The Impact of a Driver Training Course on the Causal Attributions of Young Provisional-Licence Holders

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SUMMARY

The present study examines one aspect of the application of Attribution Theory to understanding driving behaviour.

Attribution Theory approaches behaviour from the perspective of a person's "world view". It argues that an individual's actions will depend on their interpretation of the causes of events that they observe around them. These causes can be classified as Internal (within the person) or External (in the environment), and Stable (relatively constant) or Unstable (readily modified).

Our previous research has shown that young drivers place less importance on Internal/Unstable factors (such as attention and judgement) as causes of motor vehicle accidents than older drivers. Also, they place more emphasis on External/Unstable forces (such as "bad luck") than the older drivers. We have argued that such a pattern of causal judgements is maladaptive to the driving task. It indicates that the young people are placing undue emphasis on chance and insufficient emphasis on their own actions as determinants of driving outcomes. An important consequence of this is that the young people will be less inclined than the older people, to adjust their behaviour in the light of near misses or other forms of accidents. This will result in more accidents occurring due to repeated occurrences of driving practices which the novice driver should have recognised as inappropriate.

The Introduction to the present Report presents a detailed description of attribution theory and its potential application to the area of driving behaviour. It also presents our argument that the world view that young people bring to the driving task results from inadequate experience with motor vehicles and a resulting emphasis on their past, inappropriate judgements. We have sugested that formal Post-Licence Driver Training Courses may provide some of the necessary challenges to the existing world view and, in turn, lead to the replacement of that world view with one which is more appropriate to successful future driving.

The empirical study examined three sets of young Provisional Licence holders. One group undertook a one-day "update" course at the New South Wales Traffic Education Centre, Armidale. A second group undertook the same course, but with an additional manipulation at the end of the course, introduced by the researchers. This manipulation was designed to heighten any attributional changes which might occur in the recipients of the unmodified course, and was based on past attributional research conducted in other contexts. The third group in the study acted as controls. They did not undertake the training course.

All participants in the study responded to a measuring device developed by the researchers and used by them in their previous studies. The device is used to assess the respondents' world views as indicated in their causal judgements. The respondents are asked to read a number of scenarios describing fictitious motor vehicle accidents and to indicate the importance of a number of listed "causes" for the described incident.

The results of the study showed that the training course had a significant impact on the most important causal attributions of the young participants. Using a number of forms of analysis, it was clear that after undertaking the course, the participants were more aware of the potential Internal/Unstable causes of driving outcomes, and were also placing less emphasis than before on the External/Unstable causes. The additional experimental manipulation did not have the anticipated effect of heightening these changes in the second group.

We have argued that the formal driving course accomplished the desired outcome because it was able to challenge the world views of the participants and to provide them with an alternative, more appropriate set of causal targets. It is possible that typical *ab initio* driver training which is conducted on the open road under the supervision of parents or friends may not be so successful in leading to modification of causal judgements because too little opportunity is available for the initial challenge to the young person's existing world view. This matter should be pursued in future research as it has broad implications for all driver training.

We also have suggested a number of additional directions that future research should take. One task involves the development of a standardised systematic means of assessing driving quality. Such a tool would permit further validation of our own cognitive measures as well as a means of examining the cognitive mechanism which we have argued brought about the change observed in the present study. We ourselves had incorporated a measure of driving quality in the present study, but we found it had serious limitations and could not be used as intended.

A further recommendation is that further research is needed to evaluate the long-term durability of the changes which were brought about by the driving course in the present study.

CHAPTER 1 INTRODUCTION

Attribution Theory

Contextual History

Until the decade of the 1960's most pure and applied psychological research was guided by one of two basic schools of thought. Researchers attempting to understand and predict a person's behaviour tended to favour one or the other in their work. The influence of each approach can also be seen in psychological studies of driving behaviour.

One approach emphasised "personality" dimensions as central determinants of behaviour. A researcher adopting such a conceptual framework would perceive the task as one which required first, determination of the relevant personality characteristics, and second, assessment of these characteristics and classification of people according to the results of the assessment. Within the domain of road safety, this approach is reflected in the vast array of driver personality variables which have at some stage been claimed as fundamentally involved in the probability of a road accident occurring. The collections of so-called "attitudinal" predictors also has its roots in this approach.

The second popular approach was based firmly in the powerful "behaviourist" tradition which dominated most laboratory-based research until very recently. Here the emphasis was placed on discovering fundamental principles of learning which could be applied to understanding how people acquired good and bad behaviour patterns. This approach emphasised reliable associations between "stimuli" and "responses" with little or no consideration given to individual differences between people. In the context of road safety research it is not as immediately evident as the personality approach. This is because its use of strictly controlled stimulus presentations, with equally limited behavioural responses, did not lend itself easily to complex applied contexts. Nevertheless it did have a more subtle influence on much of the research which was being conducted at the time.

Behaviourism's most pervasive influence resulted from its virtual denial of the importance of an individual's cognitive processes in the establishment of a link between stimuli and responses. This even went so far, in some instances, as an active rejection of cognitive activity as a "contamination" of the pure behavioural data. Researchers avoided collecting any information on what research participants were thinking at the time of their responses and, instead, concentrated on

the acquisition of "appropriate" driving skills.

Because of the power of the behaviourist tradition, and because the personality approach offered an apparently effective means of studying real people's behaviour in applied contexts, "thoughts" were ignored in most psychological research. However, in the late 1960's and particularly, during the 1970's, mainstream psychological theory and research was overtaken by what has been termed a "cognitive revolution". At all levels, researchers turned their attention to what it was that their participants were thinking when taking part in their experiments. It soon became apparent that much of the variation in their behaviour could be accounted for by these thoughts, and furthermore they had direct relevance to the behaviour which the researchers were trying to understand and predict.

So-called "cognitive" theories now predominate in many areas of main-stream psychology. The distinguishing feature of the approach is its emphasis on the way in which an individual places meaning on, or "structures", the world in which they exist. Applied areas of interest have also revealed the value of a cognitive approach.

Unfortunately, despite its success in areas as diverse as medicine and education, there is little evidence of cognitive theories influencing research on driving behaviour. In 1985 Michon, in a review of research presented at an international conference on human behaviour and traffic safety drew attention to this fact. He hinted at the futility of the "personality" orientation with its ever-expanding list of "important" traits, and pondered the question of why the "cognitive revolution" had not yet had an impact in the area. He strongly advocated a greater research thrust in this direction. The research presented in this report represents one attempt to answer this call.

Attribution Theory as a Cognitive Theory of Behaviour.

The general argument of all cognitive theorists has been that we must understand the way people think in order to understand their behaviour. To such theorists the most important determinant of a person's behaviour is the particular way in which they view the world. A person's actions will reflect their understanding of "how the world works". Any individual holds a variety of these world views, each applicable to different aspects of their life. For example our social behaviour will be influenced by our belief of how people typically interact, what certain statements and gestures typically mean, what good or bad consequences are likely to flow from certain actions, and so on. On the other hand, our approach to driving is likely to be influenced not only by our understanding of how other people behave, but also by our beliefs about the operation of the physical world. The cognitive theorist argues that all our actions are influenced by our various world views.

Since, according to this theoretical approach, our behaviour is determined by our world views, it is important that the person who wants to modify behaviour understands **why** such world views are created and **how** they are initially formulated, and subsequently modified.

