

Do South Asian migrants in Australia travel differently to native-born Australians?

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Abstract

Recent years has seen a large influx of migrants from South Asia entering the shores of Australia. However, little is known about the group's travel patterns in Australia, and if there is any resemblance to their past travel habits. On a larger scale, their travel may also affect the transport system of Australia. Existing research suggests that various transport modes are perceived differently in South Asia versus Australia. Cars are considered status symbols in South Asian countries and developed economies alike. In developing countries however, certain occupations and education levels are associated with desiring a car, while the lower income levels mean that cars are valued even more. Cultural norms, particularly associated with gender, play a role in travel decision-making in South Asia. Commuters often choose public transport or active travel because of a lack of choice born from limited personal income. To highlight some key differences, data from the 2011 Australian census, 2009 South East Queensland Household Travel Survey and 2013 Victorian Integrated Survey of Travel and Activity has been analysed with respect to demographics and travel. South Asians in Australia are younger and most are in their working years. They are highly educated, and their income levels are on par with native-born Australians. South Asians tend to live in larger households with fewer motor vehicles on average, and yet make a substantial proportion of trips using cars. The analysis showed that when all trips are considered, mode splits and trip purpose proportions are very similar for both groups. South Asians though, have been observed to choose transit for work and education-related commuting, and prefer different modes for different trip purposes. Given the lack of previous research, the analysis reported here demonstrates the value for further research being conducted on the travel patterns of South Asian migrants in Australia.

1. Introduction

Australia's population grew at 8.3 % between 2006 and 2011, and that growth is largely driven by immigration Australian Government (Australian Government Department of Immigration and Border Protection (DIBP), 2014). The profile of Australian immigration has changed dramatically over time. While traditionally, most migrants came from the UK, Ireland and Europe today Asian migrants are arriving at an accelerated pace, and contribute significantly to the Australian population. The population growth fuelled by immigration is straining the Australian transport system, which is largely dependent on its road network (International Road Assessment Programme 2008). A large proportion of this population increase is due to the increased influx of migrants (DIBP 2014). If Australian migrants have different travel behaviour to native born Australians, it is important to understand how they may shape the transport system of the country.

Research conducted overseas, particularly in the United States, has put migrants under the spotlight to study their travel habits and choices. Notable differences in transport decisions have been found (Tal and Handy 2010, Blumenberg and Smart 2011, Chatman and Klein 2013). Yet despite the high rates of migration in Australia, very little is known about the travel behaviour of migrants in Australia. Most travel surveys do not ask about ethnic background and such questions are generally considered unimportant or 'intrusive' (M Dorney 2017, pers. comm. 2 May). To the author's knowledge, no studies examine the travel behaviour of South Asian migrants in Australia.

The research reported here focuses on migrants of South Asian origins, comprising India, Bangladesh, Pakistan, Sri Lanka, Maldives, Nepal and Bhutan, as they were the fastest growing migrant group between 2006 and 2011 (DIBP 2014). Research undertaken in those countries shows that the perception and use of different transport modes is very different than one can imagine in the developed world (Morrall, Ratnayake et al. 1991, Pucher, Korattyswaropam et al. 2005, Enam and Choudhury 2011).

The aim of this study is to examine whether there is evidence that travel behaviour differs between South Asian migrants and native-born Australians. The possible reasons for any differences identified are also be considered. We conducted this study in two stages. First, we reviewed the existing literature to highlight some of the key differences between South Asians and residents of the developed world in terms of travel behaviour and mode choices. Secondly, three existing datasets were used to uncover travel behaviour differences between South Asians and Australian-born populations. The data was collated from the 2011 Australian Census, the 2009 South East Queensland Travel Survey (SEQ HTS) and the 2009 Victorian Integrated Survey of Travel and Activity (VISTA).

2. Literature review

South Asians are the fastest growing migrant population in Australia, with a growth rate of 88.8% between 2006 and 2011 (DIBP 2014). The trajectory remains upwards; a finding based on the 2016 Australian census, data of which are not yet fully accessible, shows 468,800 people in Australia were born in India – an increase of almost 60% from the 295,363 surveyed in the 2011 Australian census (ABS 2016). South Asians made up 1.25% of residents in Australia in 2006; in 2011, that increased to 2.17%. In 2016, it is only likely to follow the trend.

