Creating Behavioural Change Through a Driving Diary: Designing and Implementing a Theory Based Brief Intervention to Improve Fleet Safety

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Abstract

Driver training and education initiatives are often considered the cornerstone of many organisational fleet safety approaches, however there is currently little evidence regarding the effectiveness of such interventions. Similarly, the evidence regarding the value of other programs such as driving incentives also remains mixed, as fleet managers search to identify cost-effective methods to reduce the burden of fleet crashes. This paper reports on the development and implementation of a driving diary within a fleet setting that aims to increase personal insight and safety through the identification of aberrant driving behaviours. The driving diary is based upon brief intervention techniques used successfully in the health care arena over the last twenty years, and thus the tool aims to reduce engagement in unsafe driving practices. The driving diary is currently being trialled with a large sample of fleet drivers in Queensland. Drivers are being asked to keep a driving diary for ten days, noting times and places associated with unsafe driving behaviour. A follow up survey and formative focus groups is underway to determine the relative effectiveness and utility of the intervention in a fleet setting. It is hoped the intervention will prove to be a time limited, low cost, evidenced-based tool that can influence behavioural change. In addition, it is anticipated the results of this project will add to the body of knowledge regarding fleet safety, particularly the driver behaviour change literature. This paper will further outline the major advantages and pitfalls associated with developing safety interventions within the fleet industry, as well as provide direction for future research-based initiatives.

Introduction

Work related crashes are the most common cause of occupational-related death, injury and reduced productivity around the industrialised world (Charbotel, Chiron, Martin & Bergeret, 2001; Moser, 2001; Wheatley, 1997). In Australia, recent worker’s compensation statistics reveal that work related fatal crashes have comprised around 40% of all crashes over the years 2001-2005 (National Workers’ Compensation Statistics database, available at: http://nosi.nohsc.gov.au). It has been suggested that the total cost of work related crashes in Australia amounts to approximately half a billion dollars each year (Wheatley, 1997). Furthermore, a conservative figure for an individual damage-only crash has been reported to cost at least $4000 (Stone, 1994). More recently, Davey and Banks (2005) calculated the total insurance costs of a work
related ‘fleet incident’ and found that the figure was approximately $28000. While there are obvious costs related to work crashes such as vehicle and property repair costs, there are also many hidden expenses including third party costs, workers compensation, medical costs, rehabilitation, customer related costs, increased insurance premiums, administrative costs, legal fees and loss of productivity (Collingwood, 1997; Haworth et al, 2000). While it is acknowledged the true figures are currently unclear, the available evidence appears to suggest that the direct cost of work related crashes is only the ‘tip of the iceberg’ (Murray et al., 2003).

Countermeasures
There are a variety of fleet safety initiatives that have been implemented in recent years to reduce the above highlighted costs, although existing initiatives employed by organisations to reduce crashes typically focus on fleet safety policies and procedures, driver training, driver education and incentives (Haworth et al., 2000; Lancaster & Ward, 2000; Murray et al., 2003). Despite the importance of these initiatives, there is little systematic research investigating their effectiveness.

For example, while driver training and education initiatives are believed to be the cornerstone of many organisational fleet approaches, the evidence for their effectiveness is scant (Haworth et al., 2000). Similarly, in regards to incentive programs, Haworth et al’s (2000) review of the effectiveness of reward programs on safe work related driving revealed that the most effective programs were those where incentives were in proportion to the crash rates, where incentives are based on group contingency and where a large incentive was provided to a small amount of drivers rather than a small incentive to a larger group of drivers. Apart from this, the evidence appears mixed and there needs to be more empirical testing of the impact of these types of initiatives on driver behaviour.

Perhaps the most significant effect upon work related driving has been the increasing focus on the issue from a legal perspective. Under all Occupational Health and Safety (OHS) acts, employers must ensure safe and healthy workplaces (which include vehicles) and conditions of work (duty of care). In addition, it is the responsibility of the employing organisation to ensure their driving activities do not present a hazard to the community. Recent changes to the road transportation industry laws including introduction of Chain of Responsibility (COR) are also believed to increasingly impact upon all work related driving in the near future (Murray et al., 2003). COR laws regard all parties involved in the supply chain equally responsible for the safety of each other and the overall event. In other words, responsibility is shared by all parties including consignors, packers, loaders, receivers and not just drivers and operators of vehicles. While there is a trend toward national standards regarding OHS processes, particularly crash investigation, the responsibility of risk management policy and procedures related to fleet safety currently rests with the organisation in many instances. As a result, the quality and extent of policy and procedure related to work-related road safety between organisations is variable.

