



LOW CARBON LIVING
CRC

Shifting from Car Ownership to Car Usership

Final Report



Authors	Associate Professor Anne Sharp, Dr Sandra Davison
Title	Shifting from Car Ownership to Car Usership: Final Report
ISBN	N/A
Date	June 2019
Keywords	Shared mobility; urban travel beliefs and behaviours; TTM; stages of change; Adelaide transport users, Car ownership
Publisher	CRC for Low Carbon Living
Preferred citation	Sharp A., Davison S. (2019) Shifting from Car Ownership to Car Usership: Final Report. CRC for Low Carbon Living, Sydney, Australia



Australian Government
**Department of Industry,
Innovation and Science**

Business
Cooperative Research
Centres Programme

Acknowledgements

This research is funded by the CRC for Low Carbon Living Ltd supported by the Cooperative Research Centres program, an Australian Government initiative. The authors appreciate their direction during this study and the writing of this report.

Disclaimer

Any opinions expressed in this document are those of the authors. They do not purport to reflect the opinions or views of the CRCLCL or its partners, agents or employees.

The CRCLCL gives no warranty or assurance, and makes no representation as to the accuracy or reliability of any information or advice contained in this document, or that it is suitable for any intended use. The CRCLCL, its partners, agents and employees, disclaim any and all liability for any errors or omissions or in respect of anything or the consequences of anything done or omitted to be done in reliance upon the whole or any part of this document.

Peer Review Statement

The CRCLCL recognises the value of knowledge exchange and the importance of objective peer review. It is committed to encouraging and supporting its research teams in this regard.

The author(s) confirm(s) that this document has been reviewed and approved by the project's Leaders Committee and by its program leader. These reviewers evaluated its:

- originality
- methodology
- rigour
- compliance with ethical guidelines
- conclusions against results
- conformity with the principles of the [Australian Code for the Responsible Conduct of Research](#) (NHMRC 2007),

and provided constructive feedback, which was considered and addressed by the author(s).

© 2019 CRC for Low Carbon Living

Contents

Acknowledgements	2
Disclaimer	2
Peer Review Statement	2
Contents	1
List of Tables	2
List of Figures	3
Introduction	4
Research Aims	5
Research Method	5
Respondent Profile	6
Findings	7
Committed Car Users	7
TTM Stage of Change	9
Case Study 1: Moving from car ownership to subscription	12
Case Study 2: The experience of relinquishing car ownership	13
Conclusions	15
Recommendations in general	16
Recommendations from the TTM	17
References	18

List of Tables

Table 1: Respondent profile	6
Table 2: TTM Pros and Cons related to Car and Public Transport Travel.....	11

List of Figures

Figure 1: Maven share cars at Noarlunga, SA	10
Figure 2: The only sign near Maven share cars	10

Introduction

Background

There were 19.2 million registered motor vehicles in Australia at the start of 2018. On a per capita basis, car ownership continues to rise with the 1955 levels of 153 vehicles per 1,000 people in Australia now at 740 per 1000 people (ABS, 2018). These high levels of ownership and exclusive car usage occur against the backdrop of a growing share economy with new transport operators such as Maven, BlaBlaCar, GoGet, Lyft, Uber and a myriad of share bike schemes all entering the market.

Car ownership clearly remains a deeply ingrained part of Australian society, locking consumers into high carbon emission mobility habits. A high 80% want to own their own car and have exclusive access. Worryingly, this is highest amongst younger people (Charting Transport, 2013).

Vehicle ownership can have a high status factor (Sprei & Ginnebaugh, 2018). Further, cars along with homes, personal jewellery, and hobby items are the objects that are most closely related to identity of the self (Ball & Tasaki, 1992), and have the highest levels of attachment. In turn, attachment has been related to emotional significance, and emotional significance can reflect important memories (Ball & Tasaki, 1992). In marketing, emotional attachment can also be related to the products which consumers purchase (Grisaffe & Nguyen, 2011). Thus, when asking someone to give up their car, or to use their cars less, we are most likely asking them to give up a valued possession with which they may have strong emotional ties and an object that helps support their identity, or how they see themselves.

Private ownership, and the limited capital available for many consumers, means that the Australian private car fleet is highly polluting, whilst alternative shared ownership structures allow higher value and lower polluting models to be utilised. For example, higher cost hybrid and electric vehicles may find a quicker pathway to the market through shared ownership structures.

Awareness of alternative mobility arrangements including vehicle subscription services; carpooling/ride sharing; and peer-to-peer car sharing is still low and with little depth of knowledge of car sharing options available to them (Sharp and Davison, 2019). Consequently, car subscription models, designed to appeal to a consumer that is used to customised, on-demand services, remain a small portion of the overall market. Better understanding is needed of why people feel the need to own a car and how they can be encouraged to transition from exclusive ownership to temporary and/or multiple ownership and/or shared usership. This project investigates this issue with the goal of identifying pathways to lower carbon mobility.

In Adelaide, private car use still remains the highest form of transport used in the Adelaide Central Business District (CBD) and the mode of transport that contributes the most greenhouse gases. In fact, Adelaide's CBD features the highest percentage of daily car commuters of Australian mainland capital cities at 54% (Charting Transport, 2013), making it a robust test market for understanding the car ownership relationship.

As with all human behaviour, the travel behaviours of car owners are complex and can be influenced by many psycho-social processes. For example, emotions influence the purchase and use of products, including cars (McDonagh et al., 2005), and thoughts, feelings, beliefs, self-confidence, personal needs and wants, perceived discomfort or inconvenience, low motivation, intentions, old established attitudes (Zimbardo & Leippe, 1991; Bamberg & Moser, 2007; Watson & Tharp, 2007) could all affect car ownership and use. External processes could also influence car ownership and could include the built environment, influence of others, policies, technologies and financial costs. In addition, habitual travel behaviours, such as regularly using one's own car, can be particularly difficult to change (Garling & Axhausen, 2003), as any behaviour that a person performs consistently is serving a purpose and has positive outcomes.

This project investigates car-related behaviours and the underlying processes that drive them. Concepts from the Trans-theoretical Model of behaviour change (Prochaska & DiClemente, 1983) are used to help identify some of the internal processes related to car owners' travel behaviours.

