Preliminary findings from the first Australian National Survey of Public Opinion about Automated and Driverless Vehicles

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**M. Regan, M. Cunningham, V. Dixit, T. Horberry,
A. Bender, K. Weeratunga, S. Cratchley,
L. Dalwood, D. Muzorewa, A. Hassan**

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Contents

Author affiliations

Author name	Affiliation
Adj. Prof Michael A. Regan, PhD	Australian Road Research Board (ARRB)
Mitchell L. Cunningham	Australian Road Research Board (ARRB)
Assoc./Professor Vinayak Dixit, PhD	University of NSW Centre for Integrated Transport Innovation (rCITI)
Prof. Tim Horberry, PhD	Monash University Accident Research Centre (MUARC)
Dr Axel Bender, PhD	Defence Science and Technology Group (DSTG)
Kamal Weeratunga	Main Roads Western Australia
Steve Cratchley	Suncorp
Leigh Dalwood	AECOM
Desmond Muzorewa	Australia and New Zealand Driverless Vehicle Initiative (ADVI)
Asif Hassan	Australian Road Research Board (ARRB)

Executive summary

The Australia and New Zealand Driverless Vehicle Initiative (ADVI), led by the Australian Road Research Board (ARRB), is a consortium of more than 100 local and international partners from government, industry and academia that has come together to accelerate the safe and successful deployment of partly- and fully-automated (completely self-driving) vehicles in Australia and New Zealand.

In late 2016, a sub-set of members of ADVI's Scientific Research Group designed and conducted a public opinion survey to gauge Australian public awareness, understanding and likely acceptance of partly- and fully-automated vehicles, with the primary focus on cars.

Undertaken across all Australian States and Territories, and weighted for demographic composition, this is the first Australian national survey of national public opinion about partly- and fully-automated vehicles.

Responses from 5263 participants were collected and analysed in relation to their level of awareness of automated vehicles generally, and their opinions specifically about partly- and fully-automated cars: perceived risks associated with them, their willingness to pay for them, perceived potential benefits, trust in them, perceived concerns and likely acceptance.

This report documents the first set of high-level findings from the survey. They are:

- Most Australians are aware of automated vehicle functions, but very few have experienced them.
- The community has concerns about many issues relating to fully-automated cars.
- Less than half of all respondents are willing to pay more for fully-automated cars than for their existing car.
- Most agree that there are many potential benefits from fully-automated cars.
- Most people are comfortable with automated cars controlling most driving functions.
- People are least comfortable with automated cars changing lanes by themselves and following cars ahead too closely.
- People are more comfortable about taking control than giving control to partly-automated cars.
- Most people would like to drive a fully-automated car manually, from time to time.
- Less than half of people think that fully-automated cars could be safer than a car driven manually by a human.
- Females and males think differently about fully-automated cars, on some issues.
- People in different Australian States and Territories think differently about automated cars.

Statistical analyses of the findings by gender, age and State of residency yielded the following findings:

Gender

Females and males think differently about automated vehicles.

- Males were more aware of automated vehicle functions and are more comfortable to allow a fully-automated car to perform all the functions.
- Female respondents were more concerned about all issues regarding fully-automated cars than male respondents.
- No significant differences were observed between male and female participants' willingness to pay for a fully-automated car, perception of potential benefits and likely acceptance of use.

State of residency

People in different States and territories think differently about automated vehicles.

- The Australian Capital Territory was the most aware State and South Australia was the least aware State regarding awareness of automated vehicle functionality.
- South Australia had the most positive perception of the potential benefits of fully-automated cars and the Northern Territory had the least positive perception.
- The Australian Capital Territory and South Australia were most agreeable to using fully-automated cars and Northern Territory and Tasmania were the least agreeable.

Age

Correlations were found between age and awareness, concerns, willingness to pay more, potential benefits and public acceptance of fully-automated cars. However, the effect sizes were found to be small.

- Older people were less aware of automated vehicle functions but more willing to pay more for a fully-automated car.
- Older people had a higher level of trust in fully-automated cars but also higher levels of concern about their safe performance and data privacy.
- Older people had more positive perceptions of the potential benefits of fully-automated cars and exhibited a higher level of acceptance for the use of them in all conditions of interest.

The research in this, and subsequent, reports deriving from the ADVI Public Opinion Survey, will be used to inform public policy, regulation, research, and design of autonomous vehicles in Australia.

The survey is planned to be repeated every year or so to gauge changes in Australian community opinion about partly- and fully-automated vehicles that may come about as a result of increased awareness, understanding and exposure to them.

1 Introduction

Automated vehicles (AVs) have been defined as '...those in which at least some aspects of a safety-critical control function (e.g. steering, throttle, or braking) occur without direct driver input' (National Highway Traffic Safety Administration 2013, p. 7).

Several different taxonomies have been developed to classify, and differentiate between, different levels of vehicle automation. The SAE International (2014) taxonomy differentiates between six levels of road vehicle automation, ranging from Level 0 (No Automation) to Level 5 (Full Automation) (see Figure 1).

