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Development and validation of an Australian Video Speed Test (AVST)

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Abstract

Anti-speeding educational campaigns (in television commercials, print ads, and outdoor ads, mostly) are constantly being tried but it is difficult to determine which ads are effective in reducing speed. A promising solution to this problem is to use a behavioural simulation such as the Video Speed Test, the VST (Horswill and McKenna, 1999). The driving simulation test involves getting drivers to view video excerpts of a person driving a vehicle in real driving situations. The drivers then are asked to estimate the speed that they would use in the same situations, that is, how many kilometres/hour slower or faster they would drive. This test has been shown to correlate highly with self-reported habitual speeding and also correlate highly with drivers' past involvement in speed-related accidents. The present study develops and validates an equivalent Australian version of the driving simulation test, called the Australian Video Speed Test (AVST). A variety of roads and driving situations were filmed, including driving through residential areas, country roads, roundabouts, shopping centres, on freeways, and around bends. An initial set of 15 scenes were selected for testing, using responses from 268 drivers, with age categories ranging from 17-25 to 66+, who were recruited via mall-intercept interviews in the Illawarra region of New South Wales, Australia. Analysis of variance (ANOVA), which tests for differences between means of different populations (such as: young drivers' speed choice versus older drivers' speed choice; males' speed choice versus females' speed choice), was conducted for all demographic and driving history variables. Based on this analysis, the 15 scenes were reduced to a final set of 11 scenes, including 1 practice scene and 10 test scenes. Overall, the AVST was validated by the fact that it correlated highly with self-reported habitual speeding (r =.52, p =.01). The 10-item AVST has high internal-consistency reliability, with an alpha coefficient of 0.83.

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Development and Validation of an Australian Video Speed Test (AVST)

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Biography
Jennifer Thornton is a Lecturer with the School of Management, Marketing and Employment Relations at the University of Wollongong, Australia. Jenny's current research area involves analysing the effectiveness of threat appeals in the context of road safety advertising. The research presented in this paper was funded by a Youth Road Safety Research Grant from the Motor Accidents Authority (MAA) of NSW.

Abstract
Anti-speeding educational campaigns (in television commercials, print ads, and outdoor ads, mostly) are constantly being tried but it is difficult to determine which ads are effective in reducing speed. A promising solution to this problem is to use a behavioural simulation such as the Video Speed Test, the VST (Horswill and McKenna, 1999). The driving simulation test involves getting drivers to view video excerpts of a person driving a vehicle in real driving situations. The drivers then are asked to estimate the speed that they would use in the same situations, that is, how many kilometres/hour slower or faster they would drive. This test has been shown to correlate highly with self-reported habitual speeding and also correlate highly with drivers' past involvement in speed-related accidents.

The present study develops and validates an equivalent Australian version of the driving simulation test, called the Australian Video Speed Test (AVST). A variety of roads and driving situations were filmed, including driving through residential areas, country roads, roundabouts, shopping centres, on freeways, and around bends. An initial set of 15 scenes were selected for testing, using responses from 268 drivers, with age categories ranging from 17-25 to 66+, who were recruited via mall-intercept interviews in the Illawarra region of New South Wales, Australia. Analysis of variance (ANOVA), which tests for differences between means of different populations (such as: young drivers' speed choice versus older drivers' speed choice; males' speed choice versus females' speed choice), was conducted for all demographic and driving history variables. Based on this analysis, the 15 scenes were reduced to a final set of 11 scenes, including 1 practice scene and 10 test scenes.

Overall, the AVST was validated by the fact that it correlated highly with self-reported habitual speeding ($r = .52$, $p = .01$). The 10-item AVST has high internal-consistency reliability, with an alpha coefficient of 0.83.

1. INTRODUCTION

Road crashes are a major cause of death and injury in Australia, and incur costs estimated to be in excess of $6 billion annually (Federal Office of Road Safety 1998). For New South Wales, Scully (1999) estimated the road accident cost in excess of $2 billion annually. The prevention costs of driver behaviour campaigns range from Tasmania's Road Safety Task Force expenditure of $250 000 (Lang 2001) to Victoria's TAC accident prevention program costing $23 million per year (Playfair 2001).

