

Industry Commission Inquiry into Occupational Health and Safety
Response to the Draft Report: *Work, Health and Safety*

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Mass Media Campaigns

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MASS MEDIA CAMPAIGNS

1. Likelihood of OHS Adopting TAC Style Mass Media Campaigns

“If mass media campaigns are an effective vehicle for improving health and safety at work, there is an argument for government funding of such campaigns” [p. 221]. Fatality estimates indicate that workplace health and safety may be more important than road safety [p. 9]. Should the TAC campaign be seen as successful there is a real possibility that the level, and model, of use of mass media in road safety could be applied to OHS.

The Victorian TAC spent on average \$30 million per annum over the past five years on mass media campaigns (Tobin, 1994). Victoria represents about 25% of the Australian population and is one of 8 States or Territories. Therefore, if this level of spending was adopted nationally it is reasonable to predict national OHS mass media expenditure of about \$120 million - \$240 million annually. If there is any likelihood that OHS mass media campaigns could result in similar levels of expenditure (that is, \$120 - \$240 million per annum versus, for example, \$10 million currently spent on OHS research [p.78]) then this potentially monumental shift must be justified by valid scientific evaluation of comparative effectiveness against the opportunities to apply these funds to other prevention programs.

There is a highly popular view that the TAC mass media campaign is effective; for example the Editor of the Age Newspaper wrote, *“Yet experience shows that those advertisements have been a major factor in saving lives”* (31/12/94). *“State Governments are also heavily involved in funding (OHS) mass media campaigns”* [p. 221]. The TAC model is sold to road safety authorities in other states and the TAC's general manager of marketing, Ian Forsyth, says there has been interest in the campaign from the USA, Canada, New Zealand, South Africa, France, Spain and the UK (Porter, 1995). The TAC model is likely to be of significant influence on OHS mass media strategies, especially given Worksafe Australia's endorsement of this *“good model demonstrable in its benefits”* [p.223]. If this campaign is to be a model of best practice, we must explore how effective it has been by objective analysis. Should there be an absence of objective analyses we must at least analyse how effective the campaign is likely to be versus how effective is it popularly believed to be.

2. Evaluation of The TAC Mass Media Campaign

For the purpose of analysis of the possibilities for evaluation we assume the advertisements aim to improve safety on the roads, that is, reduce the number or severity of road accidents by improving driver behaviour.

2.1 Measuring Change in Actual Performance

In order to scientifically evaluate the success of a media campaign in influencing the number and/or severity of motor vehicle accidents it is necessary to accurately measure the “pre” and “post” intervention levels. *“Ideally, a design should permit the measurement of changes in a nominated dependent variable after systematic manipulation of independent variables in the treatment groups, compared with a control group.”* (Triggs, Meehan, Coleman, 1983, p12).

There are two main barriers to achieving meaningful evaluation of the TAC campaign.

2.1.1 Confounding and Intervening Variables.

Among the factors that could improve road safety there are:

- Driver training
- Police speed and alcohol checks
- TAC advertisements
- Better cars - design safety and ergonomics
- Road improvements
- Economic factors
- Airline deregulation

If road safety is improving how are we to tell which of these interventions are effective? This question about mass media campaigns is not new, as an Expert Group on Road Safety reported to the Federal Minister in 1972, *"Attempts to encourage safer road behaviour have been regarded generally as worthwhile without research being undertaken to validate the techniques used. It is difficult to design a valid research model to evaluate the direct effects of education and publicity programmes"*. There is potential to evaluate some treatments such as road treatments at specific sites, but evaluation of the performance of a mass media campaign is very difficult, especially when alleged success is dependent upon the coexistence of other (police) strategies.

2.1.2 Statistical Misunderstanding

Understanding Variation

When the road toll drops, we applaud whatever's happened recently. When it rises the interventions are failing, so we apply them harder until the road toll falls again. The road toll will be subject to variations regardless independent of any specific efforts. However these variations can be misinterpreted as a result of a current intervention when in reality they may be coincidental. For instance it was recently claimed that the first \$6M spent on the TAC campaign in 1990 resulted in a \$361M saving due a simultaneous decrease in the expected road toll (Porter, 1995). The problems with this is that the estimated saving is based on the difference in the road toll between one year and the previous year without any regard for the variability of road toll and without regard for intervening variables. To realistically evaluate the success of an intervention it must be isolated from other variables that may affect the road toll. Once an intervention is isolated then evaluations must be controlled in some way to measure the change and to determine the probability that this change is real and not simply due to underlying variation in the road toll. There can be no reliable information about the success or failure of interventions without an understanding of variation.

Mis-use of Statistics: Example, Seat Belts Campaign

The TAC recently launched its 'What Hurts Most' campaign focussing on drivers and passengers who fail to wear seatbelts. Police Chief Superintendent for M district (Ballarat to the South Australian border) Noel Perry supported the campaign with the statistic that more than 50 people killed in accidents last year had not been wearing seatbelts (Punshon, 1995).

The road toll in Victoria last year was around three hundred and seventy. Given that fifty of these people were not wearing seatbelts we can say that about three hundred people were killed while wearing seatbelts (estimation is approximate without knowing figures regarding access to a seatbelt, that is, the influence of bus passengers, pedestrians, etcetera). One could then make a seemingly outrageous, and unhelpful, claim that six times as many people were killed on the roads last year while wearing a seatbelt compared to the number killed while not wearing a seatbelt.

