

Drivers' Understanding of Fatigue Management and Countermeasures

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ABSTRACT

Focus groups were used to explore drivers' understanding of fatigue, the associated crash risk, and strategies for preventing or combating fatigue.

Participants appeared to understand that fatigue impairs driving. The role of personal experience in learning about the risks and symptoms of fatigue, and about how to 'cope' with fatigue, was highlighted. Some participants appeared to believe (incorrectly) that fatigue can be overcome through 'willpower.'

Focus group participants were able to describe a range of strategies for combating fatigue, but many of these have been shown to be ineffective. Interestingly, powernaps, which have been widely promoted within the media were thought to be ineffective by a large proportion (approximately half) of participants.

Potential mechanisms for disseminating messages about fatigue to the driving public were also discussed.

INTRODUCTION

Fatigue is associated with a broad range of physical and mental impairments which reduce driving performance and make it a major cause of road crashes. A recent survey conducted by AAMI Insurance revealed that almost 30% of drivers admitted to having momentarily fallen asleep at the wheel (AAMI Insurance 2006).

Fatigue can be addressed through both fatigue management and fatigue countermeasures. Fatigue management is proactive. For example, individuals can manage fatigue by leading a generally healthy lifestyle with a good diet and appropriate sleep conditions. This reduces the risk of becoming tired when driving. In contrast, fatigue countermeasures are applied reactively, after the onset of fatigue. The effectiveness of fatigue management strategies and countermeasures is described in Table 1.

Despite recognition that fatigue is a causal factor in a considerable proportion of crashes on Australian roads (around 17%, according to Dobbie, 2002), efforts to increase awareness about fatigue management and countermeasures have been limited. This project involved exploring drivers' understanding and use (or lack thereof) of fatigue management practices and the application of fatigue countermeasures. This project was also an attempt to determine if drivers' understanding of the risks of driving whilst fatigued were leading to dangerous behaviours, and how best to deliver fatigue management and countermeasure information.

Table 1 – Effectiveness of fatigue prevention strategies and countermeasures

Strategy/countermeasure	Effectiveness
Countermeasures	
Radio	Effective for under 30 minutes based on driving simulator study (Reyner & Horne 1998)
Smoking	No evidence of effectiveness, likely to induce fatigue based on physiological impact of smoking (Hartley & Mabbott 1998)
Stopping for a short break when very tired, then resuming driving	Average of 25 minutes to falling asleep again at the wheel based on observation on a closed circuit road (Lisper, Laurell & van Loon 1986)
Winding down window	No evidence of effectiveness based on review of research (Nguen, Jauregui & Dinges 1998)
Caffeine (e.g. two to three cups of coffee or two cans of Red Bull energy drink)	Effective for two hours when used correctly based on a matched case-control design study (Cummings et al. 2001) and a driving simulator study (Horne & Reyner 2001)
Nap (10 to 15 minutes in duration)	Effective based on driving simulator study (Reyner & Horne 1997; Horne & Reyner 1996)
Caffeine ingestion followed by a nap within a 30 minute period	
Breaks early in trip with loading/unloading of contents from vehicle	Early breaks with physical activity assist in maintaining alertness, whilst the same activity later in trips does not have the same effect, based on a driving simulator study (United States Federal Highway Administration 1999)
Using highway rest stops	Effective based on a matched case-control design study (Cummings et al. 2001)
Sharing the driving	
Avoid alcohol and drugs	Effective based on retrospective survey data (Rosekind et al. 2002)
Preventative strategies	
Healthy snacks (e.g. healthy salads) and water during trip	Effective based on retrospective survey data (Rosekind et al. 2002)
Obtaining adequate sleep before driving e.g. sleeping 12 hours compared to nine or fewer hours during 48 hours before driving)	Effective based on a matched case-control design study (Cummings et al. 2001) and retrospective survey study (Rosekind et al. 2002)
Exercise regularly	Effective based on retrospective survey study (Rosekind et al. 2002)
Eat a balanced diet with little fat and sugar	
Be aware of effects of prescribed drugs and illness of fatigue	
Devise a plan to manage the consequences of fatigue	