Anti-speeding advertising is believed to result in fewer deaths, injuries and other associated emotional, financial, insurance, legal, medical, lost production, and human capital costs of road accidents caused by speeding (Maron, Telch, Killen, Vranizan, Saylor, and Robinson 1986). Although anti-speeding educational campaigns (in television commercials, print ads, and outdoor ads, mostly) are constantly being tried, it is difficult to determine which of the many driver-education media campaigns tried by the States and Territories have actually been effective or will be effective if used in the future (White, Walker, Glonek and Burns 2000). It is extremely difficult to prove that an anti-speeding campaign has worked under field conditions because a true experiment (Campbell and Stanley 1966) cannot be conducted and thus there are always uncontrolled, often unmeasured, "other factors".

For instance, the well-known, at that time highly innovative, Victorian TAC TV campaign that very realistically depicted family grief and driver remorse coincided with a decline in road fatalities in that state but it also coincided with a heavy police blitz on speeding which may have been the effective factor (White, Walker, Glonek and Burns 2000).

The fact is that most road safety ads are pre-tested only by showing them to focus group consumers, which is a useful technique for developing advertising concepts but is quite inaccurate for predicting the ad's effectiveness (Rossiter and Donovan 1983; Rossiter and Percy 1997). In some cases, more quantitative pre-tests have been conducted using the outcome measure of self-reported intention (to drive safely, stop speeding, etc). For these types of behaviours, intention is a poor predictor of subsequent actual behaviour (Job 1988; Rogers 1983).

A promising solution to the problem of finding a valid, predictive pre-test is to use a driver-behaviour simulation. A suitable simulation for speeding is the Video Speed Test, the VST, which was developed in Britain (Horswill and McKenna 1999). The test involves getting drivers to view video excerpts, filmed from a "driver's eyes" perspective, of a person driving a vehicle in real driving situations. The drivers then are asked to estimate the speed that they would use in the same situations, that is, whether they would choose the same speed or drive slower or faster and by how much (in miles per hour). The Video Speed Test (VST) has been shown to correlate highly with self-reported habitual speeding and to be significantly related to drivers' past involvement in speed-related accidents. The VST was developed and validated in Great Britain. An equivalent Australian version of the simulation, that is, an Australian Video Speed Test (AVST), is developed for our study.

The AVST10 can be used to select in advance ads that should be effective in reducing speed and thus road crashes, other things being equal. Of course it is hoped that the other components of the campaign would enhance the advertising and produce a greater overall effect.

1. RESEARCH OBJECTIVE

The specific objective of this project is to develop and validate an Australian version of the (British) Video Speed Test, to be called the Australian Video Speed Test (AVST).

2. DEVELOPMENT OF THE AVST

The original British VST (Horswill and McKenna 1999) involved getting drivers to view video excerpts of a person driving a vehicle in real driving situations. Participants in the VST study completed questions regarding how much faster or slower they would drive in each of the 7 scenarios, thus providing a reliable 7-item test of driving speed.

Development of the AVST involved several stages. Filming took place on roads in the Illawarra region of New South Wales, Australia. A variety of roads and driving situations were filmed. Initially 15 driving scenes were chosen for testing, including driving through residential areas, country roads, roundabouts, shopping centres, on freeways, and around bends. Table 1 provides a summary of the various road types and situations in the original 15 scenes.

Selection of the 15 sequences was undertaken using the following criteria (Horswill and McKenna 1999). First, the vehicle's speed had to be relatively constant. Second, there had to be relatively clear road ahead, such that driving faster was a realistic option. Third, static hazards, such as blind bends, had to be kept to a minimum. Fourth, there had to be no signs relating to speed in view. Other criteria from Horswill and McKenna's (1999) VST study were that the speedometer should not be in view, and no audio was required, to ensure that drivers were not using objective cues to decide the speed at which they would drive.

An additional consideration by the current researchers was to include a variety of road situations, as opposed to Horswill and McKenna's (1999) original 7-scene VST, which largely consisted of open road situations. Most driving by people living in cities and suburbs is done on local roads, where they encounter pedestrian crossings, roundabouts and lower speed limits in built-up areas. For this reason, there was a greater number of local driving situations included in the development of the AVST.