Figure 1: SAE levels of vehicle automation

SAE level	Name	Narrative Definition	Execution of Steering and Acceleration/ Deceleration	*Monitoring* of Driving Environment	Fallback Performance of *Dynamic Driving Task*	System Capability *(Driving Modes)*
***Human driver* monitors the driving environment**						
0	**No Automation**	the full-time performance by the *human driver* of all aspects of the *dynamic driving task*, even when enhanced by warning or intervention systems	Human driver	Human driver	Human driver	n/a
1	**Driver Assistance**	the *driving mode*-specific execution by a driver assistance system of either steering or acceleration/deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	Human driver and system	Human driver	Human driver	Some driving modes
2	**Partial Automation**	the *driving mode*-specific execution by one or more driver assistance systems of both steering and acceleration/ deceleration using information about the driving environment and with the expectation that the *human driver* perform all remaining aspects of the *dynamic driving task*	**System**	Human driver	Human driver	Some driving modes
***Automated driving system* ("system") monitors the driving environment**						
3	**Conditional Automation**	the *driving mode*-specific performance by an *automated driving system* of all aspects of the dynamic driving task with the expectation that the *human driver* will respond appropriately to a *request to intervene*	System	**System**	Human driver	Some driving modes
4	**High Automation**	the *driving mode*-specific performance by an automated driving system of all aspects of the *dynamic driving task*, even if a *human driver* does not respond appropriately to a *request to intervene*	System	System	**System**	Some driving modes
5	**Full Automation**	the full-time performance by an *automated driving system* of all aspects of the *dynamic driving task* under all roadway and environmental conditions that can be managed by a *human driver*	System	System	System	**All driving modes**

Source: SAE (2014)

AV technology is evolving at a fast rate, with fully-automated vehicles (those which do not require driver intervention at any time) predicted to be introduced on US public roads as soon as 2018 (Javelosa 2016), with other predictions suggesting introduction by around 2030 (International Transport Forum 2015).

Automated vehicles have the potential to increase safety on public roads, and decrease traffic congestion, gas emissions, and fuel consumption (Anderson et al. 2014). Despite these predicted benefits of AV technology, many potential barriers to their widespread deployment remain to be explored, including public acceptance, legal liability issues, and the security and control of the systems (Howard & Dai 2014). Public acceptance of AV technologies is critical in order to ensure that drivers utilise the technology and hence realise its predicted safety and other benefits.

One method of assessing public acceptance of AVs is through the administration of questionnaires and surveys to populations of interest.

A recent public opinion study by Schoettle and Sivak (2014), in the US, showed that 57% of participants had an overall positive opinion on AVs, with the main expected benefits of AVs including accident reduction, less emissions and reduced fuel consumption. However, a large number of respondents (~26%) also expressed a high level of concern about the AV technology itself, such as technology failure and AV performance in difficult or critical situations.

Payre, Cestac, and Delhomme (2014) developed an online survey on AV acceptance in French drivers and found that males tended to be more likely to use AV technology, and that respondents preferred to use AVs on highways, in traffic congestion, for automatic parking and when impaired (e.g. alcohol). Together, these findings suggest that AV acceptance can depend on an interaction of different factors (e.g. perceived benefits vs. concerns, gender etc.)

Public acceptance of AV technology is also likely to differ cross-culturally. Schoettle and Sivak (2014), for example, found that US respondents tended to hold more concerns regarding AVs compared to UK respondents.

The aim of this document is to report the preliminary findings of a national online Australian public opinion survey undertaken under the auspices of the Australia and New Zealand Driverless Vehicle Initiative (ADVI), to gauge public awareness, understanding and acceptance of automated vehicles in Australia. ADVI is a consortium of more than 100 local, and international, partners from government, industry and academia that has come together to support its members and stakeholders in accelerating the safe and successful deployment of automated vehicles in Australia and New Zealand.

2 Methodology

2.1 Questionnaire

A 78-item survey was developed by the ADVI Survey Working Group, comprised of experts from academia, government and industry. The items sought public feedback on the following key issues:

- Level of awareness of AV technology (e.g. whether individuals have heard about or seen a vehicle which can stay within the lane by itself)
- Sources, and degree, of concern regarding AV-related issues (e.g. cyber security)
- In what driving scenarios and conditions drivers would be most likely to use AVs (e.g. when traffic is congested, when the driver is tired or fatigued, etc.)
- What activities drivers would undertake when driving is fully supported by automation (e.g. would read, would interact with other passengers, etc.)
- Opinions regarding AVs (e.g. are AVs safer than the human driver?)
- Willingness to pay for an AV.

Once developed, the survey was distributed to 5,263 people across Australia through the online survey platform, Qualtrics.

The primary focus of this survey was on fully-automated (completely self-driving) cars, which require no human control.

2.2 Survey sample

Table 2.1 presents the demographic characteristics of participants.

Table 2.1: **Demographic characteristics of sample**

Characteristic	Description
Sample size (total)	▪ 5263
Gender split	▪ Male - 49.6% ▪ Female - 49.8% ▪ Preferred not to disclose - 0.6%
Mean age (*SD*)	▪ 44.4 years (SD = 17.54)
State/Territory of residency	▪ ACT – 4.5% ▪ NSW – 25.3% ▪ NT – 0.5% ▪ QLD – 19.0% ▪ SA – 16.6% ▪ TAS – 2.4% ▪ VIC – 22.8% ▪ WA – 8.9%
Area of residency	▪ Inner metropolitan – 33.5% ▪ Outer metropolitan – 34.0% ▪ Regional – 21.6% ▪ Country/Rural – 10.9%
Highest level of education completed	▪ Did not finish high school – 4.9% ▪ High school – 25.1% ▪ Certificate/trade – 12.7% ▪ Diploma – 27.3% ▪ Bachelor's degree – 21.5% ▪ Postgraduate degree – 8.5%
Employment sector	▪ Agricultural, forestry and fishing – 1.3% ▪ Mining – 1.2% ▪ Manufacturing – 2.7% ▪ Electricity, gas, water and waste services – 2.6% ▪ Construction – 11.1% ▪ Wholesale trade – 1.3% ▪ Retail trade – 6.8% ▪ Accommodation and food – 2.6% ▪ Transport, postal and warehouse – 2.7% ▪ Rental, hiring and real estate services – 0.8% ▪ Professional, scientific and technical services – 6.8% ▪ Administrative and support services - 5.5% ▪ Education, research and training – 6.4% ▪ Health care and social assistance – 5.1% ▪ Arts and recreation services – 1.9% ▪ Not stated – 41.2%

Driving characteristics of the sample are presented in Table 2.2.