Finally, while many organisations in Australia have commendable work safety policies and procedures, their efforts in relation to fleet safety has been described as reactive rather than proactive especially in relation to light vehicle fleet safety (Anderson & Plowman, 1999; Haworth et al, 2000; Murray et al., 2003). Despite this, government agencies are starting to become more active with regard to fleet safety, particularly through Road Safety Committee meetings. As a result, in recent years,
government committees have produced reports which have led to the development and introduction of several fleet safety initiatives including the ‘Fleet Safety Manual’ (Federal Office of Road Safety [FORS], the FleetSafe program in New South Wales and in Queensland which is known as the Workplace Fleet Safety System (WFSS) (Murray et al., 2003). The WFSS is a self audit process for organisations operating vehicle fleets in order to improve and maintain fleet safety (Anderson & Plowman, 1999). The self audit package is comprised of seven objectives including: the inclusion of fleet safety policy within overall organisational policy; informed driver selection; effective induction programs; best practice fleet vehicle selection; comprehensive databases for fleet incidents; incentives and disincentives and adequate training and education (Anderson & Plowman, 1999). However similar to above, there have not been any systematic evaluations regarding the efficacy of the program to impact upon road safety outcomes within specific organisations. Taken together, while there is a growing body of literature devoted to the examination of the nature and extent of the fleet safety problem, results are mixed regarding the results of strategies for driver behaviour change in the fleet environment. What has become evident from a range of recent fleet safety research initiatives is that industry current require intervention strategies that are inexpensive, not resource intensive, immediate and easily implemented within the current work-context and business environment.

Aims of the research
The overall aim of the current research project is to design, implement and evaluate a theory-based brief intervention tool that can practically be used in fleet settings to increase road safety and reduce the burden of crashes and injuries. The proposed intervention is a driving diary that incorporates a brief intervention technique for fleet settings that aims to increase personal insight and safety through the identification of aberrant driving behaviours. The aim of this paper is to highlight the driving diary development process and current structure of the intervention tool as well as receive feedback regarding its content and perceived feasibility for use in work-related settings.

METHOD

Search for a Brief Intervention
As highlighted above, given the importance of time management within fleet environments, the current researchers recognised there was a clear need for brief interventions that demand little resources and can be completed without intense management supervision. The term, ‘brief intervention’ is an umbrella term that originated from a family of therapeutic techniques such as Milton Erickson’s seminal works on brief therapy. When brief therapy originated, it represented a departure from the traditional worldview of the nature and treatment of psychological problems as it was not aimed at finding a cure for problems but rather trying to identify and mobilise client resources, energy and skills aimed at doing something to change the current status quo (Cade, Hudson & Norton, 1993).

The majority of brief interventions involve basic assessment, advice and brief counselling along with self help bibliotherapy or other educational media (Bor, Miller, Gill & Parrot, 2004). Brief interventions are often targeted at people who are engaging in negative health behaviours but who have not yet begun to experience any major problems as a result. For example, in the case of excessive alcohol consumption, they are not designed for dependent drinkers. The primary aim of brief interventions is to convince recipients of the potential harmful aspects of their behaviour and encourage
them to change (Heather, 1989). As a result, brief interventions are often opportunistic, and can be given to people who simply want advice, and importantly, they are also able to be implemented by non-specialist staff. Not surprisingly, the popularity of brief interventions has increased in recent years due to the minimal resource implications that are required and their wider applicability and utility in comparison with more traditional therapies. It has been advantageous, therefore, that the research evidence for their effectiveness has been favourable in a number of settings. Specifically, brief interventions have been utilised in response to health issues such as smoking (U.S Department of Health and Human Services, 2000), heavy drinking (Heather, 2002), condom use (Jaworski & Carey, 2001) drug abuse (Rowan-Szal et al., 2005) and alcohol consumption.

Diary Concept
A brief intervention can take many forms, for example, it may simply involve a five minute motivational talk by a general practitioner to a patient in relation to cutting down smoking. A key component of many, however, require participants to keep a diary of their behaviour over a short period of time, noting not only the frequency of a negative health habit, but also high risk times and situations, high risk people and places in addition to cognitions and feelings and reasoning associated with urges or acted behaviours. These diaries are often included in pocket sized booklets that people can carry around with them. They also typically include strategies for avoiding or dealing with risks. A common example is a drinking diary which requires respondents to keep a record of how many standard drinks they consume in a week. Diaries have been found to assist people tackle a wide range of health problems including reducing harmful levels of drinking, smoking cessation and have also been found to be beneficial in weight loss programs (Schmitz & Wiese, 2006). Generally, the research evidence on the effectiveness of brief interventions that has been systematically reviewed has been favourable (Heather, 2002). While it is acknowledged that the diary concept is not new, the use of a diary as a behaviour change strategy in a fleet setting is novel.