Unfortunately the statistic about the fifty non-seatbelt wearers tells us very little. What we need to know is evidence about the reduced likely consequence (see Glossary) of an accident if a seatbelt is worn. Clearly wearing a seatbelt is not a guarantee of not being killed. About three hundred people in Victoria last year followed the advice to wear a seatbelt and were let down by that system.

2.2 Measuring Change in Attitudes and Awareness

It is not possible to *actually measure changes in driver behaviour* resulting from TAC advertisements, partially due to the co-existence of many other uncontrolled variables, and also due to limitations in the availability and interpretation of appropriate 'measurement' data.

Because it is not possible to measure actual targeted performance, reliance is often placed on indirect measures such as recall tests and recognition tests (Kotler, Shaw, Fitzroy & Chandler, 1983, p.429). The TAC campaign has achieved "*unprecedented*" recall results (in the order of 90%), which is somehow evidence that "... *the ads are still working*" (Porter, 1995). However, while such evaluation may be able to measure recall or even change in 'attitudes', this level of evaluation is based on the assumption that the supposed progressive sequence from knowledge to attitude change to performance improvement is valid and will necessarily follow. Simply because

the community is aware of the campaign and has an attitude that safety is important does not mean that driving performance will change in any way. In a study of the effects of mass communications on safety attitudes, Triggs, Meehan and Coleman (1983) found improvements in safety-related attitudes following the campaign. However, they add the caution that the long term effects are unknown and that "*One can only conjecture that the change of expressed attitudes and behavioural intentions that were found would carry over and produce a reduction of accidents*" and "*In the final analysis, a success of a communications program depends on performance being changed in the correct direction, and by how much.*".

The key point is that the link between improved performance and attitude and awareness is unclear. For this reason these measures are unsatisfactory for indicating success of the program in terms of the aim of improving road safety. Attitude and awareness are suitable measures if attitude and awareness are the aims but are not suitable if improved safety is the aim.

3. Other Mechanisms for Predicting the Likely Success of the Campaign.

If it is not possible to actually *measure* the influence of the TAC campaign on driver performance, could we *reasonably expect* the campaign to be successful? In order to make this assessment it is possible to examine the extent to which the TAC advertisements align with other related theory and models such as the following.

- Risk Control Theory
- Behaviour Modification Theory
- Validity of Mass Media Message: Content and Targeting
- Quality Management Theory

3.1 Alignment with Risk Control Theory

3.1.1 Energy Damage Model

Figure 1. outlines the Energy Damage Model (Viner, 1991). The Energy Damage Model is a model of hazard control and the model highlights prevention measures. The model centres around the hazard as a potentially damaging energy. That hazard is normally controlled in some way by a hazard control mechanism. The recipient in the case of injury damage is a person. The person's boundary is their natural barrier (such as skin) to energy damage. The barrier can be extended to the person's clothing, etcetera. The transfer mechanism is the means by which the hazard and the recipient are brought into contact. (Refer to Glossary for further explanation of terms).

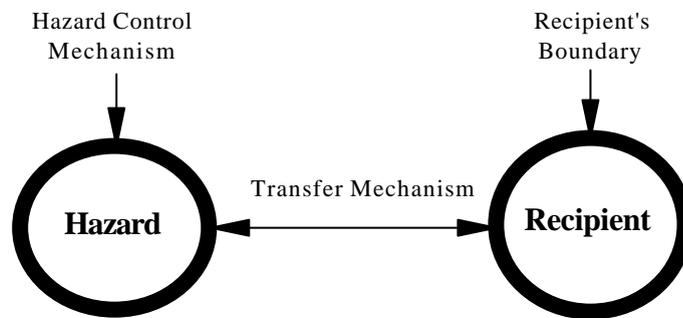


Figure 1. Energy Damage Model

3.1.2 Energy Damage Model: Risk Control Mechanisms

Risk control mechanisms arising from the Energy Damage Model are:

1. Eliminate or reduce the energy of the hazard
2. Maintain reliability of the control mechanism
3. Affect the transfer mechanism in some way
4. Raise the damage threshold of the recipient

Reliability of Risk Control Mechanisms

The most fundamental and reliable risk control mechanism is to attack the hazard itself by reducing the energy level. Reducing the energy level addresses the problem at the very source. The most unreliable risk control mechanism is to attempt to increase the damage threshold of the recipient with personal protection equipment. This mechanism leaves the hazard in place, makes no improvement to hazard control mechanism and does nothing to reduce the probability of transfer to the recipient should control be lost.

3.1.3 Motor Vehicle Trauma: Energy Damage Model Analysis

Hazard	The kinetic energy of the motor vehicles (this is the main energy; also other energies involved)
Hazard Control Mechanism	The kinetic energy (hazard) is <i>normally</i> controlled by the ergonomics of the human/equipment/environment interaction. That is, the interaction of human ability with the brakes, steering, etcetera of the vehicle and with the road surface, geometry, etcetera.
Transfer Mechanism	The recipient (if in the vehicle) is co-existing with the hazard. In this sense no transfer is necessary for damage. However once control of the hazard is lost the recipient becomes mobile within the vehicle. This becomes an ergonomic interaction between the human and their immediate environment (inner vehicle).
Recipient Damage threshold	The amount of impact energy intensity that a human can absorb without damage.