Once a world view is established it guides subsequent behaviour "automatically" with no extra reconsideration required by the person. It smooths the interaction with the environment by enabling the person to anticipate the outcomes of their actions. It is only when something unexpected happens that the person may need to work on their world view again. Such a readjustment occurs if the existing view no longer can provide an adequate explanation of the new occurrence. In such a situation, the person modifies, or even reconstructs their view to make it a better representation of the world as they are now experiencing it.

Attribution theory's initial major contribution to cognitive psychology lay in its explanation of **how** a world view is established and subsequently modified. According to the theory, world views are built around the person's perception of the **causes** of events occurring around them. People ask "why did that happen?" and proceed to **attribute** a cause, hence the full title of the theory is "causal attribution theory".

Initially attribution theory focused its attention only on interpersonal behaviour. The relevant attributions were those made by a person to help them understand why another person was behaving in the way they were. The theorists argued that the primary distinction a person made when attributing a cause in such situations, was between something within the other person (an "**internal**" cause) or something outside the other person, in the environment (an "**external**" cause).

Understanding the distinction between causes which are attributed internally and those attributed externally, has enabled social psychologists to understand why people react in different ways towards other people. For example, if I believed another person's cool behaviour toward me was due to something about them (say, their personality, an internal cause) I would react to them in a way which would differ from that which followed an attribution that the behaviour was determined by something external to them (say, a recent distracting major tragedy in their life). Such behavioural differences could not be predicted from conventional "attitude" studies which would only reveal my general opinions and feelings about the person, not my interpretation of why they were behaving as they were at the present time.

Internal/External and Stable/Unstable Causes for Performance of Skilled Tasks.

Driving a motor vehicle calls upon world views beyond those typically applied to familiar

social interactions. It is a skilled task, and in this domain initial research revealed the original simple theory was not totally adequate to understand the wide range of observed behaviour. Two important developments have occurred which have made the theory equally applicable to both skilled tasks and social interactions.

The first development has been a move away from a concentration on an individual's perceptions of other people's behaviour, toward their assessment of their **own** actions. In this context, "internal" causes become those which the person believes relate to something about themselves, while "external" causes are any of those factors which lie outside the person.

The second major development relates to the original distinction between Internal and External causes. Research on people's judgements of the causes for their success or failure on skilled tasks revealed that the simple Internal/External distinction was not sufficient to fully classify the resulting attributions. Instead, a further dimension was necessary. This dimension related to the person's perception of how **Stable** or **Unstable** the cause was seen to be, that is whether it was something unchangeable, or whether it might be variable in its presence or nature. The resulting two-way categorisation system has become central to all attribution research, and for this reason it is set out below in tabular form, detailing the type of attribution and its common manifestation in causal terms.

Attribution Type	*Cause*
Internal/ Stable	Ability
Internal/Unstable	Effort
External/Stable	Task Difficulty
External/Unstable	Luck

Behavioural Consequences of Different Attributions for Skilled Performance.

A person's interpretation of their performance on a skilled task will reflect the type of attribution they make for the outcome. The most important behavioural implications arise from the attributions made for failure.

When making an Internal/Unstable attribution for failure, a person feels they are able to succeed if they put more effort into the task, and that they will continue to fail if they don't. Such attributions are, therefore, linked with a perception of a high degree of personal control over the outcome. Success or failure is dependent on their own effort. By contrast, the Internal/Stable form

of attribution brings with it a reduced sense of control since it implies that there is little likelihood that failure at a task will be overcome in the short term at least. It means that the person is faced either with continued future failure, or long-term development of the appropriate skill. Because it is long-term, such prospects are themselves, uncertain, and hence seem to be under less personal control. The person may respond to this by "opting out" of the skill modification, rather than run the risk of investing time in an uncertain venture.

Both of the External forms of attribution contain no sense of personal control over the outcome of attempts at the task. There are, however, still behavioural differences which may follow from each. The External/Stable attribution is a reflection of the inherent difficulty in the task and suggests that the person may decide to discontinue any further attempts at it, since they will only be faced with continued failure. On the other hand, the External/Unstable attributions indicate that the person is likely to continue with the task, in the belief that the very next attempt may be successful since success or failure is dependent solely on good or bad luck at the time.

Section Summary

Attribution theory argues that people's interaction with their environment is guided by a series of world views. Such world views smooth day to day behaviour by enabling the person to anticipate the likely consequences of their actions, thereby reducing uncertainty. Once established such views guide behaviour automatically, with little necessary intervention from the person. However, when the view is challenged through inadequacy it is adjusted in some way, in order to avoid the resulting anxiety created by the uncertainty. World views are developed and modified by the person seeking the causes of events occurring around them. The resulting causes can be categorised along the two dimensions of Internal/External and Stable/Unstable. Understanding the relative importance of each dimension in a person's world view permits an understanding of why that person responds to particular situations in the way they do. In particular, a person's response to their failure in a skilled task will reflect the extent to which they place emphasis upon each of the four possible types of attribution which result from combining the two dimensions.

Attribution Theory and Young Driver Behaviour

Attributions and Motor Vehicle Control.

As noted above, the control of a motor vehicle is a skilled task and so, undertaking the task is likely to result in clear success or failure outcomes. Failure can take many forms, with various levels of consequence. "Near misses", the most common form of failure to be experienced by drivers, can be minor or major in their potential outcome. Generally though, they lead to no injury at all. Such incidents range from scraping gutters to actual loss of control of the vehicle, without an

outright accident. Of interest to the psychologist is the the driver's causal analysis of the near miss or of a full-blown accident; the driver's search for why it happened. The resulting attributions can be classified according to the table presented on p. 6, and they have the implications which were drawn out in the section of the report which accompanied the table, under the heading of "Behavioural Consequences".

Consistent with the discussion of behavioural consequences, the most productive attribution for failure experienced while driving is an Internal/Unstable attribution. That is, if the driver believes the incident resulted from some failing which is under their personal control, they are likely to follow-up with attempts to identify and modify the inappropriate features of their behaviour. Internal/Stable attributions also acknowledge the cause of the accident as lying within the driver themself, and may lead to long-term attempts to modify the skill level, but, because of the uncertainty that such attempts may be successful, it is also possible that the driver will make no attempt at all. The two forms of External attribution are unlikely to lead to any behavioural modification and can be considered maladaptive, although, under some circumstances, following an External/Stable attribution, the driver may conclude that the task, or some aspects of it are simply too difficult, and they will avoid it in the future. The greatest problems are likely to arise from those drivers who make External/Unstable attributions. These people are concluding that success or failure is, in effect, random, and no form of adjustment or avoidance will change the outcome. They are, therefore, likely to continue driving with no attempt at modifying their approach to the task.

Young Drivers' Attributions for Motor Vehicle Accidents.

Previous research conducted by the authors of the present report has shown there is cause for concern about the attributions made by young drivers for motor vehicle accidents. The marked difference in accident rates between younger and older drivers is matched by a difference in the attributions the two groups make for typical motoring accidents. This difference is in the direction of the young people preferring, relative to their older counterparts, a set of attributions which we have already described as maladaptive.

In the research, young drivers (aged 17 to 25 years) and older drivers (aged 30 years and over) were given written descriptions of a number of fictitious motor vehicle accidents. They were asked to imagine that they were the driver in each case and to indicate the relative importance of four possible factors in "causing" the accident. These four factors tapped each of the four combinations of the attributional dimensions we have described previously.

The two groups of drivers showed reliable, statistically significant differences in the relative

weightings they assigned to the causes. The older drivers placed more emphasis on the Internal/Unstable causes than the younger ones did. That is, they saw the accident as being more likely to have resulted from their lack of effort, concentration, and so on. The older drivers, then, were recognising the need to adjust their own behaviour following an accident more than the younger drivers were.