The Trans-theoretical Model of Behaviour Change (TTM)

According to the TTM, people move through a series of stages on their way to making a behaviour change (Stages of Change) – commencing with a pre-contemplation stage where there is no thought about changing; then moving through contemplation, preparation, and action stages; finally arriving at a maintenance stage where a new behaviour has been acquired and is maintained over time. As they progress through the stages, people come to perceive more 'pros' or personal benefits, and less 'cons' or personal costs related to making a change (Decisional Balance). People will also have, or they acquire, more confidence in their ability to change (Self-Efficacy); and they also use several specific psycho-social processes as they move towards changing a behaviour (Processes of Change). Overall, the TTM relates to thoughts; emotions; needs; self-efficacy; awareness; personal norms; social support; stimulus control and reinforcement; motivation or readiness to change, and behaviour (Prochaska, 2013). Using TTM measures, some of these influences on travel behaviour have already been identified in a recent survey of over 800 Australian car users (for more detail see Sharp & Davison, 2019). This present project expands on those findings.

Drawing on the concepts of the TTM, the present project identifies car owners' stage of change, their perceptions of the pros and cons related to their current car use, and their motivation to change from ownership to alternative options. This specific knowledge can then be considered when developing interventions to shift existing ownership options.

TTM concepts can also be particularly helpful for the presentation of new information to car owners. For example, information can focus on making car owners more aware of their travel options by addressing the cons, or the costs that car owners' currently perceive as being related to the use of alternative forms of transport. Benefits of change can also be highlighted to show car owners how other transport options could meet their needs – or benefits can be identified and increased by governments and policy makers to enable public transport and other alternative transport to better meet those current car users' needs.

Research Aims

This research takes a in-depth look at the relationship people have with cars and their willingness to move away from a relationship of personal ownership. The research involved respondents across a range of car ownership situations including:

- Car owners who do not use other transport
- Car owners who sometimes use other transport but who still rely heavily on their cars
- Car owners who recently started using other transport
- People who have moved away from car ownership

Expected Outcomes

Expected outcomes include

- A better understanding of commuters' behaviour and their internal processes that operate around the ownership and usage of cars.
- Clear identification of the motivations and triggers for car ownership and the barriers to moving from ownership to other relationships such as leasing, subscription, or sole reliance on other transport options.
- Based on behaviour change theory (the TTM), guidance for the future development of marketing messages and interventions to promote movement away from the current high levels of car ownership.

Research Method

The research was undertaken by Associate Professor Anne Sharp and Dr Sandra Davison. Both are researchers with the Ehrenberg-Bass Institute for Marketing Science at the University of South Australia. The research was undertaken in line with the Australian Social and Market Research Society (AMSRS) Code of Professional Behaviour (Associate Professor Sharp is a full member of AMSRS).

The research consisted of ten depth interviews with respondents purposively chosen to fit a range of car ownership and usage scenarios. Interviews were conducted across May and June 2019, in South Australia where there is high ownership and usage of private vehicles (85% reported ownership from the linked CRC research report).

The research covered topics of car ownership outright, leased cars, work vs home car ownership, share car usage, car-pooling, financed cars, multiple car families and single car families, car users who also use public transport, new and long term car owners across a range of price brackets and car involvement levels, as well as car subscription and relinquishment of car ownership when moving into an area with good public transport infrastructure.

Using a depth interview and observational research approach, we sought to identify what leads to car ownership being so embedded, the triggers for movement from this exclusive ownership and the barriers to making this change.

The interviews were transcribed and thematically analysed. Direct quotes are shown in italics to bring the reader closer to the findings.

Respondent Profile

Six females and four male car owners were interviewed. Ages ranged from 21 to 66 years. The spectrum of respondents in terms of age, sex, profession, household situation and car ownership is shown in Table 1.

Table 1: Respondent profile

Respondent	Sex	Age	Profession	Status	# Cars in HH
R1	F	20s	Registered Nurse	Married, 1 infant child	2
K1	F	40s	School Psychologist	Married, 2 teenage children at home	2
L	M	20s	Uni Student and part-time worker	Single (lives with grandparents)	2
K2	F	30s	Unemployed	Single, 2 primary school children at home	2
R2	M	60s	Retired security guard	Married, no children at home	2
T	F	60s	Retired social worker	Single, lives alone	1
C	M	50s	State manager, retail	Lives with partner	2
M	F	50s	Shop assistant	Single, lives alone (Mother of K2)	2
N	F	20s	Museum curator	Lives with partner	0
P	M	40s	Investor and entrepreneur	Married, 2 children at home	5

Current Car Ownership Details

Eight of the ten interviewees had two or more cars in their households. Six were living with a partner who also owned a car. Two interviewees were single females in single households who each owned two cars. Interestingly these two were a mother and daughter who came from a family where cars and the mechanics of cars played a dominant part in family life, showing that family history may influence later transport behaviour.

Distances travelled annually varied from 2,000 kilometres (for a single female, K2, who used her car for work and visiting family in her local area), up to 20,000 kilometres (for a retired male, R2, who frequently holidayed in various places around Australia). Overall, 10,000 kilometres was average for the other car owners who were interviewed, which is about the Australian average.

Model and value of cars varied. No patterns emerged and the time before a car was replaced varied. When owners simply believed it was time for a change, or it was time for a car to be replaced, were the most popular responses and no clear reasons were stated.

The number of cars owned during the respondent's lifetime varied for interviewees. L at 21 still had his first car; 29 year old R1 had owned four cars, while R2 at 62 had owned 13 cars. Age was not a factor for two owners who came from very car and mechanical family backgrounds – K2, who was 31 years old, was adamant that she had owned 70 cars while her mother M at 57 years of age had owned at least 20 cars. One respondent, P, owned cars for both business and private use. One respondent, N, had recently relinquished her car when moved into the CBD.

Findings

Reasons for own car use

All nine respondents who currently owned one or more cars considered that cars were a very important part of their lives. Although shopping can now be undertaken very easily on the internet with goods and groceries delivered to the home, almost everyone stated shopping was one of the main reasons for using their own car. Private cars were used for work by most people, and those with children noted the importance of having a car for the family - for transporting children to school as well as for emergencies or to travel to medical appointments. Cars were also important for holiday travel, with one respondent owning a holiday home on the coast they used their car to travel to, as well as to transport their dogs to the beach for exercise. Even those without children at home were reassured to know that they could have immediate access to their own car in the case of any emergencies.

Amount of car use

The interviews revealed three main types of car users -

1. Eight 'committed' car owners who relied completely or mostly, on their own cars.
2. One car owner who had recently started using public transport.
3. One respondent who had relinquished car ownership completely.