There is very little literature regarding the travel behaviour of South Asians in Australia. However, this review is structured around two main possible influences behind South Asian travelling decisions in Australia:

- Attitudes towards transport modes in South Asia
- Past experiences or habits

Those two aspects are examined in the subsections which follow.

2.1. Attitudes towards different modes of transport

Different modes of transport are perceived differently by South Asians and Australians.

This section puts into focus the two most commonly used transport modes in Australia: private vehicles and public transport (ABS 2011).

2.1.1. Car: Status symbol and emotional attachment

Australia has one of the highest motor vehicle ownership rates in the world, standing at 731 motor vehicles per 1000. In contrast, Indian people own 18 cars per 1000 in their homeland. Sri Lankans have the highest in South Asia, which stands at 76, while at the other end of the spectrum is Bangladesh and Nepal, where people own 3 per 1000 and 5 per 1000 respectively (World Heritage Encyclopedia 2016). The numbers suggest that the meaning and significance of owning a car is likely to be different for South Asians and Australians.

Some perceptions are shared between the two. Studies show that cars are associated with self-presentation, status (Gettersleben 2007) and self-esteem (Sheller 2004). Cars are known to provide greater privacy, safety and security than public transport (Ellaway, Macintyre et al. 2003), while some consider owning and driving one “the coolest way to get to school” (Thigpen and Handy 2015). It is very likely that such thoughts are shared by both South Asians and Australians.

Car ownership levels are climbing significantly in many South Asian cities (Bandyopadhyay 2008). This means a growing number of first-time vehicle owners who will greatly value their vehicle assets (Raza 2016). However, because car ownership is so aspirational in developing countries, it is often associated with a particular social class or occupation more so than in Australia. For example, in India, it has been found that people with higher education or in a respectable occupation want to purchase a car (Verma, Manoj et al. 2016) while in China, entrepreneurs and employees in foreign firms cite their occupations as reasons for wanting to buy a car (He and Thøgersen 2017). In contrast, recent work in Australia found that very few young people thought having a car was an indication that someone was ‘doing well in life’ (Delbosc and Currie 2014). Cars are also used very differently, especially when it comes to carsharing (Enam and Choudhury 2011).

Private vehicles allow many to go to places which public transport simply cannot take them, such as natural attractions (Sheller 2004). In both developed and developing countries, a car provides more freedom, job opportunities and a better quality of life (Handy, Blumenberg et al. 2008, Delbosc and Currie 2014). Yet for immigrants, isn't this one of the biggest reasons for coming to a new country in the first place? Considering the low literacy rates, income levels (UNDP 2016) and car ownership levels in South Asian countries, it is justifiable why positive feelings towards cars are amplified for South Asians.

2.2.2. Public transport: Negative perceptions

Perceptions of public transport vary significantly between developed countries with common complaints about slow travel times relative to cars, frequency of service disruptions and feeling unsafe at night (Currie and Delbosc 2015). However, these complaints pale in comparison to the issues faced by transit services in many developing countries. Most South Asian cities have very poor transit services that tend to be slow, overcrowded, uncomfortable, undependable and even dangerous (Pucher, Korattyswaropam et al. 2005). There is an absence of the basics such as published timetables and efficient ticketing systems (Enam and Choudhury 2011).

More surprising is that research so far suggests South Asians are not really encouraged to use public transport in their homelands – they are discouraged if anything. Government policies in India and other South Asian cities, in attempts to decongest city centres, tend to

facilitate private modes of transport, leading to a lower number of registered transit vehicles (Bandyopadhyay 2008). Only a few large cities in India have operating metro systems (Singh 2015), and none elsewhere in South Asia at the time this paper is written. Instead many people use paratransit services, which consists of smaller vehicles such as rickshaws and mini-buses – essentially an informal mode of public transport (Shimazaki and Rahman 1995). Above all, people use transit simply because they cannot afford privatized modes of transport (Iyer and Badami 2007, Enam and Choudhury 2011, Raza 2016). As a result, people in the subcontinent buy a car at the very first opportunity they are able to do so (Srinivasan and Rogers 2005, Raza 2016), and use them if they have access to one (Enam and Choudhury 2011, Mahmud and Rabbani 2012).