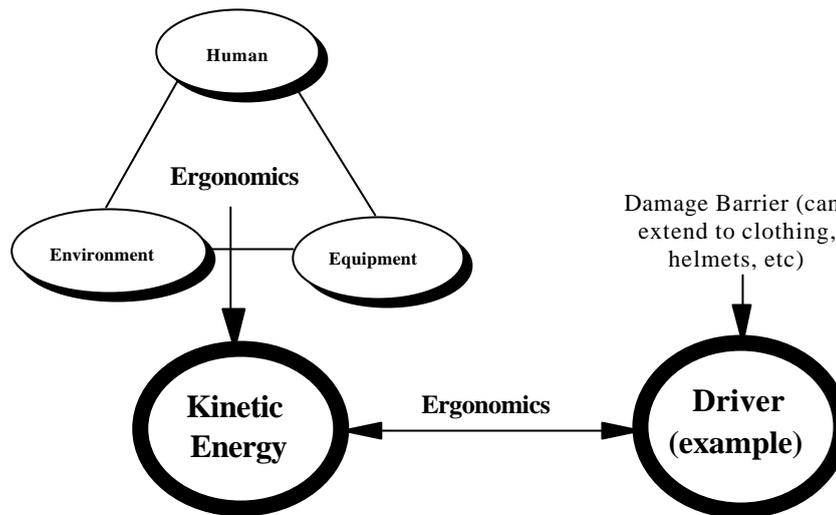


Figure 2. Energy Damage Model and Ergonomic Model for Road Trauma

3.1.4 Motor Vehicle Trauma: Risk Control Using Energy Damage and Ergonomic Models

The risk control mechanisms from the Energy Damage Model were:

1. Eliminate or reduce the energy of the hazard
2. Maintain reliability of the control mechanism
3. Affect the transfer mechanism in some way
4. Raise the damage threshold of the recipient

However we approach these using the ergonomic model (human/environment/equipment interaction) as follows.

1. Reduce the Energy of the Hazard

The components of energy are velocity ('speed') and mass ('weight').

The energy can be reduced by altering the *human/environment* interaction. For example road treatments such as roundabouts, off-set intersections and speed humps alter the speed of vehicles using road design without needing to 'tell' people what to do. There may be road treatments also that encourage smaller (lighter) vehicles (for instance the roadways on inner Paris do not encourage Cadillac size vehicles!).

The energy can be reduced by altering the *equipment*. For example motor vehicles could be made lighter, and indeed have become lighter. Motor vehicles could have reduced speed capacity. The *human/equipment* interaction could also be altered. For example motor vehicles could be designed to be very noisy at higher speeds.

The energy can be reduced by focussing on the *person* with encouragement for them to drive slower providing they respond accordingly (for example, TAC 'Speed Kills').

2. Maintain the Reliability of the Hazard Control Mechanism

The hazard control mechanism is specifically the ergonomic interaction of human, environment and equipment.

Control can be improved by altering the *environment* and the *human/environment* interaction. For example, widening roads, improving delineation, improving geometry, eliminating intersections, etcetera.

Control can be improved by altering the *equipment* for example anti-lock brakes, improved suspension, tyres, etcetera and by altering the *human/equipment* interaction, for example, improved ergonomics of controls, mirrors, visibility, etcetera.

Control can be improved by altering the *equipment/environment* interaction. That is, by improving the interaction of features such as tyres and suspension with the roadway.

Control can be improved by improving *human* ability (for example, driver training).

3. Affect the Transfer Mechanism in Some Way

The transfer mechanism can be used to reduce risk once again using the ergonomic model.

Equipment/environment interaction can be altered favourable by such measures as physically separating vehicles with median divisions, grade separated intersections, crumple zones, etcetera.

The *environment/human* interaction can be improved with such measures as pedestrian planning to avoid the need for pedestrians to cross roadways (that is, avoiding placing pedestrian needs on opposite sides of a road).

Within the vehicle the *human/equipment* interaction can be improved by restraints, airbags, etcetera that reduce the probability of an energy transfer once the control loss has taken place (that is, the control mechanisms have failed).

4. Raise the Damage Threshold of the Recipient

This means padding the occupants of the vehicles (and pedestrians in some way). This is unfavourable and a difficult approach to take.

3.1.5 Summary of TAC Approach

Analysis using the Energy Damage Model leads to multiple risk control measures of varying reliability. Of these multiple possible measures the TAC campaign focuses on the following.

1. An attempt to reduce the *kinetic energy* of motor vehicles by encouraging people not to speed.
2. An attempt to improve the *hazard control mechanism* (human element) by encouraging people not to speed, telling them to concentrate and not to drink and drive. This is based on the premise that driving slower, concentrating and not drinking alcohol increases a driver's ability to maintain control of the vehicle.
3. An attempt to modify favourable the *transfer mechanisms* within the vehicle following a hazard control loss by encouraging seatbelt use.

These campaigns focus on a 'safe person' approach (see Glossary for explanation of terms) in that they all rely heavily on appropriate human behaviour to succeed. The plea for concentration is particularly interesting in that it seems to rest on the assumption that people, in this case, drivers, have the ability to have, and sustain, control over their reliability (that is, their error rate). Understanding the role of human error, defined as a missing or inappropriate response to a stimulus (information) (Wigglesworth, 1978), is critical to success of a campaign of this type. Human errors are often the focus of accident analysis and interventions. The rationale has been that discovering and then removing these errors will improve safety. Indeed improving reliability of control mechanisms where humans form a part of that control is a direct measure arising from the Energy Damage Model above. However, humans are a part of an ergonomic system including equipment and the operating environment. Only by considering the ergonomic interactions within this system can human reliability be improved. The 'encouragement only' approach ignores these interactions and assumes a large degree of operator control over the information - perception - reaction - action process.