The three types of car users are analysed in separate sections hereunder in order to better identify the influences leading to their ownership views and behaviours.

Committed Car Users

Eight car owners were considered to be committed car users. These car owners regularly used their own cars for all their travel (R1, K2, R2, and M), or for most of their travel (K1, T, C and L). For example, M had relied exclusively on her car for travel for the past twenty years. L, a student, did take a train to his casual workplace in the city a few times a week but still drove his car to a nearby station although he had other options (bus, walking), and he used his car for most other activities, while C used a free bus to take him to football matches in the city area, but still used his car daily for work and all other travel.

Family car use

Many factors may contribute to why car ownership is so strong and why owning a car is perceived as a normal part of life. Past family car history appeared to play an important role for the eight committed car users. For example, R2 agreed that most people have grown up with cars and they have become part of everyone's life, also stating:

It's just one of those things that you've grown, I guess, to expect over the years. And a vehicle has always been there.

For most, a family car had always formed some part of their life, from childhood as passengers to adulthood when they became owners themselves.

Two people had always been driven to school and three had sometimes been driven to school. All could recall being

passengers in the family car, often for enjoyable trips such as family visits and holidays, sometimes travelling long distances interstate.

The importance of a family car was recalled by some who grew up seeing one or both parents to travel to work in a family car. Three committed car users came from two car families, and two of those now also had two cars in their own family homes, while the third was L, a young university student who still owned his first car.

M recalled her family's two cars, a Valiant ute used by her father for work and a Holden Monaro her mother owned and drove, were their *pride and joy*. M, a single female, who had owned twenty cars currently owned two cars one of which she purchased because:

I was just desperate to have a V8 again so I bought it but I've never really taken to it....I'm going to sell it.

K1 noted that in her childhood the family car tended to be seen as a status symbol:

I think when we upgraded our car it was a big deal. I think we felt a bit superior when we upgraded.

Interestingly, K1 stated her own first car was *different to most*. Her present car was also the newest car of all those interviewed. In 2018 when K2 purchased her latest car, a 2017 Suzuki, it was a newer model than she had intended to buy. Perhaps to some extent K2 also viewed her car as a symbol of her status.

Interviewees' other family car experiences

Some committed car users could recall fond early memories of their family car - going on family holidays which were often to other states of Australia, local picnics, being taken to school or sporting events. Learning to drive was another pleasant memory, as was K2's family experience of watching and learning from her grandfather and uncle who were car mechanics. Quite possibly these early pleasant memories were a source of motivation to own cars of their own. Certainly in the case of K2, and her mother M, the family history of mechanical skills was relevant as both appeared to be quite mechanically minded. Both had owned many more cars than any of the other people interviewed and both currently owned and drove two cars each, although both were living in single member households.

R2 drove the family car when he lived at home as an adult and appeared to have fond memories of some past family cars. He recalled:

There was a particular vehicle. It was about a 1975 Ford Fairlane my mum was in love with. And there are fond memories of another Falcon, an XP station wagon, which had the ability to go down steps - which was proven at the Kingston Park Caravan Park one night when father took a wrong turn and finished up on the beach!!

First cars owned

All the regular car users could clearly recall their first car and what it meant to own a car of their own. Strong positive emotions were held by most for their first cars, and some also noted how having their first car meant positive changes to their life style.

- R1 - *I loved it* (even though this was her Dad's old car and it only lasted about one week).
- K1- *It was really cool like a nice car that was different to most of the girly cars at that time. It was a nice green and I was pretty chuffed to get it.*
- L. recalled feelings of freedom and having more control of his own life, stating *yes, it was a pretty major change to my life.*
- K2. *I wish I still had it....(the passion expressed on her face was visible when she spoke about this first car). Corollas were everywhere, but to me I loved it. I still loved it back then even though it was rusty....and I could be more independent.*
- R2. *It was terrific.....I had a lot of pride in that vehicle.....I would polish it and I looked after it well. It had leather seats and was in brilliant condition....It gave you a marvellous sense of freedom and you weren't reliant on anybody to go from A to B.*
- T. *It opened a lot of things – I was able to live away from home.*
- C. *Oh yes (it changed my life), it gave me a lot of independence. A lot of ability to go out and see friends.*
- M. *Ah, I loved it.*

Car users who expressed very positive emotions related to their first car also held similar positive emotions for their current cars. The attachment that is formed between car owners and their cars is obviously a long-standing attachment which could make it difficult for car owners to give up their own cars, or even to use them less.

Thoughts about current car

Quite strong positive emotions related to their current car were expressed by a majority of the committed car users, suggesting that for them a car is a valued asset and one which would be difficult to give up. Four expressed that they loved their current car, two were happy, while two considered their car was just a car that could get them from A to B. The two people who owned two cars were both intending to sell one of these. One also expressed some regret at having to do so - K2 stated it would not be easy to sell her second car, as she loved it, but she believed it was too expensive to keep. K2 thought so much of this car that she hated to drive it as she was scared *people would dent or trash it.*

Thoughts about an ideal car

Past research has noted that one advantage of using a share car is that a person can hire an upmarket car, one more luxurious than they could afford to own. However, when asked to describe what they considered to be an ideal car for them car users' responses were surprisingly ordinary.

Lifestyle tended to dictate what type of car would be ideal for K2. She would personally love a luxury car, but she admitted she was now more family orientated, seeing her ideal car in terms of how it fitted with being a single parent with two children.

Some considered they already owned their ideal type of car. K1 considered her present car was perfect for her and that she did not need a big car. Similarly, R2 thought something similar to his present car would be ideal, while C stated a small sedan and nothing special would suit him. P (discussed in depth in the case on moving from car ownership to subscription later in this report) had two cars that were luxury cars yet he felt as usage situations changed (e.g. city commute versus holiday) then the car he wanted also changed.

Only two committed car users considered something larger or better than their current car. R1 thought any SUV, something bigger than her own car, would be ideal for her. M, a female living alone, was the only person to quickly consider something luxurious – a Ford Mustang.

Features most wanted in a car

Mechanical soundness was the feature most looked for when purchasing a car. However, pleasure and comfort were also considered by almost everyone, with some of these features probably only available in private cars when compared to available alternative forms of transport. Desirable features included music, reversing camera, bucket seats, power steering, a bit of luxury, air conditioning, automatic (R stated '*because we're lazy*'), and blue tooth. Safety features and being economical to run were other features mentioned.