METHOD

Participants

The main study consisted of 44 licence holders, arranged into eight focus groups as follows:

Table 2 – Sample characteristics

		Age (years)	
		18 to 25	30 to 50
Gender	Male	Two groups (mean age 21, n = 8)	Two groups (mean age 41, n = 12)
	Female	Two groups (mean age 20, n = 12)	Two groups (mean age 38, n = 12)

Both ACT and NSW residents (who work or study in the ACT) were recruited by a contracted recruiter who used a database generated during previous recruitment work to identify appropriate candidates. It was important that focus group participants did not have any special knowledge of fatigue and so people involved in research, policing or road safety related work, or the trucking industry were excluded from the sample.

Procedure

Focus group sessions were semi-structured and guided by a list of ‘key questions’ which covered the following topics:

- fatigue related driving incidents
- understanding/knowledge of the risk of fatigue related crashes
- exploration of methods to improve risk perception
- understanding/knowledge/use (lack of use) of fatigue management practices
- understanding/knowledge/use (lack of use) of fatigue countermeasures

Each focus group was facilitated by two behavioural scientists, experienced in the conduct of group interviews and focus groups. As well as presenting key questions and drawing out details of relevant information from participants, the facilitators attempted to ensure that all focus group participants had the opportunity to contribute their ideas to discussion on each topic.

Most of the topics were simply discussed by participants but ‘brainstorming’ was used to identify the range of fatigue prevention strategies and fatigue countermeasures that participants knew of. This was followed by a ‘show of hands’ to identify which participants had used each.

All participants were assured that their responses would be anonymous in all written data.

One pilot focus group was conducted to fine tune all aspects of the procedures. The main study was conducted in Canberra. Participants were paid \$50 for their participation. Each session was approximately 80 minutes in duration and all discussion was recorded on audio tape for later transcription and thematic analysis.

RESULTS

Fatigue related incidents

Many of the events that respondents described when asked to report on fatigue related driving incidents occurred on trips from ‘the coast’¹. After more severe incidents, many participants pulled off the road, typically in order to recover from their scare rather than to rest. It was fairly common for participants to indicate that the fright of a near miss increased their alertness sufficiently to continue driving safely.

‘I was sort of feeling tired driving along at one point and I just remember someone shouting my name and I must have dozed off cos I remember sort of springing and thinking oh geez and of course the heart was racing and yeah I sort of thought gee I should pull over but if I do that and she drives then it’s gonna take us even longer to get there... my heart kept me awake anyway’.

‘I was driving home from the coast once and was just with a friend and I can’t even remember what we did that weekend, I don’t know if it was a big one or not but I remember just driving and all of a sudden “God, I wasn’t in this lane!” like I knew I was in the left lane and all of a sudden I was in the right lane and I had no recollection of sliding over... I was nearly at Canberra so I just splashed a bit of water on my face with a drink bottle and kept going’.

‘it was one of those moments where you just throw the kids in the back of the car, two o’clock in the morning, in what I thought was a straight line going down the road, next thing I wake up just in time to see that the cars’ going like this (makes veering motion)... just sort of woke myself, shocked myself basically, and just thought right ok, lets drive home’.

‘I’m sure I went to sleep on the way back from the coast once... I was really tired and I’d finished the camp, I’d been up with the kids for a week, driving up the hill into the sun and I’m sure I just went to sleep and drifted off the road ... it could only have been a few seconds because I thought “oh s### I’m asleep” and stood on the brakes... stopped, got out, walked around, scared... only for a couple of minutes because I had to get back to work... that scared me enough to keep me awake for quite a while’.

Many participants believed that they could overcome fatigue or sleepiness through willpower.

‘It really scared me that I’ve been really aware of that sort of thing... if you feel your body getting tired you sort of make yourself stay awake’.