Table 2.2: Driving characteristics of sample

Characteristic	Description
Types of vehicle driven/ridden most	▪ Car – 87.2% ▪ Truck – 1.2% ▪ Motorcycle – 1.0% ▪ Bus – 1.7% ▪ Tram – 0.4% ▪ Train – 1.8% ▪ Bicycle – 1.4% ▪ None (I don't drive) – 5.3%
Mean age first getting licence to drive solo	▪ 19.4 years (*SD* = 4.8)
Traffic conditions in which most time is spent driving	▪ Heavy traffic conditions (e.g. peak hour) – 16.2% ▪ Medium traffic conditions (e.g. non-peak hour) – 69.6% ▪ Light traffic conditions (e.g. late at night) – 14.2%
Average number of hours per week driving	▪ 0-1 hour – 7.5% ▪ 1-2 hours – 6.8% ▪ 2-3 hours – 12.3% ▪ 3-4 hours – 15.7% ▪ 4-5 hours – 13.7% ▪ 5-6 hours – 9.2% ▪ 6-7 hours – 7.3% ▪ 7-8 hours – 4.4% ▪ 8-9 hours – 13.3% ▪ 9+ hours – 9.8%

2.3 Survey procedure

Following is an outline of the survey procedure:

- The study procedures were approved by the University of New South Wales human ethics in research committee
- The questions in the survey were drawn in part from previous surveys reported in the international scientific literature, in part by the authors, and in part by feedback from ADVI partners from different sectors (academia, industry and government)
- 20 people were chosen for pilot testing. This helped refine the questionnaire for comprehensibility
- The survey was sent to respondents by Qualtrics, a survey respondent recruitment and administration company
- All respondents were volunteers, who had elected to be on-call for surveys administered by Qualtrics
- Participants read an information sheet about the research and clicked a web link to indicate consent.
- Consenting participants were instructed to respond to an online survey that took approximately 30 min to complete and the order-of-presentation of the questionnaires was randomized
- Participants were paid a small amount by Qualtrics for their participation.

The information provided by Qualtrics was in the form of anonymised responses to each of the survey questions. These responses were provided to the investigating team via the internet.

2.4 Data analysis

Different statistical tests were undertaken in order to test differences in awareness, perceived risks, willingness to pay, perceived potential benefits, trust, perceived concerns and public acceptance of fully-automated cars for different demographic characteristics including gender, State of residency and age.

Data were checked and assumptions of normality were met (as inferred from the Kolmogorov-Smirnov Test and inspection of Q-Q plots).

For each of the survey questions, Analyses of Variance (ANOVAs) were conducted to examine gender differences in the responses (e.g. are males more 'aware' of driverless vehicles than females?). A measure of effect size for each analysis - the eta-squared scores - were used when testing differences between groups, and r-squared metrics for correlations.

To test the effect of State of residency (e.g. are individuals in New South Wales more 'aware' of driverless vehicles than those in Victoria?), a three-step approach was adopted, including:

- ANOVA was conducted for each of the survey questions. A measure of effect size for each analysis was also obtained using eta-squared score
- If a result was statistically significant, planned contrasts were conducted to identify the differences across States, and
- If a result was statistically not significant, then the analysis concluded with 'no significant differences were observed between the States' for that question.

For each of the survey questions, a bivariate correlational analysis (Pearson's *r*) was conducted to examine how age is linked to each response. Due to the large sample size, the variance in item responses explained by the variables, as gauged by the *r*-squared score, were also measured in addition to statistical significance level (*p*-value). Higher r-squared values reflect stronger associations.

The following section presents the results of the analyses conducted so far.

Further results from the survey will be presented in a more comprehensive report being prepared by the authors. That will contain a larger number of analyses, for a wider range of demographic variables.

3 Results

3.1 Awareness of automated vehicles

Participants were asked seven questions associated with their awareness of AVs generally.

They were given a brief definition of AVs and two different types of AVs based on the timeline of deployment including partly-automated vehicles and fully-automated vehicles (completely self-driving). The percentages of responses to the question which reads 'What exposure have you had to the following automated vehicle driving functions?' are presented in Table 3.1.

Table 3.1: Awareness about AVs

	I have never heard of this function	I have heard about or seen a car(s) with this function	I have driven in a car with this function (as driver or passenger)	I own a car with this function
Car can automatically adapt its speed to changing sped limits	45.7	44.3	4.5	5.5
Car can stay within the lane by itself	43.2	49.0	6.3	1.4
Car can follow vehicle ahead at a safe distance by itself	37.0	55.8	5.4	1.8
Car can change lanes by itself	65.2	32.2	1.8	0.8
Car can avoid collisions with other vehicles and road users (e.g. pedestrians) by itself	33.5	60.2	4.5	1.7
Car can navigate itself to desired destination (find location and follow route)	43.9	49.3	5.4	1.3
Car can park itself	20.3	66.0	8.2	5.5

Results suggest that the majority of respondents have heard about or seen a vehicle (s) with the above-mentioned functions except that of changing lanes by itself, where 65% of the respondents indicated that they have never heard of that function.

While the entire sample expressed an awareness of automated vehicles, males were more aware of all the listed automated vehicle functions than females.

An analysis based on State of residency revealed that the Australian Capital Territory was the most aware State and South Australia was the least aware State.