Mechanical knowledge

One male and two female committed car owners considered they had good mechanical knowledge and all three had at some time undertaken some repairs to their cars while the remainder's knowledge was very basic. Three others had never lifted the bonnet (hood) of their car, and for others if the bonnet was lifted it was only to check the oil and water.

All had their cars regularly serviced. Pride and/or the importance of appearance and regular cleaning were important for six of the eight committed car users, while T stated cleaning was less important now grandchildren were often in her car, and C simply considered appearance unimportant and only occasionally put his car through a car wash.

Knowledge of car expenses

Past research has shown that people are not always aware of the overall expenses of owning a car (Sprei & Wickelgren, 2011) and this was also found in the present research. Only two of the regular car users (T and P) had previously calculated the cost of running her car and appeared quite knowledgeable about running costs. One respondent (T) estimated the weekly running costs at \$30 and her total annual costs \$5,000. P estimated \$1000-\$1500 a month across the two luxury cars he had in his household. K2 had no idea of her car costs and R2 stated he had never looked into any of his costs. Two other owners demonstrated that they had not previously given much thought to their costs. They gave an estimate, then after going over some of their costs gave different estimations – K2 increased her estimate from \$2,000 to \$3,000, while C increased his original estimate from \$2,000-3,000 to \$4,000-5,000.

Some of the car owners noted that fuel was expensive the financial costs, six of the owners did not appear influence the amount of travel people undertook in their cars. R2 stated:

It's just one of those things that you've always done.....we don't think about the cost, you're paying for a convenience.

K2 noted:

Um, I've just been so used to using my car. So I just do really.

Cost was only important to T, a single older female who had recently ceased working, and L who was a young university student and part time worker.

These comments strongly suggest that for many people increasing costs relating to private car use may not motivate people to use their cars less – the benefits of having a car are likely to out-weight any costs, confirming that people are prepared to pay for comfort, speed and flexibility as noted by Steg (2007).

Managing without a car

Most people had not previously considered how they would manage if they did not have their own car. Feelings of stress, complete chaos, dislike, being restricted, as well as the loss of a car meaning a complete change of lifestyle were mentioned when people were asked how they would manage without their car.

These responses indicate that at present most people have no idea of any alternative transport that could fulfil their needs and keep them in a positive frame of mind. After consideration, three people suggested they could ask someone else to drive them – thus still indicating they would not consider transport alternative to a car. One person simply could not think of any alternative at all while other responses were using Uber or a taxi, walking, public transport if really necessary (with K2 stating public transport ‘*would not be fun*’).

In addition, car owners were asked to rate how likely they were to still own a car in five and in time years’ time. A Likert type scale was used with 0 = not at all likely to 10 = extremely likely. Six of the eight committed car owners stated they were extremely unlikely to be without their car, (a rating of ten) while two others considered this a slight possibility, with ratings of eight. Results here indicate that most people are not intending to give up their private cars. These results are also somewhat similar to recent past research where an online survey of car owners and users (Sharp & Davison, 2019) showed that forty-three percent of car owners were not at all likely to sell their car if they could save \$5,000 annually, with only four users in that study indicating they definitely would give up their car.

Environmental knowledge and concern

When car owners were asked if they thought driving a car had an effect on the environment, responses varied, and only two owners stated a definite ‘yes’ (K1 and L) as noted below. In contrast K2 and T seemed were quick to identify sources other than their own car as being environmental problems, while others were a little vague but did slightly agree to a relationship.

- R1 – *No I don't see it, but know it's not that great*
- K1 – *Yes and that is why I have a smaller car*
- L – *Yes definitely*
- K2 - *Yes there is definitely a lot of crappy cars out there...you have to switch lanes to get away from them*

- R2 - *In hindsight, I can see a relationship*

- T - *Well, most of the cars actually are better now. And I think that needs to be said because with the fuels people use now they're much better than they used to be. And also the roadworthiness of cars....it is better. (However T did agree that the number of cars on the road, and ‘tyres and things’ could be an environmental problem).*

- C – *I occasionally think about it, but not very often*

- M - *It's probably not good for it*

Only one car owner clearly stated the environment was personally considered when they travelled. Most stated a clear ‘no’ with two comments especially noted:

K2 – *Not really, my car's not smokey like smokey, crappy cars.....No absolutely not (car emissions do not worry me).*

T - *Well I don't fly anymore*

Interviewer: ‘This the car we’re thinking about here’.

T – *Not overly. Because I know I drive a car that's well maintained. And also where I have it serviced they charge for waste products. You pay thirty dollars or something and it goes towards recycling and all that stuff*

TTM Stage of Change

According to the TTM, knowing a person’s stage of change can be helpful in designing and delivering strategies and interventions to change a behaviour (Prochaska, 2013). In order to assess how likely they were likely to change to using transport other than their car, the eight committed car users were asked to respond to a TTM algorithm (as presented in Figure 1).

1. I’m not intending to use some other type of transport, rather than my car (pre-contemplation stage)
2. I have thought about using other transport (contemplation stage)
3. I’ve seriously considered using some other type of transport, and I plan to do so very soon, say within the next few months (preparation stage)
4. I do sometimes use transport other than my car, but not on a regular basis (action stage)
5. I do use transport other than my car on a regular basis (maintenance stage)

Two car users placed themselves in a pre-contemplation stage of change indicating they never considered alternative transport to their own car; while two were in a contemplation stage, in that they had thought about using alternative transport. Three people considered they did were in an action stage of change in that they did sometimes use alternative transport (although in most cases the use was considerably less than their car use). L placed himself in a maintenance stage of change as he did regularly use a train for transport to his workplace in the city.

Motivation to Change

Seven of the eight committed car users showed no motivation to move away from their cars and most were quite strong in their voicing their negative responses. These responses make it difficult to discover the type of alternatives to car use that

may attract attention and be seen as useful by the general public. Only L considered that future increased running costs could be a motivator. L believed he would increase his train use if the current train services could be improved to meet his needs – for example, for weekend travel to work. L’s beliefs about his future travel requirements were in keeping with the concepts of the TTM and a person in a maintenance stage of change.

Current Car Sharing

While most committed car users sometimes travelled as a passenger in family cars, only L sometimes travelled in a friend’s car for social reasons where everyone took turns in sharing their own car with their friends.

Seven of the eight committed car owners had used Uber, mostly only once or twice, and two had not arranged the service themselves. C used Uber regularly (if out drinking, or for transport to the airport) and L used the service twice a month (if out drinking). Not driving one’s own car if out drinking socially was the main reason for the use of Uber. Everyone who had used Uber considered the service to be good, or great. The only negative comments came from R2 who had no experience with Uber - he believed some drivers could be problematic and that using the service would be dangerous.