‘Have only just felt tired... after any shift... just persevere... it’s not a straight road, there’s lots of roundabouts, so it’s something you have to concentrate on, so I just concentrate on the driving rather than the fact that I’m tired’.

‘I just kind of was swerving ... but I was close to home ... so you know I just wanted to nick home... so I drive with my eyes as wide open as I could till I got home’.

‘You do what it takes to stay awake... but ultimately its very rarely you’ll just stop and go to sleep...I come from an industry where if you go to sleep you’re gone, same on the road but even more so, like ya just can’t do it, you just don’t do it’ .

‘It also depends on who’s driving, like I know my old man he can drive fatigued, he can drive for 13 hours fatigued, I think it depends on the willpower of the person like cos he’s just a machine, he can just go’.

¹ The New South Wales coast and Sydney are approximately 2.5 and 3.5 hours by car from Canberra respectively. Many ACT residents appear to consider a visit to ‘the coast’ to be a day trip.

Risks of driving while fatigued

One of the factors that increased some people's perception of the risks inherent in driving while fatigued is the fact that fatigue can 'creep up on you'.

'I think it's [the risk of crashing] high because you don't realise that you're fatigued' .

'It's more of a risk driving while fatigued because it's hard to pinpoint how fatigued you are... you can't rate your fatigue but you can rate how fast you're going'.

'You never know how fatigued you are, you get in the car and by the time you get to where you're going you're falling asleep at the wheel'.

One of the groups of male participants (aged 35 to 50 years) appeared to emphasise individual factors as an influence in the risk of driving while fatigued.

'For everyone it's going to be different... it might be you are used to sleeping, you know, not much, going, you know, longer hours, you might be more resistant to fatigue'

'To some extent it comes down to how good you are at driving when you're tired cos some people do it all the time and it becomes kind of a standard thing, whereas for others who never ever do it, then need to do it on the odd occasion perhaps it's a bit more dangerous'

'It depends on how capable you are of dealing with a particular situation at the time'.

Some participants thought that fatigue was not a big factor in crashes in metropolitan areas.

'around town fatigue is not the main problem on the road by a long shot...I reckon speed is...most of the people going around town are doing short trips, they're not going to be fatigued'

'all the ads are about country driving, as in long distance driving, I've really not heard much about fatigue and you know just normal everyday 20 minute here and there driving at all... like you're not really going to do something about stopping, what can you really do to alter that'

Sources of information about fatigue

The television advertisements most often mentioned were those involving Dr Karl Kruszelnicki. Although the Roads and Traffic Authority's Stop, Revive, Survive campaign has involved television, cinema, radio, press, billboards, petrol pump advertising and brochures, participants only mentioned the 'Dr Karl' television commercials. Billboards and radio advertising aimed at raising awareness of fatigue as a risk factor for crashes were also mentioned in more general terms.

'Those Dr Karl ads are OK, and if they're not working I don't know what will'

The older males tended to emphasise personal experience more than the other groups.

'I think they [TV ads] are really good but I don't know that they have anywhere a fraction of the impact that actually living it has'

'For me, I don't know whether it would affect my decision making with my driving... that personal [experience] thing does'

'It's like anything else in society, until you actually experience it, then you think it happens to other people'

'We've all known, we've been through it, but young kids don't'

Road signs, billboards and radio were felt to have benefits because they provide information during the driving task.

‘Because it’s in your face when it’s happening... big graphic billboards too... half a car sticking out of the signs... “speeding kills” you see that and you’re like yeah, ok, and check yourself’

‘I’m thinking about the drive down to Melbourne because I quite often do that, um, and that’s the billboards, again they show some sort of horrific crash ... that triggers you and you start assessing yourself’

‘Read some symptoms out to em [on the radio] “are you feeling this? Then maybe you should stop”’

Although television advertising campaigns were generally supported as a good way of teaching the public about the risks of driving while fatigued, some concerns were raised.

