

THE 1976 ROAD SAFETY RESEARCH SEMINAR

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The Road Traffic Safety Research Council held a seminar in Wellington from 29 April to 1 May 1976. Thirty-three papers were presented, almost all of them of considerable interest to psychologists, under the categories of: alcohol and drugs; education, enforcement and attitudes to road safety; accident investigation; road factors; medical factors; research data and research priorities. Perhaps by way of symbolising the liquor industry's signal contribution to road accident research the conference took place in the elegant surroundings of the James Cook Hotel.

About 200 people attended the conference representing a broad spectrum of groups concerned with road safety. There was a strong Australian contingent which showed considerable competence and gave the impression that road safety research in Australia was more sophisticated and better organised than in New Zealand. The Australian traffic engineers and medical men at the conference displayed an up-to-date knowledge of psychology relevant to their field. They seemed to have a much better understanding of the ways in which psychologists could contribute to road research than is usually the case with their New Zealand counterparts.

ALCOHOL AND DRUGS

The drinking-driving hazard is generally accepted, but the total behavioural system involving alcohol or other drug ingestion and vehicle accidents is only partially understood. The papers presented at the conference on the topic complemented one another and underlined the point that the majority of drinking drivers who are detected by law enforcement agencies or who arrive in hospital following a vehicle crash are a special population who cannot be considered a random sample of the driving public as a whole.

Roy Johnston, President of the National Society on Alcoholism and Drug Dependence, presented a succinct account of the ways in which traditional cultural attitudes to alcohol use in New Zealand impede the development of rational policies regarding alcohol and drugs. Johnston pointed to evidence that alcohol consumption in the New Zealand population follows the distribution first observed in Europe by Ledeman (1956), namely, that the distribution of alcohol consumption in the population approximates a normal curve on a logarithmic base. In the New Zealand instance this means that 62 percent of the drinking population consume only 20 percent of the daily intake of pure alcohol,

7 percent consume 40 percent, and the thirstiest 2 percent drink 20 percent of the national total. On 1970 figures, 105,000 New Zealanders had daily pure alcohol intakes of 100 ml or more. Quoting authorities such as Schmidt, Smart, and Popham (1963), Johnston argued that accidents involving drinking drivers are in a large measure a problem of the pathological drinker rather than the casual drinker. For this reason, public appeals not to drink and drive, or heavy penalties, will have little influence on the behaviour of these high-risk drivers whose psychopathology immunizes them from such controls.

Impressive support for Johnson's argument was provided by Hart's survey of drivers admitted to Christchurch Hospital. Nearly 65 percent of these drivers were aged 15-24. Some 27 percent of the drivers had been drinking and their average blood alcohol content was 143 mgm/100 ml, much higher than levels obtained in social drinking. The drinking drivers were 92 percent male and had significantly higher ($p < .001$) frequencies of conviction for criminal offences and drinking misdemeanors than non-drinking controls. Most of the drinking drivers had unskilled or partly-skilled occupations, were more likely to be accident repeaters and had more serious accidents than comparison groups. This survey has been reported in detail by Hart, Cotter and MacBeth (1975).

Gwynne presented an epidemiological study of fatal road accidents in Otago which showed driver characteristics similar to those described by Hart, while Grimmond described case studies of suicide attempts using the motor vehicle. Like Hart, Grimmond described a youthful high-risk driver group having disturbed social relations. Fourteen percent of Grimmond's sample showed serious depressive symptoms and the group also showed a high incidence of non-traffic crime and crimes of violence. These data force the conclusion that there is a disturbed sub-group of young people in New Zealand who are showing a wide variety of pathological behaviours. The existence of such a group has perhaps been obscured because different behaviours are the concern of different agencies. When separate data are published about the young violent offender, the young alcoholic, or the young dangerous driver it is easy to overlook the fact that the same person is appearing in each role. It also follows that dealing with the problems of such an individual piecemeal by different agencies must result in a considerable waste of effort.

While there is general appreciation of the fact that the acutely intoxicated driver is a safety menace, Gregson's timely contribution to the seminar gave experimental evidence that heavy alcohol use results in a permanent loss of ability to process information. This loss of cognitive ability is not revealed under normal medical examination, but becomes apparent when the information processing load is comparable to the driving task under heavy traffic conditions. Gregson observed that current estimates of the role of alcohol as a factor in accidents are based

on evidence that the driver has alcohol in his blood at the time, but fail to include the sober driver whose ability has been impaired by a past history of heavy drinking. Gregson drew attention to the inconsistency of legislation that sets sanctions against the senile or excessively fatigued driver, yet ignores the chronic alcoholic who may be neurologically impaired even when sober.

Gregson's work builds on previous studies, such as those of Parsons (1974), and Bergman and Agren (1973), and has culminated in the development of a test battery sensitive to long term alcohol effects (Gregson and Taylor, 1974).