No one interviewed knew about car sharing that was available in the city (GoGet cars); or share cars. Two Maven share cars are available for use in a large southern suburban train station and shopping precinct (Noarlunga Centre). Yet, although the centre was well known to all, and in very close proximity to most of those interviewed, no one had noticed these share cars or knew anything about them. In the case of the two available Maven cars they are within easy view on a busy road that is adjacent to the train station and right beside the shopping centre (see Figure 1). However, it is noted that there are no visible signs beside the cars to specifically indicate what service they provide or how they can be accessed (Figure 2) – rather, the signage relates to public transport options. Better street advertising is something that may help people in the area to become aware of Maven. More information delivered to the public may help people ascertain if the share cars may be able to meet some of their own transport needs.



Figure 1: Maven share cars at Noarlunga, SA



Figure 2: The only sign near Maven share cars

Once the Maven cars were explained to the committed car users, four people did express interest in these types of share cars, and in being given more information about the Maven cars. All four also stated they would like a trial of the cars at some time in the future if this could be arranged. Arranging share car trials was outside the scope of this research project.

While attitudes and beliefs can influence behaviour, (Zimbaro & Leippe, 1991), research has also shown that in some circumstances a behaviour can be a positive influence and help change established beliefs (Ajzen, 2001). Thus, arranging trials of relatively new transport options such as the share cars, and also for public transport travel (for those who hold negative views about public transport), could very useful strategies to implement. Offering free trials of new travel options could be introduced - firstly in future research, and secondly in campaigns directed at the general public

Public Transport Use

Two car owners had used public transport in the past week – L for transport to work in the Adelaide city area, and C to attend a football match. L preferred travelling by train into the city due to that being easier than coping with traffic and parking.

Only one person, R1, was interested in receiving more information about public transport – timetables and routes. Most considered public transport would as much as double the time it took to reach the same destination in a car. This was unlikely to be correct for at least some forms of transport such as the trains.

K2 knew public transport was close by her home but had no idea how to catch a bus or train. She held a firm belief was that public transport, Uber and taxis were all expensive, especially for a family as in K2’s case where her and two children would be travelling. Time was an additional factor as K2 stated public transport would take at least twice as long for her children to go to and from school, and to accompany the children them would mean four trips every day for her.

M was aware of a bus stop only three houses from her home but had never travelled in a bus. For most of her travel she considered a bus would take well over twice as long as a car.

Pros and cons of car use and public transport use

Prior to seeking what car owners perceived as pros and cons of using any type of alternative transport, several different options had been discussed and, in some instances, explained (Uber; Taxis; GoGet and Maven share cars; public transport; walking). However, when the car owners considered the pros and cons of alternatives the focus was clearly on trains and buses. This was despite some people having used Uber and

taxis in the past. Table 2 lists perceived pros and cons of both car use and public transport use.

Table 2: TTM Pros and Cons related to Car and Public Transport Travel

Pros (Advantages)	Cons (Disadvantages)
<p><i>Related to Owning a Car</i></p> <p>Most important advantage Convenience (five responses) Easiest form of travel In emergencies can just grab the car and go Provides freedom in life Provides independence</p> <p>Other advantages noted Can transport equipment, for work or private (three) If needed, own car is immediately available (three) Do not have to plan, no travel restrictions Can take your own car in an emergency situation – just grab it and go Can get the children urgently from school if needed Saves the stress of using public transport Can estimate travel time – you know when you’ll get there Can do what I want when I want Can go directly to a destination Can immediately get to a shop to purchase something needed Eliminates the need for more than one type of transport</p>	<p><i>Related to Owning a Car</i></p> <p>Most important disadvantage Financial cost, specifically stated as - Costs in general (two responses) Fuel (three) Registration, insurance (two) Services Upkeep Running costs</p> <p>Other Disadvantages noted Possibility of road rage</p>
<p><i>Related to Public Transport</i></p> <p>Not having to worry about parking in the city (two) Cheaper than a car so could save money (three) Could save money and use that for things for the home Maybe not have own car and then use husband’s car on weekends Could be handy - provided transport went express right to the door of an appointment Stress free travel No advantages at all (two)</p>	<p><i>Related to Alternatives (Public Transport)</i></p> <p>Not flexible; not as convenient as a car (three). Public transport takes longer (two) as much as four or five times as longer to get to work than with my car Unable to estimate travel time Not readily available for any family emergency. Cannot carry a lot Public transport is more expensive than a car, especially if you have children Buses and trains are smelly Not safe - full of strangers and a lot of feral people who do gross and silly things Would be too scared – have heard many stories about trouble makers on trains Not as comfortable Would still need a car –own or someone’s - to reach train stations at beginning and end of most journeys Dislike of being with other people. A loss of desired independence None seen, just prefer own car</p>

Case Study 1: Moving from car ownership to subscription

This respondent grew up in a family where cars were seen as a status symbol and where his Dad had had “a passion for cars” that he shared. The respondent was very familiar with the buying and selling of vehicles, estimating that he had owned over 20 in his life so far, acquiring his first one at just 16 years of age. He had also had a range of ownership relationships with cars including leasing, renting, financing, and owning outright. He is now considering a subscription service rather than outright ownership with Carbar.

The respondent lived with his wife and two children and they have four cars in the family currently – two of which are for restoration as BMW classics.

I don't see it (the BMW) as a car. It is craftsmanship, not a mode of transport. I don't see it how I used to see vehicles.

So, there are two distinct mindsets around the vehicles. One is for ‘classics’ and one is for the cars that are seen as working vehicles. They have a luxury car (an Audi his wife drives) and a four-wheel drive (Landrover Discovery), each with specific roles in the family.

Cars are a depreciating asset.

He was currently looking at subscription services for his family, to meet their car needs and replace the four-wheel drive. The trigger was he was looking at Carbar for work reasons (for a worker who was on a short-term contract). He noted that, while he owned the two current cars, he had done a whole range of other ways to access cars including renting and leasing in his time.

I can see a really slick model where I have a four-wheel drive every long weekend and swap it out for a city car in between. I'd do that in a shot. As much as I like driving a big luxury around the city, it is a bit over the top.