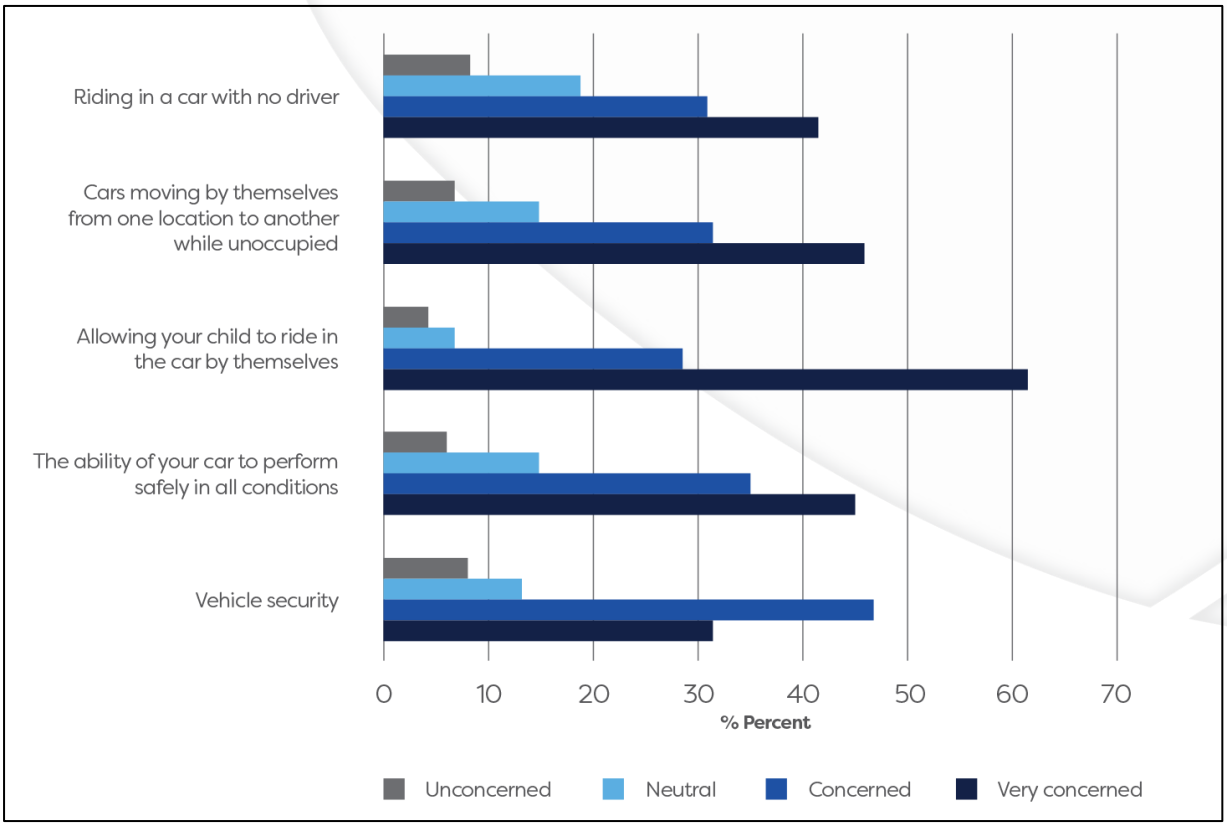
A negative correlation was found suggesting that older people are less aware than younger people of automated speed adaptation, lane keeping, car following, collision avoidance and navigation functions. However, the effect sizes of these variables were small.

No significant correlation was observed between age and awareness of automated lane changing and automated parking functions hosted by automated vehicles.

3.2 Perceived concerns about fully self-driving cars

Participants were asked seven questions in relation to perceived concerns about fully-automated (self-driving) cars. The percentages of responses to the question which reads "If you used a car that was fully-automated (i.e. completely self-driving), how concerned or unconcerned would you be about the following issues?" and "How concerned or unconcerned would you be about the following possible scenarios with fully-automated cars (i.e. completely self-driving)?" are shown in Figure 3.1, Figure 3.2 and Figure 3.3.

Figure 3.1: Perceived concerns about fully-automated (completely self-driving) cars



Results revealed that the majority of the respondents were concerned about all the aspects presented in Figure 3.1. The highest proportion of respondents were most concerned about allowing their children to ride in the car themselves (90%).

Female respondents were more concerned about all the issues stated regarding fully automated cars than male respondents.

South Australia was the most concerned State and Australian Capital Territory was the least concerned State about fully-automated cars.

A negative correlation was found suggesting that older people were more likely than younger people to exhibit lower levels of concern with allowing their children to ride in a fully-automated car and movement of the car while unoccupied.

Conversely, a positive correlation was found suggesting that older people exhibited higher concern in relation to the ability of fully automated cars to perform safely. Effect sizes of these analyses were found to be small.

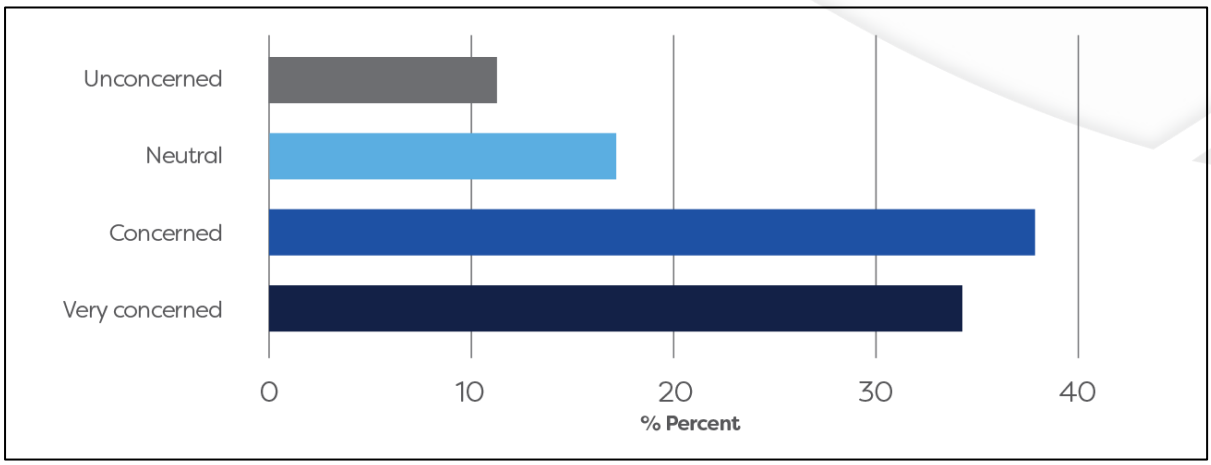
No significant correlation was observed between age and concerns about vehicle security and riding a fully self-driving car.