Table 1 – Description of the Initial 15 Scenes

Scene	Description	Straight road	Bend/ Corner	Roundabout	Pedestrian hazard
1	Freeway	✔			
2	Freeway		✔		
3	Freeway	✔			
4	Freeway	✔			
5	Country road		✔		
6	Country road	✔			
7	Residential road	✔			
8	Residential road			✔	
9	Residential road		✔		
10	Residential road	✔			
11	Freeway	✔			
12	Residential road		✔		✔
13	Shopping area road	✔			✔
14	Shopping area road	✔			✔
15	Shopping area road	✔			✔

The second stage of the development of the AVST involved the recruitment of participants in a Wollongong city shopping mall. Recruiters were positioned in a busy section of the mall and intercepted passers-by to take part in the study. The following screening questions were used: 1) Do you drive a car; and 2) What type of Drivers Licence do you hold? If the passer-by agreed to participate they were then taken to a research room to watch a video containing the 15 road scenes. The participants filled out their answers on a questionnaire, which also contained questions regarding their years of driving experience, driving record, age, and gender. The questionnaire also included measures of self-reported speeding behaviour in regard to travelling on the freeway, on residential roads, and driving fast in general. These measures were developed by West, French, Kemp and Elander (1993) and used in Horswill and McKenna's (1999) study. Participants were asked to indicate, on 6-

point scale (with 1 = "never or very infrequently", 2 = "infrequently", 3 = "quite infrequently", 4 = "quite frequently", 5 = "frequently" and, 6 = "very frequently or always"), if they: broke the freeway speed limit and exceeded the speed limit in residential areas; and drove fast in general. Participants who answered 1 to 3 on the scale were classified as non-speeders, while participants who answered 4 to 6 were classified as speeders.

The likelihood of a participant feeling the need to be consistent in their answers to how fast they would drive in the AVST scenes and their self-reported speeding behaviour was minimised by the order of the measures. Participants first underwent the AVST and were not, at any point, given feedback as to whether they were a speeder or not (as there is no speedometer shown in the driving video). Furthermore, the measure of self-reported speeding behaviour was obtained in the final part of the questionnaire, thus making it is most unlikely that participants would try to work out if their new responses were consistent with their earlier responses to the AVST. In general, it is unlikely that participants would engage in the additional processing required to work out if their responses on the AVST would be considered as breaking the speed limit or driving fast in the various scenes shown.

The study was conducted over 5 days at varying times of day. A quota sample of participants, in terms of gender and age, was employed. Overall, the aim was to obtain 150 young drivers (17-25 year old): males (n=75) and females (n=75); and 150 older drivers (over 25 years of age), with an approximately equal distribution across age and gender groups within the over-25 age classification. Survey time (25 hours) and financial constraints allowed for 278 participants to take part in the study, with 268 usable responses, as 10 participants declined to provide their age. Table 2 shows the quota targets and the actual cell sizes obtained. As can be seen in the figures for the actuals, it was difficult to obtain drivers in the age category of 66 years and over, as participants needed to walk up a significant number of stairs to get to the research room. This was a deterrent for some passers-by, particularly less physically agile people. To compensate for the lack of participation by 66+ category, other cells were allowed over the target to keep the total sample size high.

The participation rate for the study, using the mall-intercept technique, was approximately 60-70%, which is significantly higher than the norm for personal interview market research surveys, which is about 40%, and other data gathering methods, such as mail surveys, which average about 30% response rate (McDaniel and Gates 2002).

Table 2 - Planned Targets versus Actual Cell Sizes

Age	Male		Female		TOTAL	
	Target	Actual	Target	Actual	Target	Actual
17-25	75	64	75	77	150	141
26-35	15	22	15	14	30	26
36-45	15	13	15	20	30	33
46-55	15	10	15	19	30	29
56-65	15	12	15	12	30	24
66+	15	5	15	0	30	5
TOTAL	150	126	150	142	300	268

3. VALIDATION OF THE AVST

3.1 Description of the sample

Table 3, located in the Appendix, summarises the composition of the quota sample of 268 participants.

4. RESULTS

Analysis of variance (ANOVA), which tests for differences between means of different populations (such as young drivers' speed choice versus older drivers' speed choice), was conducted for all demographic and driving history variables. The results are summarised in Table 4 below. The average speed for each scene is also reported. Results have been reported where there were significant differences, at p <.05, between the sample characteristics of interest.