Assessment Aspect
Another major component of many brief interventions such as drinking diaries, is a self-assessment of the nature and extent of current risky behaviour. The most common assessment tool is the AUDIT (Alcohol Use Disorders Identification Test AUDIT) (Who, 1993), which is not a diagnostic instrument per se, but more a tool to provide an indication of probable alcohol dependence. The AUDIT assists in identification of excessive drinking behaviour and consists of ten questions. The interpretation of the AUDIT score suggests that a zero score reveals an abstainer, a score of 1-7 reveals an individual with a non-hazardous level of alcohol consumption, a score of 8-12 suggests someone who is currently consuming harmful levels of alcohol, and a score of 13 or more suggests an individual with a high risk of alcohol dependence (Babor & Higgins-Biddle, 2001). The four score levels are indicative of relative risk levels which have different implications for the type of intervention suggested. For example, no or low risk scoring individuals may only require some form of alcohol education whereas those who scored slightly higher and were of greater risk would require more specific alcohol advice. Those at higher risk levels would require more involved interventions ranging from intense advice to specialist referral (Babor & Higgins-Biddle, 2001). Examination of the AUDIT effectiveness literature reveals that it has been rigorously validated (Maisto et al., 2000). From a practical perspective, it also appeared to be relatively short, easy to understand and
administer. Consequently, the research team decided to incorporate an AUDIT-style approach within the driving diary to assess driving risk (highlighted in a proceeding section).

**Transtheoretical Perspective**

Many brief interventions are based on theoretical models, with the most widely accepted model of behaviour change being the Transtheoretical Model of Change (DiClemente & Prochaska, 1998). The model proposes that individuals move through five behavioural change stages before successfully ceasing a problem behaviour, which are:

- **Precontemplation** – No acknowledgment that there is a problem
- **Contemplation** - Acknowledgement that there is a problem but not ready to change
- **Preparation** - preparing to change
- **Action** – making changes
- **Maintenance** – maintaining changes

The model underpins a number of prominent public brief intervention health initiatives (diabetes, weight control, cancer prevention) as brief interventions have been demonstrated to instigate a natural change process, from pre-contemplation, to contemplation to action. Given the utility and predictive efficacy of the Transtheoretical Model, this theoretical underpinning was also utilised in the driving diary. Taken together, after reviewing the general brief intervention and health promotion literature, the research team decided to develop an intervention tool that incorporates common key aspects from various successful initiatives within the health field such as an assessment of risk procedure (e.g., AUDIT) and use of a diary, with the overall intervention being guided by the Transtheoretical Model.

**Diary Content and Design Process**

The concept of the driving diary evolved from a larger body of research aimed at work-related road safety and the associated issues experienced by fleet drivers. More specifically, these research projects utilised predominant self-report driving assessment self-report tools (e.g., DBQ, DAQ) to both examine and predict aberrant driving behaviours as well as develop and implement intervention strategies targeting such behaviours. From this research, it became evident that a number of additional more contemporary issues such as work pressures and multi-tasking (e.g., mobile phone use) were directly impacting upon the safety of drivers (Freeman et al., 2007). In contrast, the research projects also revealed that traditional factors do not accurately account for a high proportion of the predictability of crashes or offences incurring demerit point loss in the Australian fleet setting.

As a result, a series of focus groups were conducted within various industry work-related driving environments to identify other underlying issues influencing driver behaviour and attitudes. These focus groups also identified reasons for the reluctance of organisations to implement previously designed intervention strategies e.g., time limits, resources allocation, prioritising of core business processes vs safety, etc.

The outcomes from these focus groups, in conjunction with the previous research, provided the foundations and guidance for the development of an initial version of the driving diary, which also utilised the framework of the Transtheoretical Model. The
current version of the driving diary consists of approximately 20 pages of information regarding (a) the importance of improving road safety and (b) material highlighting the procedures for completing the corresponding driving diary. As highlighted above, the first stage of designing the driving diary involved examining the brief intervention as well as fleet road safety literature, to determine if there were any areas of congruence or similarities between the two fields. After acceptance of the brief intervention driving diary approach, the next step involved transferring the core elements of the intervention across to the fleet driving field. As a result, the first section of the driving diary tool (e.g., 4 pages) outlines the importance of road safety, the responsibility of every road user, and why it should be the concern for employers and employees e.g., obligation and duty of care.

