UNDERSTANDING DRIVER BEHAVIOUR: OPPORTUNITIES FOR GREATER EFFICIENCY

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Keywords: Transport, Energy efficiency, Behaviour, Efficient driving

Abstract

Road transport contributes a significant amount towards New Zealand’s carbon emissions, mostly from light vehicles. These carbon emissions could be partly reduced by an increase in more efficient driving practices. It has been shown that reductions of 10-20\% of fuel are possible without increasing trip times significantly. We conducted this study to understand whether people knew how to drive efficiently, whether they actually ever drove in an efficient manner and what ways there could be to influence people to drive more efficiently. Focus groups were conducted across New Zealand in urban and rural areas with groups of students, young professionals, parents and older people in order to cover different lifestyles and environments. These focus groups covered a wide range of topics including knowledge and practices of efficient driving, learning to drive, infrastructure and aspirations.

Our results show that most people reported knowing the things they could do to be more fuel-efficient. However, despite this knowledge, they very rarely engaged in these practices. When they did consider fuel efficiency, it was almost always linked to saving fuel costs. Almost no one considered the environmental aspects of driving or fuel use. This shows that there is a clear lack of connection between carbon emissions and driving when people are in their cars. Better messages could be presented to drivers linking their driving practices to carbon emissions and therefore climate change. The findings also showed other areas where more efficient practices and choices could be encouraged, such as advanced driving lessons for new skills, in-car fuel efficiency feedback and better designed public and active transport.
1. INTRODUCTION

Road transport is the highest contributor to New Zealand greenhouse gas emissions producing 40% of total emissions. As a comparison, electricity production and manufacturing industries produce 15.9% and 18.8% respectively [1]. Most of these emissions from road transport come from light vehicles. There are around 3.2 million vehicles on New Zealand’s roads, with over 90% of those being light vehicles such as cars, vans and light trucks. Car ownership is high, with almost one vehicle per licensed driver in the country. New Zealand also has one of the oldest vehicles fleets in the developed world, in 2010, the average age of the light vehicle fleet was 12.7 years. Older vehicles are likely to have higher emissions and be less efficient than younger vehicles. [2]. Consequently, this is an area where there is significant potential for better energy efficiency and a reduction in carbon emissions. One option for reducing these emissions would be an increase in more efficient driving practices.

Studies have shown that 10-20% of fuel and carbon savings are possible by driving more efficiently without a significant increase in trip time [3]. Driving efficiently consists of actions such as smooth driving, anticipation of what’s ahead, avoiding hard braking and checking tyre pressure. However, even when people know many of the things they can do to be more fuel efficient, they do not take these actions. This was demonstrated by bus drivers in Sweden, who after training in eco-driving, reduced their consumption by only 2% over the long term [4]. A more recent study [5] focused on encouraging fuel-efficient driving with real time feedback but focused on simulator driving and short term rather than long term change.

Safe driving often overlaps with efficient driving but other authors have noted that driver safety programs are not effective because drivers are not motivated by safety concerns but rather by obtaining their licence [6]. One study asked drivers what motivated them to be safe drivers and the avoidance of negative consequences such as accidents were more highly rated as motivational factors than different types of driver training [7].

New Zealand currently has some measures in place to encourage more safe and fuel-efficient driving. Safe and Fuel Efficient Driving New Zealand (SAFED NZ) is a driver training course developed by the Ministry of Transport and the New Zealand Transport Agency that focuses on bus and truck drivers. This program states it has trained over 5000 drivers with fuel savings of around 7.5% for trucks and 5% for buses [8]. The Accident Compensation Corporation (ACC) published a policy document encouraging safe driving at work in New Zealand [9], this policy has several ‘must haves’ that are minimum recommendations for company safety and some ‘could haves’ that are not necessary but are recommended additions. Efficient driving is within the ‘could haves’ section and includes advice on how to drive efficiently as well as vehicle maintenance and trip planning.