‘despite having seen it on TV, you don’t connect it with actual what you’re doing’

‘if you’re driving and you’re tired you’re not going to think back to the ad’

Some of the older age group mentioned that messages might be enhanced through the provision of more precise facts about what level of fatigue is dangerous and how much of a role it plays in road trauma.

‘Statistics, like if it can be quantified for people, I think, you know, someone referred earlier to the difference that 5 km/h makes and so those ads are very informative and they back it up with facts’

‘With quantifying it, they should compare it to other things like drink driving, and cos you don’t really hear anybody saying you know my friend got hurt because he was fatigued... so they should really compare it to the drink driving risk and all the other risks on the road’

‘More information on exactly what fatigue is... cos people go “aw yeah, I hear about it but wot are all the symptoms?” how can you pick up [the signs if you are] thinking that you might be fatigued, might be a good thing’

Linking messages to a theme that the target audience connects to was highlighted as important.

‘We’re nearly over the smashed cars but... when they flick through that ad where they go through the priest saying something at the funeral and the kids saying I’m left... those snippets, they sort of stick in your head’

‘I sort of find the less graphic ads more effective, like when they had that ad for, they had a magazine ad for speeding, and it really got me, it was like a little post it note on a fridge saying got to rush, late for school... and then it said such and such 1995, do you know what I mean, and that really got to me, like it wasn’t graphic at all’

‘If somehow you could incorporate a true story, you know what I mean, in amongst the main points, but then somewhere in there an actual event that happened... like some statistics about your local area... something a bit personal’

Although not strictly aimed at teaching the public about the risks of fatigue, road side stops were mentioned as useful in highlighting fatigue as an issue.

‘I reckon those road side stops are good. You can buy a coke or something and have a bit of a chat’

‘They’re self evident [road side stops], they’re there –“oh have a rest”’

‘I think they only have them at school holiday times, it would be nice if they could have them on a more regular basis’

It was generally agreed that print media is not a good way to convey messages about fatigue.

Countermeasures and management strategies used

The following figures show which countermeasures and preventative measures participants had used.