Table 4 - Summary of the 15 Scenes - Demographics and Driving History

Scene	+/- Δ in avg kms/hr	Gender (*F:M*)	Age (*Y:O*)	Speeding fine (N:Y)	Freeway (NS:S)	Drive fast (NS:S)	Residential (NS:S)
1	4.8	n/s	5.7:3.5	n/s	3.2:6.9	2.9:7.9	3.8:8.3
2	7.0	6.1:8.1	8.8:4.8	4.4:5.8	5.4:9.4	5.4:9.7	6.2:10.1
3	2.1	1.1:3.2	n/s	n/s	1.0:3.7	1.2:3.7	1.6:3.9
4	5.7	4.4:7.0	7.1:3.9	4.8:8.8	3.6:8.6	3.8:8.9	4.5:10.0
5	1.7	0.4:3.1	2.5:0.7	n/s	0.3:3.7	0.3:4.2	0.8:5.3
6	4.8	2.7:7.0	n/s	4.0:7.2	2.6:7.7	2.8:8.1	4.1:7.3
7	1.7	0.6:2.8	3.1:0.0	n/s	-0.1:4.2	-0.1:4.8	0.5:6.2
8	-1.6	-2.7:-.04	-0.2:-3.1	n/s	-3.1:0.5	-2.8:0.4	-2.7:2.3
9	1.9	0.7:3.1	3.6:0.0	n/s	0.7:3.6	0.5:4.2	1.1:4.7
10	0.2	n/s	1.0:-1.6	n/s	-1.7:1.9	-1.9:2.8	-1.4:4.2
11	6.1	5.0:7.4	7.0:5.0	n/s	4.4:8.7	4.7:8.6	5.1:9.9
12	-1.4	-3.0:0.5	-0.6:-2.4	-1.9:0.3	-2.9:0.9	-3.0:1.5	-2.3:2.2
13	-1.2	-1.7:-0.6	-0.5:-2.0	n/s	-2.2:0.2	-1.9:0.1	-1.7:0.8
14	-0.1	-1.8:0.5	1.0:-2.8	-1.2:0.8	-1.9:1.1	-2.0:1.6	-1.5:2.3
15	-4.3	n/s	n/s	-4.8:-2.5	-5.0:-3.3	n/s	-4.8:-2.3

Young drivers reported higher speed scores than older drivers. This result is, as expected, correlated with years of driving experience, where a similar relationship is shown. Males indicated they would drive faster in most of the driving scenes, in comparison to female drivers. In several scenes, drivers with speeding fines indicated faster speeds than drivers who had not yet incurred a speeding fine.

For the AVST, 10 of the 15 scenes were selected which most strongly discriminated between male and female drivers, young and older drivers, and speeders and non-speeders. The 10 scenes that were chosen (plus a practice scene) are listed in Table 5.

The speeding scores in the 10 scenes were highly correlated with participants' self-reported speeding behaviour on freeways (r = .48, p = .01), on residential roads (r = .46, p = .01), and driving fast (r = .43, p = .01). This means that those drivers who indicated they frequently drove fast in each of these road situations had higher speed scores on the AVST. The total sum of speeds over the 10 scenes was significantly correlated with the total sum of the self-reported speed measures (r = .52, p = p = .01). This result supports Horswill and McKenna's (1999) correlation test for the same measures used in the British VST study, which also produced a correlation of r = .52.

The 10-item AVST has high internal-consistency reliability, with an alpha coefficient of 0.83.

Table 5 - Old versus New Scenes Retained for the AVST

Description	NEW (PRAC + 10 SCENES)	OLD (15 SCENES)	+/- Δ IN AVG KMS/HR
Freeway	PRAC	4	5.7
Country road - bend	1	5	1.7
Residential road	2	7	1.7
Freeway	3	2	7.0
Shopping area road	4	13	-1.2
Country road	5	6	4.8
Residential road -roundabout	6	8	-1.6
Freeway	7	3	2.1
Residential road – pedestrian crossing	8	12	-1.4
Freeway	9	11	6.1
Shopping area road	10	14	- 0.1

5. CONCLUSION

The AVST is a new technique available to all road safety authorities for evaluating anti-speeding road safety advertisements. Focus groups may be used for developing the creative ideas for the anti-speeding ads. However, the AVST10 should then be used as a quantifiable, individual level, behavioural measure of the potential effectiveness of the ads. A random sample of drivers in the target group can be asked to watch an anti-speeding advertisement and then undertake the AVST10*. The AVST10 speed scores from the ad group can be compared to a control group score, consisting of a separate random sample of drivers, from the same target group, who are exposed to a control advertisement that does not excite viewers and is not related to cars and driving. If the researchers prefer to avoid the use of a control group ad, then they may use the original control group scores obtained from the AVST10 validation study.* Analysis of variance can be used to examine the effectiveness of different anti-speeding ads on the AVST10. The AVST10, a simulated test of driver speed choice that provides data at the individual level and therefore by gender, age and driver characteristics, is less ambiguous to interpret than aggregate data on road crashes.