3.1.6 Information/Action Model

Most of the thinking that we do and is necessary for life is undertaken sub-consciously. The mind is a self organising and self operating system. Figure 3. is a model of the 'automatic' operation of the mind to perceive and react to information. Acting on information is a vital task in driving and one that the TAC campaigns clearly attempt to influence. Where injury occurs due to a motor vehicle accident the control mechanism (see Glossary) has failed. Part of this control mechanism is the human ability to respond correctly to information. Possible ways

that this mechanism can fail is indicated in Figure 3. This model suggests multiple ways to improve the response to information however, the TAC campaign focuses on embedding a memory pattern that associates behaviour such as lack of concentration with a negative outcome.

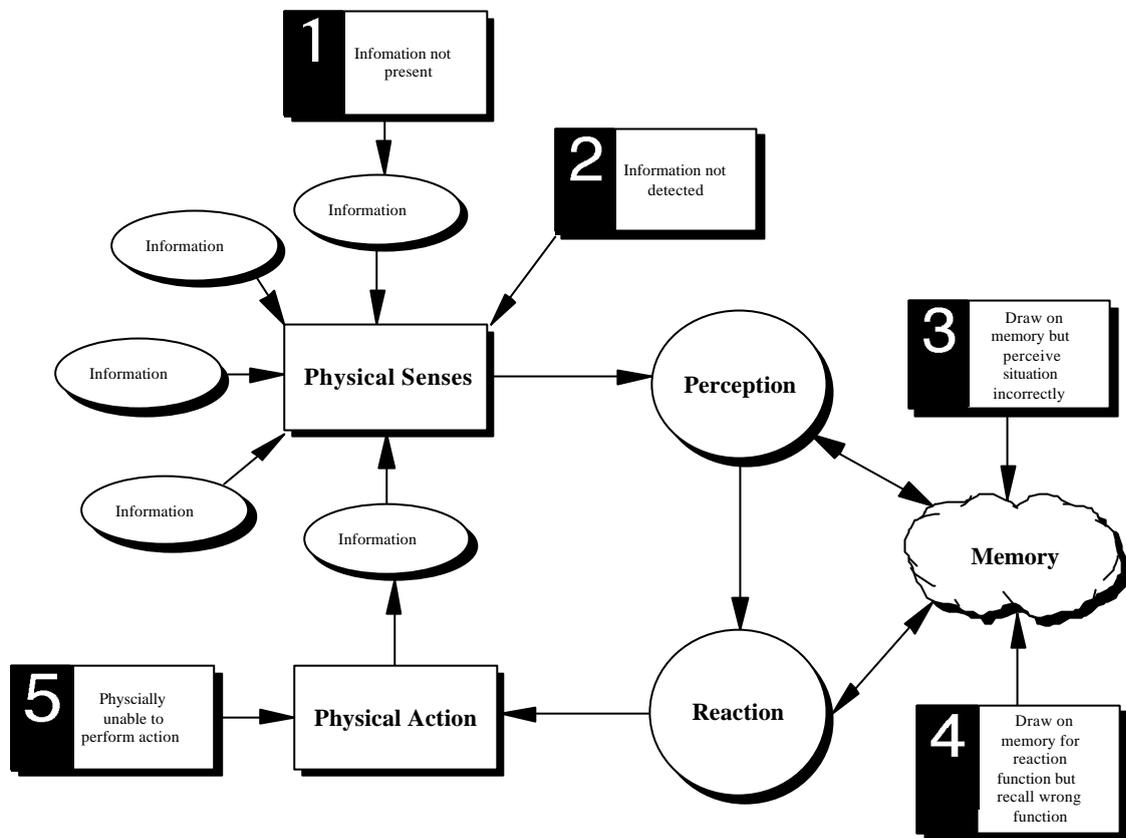


Figure 3. Information/Action Model Applied to Motor Vehicle Trauma

3.1.7 Combined Model Outlining TAC Approach

Figure 4. combines the models to build a picture of the apparent rationale of the TAC campaign. The model shows that the attempt to reduce vehicle energy and improve control relies completely on changing driver behaviour. This weakness may result in little real success for the advertising campaign to actually reduce the number or severity of motor vehicle accidents.

