

Measuring Road Safety Culture in Relation to Speed

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Abstract

This paper describes the process of developing an instrument to measure safety culture in relation to speed. Using a range of literature on the subject the researchers identified 16 variables. Questions were designed around each variable resulting in a questionnaire containing 73 questions including demographics. The questionnaire was tested, then administered to groups in schools and businesses in Christchurch. This method was used because of the length of the questionnaire, but resulted in a sample that was predominantly young and inexperienced at driving.

The results show links between personal and societal attitudes and self-reported behaviour. They provide information about beliefs and behaviour in the community in relation to speed.

The conclusions show that with a small sample the methodology appears to have merit. It is recommended that more work be done on the questionnaire with the aim of administering it to a larger sample in the community.

1. Introduction

Road Safety Culture is one of the three goals of the New Zealand National Road Safety Plan (1), but until now there has been little attempt to measure it except in relation to observed changes in behaviour.

This project is the first step towards developing a measure of 'road safety culture'. The long term aim is to develop a tool that allows precise measurements to be obtained of the changes to 'road safety culture' arising from Police enforcement, education and publicity or any combination of them.

Road safety culture is the set of beliefs and attitudes held by a group of people towards road safety matters. There is little research on 'road safety culture' and this project aims to make an initial step towards identifying the variables which correlate with stages in the development of road safety culture.

Speed was considered a good place to start as interventions and promotions on speed have been developed recently, and if they are effective we would expect widespread shifts in attitudes in the community. Many of the variables will be similar for other aspects of road safety, but some will not. Variables will need to be added to measure road safety culture in other areas.

The project set out to gather information on attitudes to speed and use these to identify variables. Questions which might measure those variables would be developed. The resulting questionnaire would be tested on a small sample of drivers and the results analysed to see if the methodology appeared robust.

2. Background

Culture reflects the beliefs and attitudes of a community. It is hoped that these will eventually be translated into behaviour, but a study researching intention to speed in relation to speeding behaviour, (Craig Gordon 1998) (2) has shown that this relationship is not necessarily immediate.

Changes in behaviour are not therefore the same as changes in culture. One may change without the other. Rothengatter (1988) (3), for example, has shown that enforcement and perception of enforcement can change behaviour without affecting attitudes and motivation.

Evaluations of individual community projects have identified areas where attitude changes can be measured (Susan Cambridge 1999) (4). The evaluations showed changes in respondents' attitudes after campaigns compared with surveys done before the campaigns. However, identifying variables which measure the extent of safety culture in a community in the way that variables have been identified to measure work place safety culture (Ann Williamson et al 1997) (5) has not been undertaken.

Change models have been used in health promotion with the idea that stages can be identified in the process of change. An individual or a community can have their readiness to change charted on a continuum. One such model comes from addictive behaviour and psychotherapy. This model has 5 stages: pre-contemplation, contemplation, action, maintenance, and relapse (Prochaska et al, 1992) (6)

It should be possible to identify variables to measure road safety culture in relation to attitudes showing the position of members of a community in relation to a change model. This will give a measurement of what proportion of the community is at each stage of change.

In this study the variables related to attitudes and beliefs in regard to speed. This project is a pilot. Speed was considered a good area as interventions and promotions on speed have been developed recently, and if they are effective we would expect widespread shifts in attitudes in the community. Many of the variables will be similar for other aspects of road safety, but some will not. Variables will need to be added to measure road safety culture in other areas.

3. Identifying the Variables

The first stage in developing the questionnaire was to carry out a literature search and use the information from this search to identify variables that would be indicators of a road safety culture in relation to speed.

3.1 Personal attitudes and the attitudes of society

One component of a safety culture is the belief systems operating in the community. There have been a number of models developed to show relationships between belief systems, attitudes and behaviour.

The Theory of Planned Behaviour proposes a model in which belief systems give rise to attitudes which in turn are translated into behaviour (Icek Ajceek 1991) (7). The two main kinds of belief are personal beliefs and societal beliefs or the beliefs of the community. Questions about these belief systems will provide information about attitudes held by respondents. According to Ajceek's model these attitudes indicate the intention of the respondents to behave according to their attitudes.