"Effects of Alcohol and Cannabis on Driving" by Caswell supported Gregson's point that meaningful behavioural research on drug effects and the vehicle driving task must subject the driver to heavy and continuous cognitive loading. Caswell uses a closed road circuit of 3.68 km on which the subject drives solo following a lead car driven by the experimenter at speeds of up to 72 kph. The experimental car has control and instrument information transmitted by radio telemetry to remote recorders and instructions can be given to the subjects over a radio link. Caswell's main experimental design administers marihuana, alcohol, placebo and three combined doses to each subject with counter-balanced treatment orders. Caswell's paper stressed the methodological problems involved in such research, emphasising the point that studies seeking a single-cause explanation of road accidents have hindered understanding of the variety of ways in which various stress factors disrupt the driving pattern. Caswell's research is currently in progress and her definitive results should attract wide interest.

The paper by Savage, Marchington, Moore, Cropp, Hardman and Houghton entitled "Minimal Effects of Long-term Medication on the Driving Skills of Psychiatric Patients" showed a lack of sophistication in behavioural research. The general experimental design followed the approach tried and abandoned by Munsterburg and others around seventy years ago. The subjects sat in a stationary piece of motorcar and still pictures were projected onto a screen in front of them. Reaction times to actuate vehicle controls were taken. The data generally failed to show differences between medicated subjects and non-medicated controls. Even if differences had been found, the results could have admitted no simple interpretation since a vast number of studies have shown that there is no simple relationship between reaction time and driving skill. Unlike Gregson and Caswell, Savage and his team failed to appreciate the need for a continuous high-load cognitive task with sophisticated behavioural measures to reveal drug effects any more subtle than the acute toxic effects which are obvious to even the casual observer.

Batt and Couchman discussed the relationship between alcohol intake and blood alcohol levels. Their paper reviewed techniques used to estimate the amount of alcohol in the body and pointed to the limitations

of our knowledge of the ways in which alcohol uptake is influenced by such things as drinking before or after meals. Some of Batt's assertions were challenged by McDonald and Stone who reviewed data relating accident, injury, and drunk-driving convictions to blood alcohol levels. Their findings substantiated the claims of Hart and Johnston that the pathological drinker is at the focus of the drink-driving problem since the mean alcohol-blood level of intoxicated drivers sampled by the Ministry of Transport is close to 170 mg/100 ml, a level difficult to achieve by social drinking in civilised society. McDonald and Stone argue that there is little point in lowering the present "legal" limit of 100/100 since the problem drivers sampled are generally intoxicated far beyond the present norm. This point is challenged by Batt. It seemed clear that both Batt's team at Massey and McDonald's team in Chemistry Division, D.S.I.R., know a great deal about alcohol effects and psychologists interested in behavioural studies involving alcohol would be well advised to discuss their research with both groups.

What do we know about the influence of drugs other than alcohol on road safety in New Zealand? While this review has criticised Savage's work on methodological grounds, his paper served a valuable function by pointing to the need for objective measures of the effect of psychoactive drugs on the driving task. Since psychoactive compounds are so widely prescribed, the conscientious physician finds himself in a dilemma prescribing drugs to assist the social competence of patients in a society of which vehicle driving and ingesting alcohol are integral parts. Since many psychoactive compounds potentiate the effect of alcohol a driver may suffer combined drug effects which make him a menace on the highway but which will not be reflected in his blood alcohol level.

McDonald and Stone referred to the problem of detecting prescription drugs and cannabis in blood samples where the active compounds may be present at only microgram or nanogram concentrations. They state that "It is premature to suggest that illicit or therapeutic drugs may be a significant factor in intoxication on New Zealand roads, but it is quite common to find that a driver who the arresting officer considered to be intoxicated had a low blood alcohol proportion".

Johnston also drew the attention of the seminar to this problem, quoting Kibrick and Smart's (1970) contention "that 35-50 percent of the general population run the risk of driving after drug use at least once per year. About seven percent of these people drink and drive while on psychotropes . . . Moreover, among the fatally injured it is clear that psychotropic drugs are most likely to be found amongst those impaired by alcohol . . . To date there has been no determined effort to associate the use of psychotropic drugs by drivers with responsibility for accidents . . . It is not known whether drivers who need psychotropic drugs would actually be more dangerous on the road without them than with them".

It is clear that the psychoactive drug-alcohol interaction has barely been explored by the behavioural scientist. This must represent a socially valuable area of research which also presents a host of interesting theoretical problems open to attack from a variety of points of view. Should the Psychological Society set up a working group to foster studies in this area?

DRIVER EDUCATION

The theoretical model of Euripedes (-457) considered the effect of alcohol ingestion by female members of a conditionally stable social system on the dimensions of gender roles, power relations and physiological determinants of behaviour. Because of the lack of rigour in the mathematical treatment of the data, modern psychologists dismiss the model's main prediction as absurd. But startling confirmation of Euripedes' (-457) conclusion that alcohol makes mad both those who use it and those who abjure it was given to the seminar by the presence of a paper by Mason entitled "A Rehabilitation Programme for Drinking Drivers". This programme sought to modify the behaviour of persons convicted of drunken driving, the majority of whom displayed syndromal or prodromal signs of alcoholism. The method used was rational and moral persuasion, and the criterion for success was the subject's verbal claim that his attitude to drinking while driving had changed. On the basis of this work the paper urged that programmes of this nature be set up on a national basis.

