Reducing car use without changing mode

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Abstract

Many authorities in Australia and New Zealand are finding that private vehicles cause considerable problems which they would like to alleviate: contribution to climate change, congestion, decreasing community spirit, decreasing health and well-being, reduced liveability, safety concerns and so on.

This has led them to set targets to achieve a reduction in car use and often also commissioning long-term programs to reduce car use.

A review of examples in Australia and New Zealand suggests that programs are being limited by inappropriate definition of the targets or objectives (i.e. what is to be achieved), the way in which change should be measured (i.e. what does success look like) as well as a lack of understanding behaviours, and the principles which make behaviour easiest to change.

This paper describes ways in which clearer measurable objectives can be defined and options for defining success in a way that programs and initiatives can be more clearly specified and change more easily measured – as well as achieving a greater magnitude of change.

1.Introduction

Many authorities in Australia and New Zealand are finding that private vehicles cause considerable problems which they would like to alleviate: contribution to climate change, congestion, decreasing community spirit, decreasing health and well-being, reduced liveability, safety concerns and so on.

This is, of course, not a new phenomenon. One of the earliest programs in Australia was a Greenhouse Gas Abatement Program (GGAP) from July 2003 – December 2007 which included programs in Queensland, Victoria, ACT and South Australia. Some of these reduced car use by up to 18% at the same time as the control group increased by 6% (Stopher et al, 2009) while all of them recorded sustained change in a follow up program in 2012 (Stopher et al. 2013).

In simple terms, the problems have been addressed in several ways:

- Infrastructure solutions (e.g. building new roads/bypasses or cycleways; offering more public transport services; providing better facilities to use alternatives to the car and so on). These are sometimes called 'supply' measures.
- Solutions that influence the use (or demand) for cars – often called travel demand management (TDM).

- Solutions that allow people (or organisations) to come up with their own solutions to the problems of too much car use (sometimes called voluntary behaviour change). These solutions often include use of infrastructure changes or reacting to TDM measures, but they are characterised by many other innovative behaviour changes.

This has led to recent initiatives of large-scale programs – extending from 12 months to 5 or even 10 years. Examples include:

- Western Australia's *Your Move* programs initiated by the Department of Transport in active collaboration with local Councils (most recently Bassendean [2018] and Stirling [2021])
- New Zealand Transport Authority's (NZTA) *Let's Get Wellington Moving* initiative where a 10 year program has been designed in 2020-21 with the specific aim of reducing congestion in the CBD – later extending to the greater Wellington region
- Sunshine Coast Council's (SCC) planned *Think Change* 5-year program with the aim of reducing car use in a rapidly growing regional city.

Most of these programs approach the desired change through multiple contexts – change in communities (sometimes established, sometimes in new estates), in schools, workplaces, among visitors, at 'destinations' like hospitals or shopping centres, and so on.

2.Targets – what do we want to achieve

In 2004 Cairns et al. in the UK coined the phrase 'smarter choices' which covered many of the approaches already used widely in Australia (e.g. Brög et al. 1999; Ampt and Rooney, 1998) and set the stage for guidance on measuring the many possibly outcomes of travel behaviour change programs.

When setting goals for their programs, most in Australia defer to a version of this guidance produced in the UK. The key document for Australia is the Australian Transport Assessment and Planning (ATAP) guidelines (2017) and for NZ is the Monetised Benefits and Costs Manual [MBCM](2020). Both of these include a range of costs and benefits. However, in both cases the focus is on the degree to which a travel behaviour change program produces mode shift away from the car.

For example the ATAP Guidelines (2017) note that :
> The objectives of the proposed initiative are to reduce pressure on road capacity and the environment by reducing car use and to encourage people to choose active travel modes such as cycling and walking for some trips, complementing other programs promoting the health benefits of increased physical activity.

Similarly in the NZ MBCM (Waka Kotahi NZ Transport Agency (2020), evaluations are based on diversion rates from car to alternative modes. This document also goes on to imply that moving from an existing travel behaviour requires that people
> 'experience a higher level of benefits as a result of the (change) activity. However, upon changing their travel behaviour, the users must also forgo the benefits of their previous travel behaviour in the do-minimum, which offsets the increase in benefits after the change. Therefore, the transport system users who change their travel behaviour receive only an incremental increase in benefits between the do-minimum and activity scenarios.