A study in Australia (Fitzgerald et al 1998) (8) on driver characteristics associated with speed found that not only was there a relationship between drivers' attitudes towards speeding and their observed speed, but that drivers' tolerance of illegal behaviours was related to speed choice.

Two of the variables measured will therefore be concerned with attitudes. Personal attitude includes beliefs about speeding being right or wrong and attitudes to the law in general. Societal attitude is the attitude of other people who are important to the respondent. The attitudes and norms of the community to which the respondent belongs are also important.

3.2 Perceived Risk

Ajceek proposes a third belief system which he calls perceived behavioural control. This variable in relation to speed, includes the perception of riskiness, risk of being caught by Police, and skill and control of the driver.

Three variables relating to risk assessment are therefore proposed. The first is risk relating to traffic. This is the belief in the likelihood of having a crash.

Perception of risk may be associated with particular driving situations and speed choice may follow these perceptions. In a questionnaire designed to make drivers think about speed designed at the Christchurch City Council (Hensley 1999) (9) environmental factors had an impact on how respondents perceived the riskiness of speeding. One variable is therefore the perception of risk in different environmental situations.

A number of researchers including Aberg (1997) (10) have found that increased enforcement leads to an increase in the perceived possibility of detection and affects driver behaviour. The third variable in relation to risk is therefore perception of the risk of enforcement or the likelihood of being stopped by the Police for speeding.

3.3 Pleasure in driving versus the cost of speeding

One of the main reasons for speeding given in the survey on speed carried out by the Christchurch City Council (Hensley 1999) (9) is the pleasure of driving fast. Another is 'showing off'.

Rothengatter found four motivational factors influencing speed choice (Rothengatter 1988) (3). These were 'pleasure in driving', 'traffic risks', 'driving time', 'expenses'. Pleasure had the highest correlation. Variables are therefore needed to show the extent to which pleasure in driving influences speed choice and the perceived cost of speeding including speeding fines and petrol.

3.4 Speed in relation to that of other drivers

Rothengatter found that speeding drivers believed that they endangered traffic less when they drove above the limit than if they drove below the limit. This is related to their belief that their own speed would deviate more from the average speed if they drove below the limit. (Rothengatter 1988) (3).

Belief that speed would deviate from the norm if you drove slower is therefore another variable. This is related to the belief that the average speeds are higher than they really are.

A further variable is the perception of the speeds at which other drivers travel.

3.5 Time Factor

The time factor and lateness is one of the main reasons given for speeding in the responses in the Christchurch study (Hensley 1999) (9). It seems that some drivers speed habitually because that is the way they organise their lives. Others do not normally speed, but do on occasions when time is a factor and environmental conditions appear to make it safer.

Julie R. Adams-Guppy and Andrew Guppy (1995) (11) carried out a survey of speed related risk taking of British company car drivers. They found that those who more frequently exceeded the speed limit on motorways, were less likely to view speeding as a risk factor and more likely to view being on time for appointments as desirable. The majority felt in control in terms of safety on a driver self-rating scale. The strongest predictor of speeding over 10 mph above the speed limit on motorways was time pressure.

Another variable reflects the belief in the importance of being on time as opposed to the choice of a legal or safe driving speed.

3.6 Perception of skill

Timo Lajunen and Heikki Summala (1997) (12) looked at speed choice in relation to risk taking and hazardous driving style. The researchers found that skill-oriented drivers like driving and drive a lot but are also involved in crashes and violations.

Adams-Guppy (1995) (11) found that in extreme speeding the strongest predictor was the driver's perception of skill and confidence. The study found that those who frequently exceeded the speed limit were more likely to view themselves as aware and confident than other drivers.

Another variable must therefore measure the driver's perception of his or her skill and ability to control the vehicle at speed.

3.7 Self-reported behaviour

To test the relationship between beliefs and attitudes and the intention to behave, it will be necessary to use variables relating to self reported behaviour, keeping in mind that this may not accurately reflect actual behaviour in different situations.

The final variables are therefore about the speeding behaviour and crash history of the respondent.