In addition to the above finding, the younger group of drivers placed significantly more emphasis than the older ones on External/Unstable causes of the accidents. That is, they were more willing to believe the accident was "caused" by bad luck. This is potentially the most maladaptive of all the possible attributions since, as noted above, it implies a person will place themself in the same situation in the future, and continue driving, with no attempt to modify their own behaviour.

It should be noted that the younger group also placed more emphasis than the older on External/Stable causes of the accidents. That is, they were more likely to emphasise such things as the road conditions and the presence of stray animals on the road.

In summary, the younger drivers were placing significantly more emphasis on the two External causes for the accidents, and less on the Internal/Unstable causes than the older group. They were opting for an interpretation which would result in less perceived need for behaviour modification following the accident, since they believed, more than the older group, that the causes were outside their control.

We have argued that these differences between the younger and older drivers could account for the equally marked difference in accident statistics between the two groups. We also have suggested a reason for the different attributional patterns.

Reasons for Attributional Differences Between Younger and Older Drivers.

For most young people, the world in which they live, and have lived for the past seventeen years or so, has indeed been controlled by factors outside themselves. They have grown up in a world dominated by their parents and school. Only limited choice has been available to them, and as a consequence, they feel they have minimal personal control over their world. It is not surprising then, that these people tend to view events around them as being externally determined, even, to some extent, the result of luck. This is particularly likely to be the case in their attributions for a skilled task which they have only just commenced, such as the control of a motor vehicle. They have at their disposal, no past experience relevant to the specific task, and hence tend to apply their more general world view to it. This interpretation has gained support in two ways in the data collected in our research.

First, we have shown that the difference in attributions between young and older people for driving accidents, is not found when the two groups are describing social encounters. We argued that there would be no such difference, since this is one area where the young people will have built up a collection of experiences upon which a specific world view was formulated. They would be quite aware that in this context, their own actions are likely to have a significant influence on another person's behaviour toward themselves, and that by modifying that behaviour, they are likely to be more or less successful in their continuing social encounter.

A second finding which supports our claim that the young people's attributions are being influenced by their more general world view, which is being applied to the driving context because of the lack of other relevant experience, comes from studies we have conducted on the attributions of young bicycle riders. There is a difference in the pattern of preferred attributions for bicycle accidents between younger and older secondary school students. Although not as clear-cut as that found in the studies of drivers, it does act to support the basic explanation. Thirteen-year old bike riders place more emphasis on External/Unstable causes of bicycle accidents, relative to other causes, than older riders do. The thirteen-year olds are also likely to have had less experience with their bikes than the older children.Their tendency to place more emphasis on the external causes for their riding failures then, is consistent with the suggestion that experience and development of the appropriate skills is likely to shape the world view that the young person is likely to bring to the skilled task at hand. The less definite nature of the findings in this context reflects the fact that even at thirteen, the gap between the bike-riding experience of the younger and older children is closing.

Although the existence of an established though inappropriate, world view, as explained above, is probably the single most important determinant of the young people's driving attributions, another factor also is likely to play a role.The term "defensive attribution" is used to refer to a tendency for people to avoid believing that the cause of failure lies within themselves. Young people in particular, are likely to be victims of this form of bias. They are at a point in their lives where they need to state and to exert their independence from the family, in order to adequately survive as functioning members of the community. Attributing the cause of failure to themself can threaten their self esteem at a time when it is most vulnerable. This can lead to a simplistic tendency to direct "blame" away from themselves, and into the environment; to seek external causes for their failure.

The tendency to seek an external cause is described as simplistic in the previous paragraph because such a causal explanation fails to recognise that one form of internal attribution, indeed the most adaptive form, need not threaten esteem. An Internal/Unstable attribution implies the person **can** succeed at the task provided appropriate effort is directed at adjusting their behaviour to match

the demands of the task. In other words, although it may not be immediately apparent to the person who has just failed, they are in fact able to acknowledge themself as the cause of a failure without producing a stressful threat to their self esteem.

Section Summary.

Driving is a skilled task and consequently, people can experience a sense of failure following "near misses" or accidents. The way in which a person responds to such failure will depend on their understanding of the causes for the incident. The most adaptive explanation places the cause in Internal/Unstable aspects of the driver themself. This leads the driver to seek out and adjust the inappropriate elements of their behaviour in order to succeed in the future. Unfortunately young people, more than their experienced older counterparts, tend to locate the cause of accidents in elements which are external to themself. In contrast, older drivers place relatively more emphasis on the adaptive Internal/Unstable elements. This suggests the world view which the young people bring to the driving task is inappropriate to positive adaptation. Because the task is novel to them they have brought to it a world view which has been developed in other contexts. It has been determined by their past experiences in a world which operated largely outside their control, and by a need to avoid a perceived threat to their self esteem.

Attribution Theory and Driver Training

The Effectiveness of Driver Training Programs

The effectiveness of formal post-licence driver training programs has been a moot point for many years. Following a review of 16 Defensive Driver Courses in the United States by Lund and Williams (1984) some people have argued that such courses have little influence on accident statistics of those participating compared with those who did not undertake training. However, others who have studied the Lund and Williams report, and subsequent studies from around the world, have suggested that the situation is far from clear. In a recent Australian review, Telfer, Cook, Watson, and Field (1987) argued that a major problem with evaluating such courses lies in the fact that there is no common purpose across courses and no commonly agreed outcomes for evaluation. Accident statistics are a very gross form of assessment which can not take into consideration the diversity of potential contributing factors.

Telfer *et al.* believed that driver training programs can be effective, but that they require a clearer view of purpose, and that they need to direct their attention to a **combination** of skills training, on-road experience, and what they called attitude development. They also argued that both "knowledge" (the attitude component) and practical skills need to be assessed in any outcome

evaluation of programs. In their own research study Telfer *et al.* did find that a driver-training course of the type they advocated could influence both of these outcomes.

The so-called knowledge component of the training program devised by Telfer *et al.* was a "judgement training" course. Participants were tested on questions derived from the course before and after undertaking the training program. The questions consisted of assessments by the participant of what constitutes good and bad judgement in a variety of described situations. People who had undergone the judgement training program in conjunction with practical driving skills training showed a significant improvement in their ability to assess good judgement at the conclusion of the program. They also showed an improvement in their driving behaviour which was greater than the improvement found in a group of "controls" who had undertaken a program without the judgement training.

The study by Telfer *et al.* has shown that driver-training programs can have an assessable effect on both cognitive processes and skill acquisition.

Changing Attributions by Driver Training.

We have argued above, that a driver's behaviour reflects their world view. We have also argued that the world view of many young drivers is likely to lead to behavioural responses to near misses and accidents, which are more maladaptive than the responses of their older counterparts. This is because the young driver places relatively more emphasis on External/Stable and External/Unstable causes of these incidents than the older drivers do. They also place less emphasis on the modifiable Internal/Unstable causes. This latter point, in particular, means they are less likely to make personal behavioural adjustments in response to the near misses and accidents.

Normally, the young person's world view will gradually develop and change over the years of accumulated driving experience which follow their early attempts. As their experience widens they are likely to encounter more incidents which do not fit their existing view. This process could be described as "maturing". Attributional theory would predict that the driver's accumulated experience would influence the world view through processes associated with consistency, consensus, and distinctiveness. These processes each have technical significance to the theory but need not be expanded here. The important point is that any modification to the existing world view which is achieved in this way would normally take many years of accumulated experience. Of more interest in the present context is the possibility that the process of change could be accelerated.