The next section in the driving diary (2 pages) focuses on the “Challenge to Change” and provides some reasons for why someone would benefit from taking the time to examine how they perceive their driving behaviour. As highlighted in Table 1, the section also begins incorporating the concept of “risky driving behaviours” by highlighting a range of such behaviours (e.g., speeding, not wearing a seat belt, drink driving, etc) and asks respondents to start thinking about and identifying their own risky behaviours.

Table 1. The Challenge to Change.

You may believe that due to your training and experience you are a good driver and possess better driving skills than the ‘average’ driver. You may never have been involved in a crash while driving for work. However, there may have been times, where you have found yourself:

- exceeding the speed limit without realising
- driving without wearing your seat belt
- driving while under time pressure
- driving while using a hand-held mobile phone

We will refer to these driving behaviours as “risky behaviours”. You may think of others which you can write below in the space provided.

Making an Assessment

The third section focuses on “Assessing Your Risky Driving Behaviours” and requires respondents to answer 10 questions that focus on the frequency and severity of the behaviour. More specifically, in order to model the driving diary on the AUDIT, the various test items were changed to cover the following:

- frequency of risky driving;
- severity of risky driving;
- number of times felt loss of control while driving;
- number of times when risky driving behaviour interfered with work responsibilities;
- number of times when risky driving brought about feelings of guilt;
- whether driving has resulted in injury/crash/near miss (in last six months); and
- whether another person has expressed concern over the person’s driving in the past.

Respondents are then required to total their responses to the items which provides an overall score highlighting their category of risk: (a) low-moderate, (b) high and (c)
serious. The section also explains the possible risks associated with each category, discusses the benefits of change and requires participants to provide their own perceived possible benefits to commencing the change process e.g., reduce demerit point loss or reduce risk of harm.

**Motivation to Change**
This section also includes three questions related to readiness or motivation to change, confidence about making change and level of importance assigned to the behaviour change process. It is expected that the driving diary will assist drivers move through the various stages of change suggested by the stages of change model in relation to changing unsafe driving behaviours. And thus for both practical and research purposes, an initial assessment of motivation to change is undertaken.

**Introducing the Driving Diary**
The final section introduces the concept of the driving diary, outlines the process and highlights the importance of motivation and confidence both in regards to remaining on task and creating behavioural change. Filling out the diary requires respondents to make notes on how often they carry out unsafe and risky driving behaviours and take note of situations in which they have a tendency to engage in these behaviours more often than others. For example, individuals may recognise that their worst days are related to particular roads or times of the day. The section also reinforces that users need to fill in their diary on a daily basis, either during the day while on breaks, just before they are about to get out of the car, or at the end of the day. Taken together, there is no special induction, however the researchers anticipate that it will be beneficial if a brief workshop or induction program (e.g., explanation) is provided to participants at the commencement of the intervention to remind drivers of how the driving diary is congruent with the company’s policies and strategies to encourage safe driving.

The instructions material also highlights that respondents will need to review what they have written on a daily basis. It is expected that through this non invasive process drivers will be more honest about appraising their own driving behaviour and reflecting on and developing strategies for change. As a result, self-monitoring is believed to be a key strategy in behaviour change. Furthermore, guaranteed anonymity will assist convey the message that the company is more interested in employee safety than identifying a method to ‘check up’ on driver behaviour. Importantly, one of the primary aims is to identify when and where high risk driving behaviours occur and what feelings and emotions are associated with the event. By engaging in this process it is anticipated that participants will gain a greater level of understanding regarding their driving habits and high risk times, which will ultimately help them improve their driving behaviour. Table 2 highlights an example of the driving diary and typical responses to the task.

