“If I got a letter in the mail from a camera I wouldn’t take that much notice of it, the fine wouldn’t bother me ... but if I actually got pulled over ... that would make me think harder about it and not speed” (Female, 25, Brisbane)

“You go past it [speed camera] and everyone starts speeding up again so I guess it is helpful with people slowing down but only in that 200m where the camera is and that’s for stationary cameras more so than radars. I think with radars, they are more effective than the set up ones” (Female, 19, Brisbane)

“I think it’s about operant conditioning ... if you find out through the mail you’re like ‘Ok, I sped sometime in the last two weeks so what can I do about it’ ... but if you get pulled over straight away than you feel bad and you have to deal with the embarrassment of the face-to-face ‘Why were you doing this bad thing?’ ... you feel terrible because you were just doing it and you can’t deny it whereas in the mail it’s just sort of irrelevant” (Female, 20, Brisbane)

Perceptions and behavioural impact of camera based speed enforcement approaches

Perceptions of camera-based speed enforcement methods were much more varied. Among the participants, support for the use of stationary mobile speed camera vans and fixed cameras appeared to be contingent on a number of factors including the visibility of operations and the legitimacy of the deployment site. Specifically, camera-based approaches received greater support when operations are highly visible and there is greater transparency in the criteria used for choosing camera deployment locations:

“The only fit purpose for speed cameras is things like school zones and so on where it’s important to have compliance. You make it visible, you make people see it ...but the object isn’t to fine people” (Male, 35, Toowoomba)

“I reckon they’re [fixed cameras] fine, but they have to notify the person ... with a sign saying one coming up ahead” (Male, 24, Brisbane)

“It’s [camera-based methods] got to be in accident prone areas” (Male, 49, Brisbane)

Due to the high visibility of fixed speed cameras, this approach seemed to be associated with greater levels of acceptability than mobile speed camera vans:

“They [fixed cameras] are very effective because of their visibility. I would like to see them every 2 kilometres down the road” (Male, 61, Toowoomba)

“They [fixed cameras] aren’t revenue raising because they give you so many warnings” (Female, 53, Toowoomba)

Conversely, mobile speed camera operations were perceived as being much more susceptible to “sneaky” tactics. These included making the speed camera less visible, which was seen by many as being synonymous with revenue raising:

“I would have them [mobile speed camera vans] more visible. I would like to see them stop skulking around town to raise revenue” (Male, 61, Toowoomba)

In addition, participants highlighted a number of factors that they felt might improve the effectiveness of camera-based approaches. Specifically, the approach could be improved by increasing the randomness of deployment sites and the swiftness of punishment following a detected offence:

“I say the key would be having them at random locations, having people caught more often and following up when they are caught quickly so it reinforces it” (Male, undisclosed, Brisbane)

However, a number of participants acknowledged that the high visibility of many camera-based approaches, coupled with a lack of randomisation of deployment sites, led to site-learning effects which subsequently diminished the effectiveness of such methods:

“You start to learn the spots after you’ve been driving for a few years of where they [speed cameras] are and then you learn just to be cautious around those areas, which would be good if they did it in areas that are more accident prone but I’m not sure they do” (Female, 20, Brisbane)

Further, some believed that the lack of swiftness in punishment associated with camera-based approaches called into question the general deterrent effect of such methods:

“I would have thought the idea of enforcement is to prevent the infraction. You can be photographed three times ... and have an accident ... your behaviour could have been stopped ... that’s why I am concerned about speed cameras and fixed cameras” (Male, undisclosed, Toowoomba)

However, some claimed that camera-based methods, particularly mobile speed camera vans, did serve a general deterrent effect:

“Whenever you see any sort of 4WD on the side of the road you slow down, or when you go past certain spots where you see them regularly you slow down” (Female, 25, Brisbane)

There were mixed reports regarding the impact of camera-based methods on self-reported speeding behaviour. Consistent with prior research (Champness, et al., 2005), many participants noted halo effects associated with mobile speed camera vans and fixed cameras, particularly when those methods are highly visible:

“I think they are very effective in getting people to slow down for I don’t know, 100 metres around that area” (Female, 29, Gold Coast)

“I think they are effective in the immediate area of where they are ... but I don’t think overall they are effective at just keeping people to the speed limit” (Female, 25, Brisbane)