In addition, cultural norms and frequent harassment mean South Asian women perceive public transport negatively when compared to their male counterparts (Enam and Choudhury 2011), and have a higher tendency towards private vehicles (Verma, Manoj et al. 2016). Even in the developed world, females prefer to sit beside other females while using transit services (Thomas 2009). This probably holds true in the South Asian context, but it takes a step further: there are gender-segregated train cars in Pune, while women in Dhaka prefer women-only bus services (Peters 2001).

2.2. The role of habits and past experiences

Most South Asians in Australia are first generation migrants (ABS Australian Bureau of Statistics (ABS) 2011), and are likely to be strongly influenced by pre-existing travel habits. For this reason, it is necessary to review research on habit.

Studies analysing habit suggest that people are likely to do what they have done in the past (Haustein, Klöckner et al. 2009). Smart and Klein (2017) argued that transit-dependent commuters are more likely to continue that practice even after moving to low-transit regions. In addition, the behaviour of parents has been found to influence one's travel habits (Johansson 2006). For migrants in particular, the behaviour of the head of family plays a key role in the individual's travelling choices (Smart and Klein 2017).

A lot of transit use in developed economies come because of habit. Previous use of transit significantly alters future transport decisions (Muromachi 2017). Those living in transit rich neighbourhoods also tend to have higher dependency on public transport (Smart and Klein 2017). One is also likely to use public transport if parents also used public transport (Johansson 2006). All these factors shape up the personal norms of oneself (Haustein, Klöckner et al. 2009), and suggest that public transport use in developed economies is not necessarily due to financial restrictions or for environmental benefits. There are some suggestions that technological advances can lead to more people using transit, simply because it can help them be more productive on the go (Campbell 2012). Particularly for young adults, technology helps them obtain information about public transport such as bus routes etc.

As discussed in the previous section, South Asians are less likely to own and use cars and more likely to use transit or paratransit than residents of developed countries like Australia. If this is the case, then past habits may encourage South Asian migrants to keep using more familiar modes when they reach Australia. Unfortunately, few studies have been conducted on the travel habits of migrants or ethnic minorities in Australia (Kerr, Klocker et al. 2016) and as far as we are aware none have been conducted on South Asian migrants. However, studies conducted in other countries, mostly in the United States, have analysed the travel behaviour of migrant groups and ethnic minorities, and the general conclusion is that migrants are likely to keep some of their habits. A study in California found that a larger proportion of immigrants rely on carpooling than US born citizens as primary commute modes (Handy, Blumenberg et al. 2008). Interestingly, the study found that carpooling levels remained higher even for immigrants who have lived in the country for 20 years. Members of migrant groups without cars often get rides from others or borrow cars within the community,

and few are truly transit dependent. The study further showed that walking is considered important to ‘save money’.

Immigrants also tend to live in larger households on average (Liu and Painter 2012), further supporting carpooling and car sharing. All these findings suggest that past habits may play a very important role in shaping travel behaviour of South Asian migrants in Australia.

2.3. Attitudes vs Habits

In conclusion, it is likely that both attitudes and habits will influence the travel behaviour of South Asians. Interestingly, they are likely to act in opposing ways. If South Asian attitudes and perceptions of transport modes take precedence, then it is likely that they will prefer privatised modes of transport, mostly cars, over public transport. On the other hand, the effects of habits on travelling choices suggest lower car use and higher transit dependency. It is not clear which of these influences will have a greater impact on travel behaviour of South Asian migrants in Australia.

Table 1 Likely effects of habits and attitudes on car and PT use of South Asian migrants

	Car Use	Public Transport Use
Habits and past experiences		
Attitudes and social perceptions		

But these relationships are not necessarily straightforward. If South Asians use transit more in Australia, it doesn't necessarily mean they are habituated to do so; they could simply like the quality of transit here better. Conversely, a migrant may not want to use a car in Australia because of rules and driving conditions, but it is not necessary that his/her perception of a car changes. Weather, infrastructure, government policies and personal finances may all play a role. Many hypotheses can be established, but none can be solidified without surveys and data, which as it stands, is very limited.