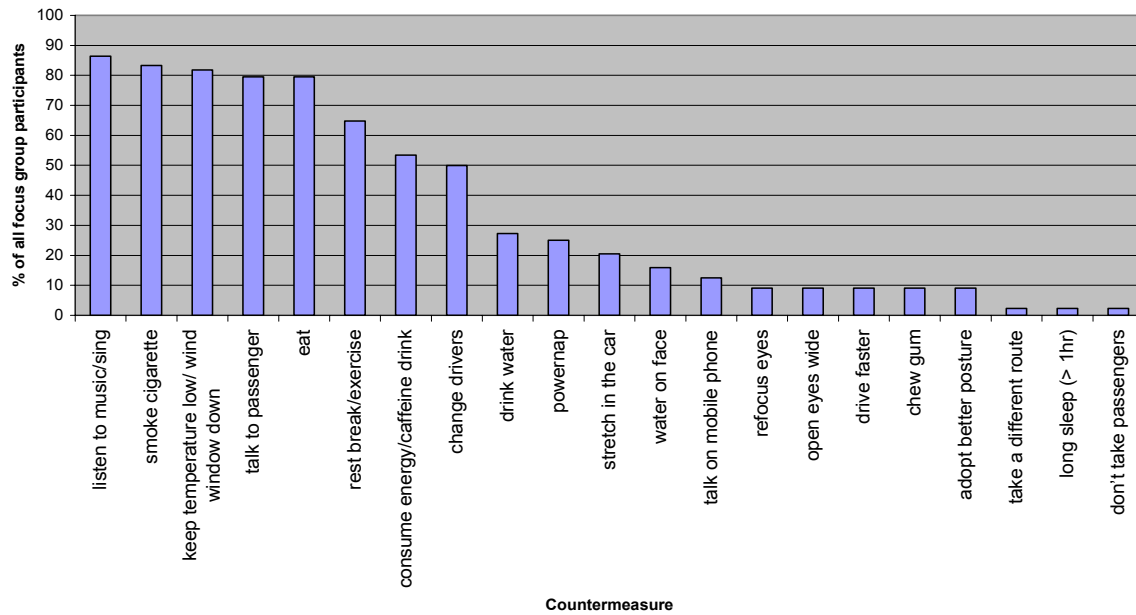


Figure 1 – Countermeasures used by focus group participants

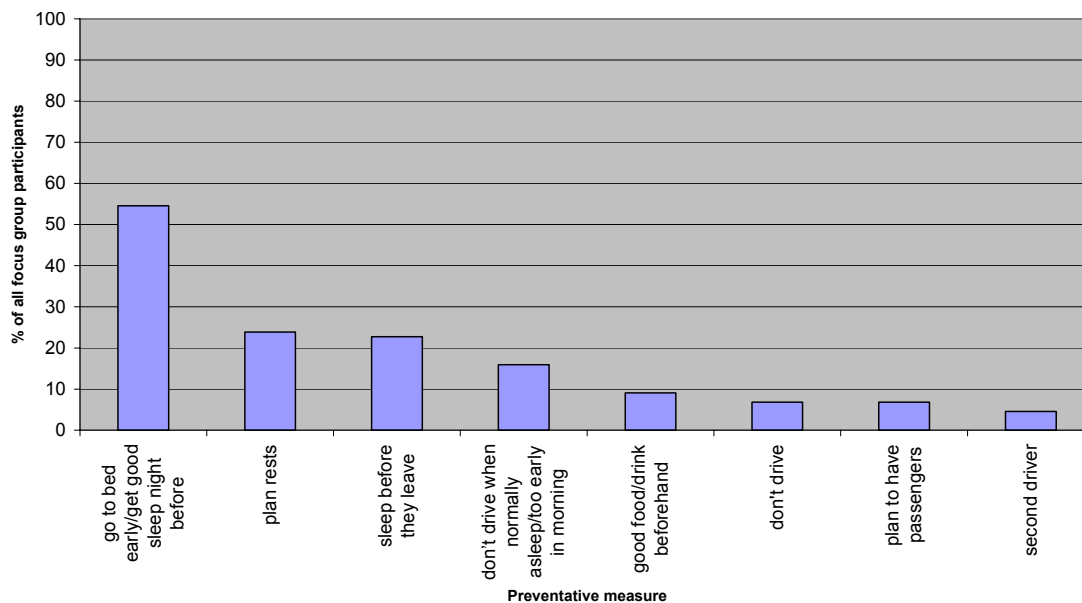


Figure 2 – Preventative measures used by focus group participants

The vast majority of participants believed that the fatigue management strategies described were effective in reducing the risk of a fatigue related incident. Opinions on the effectiveness of most countermeasures were varied but the vast majority of participants thought changing drivers, talking to passengers, taking a long sleep and taking a short break from driving were effective. Many participants pointed out that although they perceived a particular countermeasure to be effective, they understood that this would be the case for only a short period of time.

Although around half of the participants indicated that they thought powernaps had potential to be effective, many also stated that this strategy was ineffective for them personally due to difficulties getting to asleep or waking.

'It wouldn't work for me because I don't fall asleep really easily, so I'd probably spend an hour trying to get to sleep'

‘If I sleep for 15 minutes and then get up in the belief that I’ll be right to drive I reckon that is more dangerous than not having, than just continuing to drive without a powernap’

‘I think it would actually work if you could get to sleep’

‘If you sleep for too long you get too groggy’

Rest stop areas were considered a good idea, but too infrequent, by most but some concern was expressed, typically by women, about the condition and safety of rest areas and of stopping on the side of the road.