The ability of the relevant road safety authorities in the States and Territories of Australia to actually select in advance ads that have been proven to be effective greatly improves the value of road safety advertising, thereby being able to better justify public expenditure on campaigns to reduce speeding by target populations such as young drivers.

* AVST10 questionnaire and control group data is available from the MAA of NSW.

APPENDIX

Table 3 - Demographic and Driving History of Participants

Demographics and Driving History	%
Gender	
Female *(F)*	53
Male *(M)*	47
Age	
25 years and under *(Y)*	53
26 years and over *(O)*	47
Average age	31 years
Driving experience	
Less experienced (less than 7 years) *(L)*	51
More experienced (7 years or greater) *(M)*	49
Average driving experience	14 years
Median driving experience	7 years
Annual kms	
15 000 or less *(L)*	55
15 001km or more *(M)*	45
Median kms	10 001 - 15 000kms
Regularity of driving	
Irregular (0 - several times/wk) *(I)*	28
Regular (every day) *(R)*	72
Licence	
Provisional *(P)*	17
Normal *(N)*	83
Suspension of Licence	
Never *(N)*	88
Yes (currently or previously) *(Y)*	12
Speeding fine in the last 3 years	
None *(N)*	78
1 or more *(Y)*	22
Accident involvement in the last 3 years	
None *(N)*	85
1 or more *(Y)*	15
Freeway self-report	
Non-speeder *(NS)*	59
Speeder *(S)*	41
Drive fast self-report	
Non-speeder *(NS)*	63
Speeder *(S)*	37
Residential area self-report	
Non-speeder *(NS)*	79
Speeder *(S)*	21

Note: The *italicised* letters are notations that are used in Table 4.

References

Campbell, D.T. and Stanley, J.C. (1966), *Experimental and Quasi-Experimental Designs for Research*, Chicago: Rand McNally.

FORS (1998), *The History of Road Fatalities in Australia*, Monograph 23, Canberra, Australia.

Horswill, M.S. and McKenna, F.P (1999), "The development, validation and application of a video-based technique for measuring an everyday risk-taking behavior: Drivers' speed choice", *Journal of Applied Psychology*, 84(6), pp.977-985.

Job, R.F. (1988), "Effective and ineffective use of fear in health promotion campaigns", *American Journal of Public Health*, 78(2), pp163-167.

Lang, Deanne (2001), Letter detailing expenses from Road Safety Task Force, Tasmania, Senior Executive Officer (9 January).

Maron, David., Telch, Michael. Killen, Joel. Vranizan, Karen. Saylor, Keith. and Robinson, Thomas. (1986), "Correlates of Seat Belt Use By Adolescents: Implications For Health Promotion", *Preventive Medicine*, 15, pp.614-623.

McDaniel, C., and Gates, R. (2002), *Marketing research : the impact of the Internet,* 5th Edition, Cincinnati, South-Western.

Playfair, Ann Maree (2001), E-mail detailing expenses from TAC Marketing Department, Victoria, (10 January).

Rogers, R.W. (1983), "Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation ", In J. Cacioppo and R. Petty (eds.), *Social Psychophysiology*, pp153-176, New York, Guilford.

Rossiter, J.R. and Donovan, R.J. (1983), "Why you shouldn't test ads in focus groups", *Australian Marketing Researcher*, 7(2), pp.43-48.

Rossiter, J.R. and Percy, L., 1997. *Advertising Communications & Promotion Management*, 2nd Edition. New York, McGraw-Hill.

Scully, Carl (1999), Roads and Traffic Authority, New South Wales (1999), "Road Safety 2010", NSW Government.

West, Robert., French, Davina., Kemp, D., and Elander., (1993), "Direct observation of driving, self reports of driver behaviour, and accident involvement", *Ergonomics*, 36 (5), pp557-567.

White, Michael., Walker, John., Glonek, Gary., and Burns, Nick, (2000), "Re-investigation of the effectiveness of the Victorian Transport Accidents Commission's Road safety campaigns", *Transport SA*, Strategy, November.

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Keywords

Road safety; speeding; ad testing; research; video speed test