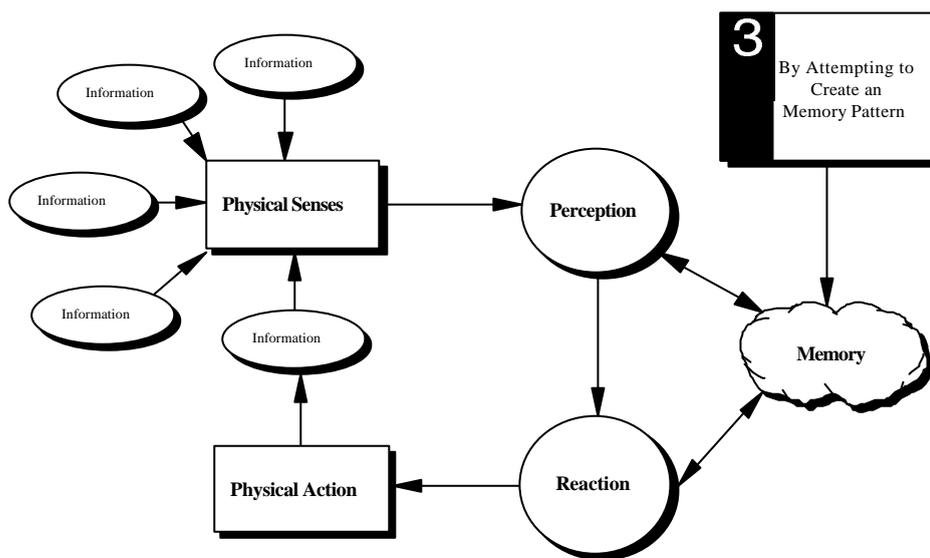
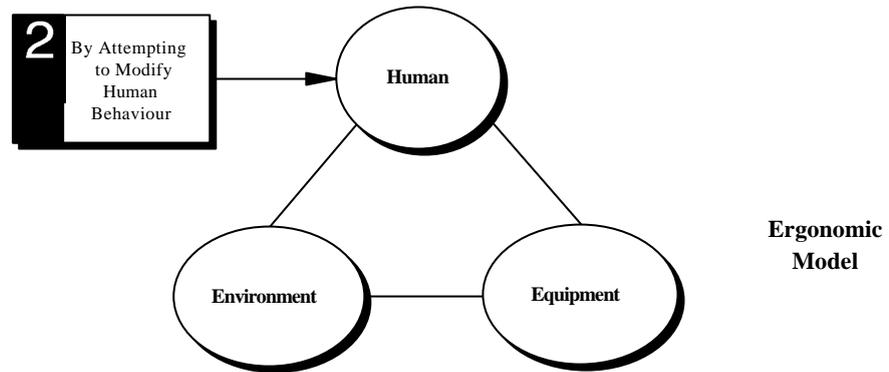
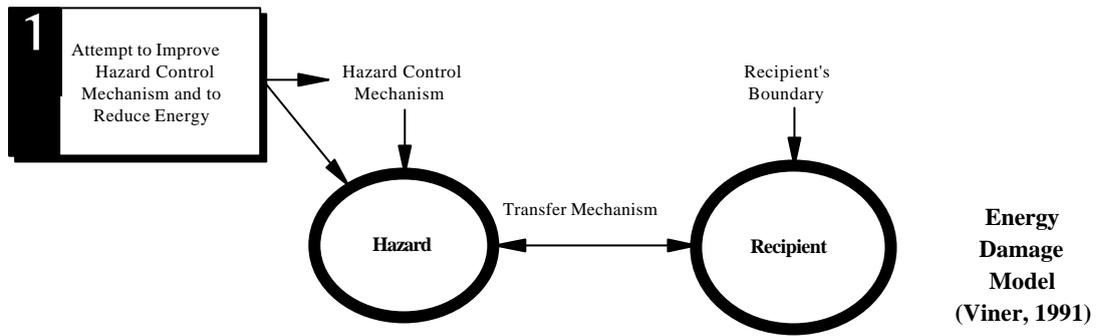


Figure 4. Apparent Rationale of Mass Media Campaigns ('Speed Kills' example)

3.2 Alignment with Behaviour Modification Theory

To avoid the problems of transference from attitudes to behaviours, an alternative strategy is to ignore attitude targeting and *directly* target behaviours. A behavioural model proposes that an individual determines their 'choice' between alternative behaviours, against the balance of perceived negative and positive outcomes. It could be construed that the TAC graphic/horror/shock style of advertisements is attempting to increase drivers' perceptions of the negative consequences of speeding, and so on. This theory is based on affecting conscious decisions rather than semi-automatic perception/reaction responses.

In order to evaluate the potential success of mass media campaigns against a behavioural model, it is necessary to outline the basic requirements of a true behaviour modification program. Typical guidelines propose the following sequential steps:

1. Identify the specific behaviour(s) to be targeted. Both the existing (undesirable) and the desired behaviour should be expressed in specific observable and measurable terms.
2. Measure the baseline frequency prior to any intervention.
3. Establish clear behaviour targets or goals.
4. Identify and minimise the reinforcers of existing (undesirable) behaviour and factors suppressing desired behaviour.
5. Select a positive reinforcer for the desired behaviour which maximises the following characteristics:
 - personal
 - can be applied immediately after the observed desired behaviour
 - can be used repeatedly (without satiation)
 - is commensurably valuable to required level of effort
6. Initiate intervention by continuous reinforcement of desired behaviour.

7. Once the exact behaviour is established:

- gradually replace continuous with intermittent reinforcement
- replace primary with secondary reinforcers (social, natural)

(Davey, 1981; O'Brien and Dickinson, 1982; Martin and Pear, 1978, Ch. 2., Bradley 1987, Ch. 9).

There appears to be little indication that the TAC mass media campaign meets any of the above requirements.

3.3 Validity of Message Content and Targeting

It has long been established that for a road safety media campaign to be effective, the message must be positive, specific, unambiguous, and credible (for example, Johnston & Cameron, 1979; Anderson, 1977; Freedman & Rothunan, 1979; Haskins, 1969; in Triggs, Meehan & Coleman, 1983).

The current TAC advertisements include the following.

- Speed Kills
- Concentrate or Kill
- Country people die on country roads
- Drink & drive - you're a bloody idiot
- Belt-up or suffer the pain.

3.3.1 Positive versus Negative Reinforcement

All of the above feature a strong negative message with highly emotive and shocking portrayal of the potential undesirable outcome, that is, death, grief, physical or mental trauma, etcetera. Negative reinforcement has long been regarded as inferior to positive reinforcement 'for achieving behavioural change' (for example, Symonds, 1956, in Sperling, 1982, P.80). Furthermore, within the research into mass media influences on safe behaviours ...
"There is a substantial body of evidence to suggest that shock/threat messages have diminished effects."