If a young driver's world view could be modified without the need for years of accumulated experience, those drivers may exhibit a more appropriate style of responding to failure experiences

in the future. They would perceive their driving outcomes as being more dependent upon their own actions, and may therefore seek out the inadequacies in their actions following such failures. This contrasts with the consequences of their existing world view, which places an inappropriate amount of emphasis on factors such as luck and other factors such as the condition of the road, or other driver's behaviour, without giving due prominence to the potential contribution of their own defensive driving tactics.

Clearly, if it is possible to change the young drivers' world views in an accelerated fashion the consequences would be most desirable. Attribution theory and its attendant research does offer suggestions as to how such change may be accomplished.

The research has shown that people do not change their world view spontaneously. They do this only when something in the environment challenges the existing view in a way which suggests it is inappropriate or inadequate in some way. It is only then that the person will ask "why?" and proceed to seek out a new set of causal links, that is, to construct a new world view which can account for all of the person's experiences.

For most novice drivers their early road experiences are not sufficient to provide significant challenges to the existing world view which they have brought to the driving context. Only a serious accident, or an accumulation of minor incidents over time, is likely to finally bring about an awareness that the existing view may be inadequate. However, a driver training program does have the potential to accelerate this process. This is particularly so if the program is conducted in an off-road site where driving incidents can be experienced under controlled conditions without danger to other motorists.

By presenting the novice driver with a series of unexpected failure experiences, a training program can instigate a new causal search much more rapidly than ordinary driving experiences can. However, it is important that an appropriate solution to this search is reached by the young driver. Again, instructors are able to ensure that an Internal/Unstable solution is readily available, and that alternatives are discredited where possible.

We believe, therefore, that an effective driver training program should be able to modify the world view of its participants. In particular it should lead to a change of emphasis away from causes which are External/Unstable or External/Stable, toward those which are Internal/Unstable, reflecting the driver's awareness that the outcome of their actions is primarily under their own control.

If a driver training program were indeed able to modify the participants' world view in the way described, the long-term outcome for the drivers should be significant. This is because the world view, by its nature, would encompass all subsequent driving actions. The person's whole approach to the action would be influenced by the world view. This is in contrast to approaches to driver training which have stressed the importance of "appropriate attitudes". The problem with attitudes is that they are most predictive of behaviour when they are very specific. This means that they are most valuable when they relate to very specific actions in specific circumstances. Clearly, it is not possible for any program to train people to have the correct attitude for every possible circumstance in which they are likely to find themselves.

Experimental Techniques for Changing Attributions

A number of unconventional techniques for modifying attributions have been developed in laboratory studies and some of these have also found useful application in specialised contexts.

One technique which has attracted attention uses video technology to modify a person's attributions in the direction of an increased emphasis on Internal/Unstable causes. This approach involves video-taping the individual while they are performing some task or simply while they are engaged in social interaction. Attributions which the person is encouraged to make for their behaviour while watching a replay of the recording show a significantly increased awareness of the role of Internal/Unstable causes of the behaviour they have just exhibited. Repeated exposure to this experience leads to a modification of the world view in the same direction. Therapists have found the device to be a useful means of restoring an individual's sense of self-control and reducing feelings of helplessness.

There are two possible explanations for the effect that video-replay has on a person's attributional judgements. One explanation simply argues that the replay enables the person to see themselves as others would. Such observers of other people's behaviour do tend to emphasise Internal/Unstable explanations of what they see. Hence, it is argued, a person who is asked to seek causes while viewing a replay of their own behaviour will also tend to emphasise these forces, even if they had not done so before the replay.

The second explanation for the effect claims that the focusing of the camera on the person while they are carrying out the initial activity is the important mechanism, rather than the actual playback. It is argued that such focusing heightens the person's self-consciousness, and they become more aware of the internal causes for their behaviour at that stage. The result is an apparent shift in their attributions when subsequently assessed.

Whatever the most appropriate explanation is, the use of video recording and playback does appear to be a potentially useful means of changing people's attributional responses in the direction of an increased acknowledgment of Internal/Unstable causes. It is conceivable that the technique could be incorporated in a driver-training program to enhance any impact that the existing course had on the participants' attributions and resulting world view. In such a case, the participants might be video-taped while performing driving tasks during the program, and subsequently asked to make attributional judgements on the causes of their actions as they watch the recording in a replay session. Their resulting heightened awareness of the Internal/Unstable forces is likely to have a long-term impact on their relevant world view when approaching that and other driving tasks in the future.

Section Summary.

Despite some controversy, evidence suggests that driver-training programs are capable of modifying both cognitive and behavioural aspects of a participant's approach to the driving task. Although a number of cognitive processes have been examined in the past research, to this date no attempts have been made to examine the impact of training programs on the participants' attributions. If indeed these attributions and the resulting world view could be modified by the programs, it may have a significant impact on the behaviour of young drivers in particular. By challenging the young person's existing, inappropriate world view, with its undue emphasis on External/Unstable and External/Stable causes of failure, a training program could encourage the adoption of a new view which would place relatively more emphasis on the controllable Internal/Unstable forces. This revised world view should influence the individual's approach to all aspects of the driving experience in the future. It is also possible that more unconventional techniques for modifying attributions could be incorporated in some driver training programs to enhance the likelihood of a change in the participants' world view. One such technique would involve the video-recording of participants performing driving tasks. During a replay of the recording the participants would be asked to make attributional judgements on their behaviour. Past research suggests this should encourage a shift toward an emphasis on Internal/Unstable forces.

The Present Study

Aim

The present study aims to examine the impact of both a conventional and a modified driver training program on the attributions of young drivers. The conventional program will be a one-day Course for Provisional Drivers conducted at the New South Wales Traffic Education Centre in Armidale N.S.W. The modified program will add a video-recording and playback segment to the

conventional course. Participants' world views will be assessed through attributional judgements on a series of fictional driving accidents.

The experimental question being pursued in the study is whether a driver training program can indeed lead to a modification of participants' world views in a direction toward a greater emphasis on Internal/Unstable forces than existed prior to undertaking the course. In the event that the conventional course may not be able to accomplish such a change, the video modification is included to determine if this additional manipulation can accomplish it.

Design

There will be three groups in the study. All will contain young drivers, who are in possession of N.S.W. Provisional licences. One group (Conventional Trainee) will undertake a conventional one-day course at the New South Wales Traffic Education Centre. The course will include a practical "brake and evade" exercise. The second group (Modified Trainee) will also undertake the course, but will have their performance on the "brake and evade" task video-recorded. They will subsequently be asked to view the recording while recalling their thoughts at the time. This process is designed to focus their attention inward, and to promote Internal/Unstable attributional judgements. A third group (control) will not undertake the course.

All groups will be paid for their participation. Those undertaking the course will each receive $20.00 while the control group participants will receive $10.00 each. In addition, the cost of the course, for those undertaking it, will be borne by the research budget. This is to ensure sufficient numbers of participants to make the research possible.

Both Trainee groups will complete the attributional assessment before and after undertaking the course. The Control group will complete the assessment once at their school. They will not have any association with the course. The assessments taken before and after the course from the Trainee groups will be compared to determine if any change has occurred. The assessments taken before the course will also be compared with those from the Control group to determine if the two former groups differ in any way initially from the Control. The assessments taken after the course will be compared with those of the Control group to confirm that any change which has occurred after the course is reflected in a difference from the group who had no contact with it. In addition, the Trainees will receive an evaluation of their street driving from the Centre's instructors, at the conclusion of the course. Performance on this measure will be compared with the attributions made by each of the trainees to provide further validation data on the attributional measures.