However, many participants did not perceive this to be a disadvantage of camera-based approaches. Rather they argued that such an approach is beneficial in areas such as accident black-spots and school zones where reducing vehicle speed is perceived to be most important:

“Everyone is going to slow down through that spot, but at least that section will always be kept to the speed limit ... So that probably has its purpose” (Female, 24, Brisbane)

“In areas that need to be targeted, like at the front of schools or areas of poor visibility for both drivers and pedestrians, if you have one there, obviously people aren’t going to speed there. So they are probably beneficial in that sense, purely to stop people speeding in specific areas” (Male, 45, Brisbane)

In contrast, some participants reported prolonged, network-wide effects associated with camera-based methods:

“For me, if I see one I think it does remind you ... because you can be so absorbed with what you have to do that day, you see it and you think ‘oh gosh I really do need to watch my speed’” (Female, 50, Brisbane)

Recommendations and conclusions

From the material above, there appear to be a number of incongruities between the perceptions participants have regarding speed enforcement legislation and policy and their perceptions of actual speed enforcement practice in Queensland. These incongruities *may* be due to important differences between current speed enforcement legislation and policy and what practices the police are currently actually adopting. A perceived lack of transparency of speed enforcement operations and camera site deployment criteria were prominent themes, and are intrinsically related to the perceived legitimacy of speed enforcement efforts. These incongruities suggest the need for improved communication between the police and the public regarding speed enforcement policy and practice. It also suggests that enforcement agencies *may* need to review current deployment policies and practices (e.g., visibility, signage, site allocation criteria).

Overall, participant views supported Zaal’s (1994) recommendation that general deterrence be the underlying philosophy of speed management programs. Specifically, participants stressed that speed enforcement should focus primarily on increasing the risk of detection rather than increasing levels of apprehension. Participants expressed support for the use of highly visible, non-camera-based speed enforcement methods across the entire road network. One notable exception however, was a clear preference for camera-based methods in areas perceived to be of high-risk, such as accident black-spots and school zones. Use of stationary, camera-based methods and covert operations in areas not perceived to be high-risk was typically viewed as divergent to the goal of general deterrence and rather as a means to apprehend more drivers. Such approaches inevitably led to claims of revenue raising in this sample.

Both camera-based and non-camera-based approaches were associated with greater self-reported compliance to speed limits, however there were some significant differences. Consistent with prior research (Champness, et al., 2005), camera-based approaches appeared to be associated with site-specific behavioural changes. Thus, while some participants reported a general deterrent effect associated with camera-based methods, it is unclear how prolonged this effect is, and how it differs between drivers. Conversely, non-camera-based methods, particularly routine traffic patrol and to a lesser extent hand-held and moving mode radar use, were reported to have more network-wide effects. A number of factors, including the mobility of the methods, immediacy of punishment, direct contact with a police officer and the subsequent embarrassment associated with this interaction, appeared to be responsible for the heightened deterrent impact of such approaches.

Irrespective of the approach, increased visibility and perceived police presence were associated with greater self-reported compliance to speed limits. However, participants reported a number of additional advantages for non-camera-based methods. Firstly, there appeared to be a perception that greater officer discretion is afforded such approaches and thus, extenuating circumstances can be taken into account, or warnings given instead of formalised penalties. This was perceived as being able to improve police-community relations. Secondly, routine traffic patrol was perceived as allowing officers to police other offences in addition to speeding, and thus was perceived as a more parsimonious approach to traffic enforcement.

Participants identified a number of factors they perceived might improve the effectiveness of camera-based approaches. Firstly, some participants believed that by increasing the randomness of speed camera deployment the police would achieve a greater general deterrent impact and negate potential site-learning effects. Randomness of deployment is currently a unique feature of the Queensland speed management program, and thus greater promotion of this element of the deployment process to drivers may be required. Secondly, some participants believed that, in line with extended classical deterrence theory, the punishment associated with a speeding offence detected by camera-based methods should be administered more swiftly.