4. Developing the Questionnaire

Once the variables had been agreed, up to five questions were designed to provide a measure of each variable. Most questions were designed to be answered on a five point Likert scale, with a few requiring simple numbers or speeds.

A set of questions at the end of the questionnaire collected information on demographics. Land Transport Safety Authority surveys were used as a model for these questions so that comparisons between the two surveys will be possible.

When the questions had been agreed, they were ordered randomly within these broad sections. The final questionnaire after the testing process contained 73 questions.

5. Results

The results show there is a clear difference in the societal and personal attitudes to driving at more than 10 km/h over the speed limit in 50km/h areas and in 100km/h areas. Respondents generally agree that they and their significant others believe that it is all right to go more than 10km/h over the speed limit on the open road. But they are neutral or disagree that drivers should go more than 10km/h over the speed limit in 50km/h areas.

However, most respondents agreed that “most people think that driving at 10km/h over the speed limit in a 50km/h area is all right”. There is a difference in the perception of what their ‘significant other’ believes and what most people believe.

The response to the statement “It is fine to go faster than the speed limit if you can do so safely” provided a fairly even split between agreement, neutrality and disagreement. Most respondents were aware of the importance of slowing down when driving through shopping centres and past schools. While the majority of respondents agree that driving fast is fun, fewer agree that driving fast shows what a skilful driver you are.

Most respondents felt that it was safest to keep up with other traffic even if it was travelling over the speed limit. This is of concern as it shows how drivers may be pushed by the traffic around them to drive at speeds faster than their own comfort zone and how personal beliefs can be subverted by the behaviour of other drivers.

This concern is reinforced by the agreement from respondents that most people travel at least 10km/h over the speed limit in both 50km/h areas and on the open road.

Most respondents felt that they were skilled drivers and skilled at deciding the best speed for the circumstances. Hardly anyone disagreed that they were safer than the average driver.

Most people felt that they didn't go much above the speed limit. But when asked what speed they normally travel in a 50km/h area, almost everyone said 55-59 or 60-64. On the open road the most common reply was 110-119km/h with nearly half of the respondents giving this answer. Nearly one fifth of respondents said they travelled at 120-129km/h. Most respondents said they drove more slowly when the road was wet and when they were passing a school with children arriving or leaving.

Nearly three times as many respondents had received speed camera fines as had received speeding tickets from a Police Officer. There were not many respondents in either of these groups. This may reflect the lack of driving experience of the sample.

Although most respondents agreed that they were more likely to drive fast if they were running late, most disagreed that being on time was important to them or that the pace of their lives was fast. There may be a difference between the philosophy of speed and actual behaviour.

A quarter of the respondents had had a crash and in more than half of those crashes the respondents admitted they were to blame. In only 18% of crashes was speed admitted to be a factor.

Respondents did agree that driving fast around bends was more likely to cause crashes, driving faster in town would result in injuries to pedestrians and that driving at more than 60km/h in a 50km/h area was more likely to result in crashes. However they were fairly evenly spread in their response to the

suggestion that if you drive at more than 10km/h over the speed limit there is a good chance you will have a crash. This question seems to distinguish different groups in the community.

Responses to the questions about the likelihood of getting stopped by Police or getting speed camera tickets show a stronger belief in the likelihood of getting caught in 50km/h areas than in 100km/h areas.

The idea of increasing fines elicited a fairly neutral response in terms of the effect on the likelihood that they would speed, but most respondents felt that if they saw more drivers being stopped by Police they would be less likely to speed.

The study sample generally agreed that they were good at judging the right speed to go around bends and when it is safe to travel above the speed limit. But they did not agree that good drivers were unlikely to have crashes even when driving well above the speed limit. Most disagreed or were neutral about their reactions being good enough to drive fast and still stop in time.

The agreement from most respondents that there are roads out in the country where it is quite safe to drive above the speed limit confirms the speed culture in this country. However, more people disagreed than agreed that it is safe to drive well above the speed limit when there is little traffic about. This question did not distinguish between 50km/h roads and 100km/h roads. The pattern of response might change if it did.

6. Cross-tabulations

A number of cross tabulations were carried out to investigate some of the relationships between questions and see whether the responses were valid.