**Table 2. Driving Diary Example**

<table>
<thead>
<tr>
<th>DAY</th>
<th>Behaviour</th>
<th>Where</th>
<th>When</th>
<th>What happened</th>
<th>How do you feel</th>
<th>What could I have done differently</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Speeding</td>
<td>On Highway</td>
<td>6.00pm</td>
<td>I was speeding on the way home</td>
<td>Annoyed, frustrated and tired</td>
<td>Slowed down and thought of arriving safely</td>
</tr>
<tr>
<td>1</td>
<td>Cut drivers off</td>
<td>City</td>
<td>2.00pm</td>
<td>Rushing to next client and was late</td>
<td>Stressed</td>
<td>Phoned ahead and advised of new arrival time/ review schedule</td>
</tr>
</tbody>
</table>
The Next Step: Proposed Research Initiatives

The next stage of the program of research now involves systematically evaluating the effectiveness of the brief intervention tool to create behavioural change in fleet environments. Specifically, this process will be aimed at determining whether a broad based brief intervention technique aimed at a general population of fleet drivers is capable of bringing about positive behaviour and attitudinal changes in relation to work related driving. This process includes:

1. Conducting focus groups with fleet drivers and managers to confirm the readability of the diary, ensure that the content reflects organisation specific terminology and to ensure that the diary is relatively easy to use;

2. Implement the driving diary in various government and non-government fleet settings, incorporating approximately 600 fleet drivers. A follow up survey and formative focus group will determine the relative effectiveness and utility of the intervention in a fleet setting, along with the impact on work-related crash rates and offences incurring demerit point loss;

3. Implement the driving diary within organisations consisting of professional drivers e.g., taxis, truck drivers, etc;

4. Formative evaluation of the overall research process will also be undertaken to determine the feasibility of different methods to distribute and implement the brief intervention, including (eg. seminars, intranet, workshops, email); and

5. A number of focus groups will be also conducted to elicit feedback from both fleet managers and fleet drivers in regards to a number of core issues such as the distribution process, driving diary content and procedure as well as the perceived strengths and weaknesses of the intervention tool.

A baseline survey package has been designed to measure participants (i) pre-intervention driving behaviours and attitudes, and (b) post-intervention change that results from completing the driving diary. The measurement tools utilise condensed versions of predominant self-report questionaries in the road safety arena such as the:

a) Driver Behaviour Questionnaire (Reason et al., 1990) to investigate aberrant driving behaviours (errors, speeding and aggressive violations);

b) Driver Attitude Questionnaire (Parker, Stradling, & Manstead, 1996) to examine participants’ attitudes towards driving and road safety; and

c) Safety Climate Questionnaire-MD (Glendon & Litherland, 2001) to investigate organisational perspectives and attitudes toward fleet safety e.g., organisational safety culture.

In addition, demographic information, driving exposure, other driving related information (eg. crashes, near misses, infringements, vehicular damage, injuries and type of vehicle driven), driving intentions over the next six months and corresponding driving behaviours over the last 6 months are also incorporated within the assessment package. As a result, participants will be required to complete a pre-intervention survey before they commence using the driving diary to determine their current driving behaviours and attitudes towards key road safety issues. In addition, such participants will also be required to complete a similar post survey in order to
facilitate pre and post data comparisons and thus determine the effect of the brief intervention on driving outcomes.

Overall, it is expected that the program of research will show whether such an intervention can lead to behaviour change in fleet drivers. The practical implications include the development of a time limited, low cost evidenced based tool as an intervention for driver behaviour change. The results of this project will also add to the body of knowledge regarding fleet safety, particularly the driver behaviour change literature.

**Discussion**

The aim of the current paper was to highlight the initial development and contents of a driving diary brief intervention tool designed for fleet settings. It is anticipated that the tool will provide drivers with information about safe driving behaviours and strategies to overcome bad habits, which will ultimately promote behavioural change. Generally, the driving diary aims to not only improve driver safety but also to empower drivers to maintain changes so that they are less likely to fall back into inappropriate driving habits and behaviours.

The driving diary is based on the brief intervention concept, and draws on well-validated and effective assessment and intervention concepts such as the AUDIT and Transtheoretical Model of Change. As a result, it is anticipated that creating change within fleet environments will not necessarily be a linear process, but may involve relapse and recycling before termination of unwanted behaviours is achieved. Taken together, it is anticipated that diary will provide information that helps individuals think about their driving and gives them a rationale for changing unsafe behaviour and implementing safe driving behaviour.

It is also anticipated that the driving diary benefits will be associated with its brevity (e.g. only taking a few minutes per day), and that it will train people to become their own coach and take responsibility for their own driving behaviour. The anticipated limitations of the tool are that individuals may not devote the necessary time to sufficiently complete the allocated tasks and that an adequate workshop or brief induction program will not be permitted to be implemented before the implementation is implemented. Nevertheless, this fleet safety countermeasure may prove to make a practical contribution to road safety in the work-related arena and thus assist in reducing the tremendous burden of road crashes on the Australian community.

**References**