Implication of findings

Traditionally, policy makers have been concerned very little with what drivers report as the most effective tools for changing their behaviour. This study explicitly asked participants to state the speed enforcement methods they believed would be most effective in impacting on their driving speed, irrespective of their perceptions of the acceptability of the use of such methods. The answers were surprisingly consistent, with mobile speed camera vans being perceived as the least effective method. Non-camera based methods, particularly routine traffic patrol, were deemed most effective in producing general, network-wide impacts on speeding. However, fixed speed cameras were believed to have a beneficial impact in accident-prone areas and school zones. These findings are highlighted in the following quotes:

“Fixing a certain problem in a certain stretch of road at a certain place, the most effective thing you can do is put in a fixed camera and big signage ... but if you are talking about changing people’s behaviour in general and their attitudes in general ... then hand-held radars or more on-road cops would be most effective at random places that you never know where they are going to be and then they would pull you over” (Female, 25, Brisbane)

“24-hour fixed cameras in recognised black-spots and more visible police presence on the road” (Male, 56, Toowoomba)

The following quote sums up the perspective of many participants. It appears that most people realised the resource constraints that perpetuate the reliance on mobile speed camera vans in Queensland. However, a reliance on this method in spite of other methods perceived to be more effective leads many to argue that speed enforcement methods currently are geared towards a revenue raising goal:

“I think just focussing too heavily on cameras can make people think they are just revenue raising ... or just make it public the criteria they use ... if people understand the criteria they are using to choose somewhere to put a camera or speed trap, then it might sort of lift their image a bit” (Male, 45, Brisbane)

Limitations & Directions for Future Research

The findings reported in this study must be viewed in light of a number of considerations. Firstly, it is difficult to ascertain whether the perceptions reported by participants in this study are genuine constructive criticisms of the current speed enforcement environment in Queensland or carefully crafted arguments used to justify illegal driving behaviour. Secondly, although the qualitative methodology chosen allows for more in-depth discussion with and between participants, the process is time consuming and thus the findings are based on a limited sample size. Finally, it could be argued that improving the perception of speed enforcement methods in the eyes of drivers will not necessarily equate to changes in speeding behaviour. Nevertheless, it could be argued that an increased perception of the legitimacy of speed management policies and practices might be associated with an increased willingness to comply among drivers.

To address these issues, further research must be undertaken utilising other methodologies. The second phase of the broader program of research, to which this qualitative study is encroached, involved a quantitative survey of approximately 900 drivers examining the impact of current speed enforcement practices on self-reported speeding behaviour. This phase of the research, with a larger, more representative sample of Queensland drivers, should build on the findings of the qualitative phase reported here.