3. Methods

The previous section reviewed how South Asians perceived transport modes differently to native-born Australians. To explore some of these differences further, three datasets were analysed:

- 2011 Australian Census
- 2009 South East Queensland (SEQ) Household Travel Survey (HTS)
- 2013 Victorian Integrated Survey of Travel and Activity (VISTA)

These datasets were chosen because they contained the ‘country of birth’ variable. The 2016 census data was not available when this report was written, while 2009 was the last major SEQ HTS survey where the country variable was collected (M Dorney 2017, pers. comm. 2 May).

Neither of these surveys were designed to specifically examine the travel behaviour of South Asians¹. The census will help build the demographic profile of South Asians in Australia, whereas the VISTA and SEQ HTS will provide an insight into ways travel patterns are different between South Asians and Australians in Australia.

¹ For the purpose of this analysis, South Asia includes Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

For the rest of this paper, ‘South Asians’ refers to residents or citizens of Australia who were born in South Asia whereas ‘Australians’ refers to anyone born in Australia, unless otherwise specified.

3.1. 2011 Australian Census

TableBuilder Pro (ABS 2011) has different databases categorised for demographics, education and other aspects. The total number of South Asian-born and Australian-born residents in Australia can be approximated to 465,000 and 15,000,000 respectively.

Because the country of birth variable was used to classify respondents as Australians and South Asians, some second-generation South Asian migrants were classified as ‘Australians’. However, over 97% of South Asians in Australia had both parents born overseas, a reflection that most are first-generation migrants.

The Priority Mode approach has been used on trips with multiple modes to assign a main mode of transport (The Urban Transport Institute (TUTI) 2008).

3.2. 2009 SEQ HTS

The data (TMR 2009) included 20,735 respondents with country-code Australia and 190 with South Asia. All respondents were residents of Queensland at the time of the survey. All South Asian countries bar Maldives was represented in this dataset.

3.2. 2013 VISTA

The data (Victoria State Government 2013) included 7,422 respondents with country-code Australia and 415 with South Asia. All respondents were residents of Victoria at the time of the survey. All South Asian countries bar Maldives was represented in this dataset for demographics, while trips and travel activities did not represent Bhutan and Maldives.

4. Demographics of South Asians in Australia

Only the aspects of the analysis which showed significant differences between the demographics or travel of South Asians and Australians have been presented in this section.

4.1 Age, ancestry and residence in Australia

Figure 1 represents the age distribution of South Asians and Australians, from ABS.

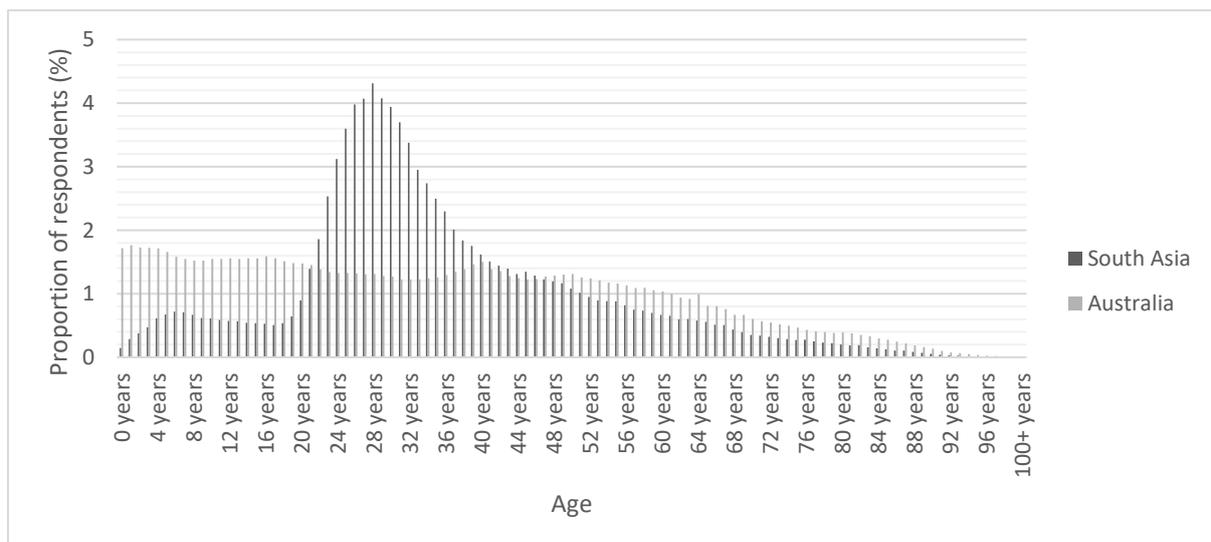


Figure 1 Age Comparison: South Asians vs Australians (Source: 2011 census)

It can be observed that the majority of South Asians are young adults, with 40% aged between 25 and 35, compared to 14% for Australians.