Predictions

It is predicted that the driver training program will influence the attributions made by the Trainee participants. In particular it is believed that attributions recorded after the course will show an increased emphasis on Internal/Unstable causes of the fictional accidents when compared with attributions made before the course and when compared with attributions of the Control group who had no contact with the course. It is also predicted that the video modification will produce an additional attributional shift toward Internal, Stable and Unstable causes.

CHAPTER 2 METHOD

Participants

All participants were volunteers from two local schools in Armidale. All were paid the nominal sums for their involvement mentioned on the previous page.

The Trainees were recruited by letters of invitation which the schools distributed to students who had Provisional licences. The students were invited to participate in the one-day course either during a school holiday period or on a weekend, with all costs being borne by the granting body. Parents/guardians were required to authorise their child's involvement in the course.

The Control group were recruited by separate verbal request through class teachers. The students in this group completed the measures during lunch breaks.

The Modified Trainee group contained nine males and five females (n=14), the Conventional Trainee group contained eight males and six females (n=14), and the Control group contained eleven males and nine females (n=20). The mean age of the groups were 17.5, 17.6, and 17.6 years, respectively.

Most participants reported that their parents had been the major source of driving instruction. The proportion of each group reporting this was as follows; Modified Trainee, 86%; Conventional Trainee,71%; and Control, 65%. However, most had also had at least some instruction from a professional driving instructor, the proportions who reported this being; Modified Trainee, 71%; Conventional Trainee, 69%; and Control, 69%.

Only 3 of the Modified Trainee group reported having a car for their personal use, although 9 of the remaining 11 did report having driven a car at least four times in the week prior to the testing. The comparable figures for the other groups were 8 and 6 for the Conventional Trainee group, and 11 and 8 for the Control group.

The Attribution Measure

The attribution measure was derived from the technique used in our previous research. It consisted of a number of brief scenarios describing a variety of motor vehicle accidents. The amount of damage caused in each described accident, and the seriousness of any resulting injuries, is varied across the scenarios. However, our research has shown that these factors have no consistent effect on attributional responses.

Participants are asked to read each scenario, imagining that they were the principle driver involved in the described incident.They are then asked to record their estimates of the extent to which the described accident has been **caused** by each of four possible factors. They record this estimate by marking their response on a Likert-type scale which ranges from 1 (weak cause) to 7 (strong cause) for each factor. The four possible causes correspond to the four possible attributional responses. For example, the Internal/Unstable response is tapped by a factor described as "a mistake in your judgement at the time". The participant records a response for each possible cause, thereby providing the researcher with the means for comparing the perceived importance of a particular cause for the groups under examination. Because the measures are independent, though, statistical comparisons can only be made between groups on one measure at a time. It is not possible to treat each cause as a repeated measure and thereby to compare the *pattern* of responses simultaneously across groups.

A sample scenario and response blank is included as an appendix to this report. In the booklets completed by the research participants the order of appearance of each scenario was randomly distributed. That is, while one participant may complete the A scenario before the C, another may do K first followed by, say, D. The only constraint within which this randomisation operated, was due to the fact that one set of four scenarios (here referred to as "the first set") appeared together, while the remaining four also appeared together (sometimes before, sometimes after, the first set, depending upon the experimental group). Furthermore, the order in which the four possible "causes" appeared at the bottom of the page, was varied for each scenario. In one scenario the Internal/Unstable cause may have appeared first while on another scenario the first cause may have been the External/Stable one.

The Provisional Driver Training Course.

The course which was undertaken by the Trainee groups was developed by the New South Wales Traffic Education Centre, Armidale after they were approached by us for an affordable one-day program for Provisional Licence holders. A description of the course, and the day's program is appended to the present report. The course started at 8.15 a.m. and concluded at 4.00 p.m.. It was preceded and followed by our own testing sessions which lasted 10 and 15 minutes respectively.

Mr. Peter Johnston, the Centre's Education Officer was responsible for organising the course. It was derived from elements of the three day *Professional Driver Course* conducted regularly by the Centre. In describing the course Mr. Johnston has said "the theme of 'cars, corners, time and space' was imposed by me during the introductory session titled 'Why Training?'. The concepts in that session are based on an approach used in Tasmania at the Police Driver Education Section and Transport Tasmania compulsory motorcycle rider training scheme".

In the introductory session of the course Mr. Johnston attempted to set the theme described above and suggested to students that they relate all their subsequent practical and theory sessions to the theme of gaining time and space. However, the Centre's Driving Instructors were not required to, nor did they, follow this theme through in their parts of the course.

The Video Manipulation

The aim of the video manipulation was to heighten the participant's self-awareness. It was anticipated that this, in turn, would make them more conscious of Internal causes of driving outcomes. To accomplish this, both of the theoretical explanations described on page 14 of the Introduction to the present Report were incorporated. First, the video recording of the person undertaking the "brake and evade" task included an initial sequence consisting of a close-up recording of them sitting at the wheel of the vehicle. The presence of the camera at close range was intended to heighten the trainee's self awareness at the time of undertaking the task. The exercise also concluded with another close-up to reinforce this effect. Second, the recording was shown to the trainee immediately after the task, and they were asked to recall the situation in detail, and to write down all the thoughts that were going through their head at the time. This aspect of the manipulation was intended to place the student in the position of an outside observer, inferring the causes of a person's actions on the basis of their observable behaviour. Both the self awareness effect and the observer's perspective should heighten the person's awareness of internally located causes of the outcome of the driving task. If this was the case, these participants should have revealed higher Internal (Stable and Unstable) scores on the attributional measure because these types of causes would have been salient when they were making causal searches.

CHAPTER 3 RESULTS

Trainee Groups' Attributions Before and After the Course

The responses of the two trainee groups on each of the four attributional causes were calculated. A mean score over the first four scenarios (those which the participants completed both before and after the course) was then used in the analysis of change. Table 1 presents these means and their standard deviations for each of the two Trainee groups (the possible range of mean scores was 1 to 7).

Table 1. Means and Standard Deviations of the Four Types of Attribution Recorded on the First Four Scenarios by Each Trainee Group Before and After Completing the Driver Training Course.

Attribution	*Conventional Before*	*Modified Before*	*Conventional After*	*Modified After*
Internal/Unstable	4.5 (1.3)	4.2 (1.2)	5.5 (0.9)	4.9 (1.6)
Internal/Stable	4.1 (0.8)	3.6 (0.7)	5.0 (1.1)	4.8 (0.8)
External/Unstable	2.7 (0.9)	2.9 (0.6)	2.3 (0.8)	2.8 (0.6)
External/Stable	4.9 (1.1)	5.2 (0.7)	4.9 (1.3)	5.0 (0.9)

Separate two-way analyses of variance were conducted on the data for each of the attributional measures presented in Table 1. The analysis incorporated the factor of Trainee Group (Conventional or Modified) and a repeated measure (Before/After).

The analysis on the Internal/Unstable attributions revealed no main effect for the factor of Trainee Group but a significant main effect for the Before/After factor ($F(1,25) = 17.99$, $p<.01$). There was no significant interaction. This indicates that there was a large, reliable change in the attributions recorded by both groups after the course, compared with before it. This change was in the direction of a greater emphasis being placed on the role of the Internal/Unstable cause ("judgement at the time of the accident") for the described accidents. The absence of a main effect on the Trainee Group factor, and of an interaction, indicates that the two groups did not differ significantly either in their overall responses to the items or in the amount of change they showed from the first to the second testing. To summarise, both the Conventional and Modified groups placed increased importance on the Internal/Unstable factors after the course, but contrary to our expectations, the video modification did not influence the attributions beyond this change.