3.2.1 Concerns about data privacy

Participants were asked a question about how concerned or unconcerned they would be about data privacy (e.g. being able to have your car's location and destination tracked) for a fully self-driving *car*. Figure 3.2 revealed that the majority of respondents (72%) were either concerned or very concerned about data privacy.

Further analyses to examine gender differences suggest that female respondents were more concerned about data privacy than male respondents.

Figure 3.2: Perceived concerns about data privacy



While the majority of respondents across all States and Territories were concerned about data privacy, South Australians were most concerned followed by Victorians and Western Australians (in order of descending degree of concern).

Correlation analysis suggests that older people were more concerned about data privacy than younger people. However, the effect size was small.

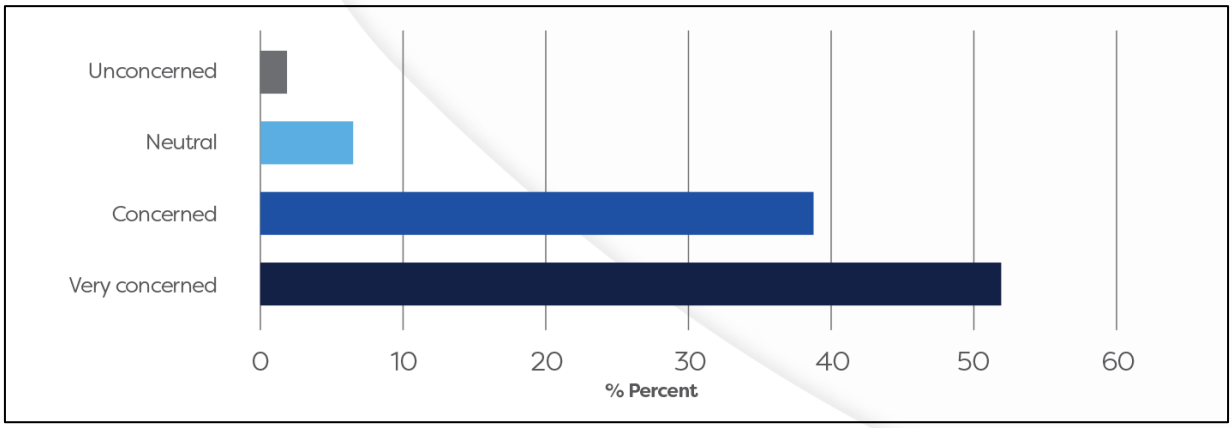
3.2.2 Concerns about legal and financial responsibility

Participants were asked a question about how concerned or unconcerned they would be about legal and financial responsibility in relation to fully self-driving cars. Figure 3.3 presents the responses received from the participants to the question "How concerned or unconcerned would you be about the possible scenario of being legally and financially responsible if the car is involved in an accident or makes mistakes (e.g. speeding)".

The majority of respondents (91%) were either concerned or very concerned about legal and financial responsibility with both female and male respondents being equally concerned.

The Australian Capital Territory was the most concerned State about legal responsibility; South Australia and Northern Territory were the least concerned.

Figure 3.3: Perceived concerns about legal and financial responsibility



Age and concerns about legal and financial responsibility are positively correlated, suggesting that older people exhibited higher levels of concern than younger people about legal and financial responsibility. However the effect size was found to be small.

3.3 Willingness to pay

Respondents were asked a question about their willingness to pay for a fully-automated and partially-automated car. They were also asked about their intention to pay for road infrastructure to support AVs and training and licencing procedures for partly- and fully-automated cars. Figure 3.4 presents the responses of the cohort.

No significant differences were observed between male and female participants' willingness to pay.

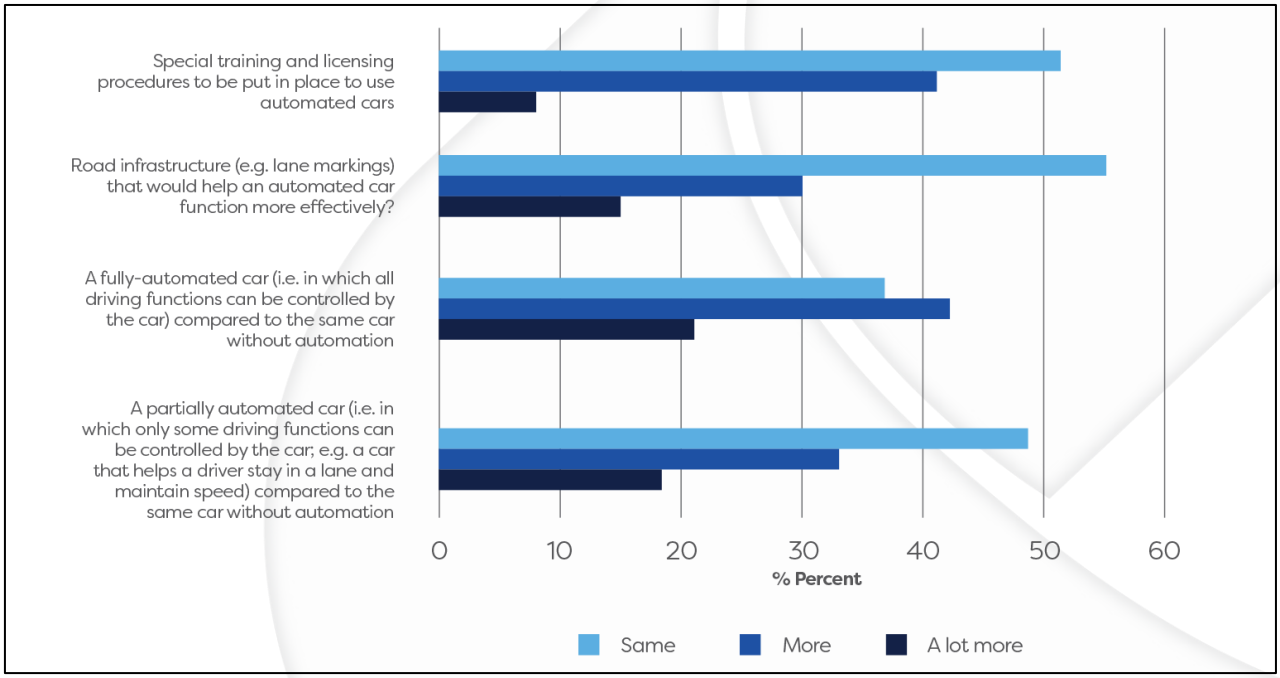
A comparison of the extent to which each State was willing to pay more revealed that respondents in South Australia were most willing to pay more for AVs and related costs than all the other States followed by Australian Capital Territory, Victoria and Western Australia (in order of descending degree of willingness to pay more). Respondents in New South Wales, the Northern Territory, Queensland and Tasmania were least willing.