‘[rest stops are] dingy, and to be honest also I’ve never felt like I needed to use one when there were any there’

‘especially like being female in the car by yourself, like anything could happen, like even if the car’s locked, if you’re on a country road or even in the street someone comes and starts to smash your window and you’re so vulnerable’

DISCUSSION AND COUNTERMEASURE IMPLICATIONS

When interpreting the results of this study it must be remembered that qualitative research, and research which has employed a non-random sample, cannot be used to base general statements about the wider population on. This study was intended only to provide an insight into the detail of participants’ perceptions and beliefs.

Participants appeared to find the most concerning aspect of fatigue to be the fact that drivers are not always aware that they are fatigued. Other well recognised risky driving behaviours such as speeding and mobile phone use typically follow conscious decisions to engage in those behaviours. Fatigued driving may not, and when discussions turned to appropriate intervention messages, the need for information on how to monitor fatigue levels was noted.

A theme that emerged fairly early during the group discussions was the inaccurate belief that ‘willpower’ could enable a driver to continue safely despite being fatigued. This belief could promote fatigued driving, especially when combined with a tendency, evident among some of the male participants, to view succumbing to fatigue as a sign of weakness. Although not explored in this study, it is possible that people who hold this belief would also see the use of fatigue countermeasures and preventative actions as signs of weakness.

Focus group participants were able to describe a range of fatigue countermeasures. Prompting was often required before preventative measures were described however. Even after prompting, responses were limited to actions aimed at reducing the risk of becoming fatigued during a particular (long) drive and no general lifestyle techniques, such as maintaining a healthy diet were forthcoming.

Of the eight countermeasures used by more than 30% of the participants, research (as presented in Table 1) has been conducted on the effectiveness of six. Only two (caffeine drinks and changing drivers) are effective for any length of time. Another two (taking a rest break with some physical activity and listening to music) can be effective for a short length of time. Winding the window down and smoking cigarettes have not been to decrease fatigue.

The information gathered during this study suggests that the following implications for countermeasure development should be considered for verification via quantitative research.

1. It appears that most participants recognised that fatigue is risky on long trips and that the focus of educational campaigns should be on motivating people to act on this knowledge, and emphasising that it is not only a problem on extended trips.
2. Statistics on how dangerous fatigue is in relation to other driving behaviours may help to increase motivation among the general public to avoid driving while fatigued.
3. Promoting messages to people about how to recognise dangerous levels of fatigue may prove valuable for those who are willing to implement strategies to address the issue.

4. Participants held a range of misconceptions about how to deal with fatigue while driving. These are likely to lead them to continue driving unsafely, thinking they are addressing their fatigue. As such, it is important to provide simple messages about what does not work, including 'willpower' while highlighting things that do work.
5. Information on preventative strategies to address fatigue, such as a good diet and lifestyle habits may broaden the driver's awareness of the strategies available to them.
6. Increasing the operating hours of 'Driver Reviver' stops between Canberra and popular coastal destinations, or between Canberra and popular snow fields during the ski season may be especially helpful.
7. The emphasis of messages should perhaps be on limiting trip length (by breaking long trips with overnight stops) or changing drivers, as many people have difficulty taking powernaps. Alternatively, or in addition, ways of providing information about powernaps to increase driver's belief in their effectiveness should be explored.

CONCLUSION

This study involved the use of focus groups to investigate perceptions about fatigued driving among ACT drivers. How to effectively counteract fatigue is not well understood. Many of the countermeasures employed by participants are ineffective or effective for short periods only, and powernaps, which have been shown to be effective, are reportedly difficult to apply successfully for many people. A limited number of fatigue preventative strategies were identified by participants.

Based on participant feedback it appears that radio and billboards, which provide information during the driving task, may be effective. 'Driver Reviver' stops should be evaluated in order to determine whether an extension of the program is warranted. Another avenue which may prove fruitful in terms of reducing fatigue related road trauma in the ACT is the provision of information which quantifies the risks of fatigue related driving, highlights effective versus ineffective strategies for addressing fatigue and provides clear guidance on when such strategies should be applied.

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