The rule of half assumes that, on average, transport system users will receive half of the incremental benefits after changing their travel behaviour.' (p.21)

Most jurisdictions take from these guidelines that:

- Reducing car use is measured by changing to other modes - specifically public transport and active transport (the main modes of which are cycling and walking, but can also include scooters, e-scooters and so on).

This means that if there is good data on mode use before and after an intervention, it would be expected that the number and possibly distance of car trips would go down while the number (and distance) of other modes would increase.

The relevant question however, is – what do we want to achieve? It is argued in this paper that if we want to achieve reduction in car use, we need to specify what we want to achieve in a more sophisticated ways than 'we want to achieve mode shift' for the reasons outlined below.

Using the simplistic measure of mode shift may well provide an indicator of change, but it is unlikely to be what a program actually aims to achieve. More likely the actual goals are:
- To reduce congestion
- To reduce emissions and their contribution to climate change
- To reduce time spent travelling cars – for well-being reasons
- To reduce car travel for safety reasons, or to develop better community spirit… and so on.

All of these have the one basic goal - 'to reduce car kms' as it is argued below that 'reducing car trips' does not always achieve the above goals. While this can be achieved by changing mode, it can also be done in many other ways. And the important characteristic of the complementary methods of reducing car use is that they are often much easier to achieve than a change of mode.

3.Travel is done to access activities

But first it is important to understand why we travel. Although some travel is desired for its own sake (e.g. Mokhtarian PL and Salomon I (2001)) this is rare. Travel is usually done to access an activity that is considered an important part of day-to-day life. As economists would say 'travel is a derived demand'. This refers to demand for one good or service in one sector occurring as a result of demand from another. Users of transport are primarily consuming the service not because of its direct benefits, but because they wish to access other services (Charles, P 2010) .

This understanding is important when considering ways to reduce car use. It is not just about getting to the same places in different ways – but about thinking about accessing activities in different ways – at the same time as reducing car kms. In order to access (i.e. take part in) activities in a different way, there are many options:
- they can be accessed by a different mode of transport
- they can be done by someone else (in a car or not) as part of an existing trip
- they can be done by the same person as part of another trip (often called trip chaining)
- they can be done at home (e.g. working from home, having phone or face-time or Zoom conversations)

- they can be done at a different location (closer to home or somewhere else a person was going to in any case – this can sometime also mean a change of mode – such as walking from work to an activity usually accessed by car),
- by accessing online information – people can avoid trips at times when shops are closed, or a good is not stocked, and, if the aim of a program is to reduce congestion, they can also be carried out
  - at a different time of day and
  - via a different route

Transport planners have attempted a summary of alternative ways to reduce car use and congestion – often called the 4 Rs. These are used throughout the world as travel demand management strategies and can be summarised by TfNSW's marketing strategy (Transport for New South Wales 2017):

- *Remode* – Customer Message: Use public transport (or alternative modes) as driving may no longer be your best option
- *Retime* – Customer Message: Avoid travel during the peak.
- *Reroute* – Customer Message: Use preferred driving routes where possible.
- *Reduce* – Customer Message: Minimise the number of times you have to travel, especially by car.

At least two of these four, however, are only applicable when the target includes reducing car use (kms) during the peak (retime and reroute). Using these four alone tends not to make clear some of the key options for reducing car use listed earlier.

By focusing on achieving the activities a person wants to include in their lives, rather than on the mode of accessing them, it is much easier to plan programs that achieve the goal of reducing car use. Most importantly, it is also much easier for people to make changes that readily fit into their lives – and are hence sustainable over time.