Glyphics (-2200), and a host of later commentators have established the fact that rational and moral exhortation has negligible positive influence on behaviour syndromes such as alcoholism, where the subject's verbalised intention to change behaviour in the future is notoriously unreliable. The advocate of such a programme in 1976 must account himself lucky if his presentation is received with polite scepticism. This was the case with Mason's paper.

Clearly, substantial progress on the alcohol and road safety problem must wait upon effective methods of modification of pathological drinking behaviour. Psychologists now know a lot about the techniques that do not work and have a public responsibility not to encourage efforts that raise false hopes and are doomed to failure. Whether we know of procedures that do work is a matter of debate.

The dangers of seduction by face validity were well understood by Hill who presented an interesting paper evaluating the career of drivers who had been ordered to complete a defensive driving course by the courts. The subjects were matched with offending driver controls who did not attend the course. Attendance at the course appeared to make at best no difference to the accident rate, whereas the post-treatment conviction rate was comparatively lower following the course than following the standard treatment. This finding leads to the conclusion that driver education has little effect on accidents but does decrease the number of post-training convictions. Hill's (1975) finding is not isolated;

O'Day (1970) also reports a negative effect from defensive driving training. Perhaps this is as well. Otherwise, in the country of the defensive driver the aggressive driver would be king.

Hill's paper contains a valuable discussion of methodological problems in evaluating training programmes in general and is worthy of careful study. Shouksmith's paper on driver training presented at the seminar may well become a classic amongst those interested in experimenter artefacts in psychological research.

Whittaker described a study using the semantic differential to explore attitudes to road safety held by a large sample of male secondary school students aged between thirteen and eighteen. The results showed that most students had conformist attitudes to road safety measures, although a small segment showed deviant views. Unfortunately the data were not related to the incidence of traffic offences in the group, so there is no way of knowing whether Whittaker's deviant sample is similar to Hart's pathological driving group described above.

Toomath and Edgar in separate papers considered the problem of evaluating the effectiveness of legislation and publicity campaigns on road safety. It seems that safety helmet and seat belt legislation has been effective in increasing use and lowering injury rates. The effect of blood-alcohol legislation is unclear, a conclusion that would be expected in view of evidence cited above suggesting that pathological drinkers make up a large proportion of the drinking-driving offenders. Toomath discussed "traffic blitzes" which have proved to be effective in the short term. His paper touched on many issues of interest to social psychologists and learning theorists.

ROAD FACTORS

The driver-vehicle-road system presents an interesting area of enquiry on the borderland between psychology and engineering. A very pretty example of the application of mathematics to a behaviour was given by Kitto who reported research work by Jenkins (1976) on accidents at intersections. If this is an example of what engineers can do in the field of behavioural research, then it can only be a matter of time before they take over the experimental psychologist's pasture in the same way that the physicists took over biology a decade or so ago.

Considerable sophistication in behavioural science was also apparent in Wright's paper on highway improvements and their influence on accidents. Wright considers that road improvements increase safety in three main ways: by improving the consistency of road-vehicle response, by simplifying the driver's decision-making, and by providing sufficient redundant stimuli to retain the driver's "job interest".

RESEARCH PRIORITIES

A sophisticated discussion on priorities in traffic safety research was presented by Dr Henderson of the Department of Motor Transport, New South Wales. Henderson's paper is worth study by anybody interested in the interaction between social policy and social research. A

short paper by Hurst outlined some of the political barriers to objectivity in traffic research and safety legislation.

Sherwin and Jackson presented a critical analysis of the problems in assessing costs of road accidents and the resultant difficulty of advising on safety policy from a costs-benefits point of view. While Sherwin and Jackson came to a rather pessimistic conclusion regarding the utility of accident cost-benefit analysis, the general tenor of discussion after the paper indicated that this was a useful line of research which forced the investigation of accidents to be both more detailed and more wide-ranging than is usually the case.

CONCLUSION

This review has highlighted those contributions to the seminar which seem of immediate general interest to the New Zealand psychologist, without considering papers such as Cooper's on the Wanganui Computer which will attract the specialist. The proceedings of the seminar will be available from the Road Traffic Safety Research Council, Wellington. Society members should ensure that they have access to a copy. Members engaged in University teaching will certainly find individual papers which will provide an excellent basis for discussion in advanced psychology classes. This reviewer considers the Seminar to have been a worthwhile event. It would be difficult to maintain an adequate standard of presentation if it were to become an annual event, but it should certainly be continued on a biennial or triennial basis.

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