(Triggs, Meehan, Coleman, 1983, p.23). Similarly within marketing/media research “*Advertisers have found that fear appeals work up to a point, but if there is too much fear, the audience will ignore the message*” (Kotler, Shaw, Fitzroy, Chandler, 1983, p.400). The TAC campaign's architect, Greg Harper, does not share this concern; “*We know fear works*” (in Porter, 1995). Fear is certainly present in many advertisements, for instance advertisements for household cleaning products often use images of children to highlight the possibility of disease should surfaces be unclean. However, to be effective, media campaigns must also clearly identify the specific desired target behaviour. This is true of the typical cleaning product advertisement that, while relying on fear, presents the desired specific action (buy and use our product) and the positive outcome that will follow (clean house safe for children). The cleaning advertisements don't promote abstract notions like 'careless cleaning kills' or ask parents to 'concentrate' more while cleaning. While promoted through fear the advertisements offer a specific instruction and positive message. In this sense, the Federal Office of Road Safety campaigns featuring desired behaviour, (for example, tired drivers stopping to sleep, party goers buying light beer, etcetera) are more likely to be successful in eliciting the targeted response. The TAC campaign generally features negative and abstract messages, with 'belt-up' perhaps being the closest to directly promoting any specific 'safe' behaviour.

3.3.2 Functional Message

For an advertisement message to be unambiguous and credible it should be relevant, able to be clearly and specifically interpreted and able to be acted upon. While 'belt-up' may appear to have these attributes, Johnston & Cameron's 1979 study into seatbelt usage promotion, defined their particular target behaviour as the correct adjustment of seatbelts for child users. This is obviously far more specific and clearly defined than 'belt-up or suffer the pain'. As far back as 1963 the same issue of using general mass media efforts to improve road safety was addressed by Professor Mendelsohn, of the University of Denver, who said “*Slogans that do not call for specific actions under specifically defined circumstances through specifically offered action mechanisms cannot be expected to generate actions. In this sense, the slogan 'drive carefully' is meaningless*”.

Advertisements such as 'Concentrate or Kill' would appear to be addressing the issue of driver error. That is, better concentration will lead to drivers responding with greater reliability to sensory input. However even the very assumption that intent 'concentration' is a desirable driving behaviour is questionable. If concentration

means to maintain attention and focus intently then drivers behaving in this way may be less receptive to information from a wider range of sources. Hence, focusing intently, that is, concentrating, could be an associated pre-cursor to accidents. It would therefore be equally, if not more logical, to conduct campaigns with slogans such as 'Concentrate and kill' which might suggest that drivers should remain as receptive to a variety of information sources rather than be focussed, as concentration suggests.

3.3.3 Message Credibility

There is a parallel need for the 'message' to be logically valid from the viewpoint of the targeted individual or the 'credibility' requirement is not going to be met. 'Speed Kills' is a good example of a likely low credibility message. In 1994, almost 500,000 Victorian vehicles were detected 'speeding' via speed cameras (Tobin, 1994). Given that speed cameras sample a small portion of activity, the majority of speeding is not detected by police, and the half a million 'speeders' only represent a small proportion of speeding vehicles. Therefore in the established experience of most drivers, speeding brings either no negative consequence, or some possibility of a fine. The slogan 'Speed Kills' then contradicts nearly all drivers' experience. *"Messages that conflict with an established cognitive set of the individual may be rejected or fail to be encoded"* (Triggs, Meehan, Coleman, 1983, p.19).

The impact of this conflict is heightened by the fact that previous research into driver behaviours has repeatedly demonstrated that the majority of drivers regard themselves as good drivers (Anderson, 1978, p.89). Therefore these 'good drivers' are likely to further discount the credibility of such a message.

'Speed Kills' also suffers from a problem of definition. There appears no credible data available to prove that speed is implicated in a significant number of fatalities. Efforts to reduce drivers' speed, target enforcing the prevailing speed limits, which implies that travelling at or below the set speed limit will be 'safe'. This is obviously not the case in all circumstances.

'Country people die on country roads', while being undeniably true delivers no useful message leading its prevention value to be comparable to saying something like 'goldfish die in goldfish bowls' as a means of reducing mortality of pet fish. A similar example is signs such as appear on the Western Highway saying 'Approach with Care - High Accident Intersection Ahead'. While the information about the accident rate may be

true, clearly this sign is not effective as if it were the intersection would no longer experience high accident rates and the sign would then be incorrect. The value of information, however true, is only in terms of its effectiveness, which in messages such as these is questionable. The apparent rationale behind the introduction of the 'Country People' slogan was the 1993 increase in road toll. A disproportionate number of non-metropolitan deaths contributed to this 'failure' to continue the downward trend in road fatalities (McLoughlin, 1993). Apparently, country drivers were not responding to the TAC strategy in the same manner as their city counterparts. Country drivers were presumed to be ignoring or discounting 'Concentrate or Kill', 'Speed Kills' type commercials, as rural people perceived that 'city travellers' were the most common road trauma victims. This illustrates the self-perpetuating potential for poorly designed and evaluated awareness/attitude targeting media campaigns, that is, because the desired outcome behaviour had not been achieved, it was presumed that country drivers were discounting the relevance/credibility of the "attitude awareness" message. Therefore a 'second tier' attitude change commercial was added to try and overcome this failure of perceived relevance; if it doesn't work do it harder.

Therefore, in addition to the obstacles to meaningful evaluation noted earlier, the TAC slogans are also poorly designed and targeted messages.