Figure 1 shows a way of thinking about options for change which puts activities ahead of modes.
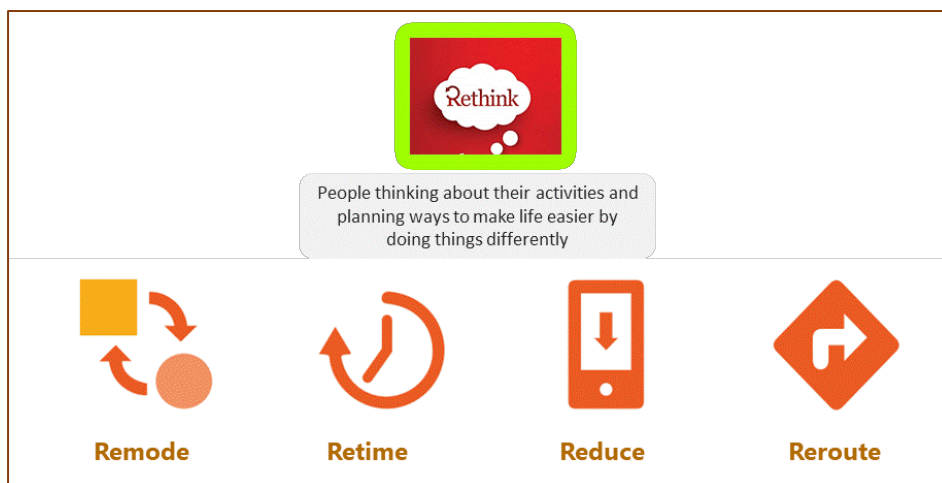

Figure 1: Activity-focused options for reducing car use

When programs with the aim of reducing car use begin by focusing on the activities people want to carry out it allows people to choose from many options, depending on their own needs and most importantly allowing them to make choices that overcome aspects of their activities which they find frustrating (see Section 7).

4. The complexity of car use

Up to now this paper has focused on a broad target of 'reducing car use'. However it is important that programs define their project aims more specifically than this – and that they realise the complexity of 'car use'. For example, there are several ways that car use can reduce, e.g. number of kms per car or per region, distance travelled by car, number of single occupancy car trips. And each of these has contexts – is it car use in peak periods, within a certain area (e.g. the CBD), by people living in a defined area, by people passing through a defined area and so on? Each of these also has different impacts, different measurement requirements and different ways of defining targets.

For each of these targets specific data is needed. For example, it is vital to separate between car driver and car passenger trips or kms. Here are examples from a past project (DPTI, 2009) that illustrate the complexity of car use and the need for clarity of definition.

- Car driver trips/kms went down and car passenger trips/kms went up because people in the same household began sharing rides
- Car driver kms went up for one household because a driver picked up a passenger on the way to work - but they became zero for the other household.
- Car driver kms went down because parents bought their son a new car – and he was able to drive (car driver) to his football games in 2 trips (there and back) instead of 4 trips as car passenger (a parent dropping him off and picking him up).

Without clear definitions there can be unintended consequences. For example:

- Car driver trips remained the same, but car passenger trips went up because a public transport user was picked up in a program encouraging car sharing.
- Vehicle driver trips in a community can increase if online shopping and deliveries are done inefficiently.

This reinforces the need for programs to have clearly specified goals

5. How often is mode shift an option?

Given the existing infrastructure for public transport, cycling and walking, in many cases a change of mode to access activities (in their current locations) is simply not an option. As part of planning for recent travel behaviour change programs in Bassendean in Western Australia, and the Sunshine Coast in Queensland[1], a technique called *potentials analysis*[2] was used to measure the proportion of current car driver trips from home which could be made by another mode (walking, cycling or public transport).

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[1] Unpublished data from projects carried out by the author and colleagues for Department of Transport, Perth (2019) and Sunshine Coast City Council (2020).

[2] *Potential's analysis* is based on Werner Brög's situational approach where he argued that even if, for example, a there is a bus running from a person's origin to their destination, it may not suit the situation (e.g. timetable not appropriate, cannot carry people or goods) for an existing trip at a certain time of day. (Brög, W. 1982). Hence the potential of mode shift for that situation is zero.

The method considered actual availability of modes for each person at the time of the existing trip (e.g. availability of a bicycle, ability to walk the distance, measured distance to the nearest public transport stop that would be needed to make the trip) as well as people's knowledge of using alternatives (e.g. do you know a route you could cycle, do you know if there is a bus/train you could catch for that trip?). Finally if all the above tests pass, they are asked a question on willingness to use an alternative mode.

The surveys showed that the potential for mode change from *existing* home-based car driver trips was extremely low (Table 1).