South Asians are largely concentrated into specific regions of Australian cities. Large proportions of South Asians live in Victoria (38% of South Asians) and New South Wales (36% of South Asians). South-East Melbourne and West Melbourne are home to 20% of native-born Australians in Victoria, but about 50% of South Asians in Victoria. Parramatta, Inner South West and Blacktown regions of Sydney house 10% of Australians in NSW, but over 50% of South Asians in NSW. This may suggest the presence of ethnic enclaves.

The SEQ HTS survey was based on residents in Queensland, which home to less than 10% of all South Asians in Australia, while greater Brisbane houses about 7% of South Asians.

4.2 Education and Work

Over 70% of South Asians in Australia have advanced degrees, half of whom have bachelor degrees or higher. A breakdown is presented in Table 2.

Table 2 Comparison of Non-School Qualification: Level of Education (Source: 2011 census)

Highest Non-School Qualification	South Asian (%)	Australian (%)
Postgraduate Degree Level	25.66	4.80
Graduate Diploma and Graduate Certificate Level	3.08	3.63
Bachelor Degree Level	35.94	24.14
Advanced Diploma and Diploma Level	16.67	15.28
Certificate Level	10.58	39.92
Level of education inadequately described	2.83	2.43
Level of education not stated	5.25	9.80
Total	100.00	100.00

More South Asians aged over 15 are employed in full-time and part-time work than their Australian counterparts, while more Australians are not in the labour force, as presented in Table 2. The data represents 423,000 South Asians and 11,241,000 Australians.

Table 3 Labour Force Status (Source: 2011 census)

	South Asian (%)	Australian (%)
Employed, worked full-time	44.88	39.87
Employed, worked part-time	21.68	19.73
Employed, away from work	3.61	4.02
Unemployed, looking for full-time work	2.95	2.15
Unemployed, looking for part-time work	2.20	1.40
Not in the labour force	24.68	32.84
Total	100.00	100.00

Furthermore, South Asian and Australian personal income levels are very similar, as suggested in Figure 2.

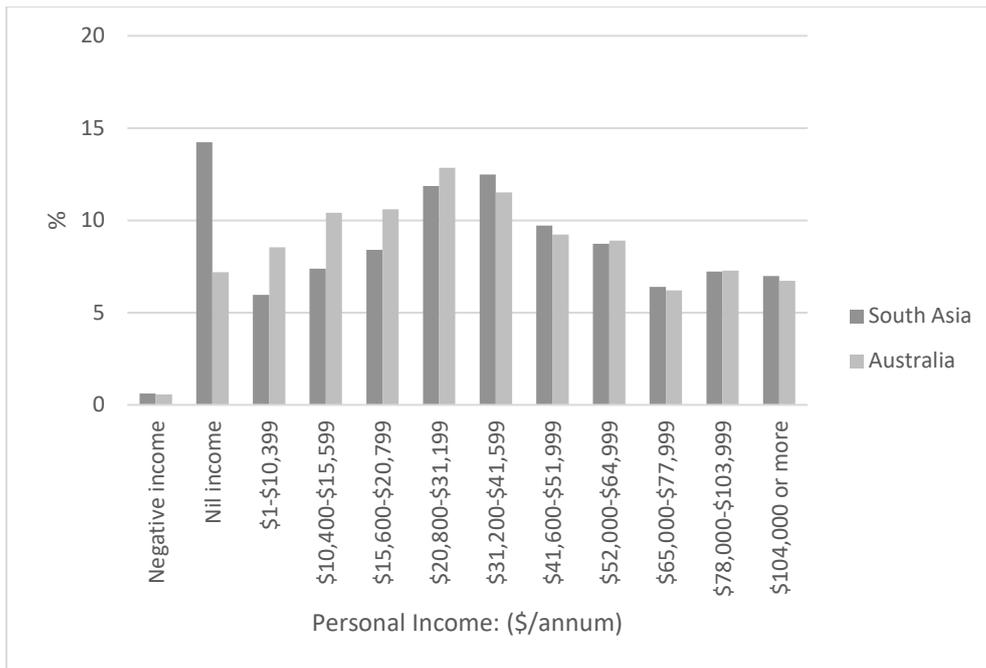


Figure 2 Personal Income Comparisons between South Asians and Australians (Source: 2011 census)