Other countries such as Japan, Austria, Sweden and the Netherlands have run eco-driving programs. These programs were made up of different activities such as information campaigns and driver training. Reductions of between 5-50% fuel in the short term (less than
three years) and 3-10% reductions in the medium term (more than three years) were found [10]. The authors recommend that eco-driving initiatives incorporate information campaigns, driver training and in-car equipment.

In order to encourage more efficient driving practices over the long term, it is necessary to understand what currently motivates people to drive the way they do and what current levels of knowledge exist. Previous work has tended to focus on larger vehicles or short-term interventions. In trying to understand driver behaviour, we conducted in-depth focus groups around New Zealand with drivers from across a range backgrounds and ages.

This research focused on two main questions related to efficient driving:

1. Do drivers know what efficient driving is and do they practice it?
2. What influences might assist in shifting drivers towards driving more efficiently?

2. METHOD

New Zealand has a population of around 4.6 million with a significant proportion of approximately 1.5 million people living in the largest urban area of Auckland. Dunedin has a much smaller population of around 126,000. The focus groups were conducted in Dunedin, Auckland and rural areas to cover different lifestyles and driving environments.

Fourteen focus groups were conducted with a total of 96 participants averaging around seven people per group. Each participant filled out a demographics form at the beginning of the focus group and all the groups were recorded and fully transcribed. There were 47 female participants and 44 male participants with the remaining five choosing not to answer. The participants’ ages ranged from 19 to 86 with an average age of 47 and were across groups of students, young professionals, parents and older people. Figure 1 shows the average age of each focus group. Sixty-seven participants owned their home, 27 rented their homes with four in other housing situations, such as living with parents. Figure 2 shows the spread of household income in bands across the focus groups. Forty-six of the participants were in full time employment, 21 were in part time employment, 13 were retired, eight were students and seven reported they were not currently employed. Political affiliation was an open-ended question with responses ranging across a wide political spectrum from left through to right. The majority of participants identified as being of European descent with the remaining nine identifying as Maori, two as Pacific Islander, one African and one who identified as other.
The focus groups were semi-structured and covered a wide range of topics. Our main interest was in efficient driving and this topic encompassed knowledge, awareness, practices and aspirations of efficient driving. The other main topics that were covered were: learning to drive, infrastructure and public transport and ideal transport situations.

3. RESULTS
3.1. Efficient driving knowledge and practices

In every one of the 14 focus groups, participants reported knowing various things they could do to drive fuel-efficiently. These included actions while driving, as well as vehicle maintenance and planning trips. Participants stated that they had learned this knowledge through a variety of ways including when they were learning to drive, through friends or family after getting a licence and via television with some participants not sure where they learned it.

“Consistency. No rapid change in speed, or decrease. Not being erratic. Planning, route planning’s very efficient ‘cause you can go the wrong way and cost yourself a fortune. Make sure your tyres are pumped up.” Rural group

“[regarding efficient driving knowledge] Something that I picked up along the way, yeah.” Auckland group

However, despite this knowledge, almost none of the participants engaged in these practices on a regular basis. When they did consider fuel efficiency, it was almost always linked to saving fuel costs.

“If petrol is cheaper I tend to not even think about it. Or if you are a student, but now I don’t think about it at all.” Dunedin group

In the case of driving in Auckland in a busy urban environment, efficient driving was perceived as not possible.

“I think it’s really hard to be an efficient driver in Auckland, either traffic makes it really difficult ‘cause like how this morning was some stop start, stop start, stop start and you don’t get your revs to a steady stage or you’re not motorway driving.” Auckland group

Some participants had experienced vehicles with fuel efficiency feedback; these participants were far more engaged with efficient driving practices than those who did not have this type of feedback. In some cases the feedback encouraged competition with themselves and members of their family, which led to changes in driving behaviour to a more efficient style.

“And it does make you really focus on it in the sense that you think “Gosh you know that trip was a higher one. Why was that?” You start thinking about the reasons for it.” Dunedin group

None of the participants reported considering the connection between burning petrol while driving and carbon emissions. When asked directly about an environmental aspect of driving, some participants acknowledged they felt they should think about emissions while driving but
when actually driving somewhere, it did not cross their minds.