Table 1: Potential to change mode for existing car driver trips from home

	Public transport	Cycling	Walking
Bassendean, WA	1%	2%	2%
Sunshine Coast, Qld	1%	2%	5%

This is not to say that mode shift cannot be achieved by travel behaviour change programs but that it is often very difficult or impossible *with the current trip patterns (purpose, time of day, origins-destinations etc.)*. When programs are based on the understanding that mode shift is not a possible option for many people *under current circumstances* it is possible for the programs to focus more on helping people to understand changes that are pre-conditions for a mode shift (if that is a preferred alternative). These conditions include:

- changing the location of an activity so that a mode change is possible (e.g. walking distance or on a public transport route)
- changing the time of day of an activity so that a mode change is possible (e.g. from night to daytime if stranger danger is an issue, or at a time of day or week when public transport is an option).

When this approach to behaviour change was used in one-on-one conversations in Bassendean, there was a self-reported increase in train use of 27%, bus use of 14% and bicycle use of 20 %.

6. Why do people change travel behaviour?

The above data not only suggests that focusing only on mode change is counterproductive, but it could also seem disheartening to organisations aiming to achieve behaviour change to reduce car trips.

Hence it is important to review lessons from past travel behaviour change programs. To simplify, there are basically two approaches:

- one based almost entirely on encouraging and rewarding behaviour change (often focusing on mode change) – often based on social marketing, e.g. Haq et al 2008)
- one beginning with encouraging people to find changes that overcome existing undesirable aspects of current travel behaviour (e.g. Ampt and Ashton-Graham, 2013)

When people are asked to consider which of their current car trips they would like to avoid – and to consider ways to change this, there is not only a higher rate of change (than if they are

asked to consider changing modes), but the change is also likely to be longer lasting – given that they are rewarded by the removal of an activity/trip they do not enjoy. This is an interesting contrast to the assertion that 'people forgo the benefits of their previous travel behaviour' (MBCM, 2020) and is likely to underpin a very successful approach to changing travel behaviour.

7. People's ability to make choices

There is also evidence that people can make choices that reduce car kms and trips without changing mode.

7.1 Working from home

The most significant of these is, of course, the large scale move to work from home during the COVID pandemic in Australia and elsewhere. While this was initially rarely a 'choice', figures suggest that two in five people with a job (41 per cent) worked from home at least once a week in February 2021, compared with 24 per cent at least once a week before March 2020 (Australian Bureau of Statistics, 2021) – and that 33% imagine they will continue that trend (Australian Bureau of Statistics, 2020)

7.2 Other supportive evidence

In the course of four focus groups as part of a project in the Sunshine Coast (31 participants), people were asked for specific recent trips which they had driven to by car if they could have done this differently.

People in these groups came up with many alternatives to a mode change which are discussed below:
- Planning – linking trips and using lists
- Sharing
- Doing things in different places (including moving house or work)
- Deliveries and other non-driving alternatives
- Changing mode

Planning ideas – lists and trip chaining
One of the most immediate ideas that came to the mind of many was based on the fact that many perceived trips to do something they forgot as frustrating. The simple shopping list or a list of activities was often the solution.
- *I could do better planning. I'm always forgetting something, so I hop into the car (just a couple of minutes while walking is 20)*
- *A shopping list is what I need. It would cut down on grocery shopping more.*

Other people realised they could reduce the frequency or trips (and distance) by simply combining things on one trip. While this seems obvious, the just-in-time behaviour we have become used to (and the speed of a car trip) have often made these things less obvious
- *I could coordinate small things together, like go to Bunnings and then shop on the way home*
- *I could do more things in one trip, then there'd be no need to go out the next day. I could do other things when going to volunteering in Maroochydore*

- *I already walk to work a lot. But on the days I drive I could do groceries on my way home using the Woollies app and direct to the boot. You call in they take it out to your car and its like 5 min. That way I could fit it in after work.*

And a further solution which would also benefit community connectedness would be to ask neighbours. This relies on knowing (or getting to know neighbours) which is often a target of behaviour change programs.