The major different is in nil income and lower income categories between the two groups. A significant contributing factor towards the South Asian 'nil income' group is the unemployment rate amongst females, almost a quarter of whom have responded as having nil or negative income (compared to less than 10% of Australian females). South Asian males have higher incomes than their Australian counterparts, which is counterbalanced by the lower personal income levels of South Asian females. A second explanation could be international students; a substantial proportion of recent South Asian migrant groups arrive as students, as presented in Figure 3.

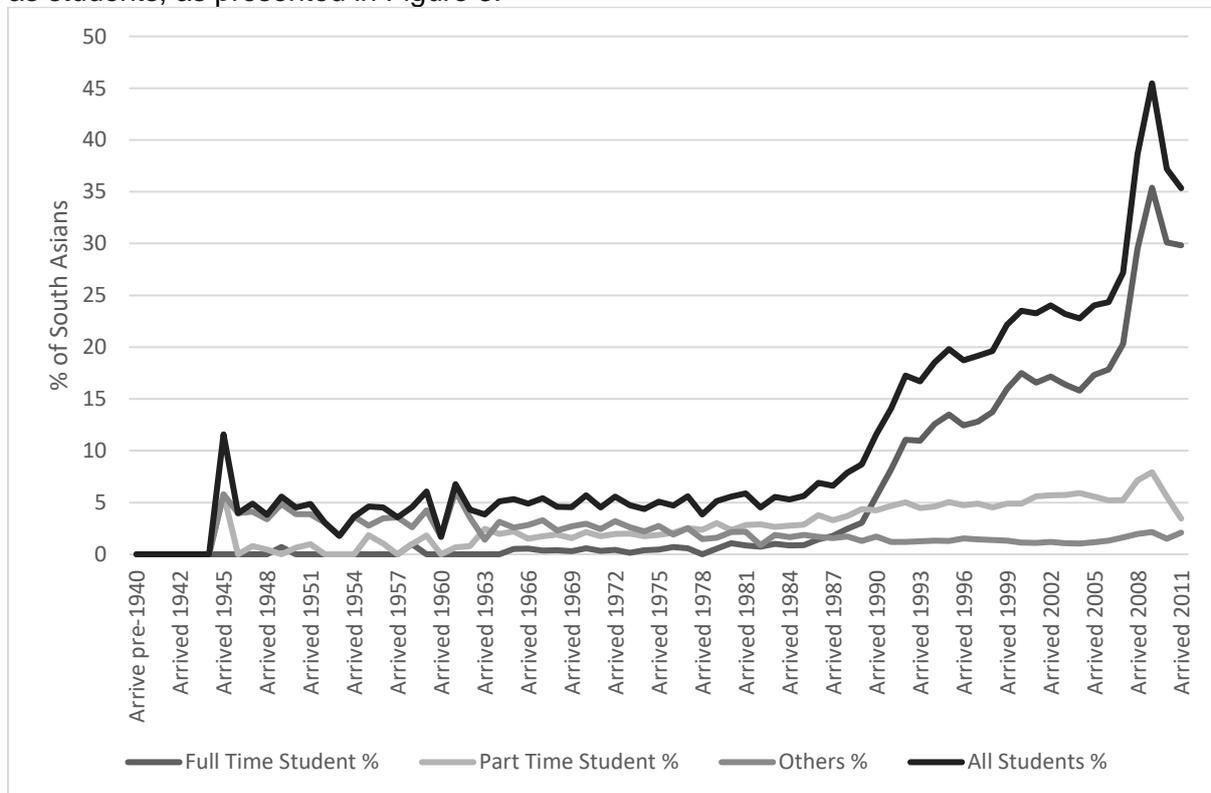


Figure 3 South Asian residents in Australia: student status (Source: 2011 census)