A positive correlation was found between age and willingness to pay, suggesting that older people were more willing to pay more for different AVs, its infrastructure and training and licencing. However, the effect size was found to be small.

Respondents were asked an additional question about if they were willing to pay more (or a lot more) for a fully-automated car, and how much they would be willing to pay compared with their current vehicle. Thirty-eight percent of the respondents provided an answer to the question "If you are willing to pay more for a fully-automated car, how much more would you be willing to pay than for your current vehicle? (Australian Dollars)"

An analysis of the extent to which the respondents who were willing to pay revealed that 50% were willing to pay at least $5,000 more and 25% were willing to pay at least $10,000 more than for their current vehicle. The average extra amount that this group of respondents was willing to pay was $9,000.

Figure 3.4: Willingness to pay for AVs and related circumstances



3.4 Perceived potential benefits

Participants were asked to what extent they agree or disagree about the potential benefits of fully-automated cars for nine different scenarios. Response distributions are presented in Table 3.5.

Table 3.5: Potential benefits of fully-automated cars

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree
They would be safer than non-automated cars	17.5	29.4	28.1	16.6
They will allow me to spend time on other activities (e.g. surfing the internet)	22.6	30.8	19.9	13.7
They would reduce my travel time	5.4	26.1	32.1	24.1
They would consume less fuel	6.4	31.8	35.1	18.5
They would be environmentally friendlier	7.1	32.3	33.6	18.8
They would allow mobility for people with impairments or restrictions (e.g. medical conditions, vision impairments)	39.9	42.2	9.7	5.6
I would not have to worry about looking for a car park	13.5	36.6	24.7	14.6
They would reduce overall vehicle repair costs (if there are less crashes)	23.7	37.1	23.7	9.1
They would reduce insurance premiums (if there are less crashes)	25.8	36.1	21.8	9.7

The responses in Table 3.5 suggest positive perceptions among respondents regarding the benefits of a fully-automated car, with high proportions of respondents agreeing that fully automated cars would allow mobility for people driving with impairments or restrictions (82%), reduce insurance premiums (62%) and reduce overall vehicle repair costs (61%).

A high proportion of respondents were largely indifferent about perceiving reduction of travel time, lower fuel consumption and being environmentally friendlier as being benefits of fully-automated cars.

Analysis by gender revealed no significant differences between male and female respondents' perception of potential benefits of fully-automated cars.

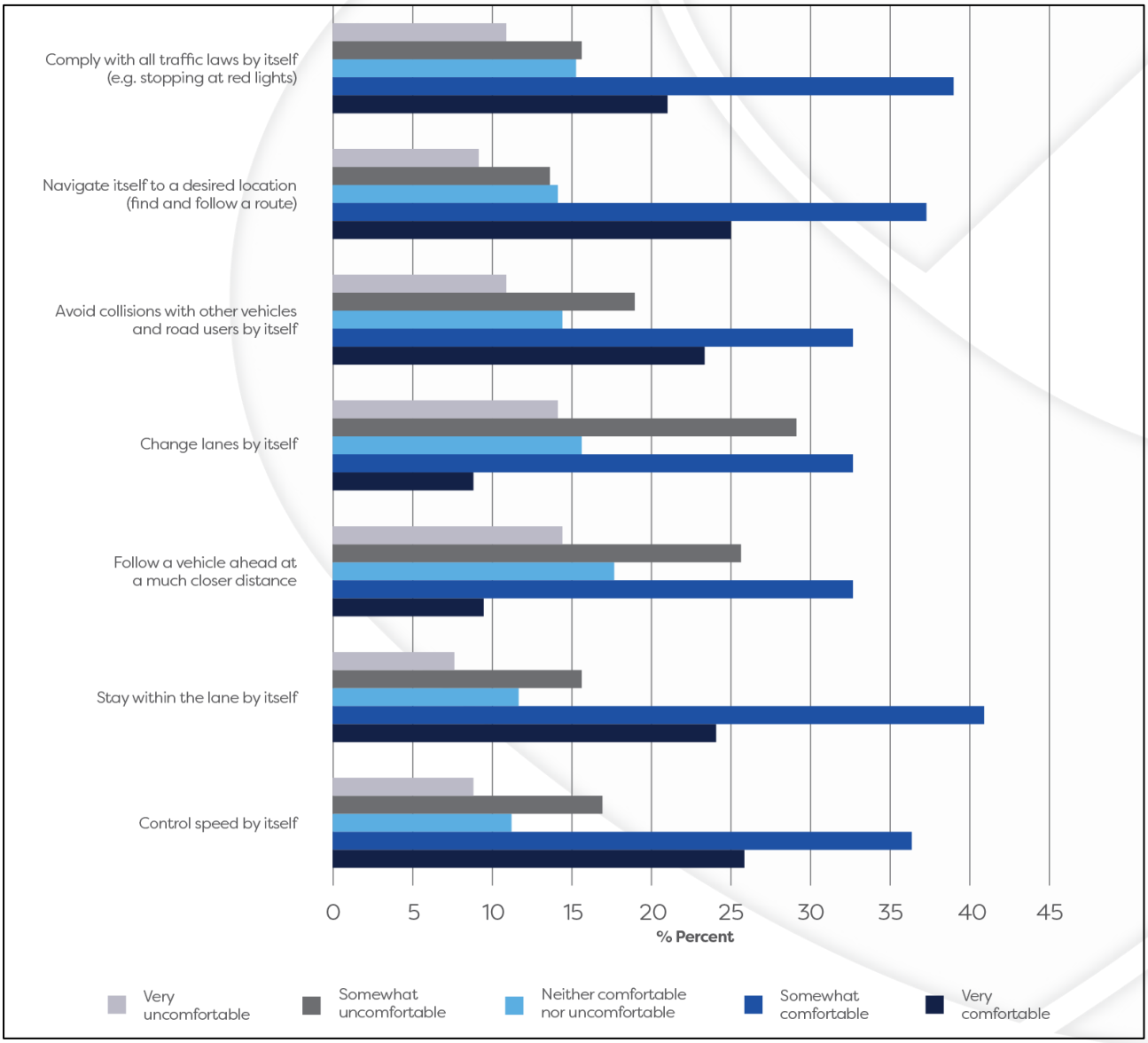
When compared with other States, South Australia had the most positive perception of the potential benefits of fully-automated cars and Northern Territory had the least positive perception.