The analysis on the Internal/Stable attributions revealed a similar pattern of results to those just discussed. There was no main effect for the Trainee Group factor, a strong main effect for the Before/After factor ($F(1,25) = 22.00$, $p<.01$), and no interaction. Once again there was a large, reliable shift in the perceived importance of this cause. After the course, both groups of trainees placed more importance on the Internal/Stable element ("driving ability") as a cause of the described accident than they did before the course. Again, the absence of an interaction and main effect for Trainee Group indicates that the video manipulation had no independent effect on the responses of the Modified group.

Overall, there was relatively little emphasis placed on the External/Unstable cause. The analysis of responses also revealed no significant change in ratings following the course. However, there was a firm trend ($F(1,25) = 3.38$, $p<.08$) for both groups to perceive this cause (luck) as less important after the course, compared with their responses before. Again, the video manipulation had no independent effect.

There were no significant effects or trends on any aspect of the analysis of responses on the External/Stable measure. This indicates that neither group made any modification in the perceived importance of environmental causes such as the condition of the road, the actions of other drivers, and so on. Both before and after the course a relatively high importance was accorded this aspect.

Comparison of Trainees' and Control Group's Attributions

Three comparisons were possible between the attributions made by the Trainees and by the members of the Control Group. The first involved the responses of the Control group to the first four scenarios and the equivalent responses made by the Trainees before the course. The second again involved the Control Groups' responses to the first four scenarios but this time the comparison was made with the revised estimates the Trainees made **after** the course. The third comparison involved the second set of four scenarios. The Trainee group completed these items only after their course. These responses were compared with those of the Control Group on the same items.

The first comparison, between the responses of the Control Group on the first four scenarios and the equivalent responses recorded by the Trainees prior to undertaking their course, permitted an examination of the comparability of the three groups. If subsequent comparisons between the groups were to be valid, there should be no differences evident between the responses of the groups. Any differences that were revealed would suggest that the people who volunteered for the driver training course were in some way different from the Control group from the beginning. Such a difference in turn, would support the notion that voluntary driver training

courses are undertaken by a unique group of people who may, in fact, be less in need of the course than those who have not volunteered. Table 2 presents the relevant data (Note: the responses for the Trainee groups are the same as those used in the preceding Before/After analysis and so this aspect of Table 2 duplicates the information in Table 1).

Table 2. Means and Standard Deviations of the Four Types of Attribution Recorded on the First Four Scenarios by the Trainee Groups Before the Driver Training Course and by the Control Group.

Attribution	*Conventional Trainee*	*Modified Trainee*	*Control*
Internal/Unstable	4.5 (1.3)	4.2 (1.2)	4.5 (0.9)
Internal/Stable	4.1 (0.8)	3.6 (0.7)	3.8 (0.9)
External/Unstable	2.7 (0.9)	2.9 (0.6)	2.8 (1.1)
External/Stable	4.9 (1.1)	5.2 (0.7)	4.9 (1.0)

One-way analyses of variance carried out on the data presented in Table 2 revealed no significant differences or trends between the three groups on any of the attributional measures. This indicates that the groups were comparable on all measures. It is possible, therefore, to make valid comparisons between the Trainee group's later attributions and those of the Control group. It also suggests that on these dimensions at least, the volunteers for a driver training course do not differ from those who do not volunteer.

The second comparison using the first four scenarios, between the responses of the Trainee groups, after the driving course, and the responses of the Control group, provides a second test of the nature of the change in the Trainee's responses. It is a more stringent test of the argument that the Trainees will change their judgements. Table 3 presents the relevant data.

Table 3. Means and Standard Deviations of the Four Types of Attribution Recorded on the First Four Scenarios by the Trainee Groups After the Driver Training Course and by the Control Group.

Attribution	*Conventional Trainee*	*Modified Trainee*	*Control*
Internal/Unstable	5.5 (0.9)	4.9 (1.6)	4.5 (0.9)
Internal/Stable	5.0 (1.1)	4.8 (0.8)	3.8 (0.9)
External/Unstable	2.3 (0.8)	2.8 (0.6)	2.8 (1.1)
External/Stable	4.9 (1.3)	5.0 (0.9)	4.9 (1.0)

A one-way analysis of variance on the Internal/Unstable scores indicated a significant difference between the groups on this dimension ($F(2, 46) = 4.44$, $p<.05$). A *post-hoc* Fisher test revealed this difference lay between the responses of the Conventional Trainee group and the Control group. The slightly reduced change in the responses of the Modified Trainee group from the first to the second testing was such that the difference between this group and the Control group was reduced to a statistically non-significant level. In summary, the analysis indicated that on the repeat responses to the first four scenarios, made after the driving course, the Conventional Trainee group were placing significantly more emphasis on the Internal/Unstable ("judgement at the time") cause of the described accidents than the Control Group who had not undertaken the course. However, the video manipulation appears to have attenuated the equivalent change in the Modified Trainee group.

A one-way analysis of variance conducted on the responses to the Internal/Stable measure also revealed a significant difference between the groups ($F(2,46) = 7.77$, $p<.01$). The *post hoc* Fisher test revealed that the difference lay between the responses of both Trainee groups with that of the Control group. Both the Modified and Conventional Trainee groups after the course, were placing significantly more emphasis on the Internal/Stable ("driving ability") cause of the described accidents than were the previously comparable Control group.

The one-way analysis of variance conducted on the responses to the External/Unstable (luck) measure revealed no significant differences between the groups. This is consistent with the fact that no signifcant change was found in the judgements of the Trainee groups in the preceding Before/After analysis. The more stringent comparison with the Control group therefore was most unlikely to have even reached the level of a statistical trend.

The one-way analysis of variance conducted on the responses to the External/Stable (environmental) causes also revealed no significant differences between the groups. This result was expected, in the light of the previously reported finding that the Trainee groups themselves showed no change in these judgements between the beginning and end of the driving course.

The third comparison between the attributions of the Trainee groups and those from the Control group, focused on the second set of four scenarios. These were completed by the Trainees only after they had completed the driving course. Unlike the first four scenarios which they completed in a Before/After design, these scenarios were only completed once. They had not been seen previously by the people. The Control group, of course, completed these scenarios along with the first four in one sitting. Table 4 presents the responses of the three groups to the second set of scenarios.

Table 4. Means and Standard Deviations of the Four Types of Attribution Recorded on the Second Four Scenarios by the Trainee Groups After the Driver Training Course and by the Control Group

Attribution	*Conventional Trainee*	*Modified Trainee*	*Control*
Internal/Unstable	5.0 (0.9)	4.5 (1.2)	4.1 (0.9)
Internal/Stable	4.6 (1.0)	4.0 (0.8)	4.2 (1.3)
External/Unstable	2.5 (0.9)	3.2 (0.8)	3.6 (1.3)
External/Stable	4.4 (1.1)	4.8 (1.0)	4.9 (0.9)

A one-way analysis of variance carried out on the Internal/Unstable attributions indicated a significant difference between the groups ($F(2,47) = 3.48$, $p<.05$). The *post-hoc* Fisher test indicated that this difference lay between the responses of the Control group and the Conventional Trainee group. Once again, the video manipulation apparently had attenuated the shift found in the trainees' responses to the point where the revised responses were not statistically different from those of the Control group. Nevertheless, the significant change found in the Conventional Group's judgements does confirm the robustness of the course's effect on the participants' causal judgements.