There was little difference between the numbers of speed camera and speeding tickets among those who agreed, were neutral or disagreed that their 'significant other' thought driving at more than 10km/h over the speed limit was often OK in 50km/h areas. However those who agreed that their 'significant other' thought driving at more than 10km/h over the speed limit was often OK on the open road tended to have more fines and tickets than those who disagreed. In this case there is a correlation between societal attitude and behaviour.

Similarly there is a clear correlation between personal attitude shown in the statement drivers shouldn't go more than 10km/h over the speed limit on the open road, and the speeds respondents said they travelled on the open road.

'The pace of my life is fast, so I have to hurry' also showed a clear correlation with the speeds at which respondents say they travel on the open road.

7. Conclusions

With a small sample of mainly young and inexperienced drivers it has been possible to show that there is a correlation between reported behaviour and personal and societal attitudes to speed.

It is clear that there is a difference between the attitude to travelling fast in 50km/h areas and on the open road. The message about slowing down around schools seems to have been taken on board by the majority of respondents.

Many of those in the survey agree that there is a connection between speed and crashes, but most respondents perceived that most drivers travel at more than 10km/h over the speed limit in both 50km/h and 100km/h areas.

This study showed that the methodology was robust enough to collect good information about attitudes to speed. The researchers now wish to develop the methodology further and test it with a larger and more representative sample. More investigation is warranted into the connections between attitudes and reported behaviour. There is also the opportunity to use the results to place groups of individuals on the continuum of 'readiness to change' which will help with targeting road safety campaigns.

The researchers recommend that they develop this project further with the aim of constructing a robust tool to measure the development of road safety culture and the position of groups in the community on a continuum of “readiness to change”.

8. Acknowledgments

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9. References

- (1) Land Transport Safety Authority, New Zealand National Road Safety Plan (1995)
- (2) Gordon, Craig and Hunt, Maree, The Theory of Planned Behaviour Applied to Speeding, Drink-Driving and Seat Belt Wearing, *Road Safety /Research, Policing, Education Conference Proceedings* Wellington (1998)
- (3) Rothengatter, Talib, Risk and the Absence of Pleasure: a motivational approach to modelling road user behaviour, *Ergonomics*, vol. 31, no. 4, 599-607 (1988)
- (4) Cambridge, Susan, Comparative Evaluations of Road Safety Awareness Projects, *Third International Conference on Injury Prevention and Control Melbourne* (1996)
- (5) Williamson, Ann M., Feyer, Anne-Marie, Cairns, David, Biancotti, Deborah The Development of a Measure of Safety Climate: The Role of Safety Perceptions and Attitudes. *Safety Science* Vol 25. No. 1-3, pp. 15-27 (1997)
- (6) Prochaska, J.O., DiClemente, C.C. and Norcross, J.C., In search of how people change: Applications to addictive behaviours, *American Psychologist*, September, 47, 1102-1114 (1992).
- (7) Ajzen, Icek, The Theory of Planned Behaviour, *Organizational Behaviour and Human Decision Processes* 50, 179-211 (1991)
- (8) Fitzgerald, Emma S., Harrison, Warren A., Pronk, Nicola J. and Fildes, Brian, An Investigation of Characteristics Associated with Driving Speed, *Road Safety Research, Policing, Education Conference Proceedings* Wellington (1998)
- (9) Hensley, Andrew, *Speed Campaign Findings*, Christchurch City Council, Unpublished (1999)
- (10) Aberg, Lars The role of perceived risk of detection, *Traffic and Transport Psychology*, edited by Talib Rothengatter and Enrique Carbonell Vaya, Elsevier Science Ltd (1997)
- (11) Adams-Guppy, Julie R. and Guppy, Andrew, Speeding in relation to perceptions of risk, utility and driving style by British company car drivers, *Ergonomics*, vol 38, no 12, 2525-2535, (1995)
- (12) Lajunen, Timo and Summala, Heikki, Effects of driving Experience, Personality, Driver's Skill and safety Orientation on Speed Regulations and Accidents, *Traffic and Transport Psychology*, edited by Talib Rothengatter and Enrique Carbonell Vaya, Elsevier Science Ltd (1997)