A positive correlation was found suggesting older people are more likely than younger people to endorse opinions regarding the potential benefits of fully-automated cars for all scenarios.

3.5 Trust in fully-automated cars

Participants were asked to what extent they are comfortable or uncomfortable allowing a fully-automated (self-driving) *car* to perform different driving activities. Responses in percentages are presented in Figure 3.6.

Figure 3.6: Trust in AVs



The majority of respondents were comfortable to allow a fully-automated car to perform all the above-mentioned tasks except changing lanes by itself and following a vehicle ahead at a much closer distance, where responses were evenly split between comfortable and uncomfortable.

An analysis by gender suggests that male respondents were more comfortable to allow a fully-automated car to perform all the functions in Figure 3.6 than female respondents.

South Australians were the most comfortable to allow a fully-automated car to perform the above-mentioned tasks and Tasmanians were the least comfortable.

A positive correlation was found suggesting that older people exhibited a higher level of trust in fully-automated cars than younger people. However, the effect size was found to be small.

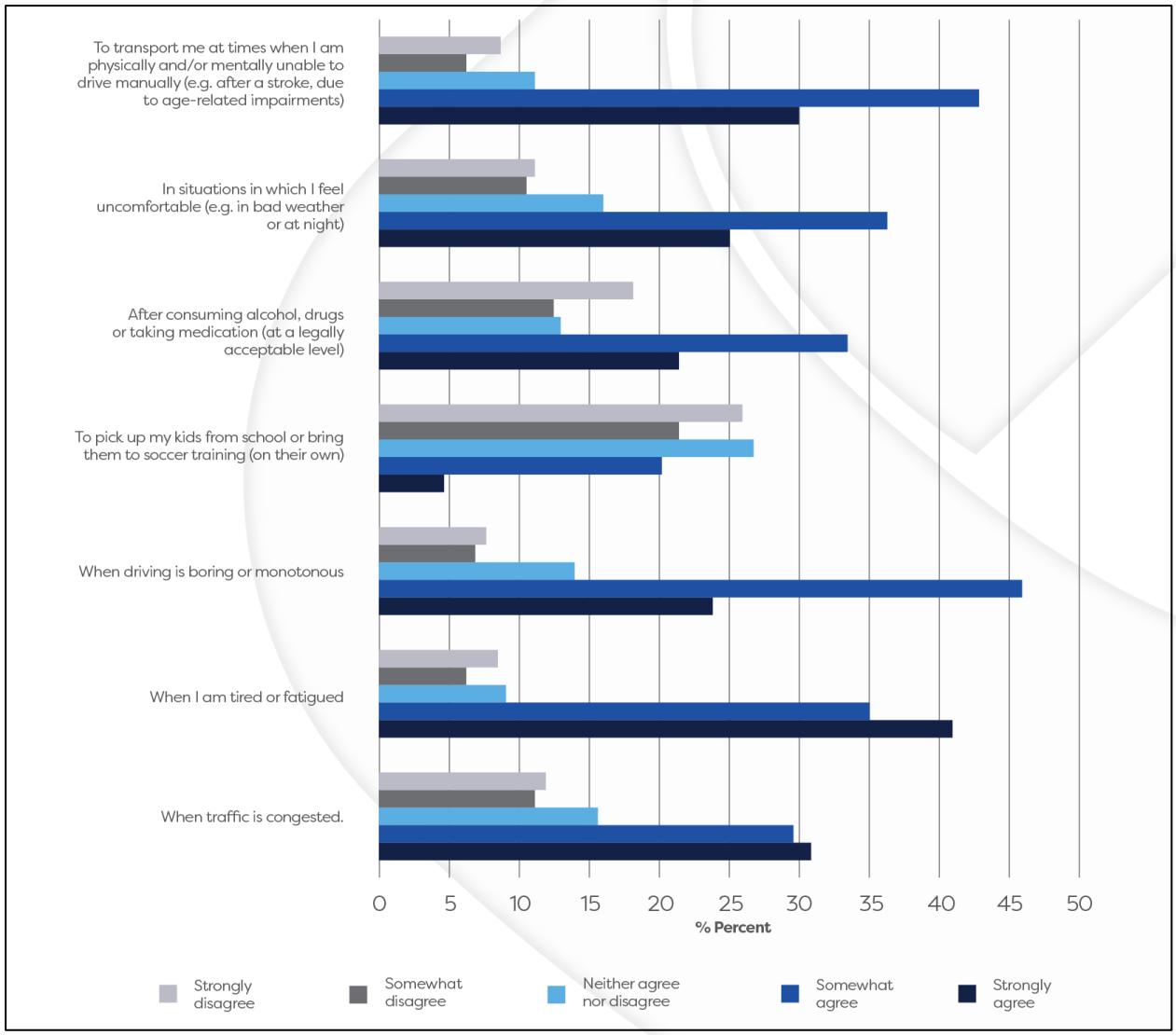
3.6 Public acceptance

Respondents were asked to what extent do they agree or disagree about their intention to use a fully-automated car for seven different conditions. Response distributions are presented in Figure 3.7.

Results revealed that the majority of the respondents intended to use a fully-automated car under all the conditions presented in Figure 3.7 except to transport their children on their own, where only 25% of respondents indicated that they would want to use a fully-automated car for this purpose.

A high proportion of respondents agreed that they would want to use a fully-automated car when tired or fatigued (76%), to transport them at times when they are physically and/or mentally unable to drive manually (72%), and when driving is boring or monotonous (70%).

Figure 3.7: Conditions where people intended use a fully-automated car



No significant differences were observed between male and female participants' intention to use a fully-automated car.

Australian Capital Territorians and South Australians were most agreeable to using fully-automated cars under the conditions stated in the questionnaire and Northern Territorians and Tasmanians were the least agreeable.

A positive correlation was found suggesting older people were more likely to exhibit a higher level of acceptance for use of a fully-automated car in all conditions of interest, however the effect size was found to be small.

4 Conclusion

This report presents the preliminary findings from the first nation-wide, representative, survey of Australian public awareness, understanding and acceptance of partly- and fully-automated (completely self-driving) cars. The survey questionnaire was developed and distributed to over 5,200 participants.

Statistical tests were conducted in order to assess differences in awareness, risks, willingness to pay, potential benefits, trust, concerns and acceptance between different demographic variables including gender, State of residency and age. The findings from the survey presented in this report may be summarised as follows:

- Whilst most Australians are aware of many automated vehicles functions, relatively few have experienced them first-hand
- There is a high level of public concern about many issues relating to completely self-driving cars (e.g., data privacy)
- A majority of Australians are not willing to pay more for a self-driving car than for their existing car
- Most Australians believe that fully-automated cars have many potential benefits