The one-way analysis of variance of the Internal/Stable attributions revealed no significant differences between the groups. Although both the Trainee groups had previously shown a strong shift in their attributions from before to after the course, when responding to the first four scenarios, this shift has clearly not generalised to the new set of scenarios. They are not placing any more importance on their ability as a causal factor in accidents than the Control group are. The failure to generalise suggests that ability is not a salient aspect of the young drivers' judgements. This would be consistent with a heightened awareness, and hence cognitive prominence, of the more controllable Internal/Unstable (effort) variable, which did show a reliable generalisation onto the new scenarios.

The one-way analysis of variance conducted on the External/Unstable attributions revealed a significant difference between the groups ($F(2,47) = 4.85$, $p<.05$). The trend revealed in the change scores of the Trainee group on the first four scenarios has been carried through to the new set of scenarios as a significant effect. The Conventional Trainee group placed significantly less importance on luck as a cause of the described accidents than the Control Group did. Once again, however, the video manipulation appears to have attenuated the difference in the Modified Trainee

group and the responses of this group are not significantly different from those of the Control group.

The one-way analysis of variance conducted on the External/Stable responses indicated no differences on this dimension. This is consistent with the previous findings that the driving course had no impact on these judgements.

Assessment of Trainees' Street Driving

It was not feasible for the Traffic Education Centre to construct a driving assessment procedure geared specifically to the present project. Instead, the standard form used by the Centre during its Professional Driver Course was adapted. This did not prove completely satisfactory.

The Professional Driver assessment form contains a total of 34 on-road actions for which the student is given a 'mark'. It also includes six off-road situations as well as an assessment on two practical tests and a number of theory tests. In the present instance only the on-road activities were to be scored, during a sample ten-minute street drive undertaken by each participant. Unfortunately the nature of these driving periods differed considerably depending upon traffic conditions, location, and so on. Because of this there was no consistency between students in terms of the skills which were relevant to their particular drive. This, in turn, meant that some students were scored on some activities but not others, while other students were scored on other skills but not necessarily the same ones as the student before them.

A further problem arose because of the limited skill range of the present participants compared with those normally undertaking the Professional course. This meant that an equally limited range of scores were recorded by the Instructors when assessing the students. In general most students received a rating of 2 or 3 on an undefined scale in which 1 was the highest score.

Given the problems with the driving assessment, it is not surprising that correlational analyses between the Trainees' attributions and their driving score were all of zero order magnitude. There was no reliable association between the two measures. It is believed this was primarily due to the inconsistency of the assessed driving tasks and the very limited range of scores used by the driving assessors.

CHAPTER 4 DISCUSSION

Effect of the Course on Trainees' Attributions

The data clearly indicate that a driver training course, even of only one day's duration, can influence the attributional judgements of the people undertaking it.

Perhaps the most important area of change we observed was that which related to the Internal/Unstable dimension. The trainees revealed higher Internal/Unstable scores after the course, on both a repeat set of accident scenarios, when the first and second set of responses were compared, and on a set of scenarios which they had not previously seen, when their responses were compared with those of the Control group. In other words, the course made the young drivers more aware of the importance of their judgement at the time and with it, the importance of their own actions as determinants of their driving outcomes.

The heightened awareness of the importance of Internal/Unstable processes is a most desirable outcome of the training course, since it suggests that the young people who undertake it are more likely to learn from future mistakes in their driving. When a mistake, near miss, or even a serious incident occurs, they will be more inclined to look for the cause in an inappropriate action of their own, rather than concluding that it was caused by something over which they have minimal or no control. This dimension was, in our previous work, the most important distinction we found between the younger, more accident-prone drivers, and the older, safer, drivers.

The driver training course examined in the present study also affected participants' Internal/Stable attributions, but this effect was less reliable than the one discussed in the previous paragraphs. There was a significant increase in the perceived importance of this cause (driving ability) on the repeated scenarios, but this change did not generalise to a new set of scenarios. This suggests that immediately after the course, ability was not as salient to the trainees as effort and judgement were. Hence, the Unstable forces were first thought of when encountering new scenarios, but longer periods of consideration and reflection, afforded by the repeated scenarios, also provided an opportunity for recognition of the additional importance of ability (but with no diminished impact given to the effort).

The less immediate impact of the change in Internal/Stable judgements is consistent with the less controllable nature of these sorts of causes. Ability is not something which can be modified readily. It is not under the same immediate control as effort and judgement. Any adjustment must be undertaken over a period of time and even then, with an uncertainty of outcome. One's ability

may be enhanced at the completion of the training period or it may prove intractable. Understandably, at the conclusion of the present one-day course, the trainees were particularly aware not so much of the long-term possibilities, but with the more immediate awareness that aspects of their behaviour here and now, in the form of judgement and effort, could dramatically influence their driving outcomes.

The driving course had one other effect on the trainees' attributions. There was a trend in the change scores, and a significant difference between Trainees and Controls in their responses to the second set of scenarios, on the External/Unstable dimension. Although not completely reliable, this trend is encouraging and certainly deserves further research attention. It indicates that the trainees are tending to place less emphasis on luck as a determinant of accidents after they have completed the courses. This was another important dimension which differentiated younger and older drivers in our previous research.

In summary, the driver training courses had a desirable effect on the trainees' attributions. It led the young participants to be more aware of their own immediate control of driving outcomes, to acknowledge the role of enhanced ability, and to reduce the perceived importance of bad luck as a cause of driving accidents. All of these changes are consistent with producing positive adaptation to the driving task, and a reduction in maladaptive responses.

It is important to note that all of these outcomes were obtained without "coaching" on the scenarios during the course itself. That is, the changes were an incidental result of the course rather than a explicit outcome goal. At no stage were the instructors aware of the contents of the scenarios or of the range of possible responses. The attributional changes, therefore, were not simply a result of the trainees being told the "correct" responses during the course, which itself bore no relation to the independent attributional testing sessions.

Rather than being a result of "coaching" on the correct responses, the attributional changes most likely arose from the direct experiences of the students during the course. This experience had the effect of challenging the young drivers' existing understanding of the causes of driving outcomes which had been derived from their limited previous range of experience. It replaced this limited world view with one which was based on the students' personal experience of control and their heightened awareness of the direct links between their own actions and the driving outcome.

The Video Manipulation (Modified Trainee Group)

The video manipulation did not have the predicted effect. The trainees who had their performance on the "brake and evade" test video-recorded did not show greater amounts of change

in their attributions. In fact, the recording appeared to attenuate the changes in these people on two of the causal dimensions (Internal/Unstable, External/Unstable), with a similar, but reduced attenuation effect on another (Internal/Stable).

On the basis of established attributional research, it had been anticipated that the video camera would have drawn the trainee's attention onto themselves and their own actions at the time of recording and thereby made them more aware of the Internal causes of their subsequent actions. It was also believed that the attributional result of this heightened self awareness would be higher ratings on the perceived importance of both of the Internal attributions when responding to the scenarios. It was also expected that the tendency to make these higher ratings would be further enhanced by screening the recording to the trainee after the exercise, and prior to responding to the scenarios. This expectation was based on the fact that under such circumstances the trainee was becoming a virtual observer of their own behaviour, and would show the associated tendency to make Internal attributions for that behaviour.