He no longer felt concerned about the lack of personalisation that was available with a car that was not owned outright, although this had bothered him in the past (not having a roof rack etc) and was a barrier to adoption. This showed an interesting mindset shift in how he viewed a car and its role in his life and what he could expect from it.

Nowadays, I just care about getting on the road and being safe and getting up to the shack and back and not having to think about it too much. I'm not precious anymore.

He currently outsourced all maintenance of his cars, even washing. He did not use many share economy mobility services, only Uber when travelling outside the region. He knew the finances of his current choices both business and personally.

I have raw numbers in my head. I'd say I spend about \$1000 a month on the four-wheel drive and the Audi is half that. This is depreciation and running costs and everything. I'm fine with that and I don't mind what it is spent on (renting or owning).

The respondent had a very rational and economic view of the working cars. He estimated it was about \$1500 a month for all associated expenses with the current cars he had. He was particularly interested in the subscription model as he felt it

would be a cheap option for the age bracket his daughter was in (P plater) as it would under-cost their insurance premium. He was just concerned that the daughter might not develop a driving record of no claims under a subscription model.

The demographic might not be people looking for flexibility it might be people looking to mitigate the insurance premium hike. It will cost me \$2-3K year to insure my daughter and the excess on a Carbar is \$2k.

He was of the opinion that the shifts he was making in car ownership would be widespread and mainstream in time.

I can definitely see me not owning a car in five years' time. My focus is to spend less money spent on depreciating assets and more on appreciating.

The daughter, who was the potential partner in the car, was open to the idea too.

She related to it big time. She has no structure. She would do whatever.

I'd hate her to do the same thing I did which is spend money on something that wasn't going to be worth anything in a year.

He was looking to do the subscription as a three-month trial and had contacted the company which was not yet in Adelaide. His daughter would contribute to the cost through her part time work. He imagined she would use it after school and in the weekends and he would use it during the week.

I'm in an investment phase. What else can I do with that 100K (that is tied up in cars currently). Employees leave and needs change so this is very flexible.

He had had very little other contact and usage of sharing economy mobility services or mainstream public transport. He could only recall taking the train as a child to school. He did not know about GoGet or Mavern share car services. But he had researched the Carbar well. He liked that it was all packaged up including insurance and roadside assist.

Needs change so constantly. You drive past so many businesses with cars just sitting there doing nothing. It really works for business flexibility.

I actually think my dad would do it too.

Case Study 2: The experience of relinquishing car ownership

One respondent had given up ownership (which she shared) of a car two years ago when she moved into the CBD and realized there was no parking for her car at the new property which was shared.

I also didn't really want one. I was working in the CBD and had my bike and it was easy to get around.

Since then she has moved again. She is currently in a household of three where one person who holds the property lease has taken the car park associated with the property, but is prepared to share their car with her and her partner, who also lives there. She has, on numerous occasions borrowed this flat mate's car and paid for this via filling up the car with fuel after use. There is no formal arrangement for this, but she feels that their rent is probably "jiggered a bit" to allow her and her partner to use the car occasionally. She had not considered what would happen if she had an accident in terms of insurance or her housemate's reaction.

I assume he has insurance and that I would pay whatever the gap is, but I have never asked.

This shows her incomplete evaluation of the informal lease arrangement she has made.

She also drove a car at work regularly. She is also exposed to many car owners with approximately half of her friends currently owning cars.

One friend is "I don't know how you live without a car" but I just say it is no big deal.

One interesting aspect about this case is her relatively passive path into car ownership. She brought a car in her teens that was already in the family with her parents and younger brother also contributing towards buying it. This car was passed on from her grandmother, rather than selling it outside the family. She shared the car for several years with her younger brother. When she moved into the city, she gifted this car with her brother and stopped contributing to the insurance and running costs and no longer considers it a car for which she has access.

Maybe that's why I find it so easy now to share a car – I have always shared a car with someone.

She currently viewed cars very much as a tool to get to places and has done no overt calculations of the cost of running a vehicle. She grew up in a family with two cars – a work car her dad owned and a 'family' car her mother drove.

Nowadays her transport needs are met by cycling mostly with the occasional bus and tram and walking if it is wet. She feels no need to outright own a car and had, after reflecting in the two years she had been without one, that

I would prefer not to own one. It makes me not lazy with all the incidental exercise.... But I have thought about it sometimes...but it just feels like an expense that I don't really need to have. I like not feeling as lazy as I did before. Cars are such a money sink. I didn't think about this before (I gave it up).

All this positive evaluation was done post giving up the car not prior, but they were not reasons she relinquished the car in the first place.

She borrowed a car for a month last year when a friend went away and lent it to her and she noticed how much she used the car and felt that it made her lazy. Her re-entry into short term car ownership has cemented her positive attitude to not owning one.

The supermarket shopping was a regular event when she felt she needed a car for but, to get around, this she went shopping with the flat mate and used his car. She did not think the selection was as good with online shopping and delivery options. She uses a backpack and handlebars to be able to carry shopping when on her bike.

She saw not just economic but also environmental and social benefits from not owning a car.

I see so many cars with just one person. It feels awful. I am glad I am doing something about that.

She was interested in a car ownership model like Maven and had downloaded their app and looked at the web site but felt it would be more expensive than Uber which she currently used.

I wouldn't want it sitting there costing me \$15 an hour. There's not much point. It's the whole sitting there I don't like.

It would be great to have a daily rate Maven.

She had also used the scooters such as Lime but more for fun and trialing them rather than as a transport solution.

I think they are a really great initiative. The best thing about them is that I feel safer riding a scooter home rather than walking.

This feeling of safety also extended to her riding the bike in town late at night. The speed meant no one could catch her. The only time she wanted to have a car was when she was travelling back from her mother's late at night where it was easier than using public transport and where she would be slow on foot. She tended to cycle home to avoid this.

My mum is very funny about me taking public transport at night like buses and things.

She had a repertoire of external solutions for this situation including her mother driving her, Uber and another family member dropping her at her destination.

Her partner also had no car. He is a DJ and felt he needed a car after work to carry boxes of vinyl records to and from events late at night. When necessary he uses an Uber. But apart from this situation, he was comfortable with their current non-car ownership status and neither saw any need to change.

On her phone she had the transport related apps of Google maps, Maven (not used), Beam, Ride, Uber, and Sheba (not used).

She felt capable to buy and maintain a car currently, but she would not be sure what would be the *best type of car to buy* and would use her father to help her.

The only trigger she could see for car ownership was if she moved interstate. Having a family (young children) was not seen as a potential trigger.