In SEQ HTS, a larger proportion of South Asians above 18 are studying (full-time or part-time) without work (full-time, part-time or casual) compared to Australians over 18, as shown in Table 4. This is also true for South Asians in Victoria as collected from VISTA, although the numbers are significantly lower. More South Asians are employed than Australian though, and fewer South Asians fall under the category “No Work, No Study”. This table represents 15,006 Australians and 171 South Asians in South East Queensland, and 5,029 Australians and 350 South Asians in Victoria. Despite the significantly lower number of South Asians in the table, it supports the argument that full-time international students may be supported by families overseas.

Table 4 Work/Study: Australians vs South Asians (Source: 2009 SEQ HTS, 2013 VISTA)

(Respondents % aged 18+ only)	2009 SEQ HTS		2013 VISTA	
	Australians	South Asians	Australians	South Asians
Work, Study	5.8	10.5	5.3	4.0
Work, No Study	61.5	53.2	67.5	70.9
No Work, Study	2.7	9.9	0.1	0.3
No Work, No Study	30.0	26.3	27.0	24.9

5. Travel Behaviour

The census collected very little on travelling patterns. Household size and vehicle ownership was recorded, but not segregated based on respondent nationality. The only travel mode recorded in the census was for going to work on a weekday. The SEQ HTS and VISTA was tailored to focus on travel behaviour, but the sample representing South Asians is quite small.

5.1. Method of Travel to Work

The census collected information on mode use for the journey to work on census day (a Tuesday), as presented in Figure 4. The figure also shows a comparison to the work-related trip data collected from 2009 SEQ HTS, which represents 7,444 trips by Australians (4,355 by males, 3,089 by females) and 64 trips by South Asians (39 by males, 25 by females). The last components shows the trip data collected from 2013 VISTA, which represents 7,444 trips by Australians (1,503 by males, 1,159 by females) and 158 trips by South Asians (96 by males, 62 by females).