- Most people are comfortable with automated cars controlling most driving functions, however are less comfortable with these cars changing lanes by themselves and following cars ahead too closely
- People are more comfortable about taking control than giving control to automated cars
- Most people would like to drive a fully-automated car manually, from time-to-time
- Only a minority of Australians believe fully-automated cars could be safer than a car driven manually by a human
- In certain areas, females and males have different opinions and attitudes towards fully-automated cars
- People in different Australian States and Territories think differently about fully-automated cars

These findings are broadly consistent with those derived from a previous (multi-country) survey of 3255 respondents (Schoettle & Sivak, 2014) that included a sample of 502 Australian drivers. Schoettle & Sivak found (for the 6 countries sampled – China, India, Japan, US, UK and Australia) that most respondents had heard about autonomous or self-driving vehicles, had a positive opinion of the technology and expected the technology to yield significant benefits.

However, as in this study, they expressed high levels of concern about some issues. Issues of concern among their sample included riding in self-driving vehicles, equipment or system failure, self-driving vehicles performing less well than humans, vehicles without controls, and self-driving vehicles moving around unoccupied. As in the present study, Schoettle & Sivak found that a majority of respondents across the six countries were unwilling to pay extra for fully-automated vehicles.

The research in this, and subsequent reports deriving from the ADVI Public Opinion Survey, may be used to inform public policy, regulation, research, and design of autonomous cars and vehicles in Australia.

It is planned that the survey be repeated every year to gauge changes in Australian community opinion about partly- and fully-automated cars and vehicles that may come about with increased awareness, understanding of, and exposure to them.

5 More information

For more information, please email: info@advi.org.au

6 References

Anderson, J, Kalra, N, Stanley, K, Sorensen, P, Samaras, C, and Oluwatola, O 2014, Autonomous vehicle technology: A guide for policy makers, RAND Cooperation, Santa Monica, CA.

Howard, D and Dai, D 2014, Public perceptions of self-driving cars: The case of Berkeley, California, Transportation Research Board 93rd Annual Meeting, Washington, DC.

International Transport Forum 2015, Automated and autonomous driving: regulation under uncertainty, OECD, Paris, France.

Javelosa, J 2016, 'Elon Musk: by 2018, our cars will have complete autonomy', Futurism, 7 June 2016, viewed 25 May 2017, <http://futurism.com/are-we-really-only-two-years-away-from-complete-car-autonomy/>.

National Highway Traffic Safety Administration 2013, *Preliminary statement of policy concerning automated vehicles*, National Highway Traffic Safety Administration, Washington, DC, USA.

Payre, W, Cestac, J, Delhomme, P 2014, Intention to use a fully automated car: attitudes and a priori acceptability. Transportation Research: Part F, Traffic Psychology and Behaviour, vol. 2, no. 27, p.252-253.

SAE International 2014, *Taxonomy and definitions for terms related to on-road motor vehicle automated driving systems,* J3016_201401, SAE International, Warrendale, PA, USA, viewed 28 September 2016, <http://standards.sae.org/j3016_201401/>.

Schoettle, B., & Sivak, M 2014, A survey of public opinion about autonomous and self-driving vehicles in the U.S., the U.K., and Australia. Michigan, USA. Retrieved from http://deepblue.lib.umich.edu/bitstream/handle/2027.42/108384/103024.pdf