I do see more and more people moving round with kids in pushers and baskets. I don't see myself getting a car anytime soon.

Overall this interview highlighted that it is possible to own a car and relinquish it as a positive experience. It also highlights how giving up a car may not come about from a fully evaluated rational decision making process, but rather a random event can trigger it. Most of the positive evaluation and attitude formation comes post-relinquishing and forms a barrier to owning a car again. Public transport options are used to form a new repertoire of options to fill the gap of car usage. This leaves the person with a new “normal” of non-car ownership that they are comfortable within.

These findings also highlight the potential link between residing in inner city (CBD) locations and non-ownership of private vehicles.

Conclusions

Although the sample size for the present research was small, the depth interviews gave participants the opportunity to answer open-ended questions and provide more information than is available in alternative methods such as surveys.

The presented data was often consistent, but more nuanced, when compared with other larger survey data obtained by the authors (Sharp & Davison, 2019). For example, both sets of data showed that alternative transport options is perceived to be unable to meet the mobility needs of the public; that most car owners have no knowledge of share cars; and both sets of data revealed that the vast majority car owners were not ready to give up their cars.

Needs, Beliefs, Behaviours

For people with children, public transport is perceived to be expensive and time-consuming if parents wish to accompany young children to and from school. Several people also felt reassured to know their own car was available instantly in case of any emergency. For example, some participants felt that even ambulances take some time to arrive at emergency situations, possibly reinforcing the need for a private car, especially to be available for young children in emergency situations. These are important needs that participants perceived to be difficult to meet by alternative transport such as share cars.

TTM and Motivation to Change Behaviour

Currently, the regular car users interviewed were not motivated to reduce their car use, with only one person (who was in a maintenance stage of change) suggesting anything at all that could help motivate less car use. Similarly, over eighty-five percent (seven of the eight) committed car owners interviewed stated there was no likelihood at all of them giving up their car ownership status in the next five or ten years.

The pros and cons related to private car use and the use of alternative forms of transport - freely mentioned by the eight committed car users in open ended questions – supported the concepts of the TTM behaviour change theory. People who are not currently using alternative transport clearly see more pros, or disadvantages, in doing so. In contrast they are experiencing many more advantages by using their own cars for most or all of their travel. Thus the TTM appears to be a suitable behaviour change theory to apply to transport behaviour, and TTM concepts and guidelines should enhance the strength campaigns and the development of strategies to encourage changes to transport behaviours.

Overall Research Conclusions

Car ownership seems to be a habitual behaviour and an assumed activity. It typically follows on from the experience people have grown up with, and becomes an expected behavior. Disruptions to this ownership path are rare and not triggered from an evaluation of the ownership but rather external event which bring it into the consideration set (leasing a car for work, or moving to the CBD) or forces it (moving to a home with no parking).

This research looked at a scenario where inner-city living meant a car was not needed and when the business leasing model was taken into the private context. In both instances,

the behaviour happened and then positive attitudes to not owning a car formed after the event. This follows the pattern of what we know about how attitudes typically describe past behavior better than predict future and therefore are seen to follow behavior change.

Given that re-evaluation of car ownership is rare and that economic arguments for non-ownership tend to fall on deaf ears, the marketing implications are:

- Don't make economic or rational appeals in communications the main message in communications or focus of program activity when seeking to reduce car ownership
- Help people to form easy and new repertoires of transport options when the owned car is removed from the choice set
- Don't assume sustainability is the key driver for a move away from car ownership. There may be other motives (economic being a strong one) or no real motive, but rather just a forced life event.
- Lack of awareness is the biggest challenge facing a brand that is introducing alternatives to private vehicle ownership models. Therefore, the focus should be on creating mental and physical availability above all else.

Recommendations in general

The present pros (benefits) of private car ownership and use outweigh any perceived benefits of other types of mobility services (see Table 2). Similarly, in comparison to private car use many more cons or barriers are perceived for other forms of transport. Therefore, campaigns seeking to change car ownership will need to place more focus on removing perceived barriers related to alternative models.

It will also be important to present information to car users in a manner that can attract their attention and thus increase their awareness of available alternatives to their car, including the use of share cars – because at present there is little motivation to seeking out information about alternative options.

Because people have little interest in information about other transport options, or because there is little information being distributed to the general public, few people had a good knowledge about the alternative car ownership models that may be available to them. Although the alternative transport options may not meet their need in all situations, more knowledge about what is available could encourage some people to use their car less. Further research is required to understand how to best increase knowledge of alternative mobility services. Given the available evidence, it is not likely to be easy to cut through the feelings of comfort gained from current private car use, or to cut through current beliefs which in turn reinforce current behaviours around car ownership. However, the TTM pros and cons of car ownership and use noted in Table 2 could be used as a guideline when introducing strategies for change.

To some, until the first and last mile (especially the first mile) of transport can be conveniently provided by an alternative to the private car, then the preference of private car use will remain. In the present research car owners were reluctant to use local buses to reach train stations. Others, who considered a train, or were aware of a train, did not actually use this form of transport, still preferring their own car mostly due to time efficiency factors. The few who did use trains preferred to ‘park and ride’ which meant they were still using their own cars for at least part of their journey. While ‘park and ride’ facilities are very useful and do encourage the use of public transport, they are also encouraging the use of private cars.

In the case of car users with families, it seems that using one’s own car is also perceived as being easier, convenient and more economical, than using public transport or shared mobility services. Making other forms of transport cheaper for family use could encourage a change for some. Also, making people more aware of the annual costs of car ownership could be a useful strategy. In the present research it was surprising how many car owners were unaware of the real costs of owning and maintaining their cars.

Most private car owners and users did not consider the related environmental impact to be very important in relationship to their car use – and some had the false belief that their own car travel did not contribute at all to the state of the environment. Increasing environmental awareness may help people consider the environment more than they do now, but it is unlikely that an environmental sustainability focus would bring about any major changes to current transport behaviours.

With many people showing little or no interest in shared transport it may be useful to promote the use of hybrid and

electric cars as low carbon solutions at this time. Certainly car manufacturers are pushing towards more electric vehicles and expecting a big uptake from the general public, with estimates of most car manufactures intending to sell one million electric vehicles annually in Australia by 2025 (RAA, 2019).

In future research, more exploration of people’s emotional attachment to their cars, and how their cars may support their view of themselves may be helpful. The use of a particular car to support identity could vary over time (Ball & Tasaki, 1992). Therefore, following on from the present research, attachment and related internal factors could be useful variables to study further in order to be able to better persuade people to reduce their car ownership.