- *If I ran out of sugar or salt, I could ask a neighbour. It would work in our small town.*

Longer term solutions also require planning but suggest another opportunity for travel behaviour change programs:

- *…… I could also grow my own veggies and use that as a substitute for one trip*

Sharing
Sharing a ride was considered relatively easy for some people – it still allowed the use of a car for many of its benefits, but also reduced the number of trips and kms made overall.

- *I could ask my roommates if they want to come with me when going to shops.*
- *I could rideshare with teachers (at the school where I teach) living in the same area as me*

Doing things in different places
Getting people to think about activities also allows options of changing locations for some activities. This can be done in the short and long term – choosing local shops or choosing new workplaces of homes.

- *If I did my gym sessions after driving to work in Chermside it would eliminate the need for Buderim to Maroochydore on one day*

- *Not everyone can do it, but I choose to live where I do so I won't need to use my car. I don't like traffic, so I prefer not to drive for day to day.*

- *I moved down to Brisbane for work for a while - you can relocate and avoid driving*

Working from home was of course mentioned, but using the activity-thinking approach led one person to realise that she now actually travels longer distances by car to a childcare centre she had chosen to be close to work. More imaginative ideas – like alternative workplaces closer to home were also considered.

- *Of course, I already work from home now but that means a longer drive to drop off and pick up my child – so I'm going to choose a new day-care centre closer to home*

- *I don't like working at home. My office is shut so I'm looking at serviced offices near me.*

Deliveries or non-driving alternatives
Technology allows other solutions – not only for groceries, but also for other services such as health.

- *Get groceries delivered, one truck delivers all groceries for multiple people.*
- *I could think telehealth because a lot of times they just talk to you so*

Someone else picks something up as part of an existing trip
Another solution which avoids both car trips and kms but keeps the car as the main mode are to get other people to trip chain as part of an existing trips. This can work well in the workplace and in small towns of close-knit communities.

- *We do that at work*
- *We do it with our friends in Maleny give notice to friends and neighbours that we're going to Bunnings*

Changing mode

Of course, changing mode was also an option for some – and once they were thinking about their activities, they realised that using the car also carries with it time conditions that are often overlooked.

- *I could walk to the post office or IGA rather than driving. I would only take me minutes. It probably takes me longer to take the car out of the garage.*

No one mentioned public transport as an option, and while several people mentioned cycling none of these thought they would actually do it.

Summary

While these indications are simply from four focus groups two things suggest that results might be replicated elsewhere:

- when asked if there was a way to use the car less (not – 'could you use an alternative to the car?' mode shift was the least likely answer
- almost all participants suggested non-mode shift alternatives as their first answer.

It is recommended that a similar method is tested by other practitioners and policy makers in different regions. Ideally a question on the proportion of daily or weekly car trips that would be affected should also be asked.

8. Implications for policy makers and practitioners

The considerations in this paper suggest that while mode change is often the key goal of travel behaviour change programs it has several drawbacks:

- Unless the goal of a program is actually mode shift (e.g. to get more people to use a bus fleet) it will rarely ensure that the actual targets of a travel behaviour change program are being achieved
- Many people find changing mode away from a car the most difficult of all travel behaviour changes
- It is not a necessary goal to achieve travel behaviour change.

The paper also shows that people are able to identify trips to activities which they do not enjoy and would like to change. Furthermore the qualitative evidence suggests that people can readily find alternatives that reduce car kms but do not involve a change of mode.

Another important lesson is that policy makers need to clearly identify what they want to achieve as this is critical to establishing evaluation and monitoring protocols, including the metrics of change.   If the aim is to reduce car driver kms, the measurable change is car kms – not mode shift. If the aim is to make buses run more efficiently by having more passengers, change in bus patronage will be the metric – not necessarily mode shift.

Future programs would benefit from considering the multitude of options for reducing car use (kms and trips) without focusing only on changing mode. This could be done in the following ways:

- Including formative research as an initial step before commissioning or at least before commencing a program. During this phase the propensity for mode change under the status quo would be considered.
- Practitioners could include options for focus groups or potentials' analysis type surveys as part of bidding for a behaviour change program, even if not specifically required in the brief.

Using these approaches interventions can focus attention on the most likely ways that people will change in a specific region to achieve the program's goals. It also means that there will be cases where there could be significant reduction in car use without immediate investment in infrastructure.

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