3.4 Alignment with Quality Theory

3.4.1 Focus on Systems not People

The multiple 'safe-place' controls (see Glossary) arising from the analysis using energy damage theory are harmonious with quality theory. Quality management promotes performance improvement by system changes rather than exhortation, encouragement or punishment (Deming, 1982). Many of the viable risk control measures from the Energy Damage Model and ergonomic model make changes to the system to reduce likely damage, whereas encouragement and fear-based campaigns rely on personal performance improvement without consideration of the ergonomic interaction with the system.

3.4.2 Remove Fear (of reporting)

Total Quality Management emphasises the need to drive out fear. It is well recognised at work that approaches to accident prevention which engender victim - blaming generate a fear of reporting accidents and hence under-reporting. Could road accident reporting decrease, in response to the 'stigmatising' effect of advertisements such as 'Drink and Drive - Bloody Idiot', 'Concentrate or Kill'? Success in changing 'attitude' in that having an accident is unacceptable, faulty or errant behaviour, may not just fail to produce the desired outcome (that is, safer driving) but induce reporting suppression. Data from the National Inquiry Surveillance Unit indicates that “ in 1990-91 there were nearly 120,000 hospital attendances for road injury. This figure is nearly 50% higher than estimates based on crash reports to Police.” (NISU, 1995, p.1)

Recently a train collision in India at Ferozabad resulted in the deaths of approximately three hundred and fifty people (Kapoor, 1995). Despite India's long history of rail collisions the assistant superintendent of police at Ferozabad said "*The accident took place due to human error*". The general manager of the railway says that "*...the signalman at the (nearby) Farukhabad railway station is at fault*". He goes on to say that the signalman now has gone missing! Little wonder he's missing if the blame for the deaths of these people is to entirely rest on his shoulders. This approach is not restricted to countries such as India. Professor Trevor Kletz (1993) cites the case of a 1989 British Rail collision where the train driver who passed a signal without slowing down was convicted of manslaughter and imprisoned. Finding the operator within the system (for example; the signalman) at fault is certainly convenient for the operators of the system (railway management) as it minimises their responsibility for the collision and minimises their responsibility to examine and improve the system.

4. Other Potential Undesirable Impacts

4.1 Learning Negative Behaviours

The TAC advertisements rely on the premise that showing poor performance and negative outcomes will improve performance. Research at the University of Illinois (Kehoe, 1987) with basketballers used the opposite approach. The experiment showed that basketballers who practiced daily by *imagining* throwing *successful* hoops improved their success rate by the same amount as basketballers who practiced with real basketballs. Remember, one group did not touch a basketball. They practiced creating patterns of required performance in their mind. Golfer Jack Nicklaus recommends, "A mental "picture" of every golf shot is essential before you hit the ball" (Nicklaus, 1981). The visualised shot must be a successful one, in the hole, on the green, etcetera.

If Jack Nicklaus used the poor performance/negative outcome theory he would visualise himself playing poor shots, missing puts, driving into the water, coming last and then having to move out of home and onto the streets.

What do advertisers like Coca-Cola do? They show people drinking Coca-Cola, having fun, etcetera. They show the performance they want and associate it with positive outcomes.

Unfortunately, the TAC advertisements create the opposite effect. When drivers lose control of a vehicle, we want them to regain control rather than to run into something. What do the advertisements do? For example, one of the 'concentrate or kill' advertisements features a vehicle driving off the sealed part of the road and into gravel, this happens on a bend, the driver realises that he is off the road and responds by violently turning the wheel. The result of this is that the vehicle slides into a tree. Embedding this pattern into driver's minds may not be helpful. Not many drivers will have any 'real' experience of losing control of a car. Therefore few drivers will have an embedded memory pattern to guide an appropriate action should they lose control. The artificially embedded pattern via the campaign may be the strongest action function called on if they do find themselves in this situation. The pattern created in the advertising is to steer wildly which is hardly a suitable reaction.

4.2 Promoting Non-Scientific OHS

Contemporary approaches to OHS risk management adopt philosophies that place the main avenue of OHS improvement on system changes. The TAC campaign educates the community with the opposite message. The anti-educating effect of a campaign such as this could be considerable. For instance much of the campaign

suggests that the behaviour of individual people (often victims) within the system is the cause of accidents. While human error is important, focussing on appropriate human behaviour as a means of improving human reliability is unhelpful. Leaving the blame resting on those who work within the system and often with those who are injured may be comforting for those responsible for the system but does nothing toward prevention. Those responsible for the system have the ability to make changes to the system. However, why will employers make changes to the workplace to improve safety when it is the behaviour of the employees that cause the accidents? A sensible approach for employers to take in this light will be to encourage people to be safe and punish those who misbehave. Employees are likely to support this approach as they also believe that faulty behaviour is responsible for accidents. Therefore embedding a concept that individuals within systems are responsible will make systematic approaches to risk improvement very difficult and reverse the science of safety to such a point where it may parallel the medieval 'victim blaming' (Wigglesworth, 1978) approaches to disease.

5. Why is the TAC Campaign Popular?

5.1 Face Validity

The TAC media campaign has apparent face validity. This has arisen because of:

- an inability to actually evaluate its true level of success
- the use of 'awareness/attitude' tests which may show significant positive change (but not necessarily for behaviour).
- the 'community' support, (or reluctance to criticise) which is inherently associated with an expensive, high profile, well intentioned strategy addressing the 'public good'
- the flow-on support provided by the TV and print media, for example; "*Motorists and other road users are now more alert than ever to the dangers of speeding, drink-driving and simple carelessness ... experience shows that those advertisements have been a major factor in saving lives ...*" (Age Editorial, 31/12/95)
- the confusion of impact and artistic success with effectiveness.