“Like when you think about oh yeah I should drive less because it is bad for the environment but when I am driving I never put the two together, because it is like, I need to get somewhere, I need to do this, you know.” Student group

When listing the qualities of a good driver, no participants stated fuel-efficient driving as an attribute that good drivers display.

3.2. Learning to drive

Most New Zealanders learn to drive from family members or friends rather than from formal professional lessons. Many participants felt that the driving test was not comprehensive enough to enable people to deal with the varied situations drivers face. Defensive driving courses are offered to reduce the amount of time it takes to get a full licence, but these are theoretical only with no practical component.

“Maybe people need to be taught on different road surfaces ’cause it’s not something you’ve done when you go to get your driver’s licence, it’s just straight on tar seal. And different road conditions as well.” Rural group

“Right now the kids go on a defensive driving course and they don’t sit in a car while they’re doing it, it means they can go to their full licence three months earlier and it’s absolutely ridiculous and they’re not better off for it.” Dunedin group

In eleven of the focus groups, participants displayed a desire for learning new driving skills, such as driving under adverse conditions. When discussing how their driving had changed over the years, many people stated that they had become more lax at following the road code since passing their test. Rather than learning by doing, some people would be more comfortable with affordable advanced classes that encouraged ongoing learning of skills. Having these classes provided at low cost, or with incentives such as demerit points removal from licences or lower insurance were stated as ways to motivate people to take part.

“I think they’re a good idea. Fantastic, I’d love to do an advanced driving course.” Rural group

“Well it probably would be good to have a refresher. Yeah I couldn’t say I could pass a road test now...more awareness about every day sort of occurrences for drivers, you know like kids running out on the street and driver skill rather than the rules. When you come along on a push bike, giving them 5 feet of room if you can rather than 6 inches and you know, just things like that.” Rural group

When most participants had themselves learned to drive, efficient driving was not a skill that
was taught, many of the practices of efficient driving overlap with safe driving but this was incidental.

3.3. Driving norms

Owning and using a car was seen as essential, especially in Auckland, in rural areas and for parents but many of the participants were unhappy with their current travel situation. Unhappiness was especially prevalent in Auckland where large amounts of time can be spent in traffic during the daily commute.

“I lived in London for four years and didn’t have a car and I didn’t miss it but I didn’t have children. I wasn’t time poor. I was under my own steam; you know my own timetable for the day. But now I’m here and there and back and forward. Sometimes I think my neighbours must just see me do this all day in my car. And I feel terrible.” Dunedin group

“[regarding driving in Auckland] No I hate it, I absolutely, I would rather catch public transport than drive, yeah.” Auckland group

When describing their ideal travel situation, often this included newer, more fuel efficient vehicles, along with a mix of convenient and modern public transport and the option for active transport.

“Even though I drive a car I would say public transport would be the ideal way and then like less cars on the road and more public transport rails and stuff. So you go more places.” Auckland group

“I enjoy driving but I would still rather walk to work every day if I could, I would still try and find somewhere to live that involves walking to work. I would love to walk to work every day.” Dunedin group

Access to mobility with the potential of driverless cars was also mentioned as making up part of an ideal travel situation.

“I think we wanna ring up, a driverless taxi arrives at the door, drops you off at the station and doesn’t have to be parked before it goes off to find someone else.” Auckland group

In six of the focus groups, participants discussed that they drive differently in different vehicles with a few mentioning that if they have a sporty car, they were more inclined to drive less efficiently.

“Well if you’re buying a sports vehicle, you’ve gotta drive it like a sports vehicle at some point.” Rural group

3.4. Public and active transport
Across all of the focus groups there was a desire for better infrastructure and more convenient public and active transport. At the moment, many participants, especially those in Auckland and rural areas and those participants with children did not feel public transport was a reasonable option for them. This was either due to public transport taking more time than driving, being more expensive or the lack of access in their area.