Research has shown that in some circumstances performing a new a behaviour can be a positive influence and help change established beliefs (Ajzen, 2001), and transport attitudes, beliefs and behaviour have been shown to change following the provision of information along with a free ticket for public transport (Bamberg, 2006). With the knowledge that performing a new behaviour has the potential of changing pre-existing attitudes and beliefs, offering free trials of share cars to car users, particularly committed car users, could be very useful. Some committed car owners interviewed expressed interest in having a free trial of Maven share cars and this could be followed up.

Recommendations from the TTM

For behaviour change to occur the general community first needs to be aware of what options are available. Any information that is presently available is not being accessed by most people. Therefore it will be necessary to find some new methods to develop and deliver more information about alternative transport options to the general public (based on the process of change ‘consciousness-raising’ and knowledge of shared transport options).

Information needs to be in public places that are frequented by current car users, so they can at first become aware of their options. This is a necessary first step in the stage of behaviour change. The present research has shown that there is a segment of the community, albeit small at present, who are considering making changes away from car ownership. More information in public places may help more people begin to consider the alternatives available (based on ‘stages of change’ measures for car sharing and bike sharing).

Information promoting behaviour change will have to show how alternative mobility services can meet the needs of current car owners and users. Encouraging some use of alternative transport modes may be able to start reducing the need for using a car for every trip. It appears from this research that it is unlikely that many people will give up their car completely or quickly - this would be a very long process and one that would need to be undertaken in steps (based on responses to items 3,4,7 ‘decisional balance’; process of change ‘stimulus control’; attitude items 4, 6, 8, 9)

The research confirms that at present the ownership and availability of the car is a stimulus for transport behaviour. If a private car is visible and available then it is going to be used. New, alternative, stimuli need to be available to compete with this (based on ‘decisional balance’ item 10 and habitual behaviour items)

Campaigns seeking to change transport behaviours will need to place more focus on removing the perceived barriers related to car and bike sharing. People may be aware of both the personal and environmental the benefits of changing, however, these benefits are rarely strong enough to outweigh barriers, such as the convenience and perceived safety of using a private car – and the lack of safety of bike use (based on responses to all ‘decisional balance’ and all attitude and belief items).

Almost everyone could use more information about the available sharing economy mobility service options within the city, regardless of their residential location. It cannot be presumed that those near available public transport or alternative transport options will use them – or that they are even aware of all of the available options (based on transport modes used in the past week).

Having alternative, easy to use and convenient transport for people to arrive in the CBD without using a privately owned will be important to facilitate a change of behaviour with a lower carbon impact. While some people are using public transport and a small number consider shared transport, most people still see their car as the most convenient method of travel and the one that can meet their mobility service needs. Eliminating the car out of the ‘first mile’ of a trip, may help people rely less on their cars and help them consider alternative more sustainable modes of transport. At present,

once people are in their cars, then many are likely to continue on with their complete trip, as evident by the large number of private cars entering the CBD.

More research is still needed to investigate car ownership, and the related behaviours and internal influences that at present are driving the use of private cars by the majority of the general public. Talking with more car owners could now help to further expand the data obtained from the present research. More knowledge means more fruitful campaigns can be developed – campaigns that can enlighten the general public to the availability of sustainable transport options and at least make a start at replacing what is at present a strong community need to own a car, and strong habitual behaviours that currently maintain the use of a car for trips for which there are already available sustainable alternatives.

The development, delivery and evaluation of a short campaign that draws on the concepts of the TTM model, and the recommendations presented in this research, could be the next step forward.

References

- Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology*, 52, 27-58.
- Australian Bureau of Statistics (2018). *Motor Vehicle Census*, Australia. Report 9309.0
- Ball, A.D. & Tasaki, L.H. (1992). The role and measurement of attachment in consumer behaviour. *Journal of Consumer Psychology*, 1(2), 155-172.
- Bamberg, S. (2006). Is a residential relocation a good opportunity to change people's travel behaviour? Results from a theory-driven intervention study. *Environment and Behavior*, 38(6), 820-840.
- Bamberg, S., & Moser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psychosocial determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1): 14-25.
- Charting Transport (2013). *The journey to work and the citycentre (Australian cities 2001-2011)*, via https://chartingtransport.com/2013/02/1_6/the-journey-to-work-and-the-city-centre-australian-cities-2001-2011/ Accessed 8 Feb 2018
- Gärling, T., & Axhausen, K. (2003). Introduction: Habitual travel choice. *Transportation*, 30(1): 1-11
- Grisaffe, D.B. & Nguyen, H.P. (2011). Antecedents of emotional attachment to brands. *Journal of Business Research*, 64 (10), 1052-1059.
- McDonagh, D., Hekkert, Plk van Erp, J. & Gyi, D. (2005) (Eds). *Design and Emotion*. <https://books.google.com.au/books?hl=en&lr=&id=vBJqD22G2lkC&oi=fnd&pg=PA378&dq=emotional+attachment+to+cars&ots=NpCsPFgpX9&sig=9fx-PCgVY4k2cOuLr4UOwBQ3lRQ#v=onepage&q=emotional%20attachment%20to%20cars&f=false>. Accessed 4 June 2019
- Prochaska, J. O. (2013). Transtheoretical model of behaviour change. *Encyclopedia of behavioral medicine*, 1997-2000: Springer.
- Prochaska, J. O., & DiClemente, C.C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51: 390-395.
- Sharp, A. & Davison, S. (2019). *Demand for Sharing Economy Mobility Services: The Market, Brand Growth & Behaviour Change*. Report, Low Carbon Living CRC.
- Sprei, F. & Ginnebaugh, D. (2018). Unbundling cars to daily use and infrequent use vehicles – the potential role of car sharing. *Energy Efficiency*, 11, 1433-1447.
- Sprei, F. & Wickelgren, M. (2011). Requirements for change in new car buying practices – observation from Sweden. *Energy efficiency*, 4(2), 193-207.
- Steg, L. (2007). Sustainable transportation: A psychological perspective. *IATSS Research* 31 (2), 58-66.
- Watson, D. L. and Tharp, R.G. (2007). *Self-directed behaviour* (9th ed.). Belmont, CA: Thomson Wadsworth.
- Zimbardo, P. G. and Leippe, M.R. (1991). *The Psychology of Attitude Change and Social Influence*, McGraw-Hill Inc, New York, NY.