5.2 Convenience

One arm of Government is responsible for accident investigation and policing of traffic rules. This government agency is unlikely to blame a poor driving environment as the focus for prevention when the same government would be responsible for addressing this issue.

Government itself is unlikely to want to promote massive spending increases to enhance the environment or vehicle improvement if it has to come out of current revenue. This is understandable if such a strategy needs increased taxation to fund, or results in decreases to other services.

Therefore, it is likely to be convenient for government to support a media campaign which reinforces self blame by victims. This decreases the likelihood of 'voter' anger directed at government for not able to provide risk control, especially if it is thought that government is doing something (or everything it can to change careless drivers).

The campaign is also unlikely to motivate individuals to push for changes to road safety standards or to lobby for safer cars.

5.3 Lack of Professional Input

In parallel with the current lack of established professional status in OHS, road safety strategy and policy design has arguably even less clearly recognised professional input to this strategic decision making than workplace health and safety.

Ironically, these problems in road safety had been clearly identified as early as 1970 in the USA (Klein & Waller, 1970; Barry, 1975) and by 1980 in Australia (for example, Henderson, 1980). This lack of professional support, recognition and input, leaves policy makers unsure who to believe when genuinely working hard to address a significant health issue. Without strong, coherent and acknowledged professional involvement, questionable prevention strategies, whether OHS or road safety, are unlikely to be recognised and rejected.

6. Conclusion: The Role for Mass Media in Improving OHS

The TAC mass media campaign is popular owing to its good intentioned nature and apparent usefulness in that it targets a well-held contention that individual behaviour of people within systems is the cause of accidents. However evaluation to show the effectiveness of this campaign is difficult due to many intervening variables.

The problems with direct evaluation of the campaign leads to evaluation that relies on 'awareness' and 'attitude' using instruments such as recall tests. These evaluation techniques do not give any indication of the potential for desired behavioural change to naturally follow, even if there is a positive shift in awareness and/or attitude. They do not consider the impact on health and safety outcomes - which, after all, is the ultimate objective of awareness campaigns. The nature of the campaign with its appeals to emotion, startling images and so on render the campaign provocative, memorable and artistically acclaimed but this does not show that it is effective in improving road safety.

"Evaluation techniques that analyse the impact of campaigns on awareness levels are available ... However measuring the impact of a campaign on health and safety outcomes is more difficult. This will only be possible with more research on the link between awareness levels and health and safety outcomes. Until this is done there will continue to be uncertainty about the effectiveness of mass media campaigns in relation to other prevention strategies." [p.224]

While evaluation would be complex we can analyse the potential benefits of the TAC Mass Media campaign by comparison with other related, established models (risk control, behaviour modification, message design and targeting, etcetera). In comparison to these models the TAC road trauma campaign does not exhibit any real potential to positively improve driver performance and hence a reduction in road trauma fatalities. Theory shows that the campaign focuses on a minor and unreliable method of improving hazard control.

It is feasible that the stigma created by the campaign, in portraying 'accident causing drivers' as 'bloody idiots', careless and deserving to 'suffer the pain', results in significant reporting suppression; a seriously undesirable and unintended behavioural change. A further, and serious, disadvantage may be the general education effect that is not in line with contemporary safety theory.

While mass media may prove to be a valuable tool for improving occupational health and safety, the current TAC campaign is insufficiently evaluated and appears inadequately grounded in safety theory to be a 'best practice' model for OHS to emulate.

7. Glossary

Hazard	A hazard is a potentially damaging energy.
Accident	An accident is a loss of a control of a hazard.
Control Mechanism	Mechanism / system that normally maintains control of the hazard.
Exposure (E)	Exposure to a hazard is the amount of time that potential recipients of the damaging energy are exposed to the hazard (could be measured in units other than time)
Probability (P)	The probability of an accident is the probability per unit of exposure that a control loss will occur.
Frequency (F=PE)	Accident frequency is the combination of exposure and probability.
Consequence (C)	The outcome of an accident (measured in \$ or another unit)
Risk (R=FC)	Risk is the combination of frequency and consequence.
Risk Reduction	Risk reduction means undertaking measures that address one or more of the components of risk. Risk reduction can be achieved by targeting these components as follows.
<ul style="list-style-type: none">• Target Hazard	Reducing the energy.
<ul style="list-style-type: none">• Target Exposure	Reducing the amount of time exposed to the hazard

- Target Probability Reducing the probability of the accident (control loss) by improving the control mechanisms.
- Target Consequence Reducing the likely consequence of the accident (control loss).

Safe-Place Strategy A Safe-Place Strategy is one that creates an environment that is safe due to absence of hazards or passive control of those hazards. Passive control means control that does not rely on appropriate human behaviour.

Safe-Place strategies are those considered most reliable (for example Kletz, 1991, Viner, 1991). The most fundamental and reliable safe-place strategy is the elimination of the hazard.

Safe-Person Strategy A Safe-Person Strategy is one that relies on appropriate human behaviour to avoid the control loss. This strategy is characterised by the domino model of Heinrich .

Note: With any hazard there are different ways control can be lost and different consequences from that control loss. Full analysis of risk associated with a hazard requires estimation of the probabilities of these to determine the overall risk.

Note: For a more in depth discussion of the notion of energy damage see Gibson (1961) and for a further explanation of risk control and the energy damage model see Viner (1991).

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