The failure of the manipulation to have the desired effect could mean that it was not appropriate to the present situation or that it was not applied in the most effective manner. We feel that it would be premature to conclude the first of these possibilities. Indeed, the manner in which the video manipulation was carried out in the present study may have altered its impact on the trainees. In particular, the majority of the television experience occurred while the student was in the car driving, but the camera was located outside at some distance. This had been anticipated as a potential problem which could reduce the driver's self awareness during most of the task, therefore each filmed sequence commenced and concluded with close views of the driver at the wheel of the vehicle. However,in retrospect it appears likely that these close scenes were not sufficient to overcome the problem arising from the separation of camera and subject during the actual task. Similarly, the attempts to draw the driver's attention onto themselves during the playback also appears to have been insufficient to overcome the fact that the majority of the material that the student was viewing was not of themselves *per se* but of the car moving around the track and through the exercise area.

Any future attempts to use the video manipulation should ensure the driver is the focus of the camera's attention throughout the task. This would have the combined effect of enhancing self awareness at the time of the recording and also ensuring that during the playback, it was the person themself who was the focus of attention, not the vehicle on the track.

Not withstanding the possibility that the impact of the video manipulation could be enhanced, there remains the question of whether it needs to be included in future research which is

carried out on the attributional impact of training courses. The course we examined in the present study clearly was capable of effecting the sorts of changes which we consider desirable in the participants' world views. It would be more profitable to pursue aspects of such conventional courses which are relevant to these changes rather than attempting to modify the courses in experimental ways. Our original aim in including the video manipulation in the present study was to provide a direction to pursue if the course had not been effective. The success of the course itself suggests there is in fact, no need to proceed further along this path.

Assessment of Street Driving

The difficulties experienced with this measure have drawn attention to the need for a comprehensive, systematic means of assessing and comparing the quality of a person's driving. This is not a new problem and was noted as an area of difficulty in the study conducted by Telfer *et al.* (1987) which was referred to earlier in this report.

Telfer *et al.* devised a driving test specifically for their research project. They considered the sorts of problems we encountered in trying to carry out the assessment on public roads and they concluded that the potential difficulties were too great. Instead, they chose to conduct their assessment within the off-road facilities of a Police Driver Training School.

Although Telfer *et al.* drew attention to further limitations of their test, resulting from the artificial surroundings of the Driving School, the reliability figures they obtained on the assessments made in this context were clearly better than those made on-road. We believe that off-road sights should be the starting point for the development of a standardised assessment procedure. If an appropriate instrument can be devised in this context, then attempts could be made to extend it to on-road testing. However, the unpredictability of events in real-life driving contexts are still likely to mean little consistency regarding the situations that will be assessed for each participant once the transition to on-road situations is attempted.

We believe that the development of an assessment procedure should be treated as an issue of importance. With the growing awareness not only among the academic community, but also among practitioners and the general public, of outcome evaluation, it is essential that a reliable, systematic means of assessment is available. Such a device would not only aid the evaluation of particular training techniques but would also be applicable to validation studies of the competing theoretical approaches to understanding driving. In the long term, it is the theoretical models which will guide progress in the development of effective preventative and remedial programmes directed at poor drivers.

Conclusions and Directions for Future Research

The success of the driver training course in changing the attributions of the participating young drivers has been a valuable outcome. It suggests a number of directions which can be taken by subsequent research in order to better understand the changes which occur in a driver's world view as they mature.

It has been argued throughout this report that young drivers normally approach the driving task with a world view which has been derived from their past experiences, and which is therefore inappropriate in a number of ways. In particular, the level of importance they place on Internal/Unstable forces is less than more mature drivers, and their emphasis on External/Unstable forces is greater. Attribution theory would suggest that the only way to change this world view is to challenge it in some way and to replace it with one which is more approriate to the task at hand. This replacement view would place more emphasis on the controllable, modifiable aspects of the driver's behaviour, so that the person is likely to learn from near misses and other forms of driving failures, rather than to dismiss them as out of their control.

We argued that the off-road driving course was in an optimum position to present this challenge, since it enabled the young person to directly encounter the varying outcomes of different levels of personal input into the driving task. Such encounters could be the result of discussion, demonstration, or first-hand experience. The latter two experiences would not be possible in on-road contexts where road rules and the actions and the safety of other drivers must be an over-riding concern.

We believe that the training course did challenge the participants' world views. It also ensured that an appropriate alternative set of explanations were available to the participants to replace the inappropriate orignals.

There is a need now to obtain further supporting evidence of the hypothesised mechanism of change, the challenge to world views and the replacement with a more appropriate alternative. If this process can be verified through other techniques of investigation it would permit a greater understanding of the mechanism for change, which we consider so important to the development of better drivers.

Future research must also attempt to determine if the hypothesised mechanism of change is in fact less likely to be found in the typical on-road training that many young drivers receive from parents, friends and so on. We believe that this may be the case, because of the limited range of unexpected experiences which the student is likely to encounter in this context and the absence of

trained instructers to direct any causal searches that do result from such experiences, in an appropriate direction (that is, toward Internal/Unstable explanations). A replication of the core components of the present study, but one which focused on drivers who are undergoing training outside the controlled environment of the Centre, would provide initial answers to this question.

A further implication of the hypothesised mechanism of change relates to the possible development of training instruments which might provide the necessary challenges to all novice drivers in some form. Such devices could be provided to all trainee drivers, whether they were receiving tuition at a formal Centre, or through their parents and friends on the open road. They could perhaps take the form of scenarios similar to those employed in the present study but presented as training tools rather than assessment devices. The scenarios would need to challenge the student in some way and require involvement from the student in order to instigate a causal search. Also, guidelines would need to be included to ensure the search led to appropriate conclusions in which Internal/Unstable causes predominated. To do this the novice would need to be presented with a series of described incidents which might at first sight appear to have been caused by External forces but which subsequently could be shown to have arisen from, or at least to have been avoidable through, the driver's own actions.

The future for the attributional approach to understanding driving behaviour is very promising. However, a formal, systematic means of assessing driving ability is needed. The development of such a tool would provide the needed validation of the cognitive indices which form the basis of our research and theorising. It would also provide the means of comparing the outcomes of different training techniques not only in cognitive terms but also in the practical driving context. The long-term examination of accident statistics is much too broad a measure to be used in this context.

Finally, it is important to note that the present study has not been able to examine the long-term impact of the Training Course on the participants' attributions. It is possible that once they have returned to their everyday activities, the young peoples' new world views may be overwhelmed by past habits and show some reversion to their earlier, less approriate form. Cognitive theory would suggest this is unlikely, since such changes in world view are likely to occur only if there is a conflict with actual experience. However, until the durability of the change which we found is tested, this must remain a theoretical assumption. A longitudinal study, tracing the world view over a number of months is an important direction for future research consideration.

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APPENDIX

Example of scenarios used to assess causal attributions.

YOU are the driver of the principal vehicle.

SCENARIO L

You have been to a friend's place for the afternoon. As you drive home, you have one of your favourite cassettes playing on the car's stereo system. Your route home takes you past a busy shopping centre, and since to-day is the day before a long-weekend holiday break, the centre is very busy. As you drive past one of the exits to the centre's car park a small sedan suddenly drives out and into your path. You swerve to avoid the sedan, but as you do so you bump the side of an oncoming car. Although the first car is not damaged both your vehicle and the one you hit have panel damage on the side. None of the drivers is seriously hurt.

1. To what degree do you see the accident being **caused** by the following?

		weak cause						strong cause
(a)	The sedan leaving the car park	1	2	3	4	5	6	7
(b)	shortcomings in your driving ability	1	2	3	4	5	6	7
(c)	misfortune	1	2	3	4	5	6	7
(d)	a mistake in your judgement	1	2	3	4	5	6	7