“Oh there is none. It’s just having busy kids and doing lots of activities and yeah there’s no other option really…it’s cheaper to drive my car into town than it is to catch a bus. Busses are more expensive. And it’s time consuming as well to go on a bus.” Dunedin group

“I’m conscious of the time it takes me to get in the car somewhere and what I could’ve been doing in that time, ’cause I’m time poor you know because of distance and long working hours. So I think, for instance if they brought back the train service in this area. Oh I’d love the train, I would love the train.” Auckland group

Although there were aspirations of cycling more, many participants had serious safety concerns about cycling. Parents especially wanted their children to be able to cycle more but increasingly felt less safe about children being on the road along with traffic.

“I’d love for the kids to be able to ride to school but I stupidly once took the kids [cycling to school]…It was a nightmare. I don’t know how my son didn’t die that day.” Dunedin group

“I wouldn’t mind if it was safer for me to cycle, I would cycle to work but I would never cycle home…because you have got to cross the motorway to get through, I would never do it. I would cycle if it was safer.” Dunedin group

4. DISCUSSION

In every focus group, there was knowledge and discussion about what efficient driving practices are; however, these practices were rarely engaged in. It seems clear that the lack of knowledge or having incorrect knowledge about efficient driving are not reasons people drive inefficiently. The authors of an International Energy Agency report [10] suggested information campaigns as an effective way to encourage more efficient driving. However, this does not seem as if it would be appropriate in New Zealand due to the high levels of knowledge discussed within the focus groups. It is necessary to know the levels of knowledge within the target group first before creating and implementing campaigns.

When driving efficiently was considered, it was usually linked to concerns about fuel cost or saving money rather than environmental reasons. It seems there is a clear lack of connection between carbon emissions and driving when people are behind the wheel. An opportunity exists to better present messages to drivers that their driving practices have a significant effect on carbon emissions and therefore on climate change. This change in message delivery at a policy level could motivate people to think about driving differently.
Another potentially effective way to motivate more efficient driving is through in-car feedback, participants reported engaging with this type of feedback when it was available in their vehicles and that it drove competition. This competition led to changes in driver behaviour to a more efficient style. Bar, Kohlhaas, Zollner, & Scholl [5] tested efficient driving advice in a simulator and there is an opportunity for further ‘in the wild’ research in this area to understand ways to motivate long-term change.

There seems to be a significant opportunity to provide specialised or advanced driving classes to drivers of all levels. The idea of additional training was received very positively across the groups especially if it was incentivised by removing demerit points or reducing insurance costs with the feeling that a drivers licence alone does not equip one with the varied skills necessary to be a confident driver. Efficient driving could be included in a more general advanced class that included dealing with adverse weather conditions or attaching a trailer to a car. Alternatively, classes could be designed to be modular where people pick and choose the specific skill they want to learn or re-learn.

When describing an ideal travel situation, a lot of participants desired to drive less and use more public and active transport where possible. New Zealand has a lot of cars [2] but it appears that New Zealanders would like other options to complement this car ownership. Parents especially would like to cycle more with their children. Creating more public transport or safe cycleways could be difficult due to the large area of the country with the comparatively small population. However, policy makers should take into account the desires of the population to spend less time in a car where they can.

One of the shortcomings of this study is that it was conducted in New Zealand, which has a lot of space with a relatively small population leading to high car ownership and less ability to have frequent intercity public transport. New Zealand’s fleet of cars are also older than other developed countries, which may affect behaviour. In-depth qualitative work in other countries could be conducted to compare similarities and differences in the behaviour of other populations with high car ownership to increase the reliability and applicability of the findings.

5. CONCLUSION

Even though New Zealand has some unique characteristics, there are still findings from this study that are applicable in other countries. Clearly where the level of knowledge around efficient driving is high, rather than trying to inform people about how to drive efficiently, perhaps the focus should be on messages that link driving to carbon emissions. To encourage change in someone who has been driving for a while, they may benefit from advanced classes or in-car feedback. For someone who is learning to drive, efficient driving can form part of lessons and the driving test. More satisfaction and happiness in day-to-day transport could be partly enabled by more support for public and active transport. Overall, our findings show that
rather than a one size fits all solution to encourage more efficient driving there are a range of flexible points where more efficient driving practices or choices may be encouraged.

REFERENCES