References

- Aarts, L., & van Schagen, I. (2006). Driving speed and the risk of road crashes: A review. *Accident Analysis & Prevention*, 38(2), 215-224.
- Champness, P., Sheehan, M., & Folkman, L.-M. (2005). *Time and distance halo effects of an overtly deployed mobile speed camera*. Paper presented at the Road Safety Research, Policing and Education Conference, Wellington, New Zealand.
- Connelly, L. B., & Supangan, R. (2006). The economic costs of road traffic crashes: Australia, states and territories. *Accident Analysis & Prevention*, 38, 1087-1093.
- D'Elia, A., Newstead, S., & Cameron, M. (2007). *Overall Impact During 2001-2004 of Victorian Speed-Related Package*. Melbourne, Victoria: Monash University Accident Research Centre.
- Delaney, A., Diamantopoulou, K., & Cameron, M. (2003). *MUARC'S Speed Enforcement Research: Principles Learnt and Implications for Practice* (No. Report No. 200). Melbourne: Monash University Accident Research Centre.
- Delaney, A., Ward, H., & Cameron, M. (2005). *The History and Development of Speed Camera Use* (No. Report No. 242). Melbourne: Monash University Accident Research Centre.
- Delaney, A., Ward, H., Cameron, M., & Williams, A. F. (2005). Controversies and speed cameras: lessons learnt internationally. *Journal of Public Health Policy*, 26(4), 404-415.
- Diamantopoulou, K., Cameron, M., & Shtifelman, M. (1998). *Evaluation of Moving Mode Radar for Speed Enforcement in Victoria, 1995-1997* (No. Report No. 141). Melbourne: Monash University Accident Research Centre.
- Fildes, B. N., Rumbold, G., & Leening, A. (1991). *Speed Behaviour and Drivers' Attitude to Speeding* (No. Report No. 16). Melbourne: Monash University Accident Research Centre.
- Fleiter, J., & Watson, B. (2006). *The speed paradox: the misalignment between driver attitudes and speeding behaviour*. Paper presented at the Australasian Road Safety Research, Policing and Education Conference.
- Harrison, W. (2001, August 2001). *What works in speed enforcement*. Paper presented at the NRMA Insurance National Speed and Road Safety Conference, Adelaide, Australia.
- Kloeden, C. N., McLean, A. J., & Glonek, G. (2002). *Reanalysis of Travelling Speed and the Risk of Crash Involvement in Adelaide South Australia*. Canberra: Department of Transport and Regional Services, Australian Transport Safety Bureau.
- Kloeden, C. N., McLean, A. J., Moore, V. M., & Ponte, G. (1997). *Travelling Speed and the Risk of Crash Involvement: Volume 1 - Findings*. Adelaide: NHMRC Road Accident Research Unit, The University of Adelaide.
- McKenna, F.P. (2005). *What driving behaviour do we need to change and how do we change it?* Keynote address, 2005 Australasian Road Safety, Research, Policing and Education Conference.
- McInerney, R., Cairney, P., Toomath, J., Evans, J., & Swadling, D. (2001). *Speed Enforcement in Australasia: Volume 1: Practice - Performance Measures - Outcome Measures. Volume 2: Appendices*. Sydney: Austroads.
- Murray, C. J. L., & Lopez, A. D. (1997). Alternative projections of mortality and disability by cause 1990-2020: Global Burden of Disease Study. *Lancet*, 349(9064), 1498-1504.
- Newstead, S., & Cameron, M. (2003). *Evaluation of the Crash Effects of the Queensland Speed Camera Program* (No. 204). Victoria, Australia: Monash University Accident Research Centre.
- Newstead, S., Cameron, M., & Leggett, M. (1999). *Evaluation of the Queensland Random Road Watch Program* (No. Report No. 149). Melbourne: Monash University Accident Research Centre.
- Pilkington, P., & Kinra, S. (2005). Effectiveness of speed cameras in preventing road traffic collisions and related casualties: Systematic review. *British Medical Journal*, 330(7487), 331.
- Queensland Government. (2005). *Queensland Road Safety Action Plan 2004-2005 - Safe 4 Life*. Brisbane: Queensland Transport, Department of Main Roads, Department of Emergency Services.
- Queensland Police Service Traffic Camera Office. (2007). Information on Infringement Notices Issued for Speed and Red Light Camera Detected Offences. Retrieved October 10, 2007
- Queensland Transport. (2005). *2003 Road Traffic Crashes in Queensland: A Report on the Road Toll*. Brisbane: Queensland Transport.
- Queensland Transport. (2007). Comparative Queensland Road Toll. Retrieved October 26, 2007, from <http://www.transport.qld.gov.au/Home/Safety/Road/Statistics/>
- Sivesind, K.H. (1999). Structured, qualitative comparison. *Quality and Quantity*, 33, 361-380.
- Zaal, D. (1994). *Traffic Law Enforcement: A Review of the Literature* (No. Report No. 53). Melbourne: Monash University Accident Research Centre.

Appendix A: Focus group questions and prompts

Topic: What is speeding?

1. What do you consider to be speeding?
 - Posted limit vs driving to the conditions
2. What do you believe the role of police speed enforcement is?
 - Road safety benefit or revenue-raising?

Topic: Awareness of current practice

3. What do you believe the police are currently doing to enforce speed laws in Queensland?
 - Mobile speed camera vans, hand-held speed lasers, in-vehicle speed lasers
4. How visible do you think current speed enforcement is?
5. How do you think the times and places where mobile speed cameras are set up are chosen?
6. How do you think the times and places where hand-held speed lasers are set up are chosen?
7. How effective are hand-held speed lasers and/or mobile speed cameras in making drivers stick to the speed limit?
8. Do you think the police allow a leeway over the posted speed limit before booking drivers?

Topic: Strengths and weaknesses of current practice

9. How much of a leeway over the posted speed limit do you think police should give drivers before booking them?

Topic: Punishment avoidance strategies

10. What do you think of the broadcasting of speed camera locations on the radio?
11. Do you know of any strategies that could potentially be used to avoid being caught speeding?
 - Remembering typical speed camera sites, slowing down when you see a white van/jeep parked on the side of the road – what effect would this have on people's behaviour?

Topic: Possible directions for the future

12. What would you think of hidden speed cameras?
13. What do you think of fixed speed cameras?
14. What could police do to improve the road safety impact of current police speed enforcement practices?
 - How they choose sites, how visible the enforcement is, leeway, more on-road enforcement
15. What mix of enforcement strategies do you believe would have the greatest impact on your speeding behaviour?