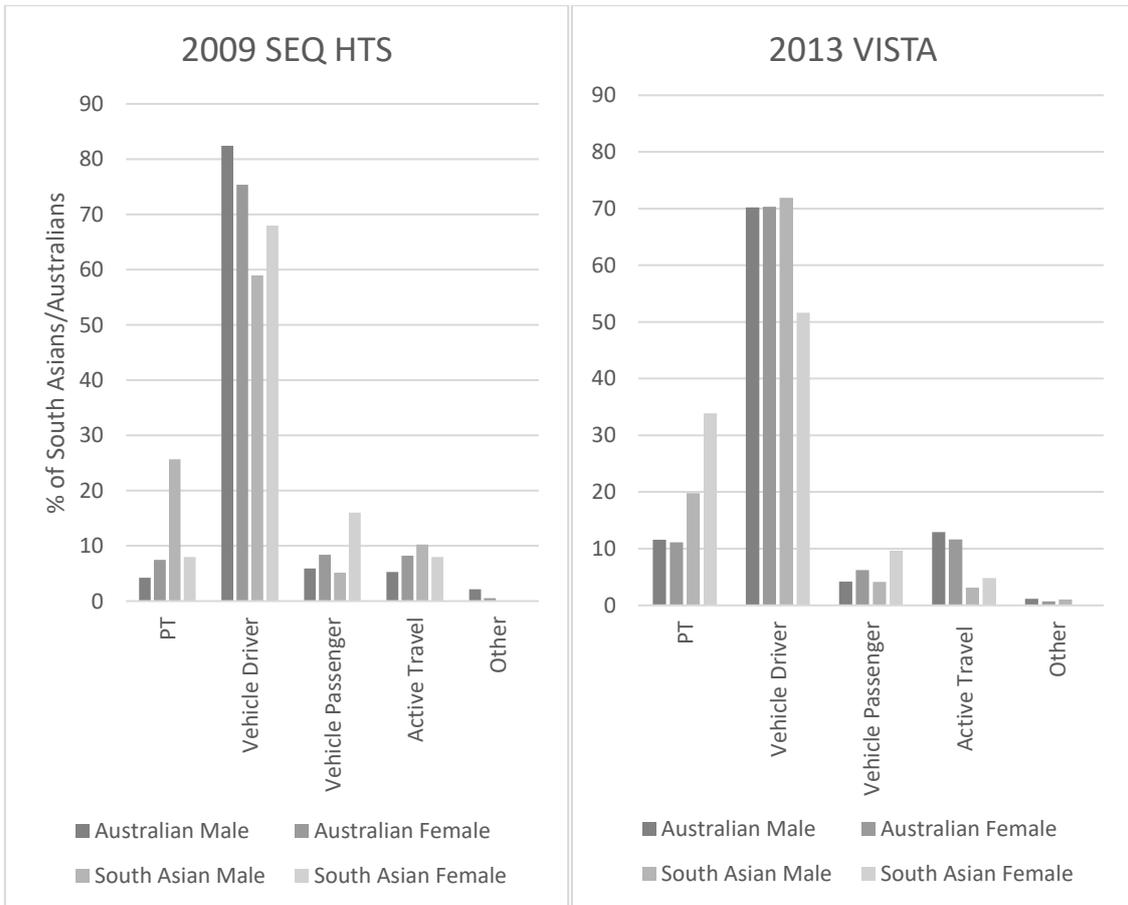
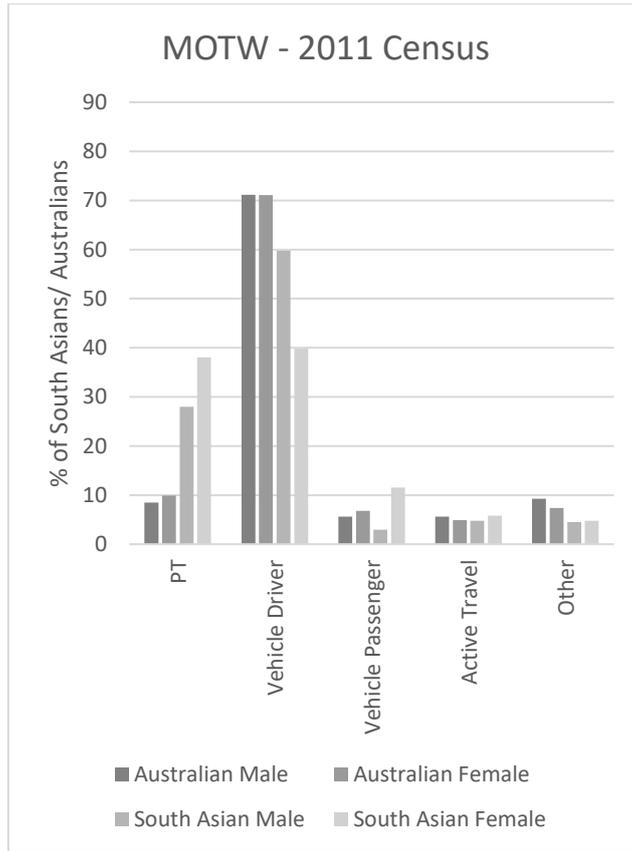


Figure 4 Method of travel to work: South Asians vs Australians (Sources: 2011 census, 2009 SEQ HTS, 2013 VISTA)

The data has been segregated based on gender as it is a key influence for travelling decisions in South Asians countries. A couple of trends can be observed. More South Asians use public transport than Australians while more Australians drive to work. More South Asian females tend to be vehicle passengers than any other cohort, while South Asian males are lowest in that aspect.

Some differences in patterns are present between the two samples. The census, which should hold higher validity due to a larger sample size, shows that females use PT more, and drive the least. The SEQ HTS, which has a smaller sample size, show that very few South Asian females use PT, and a greater proportion of them drive when compared to males. VISTA, on the other hand, showed South Asians' inclination towards motorized transport (PT, Vehicles) over active travel, and the mode preferences South Asians show similar proportions to the census.

5.2 Trips for non-work purposes

The data presented in Figure 5 represents 60,990 trips by Australians (28,370 by males, 32,620 by females) and 399 trips by South Asians (237 by males, 162 by females) from the SEQ HTS. VISTA had 20,905 trips by Australians (9,751 by males, 11,154 by females) and 966 trips by South Asians (557 by males, 409 by females).

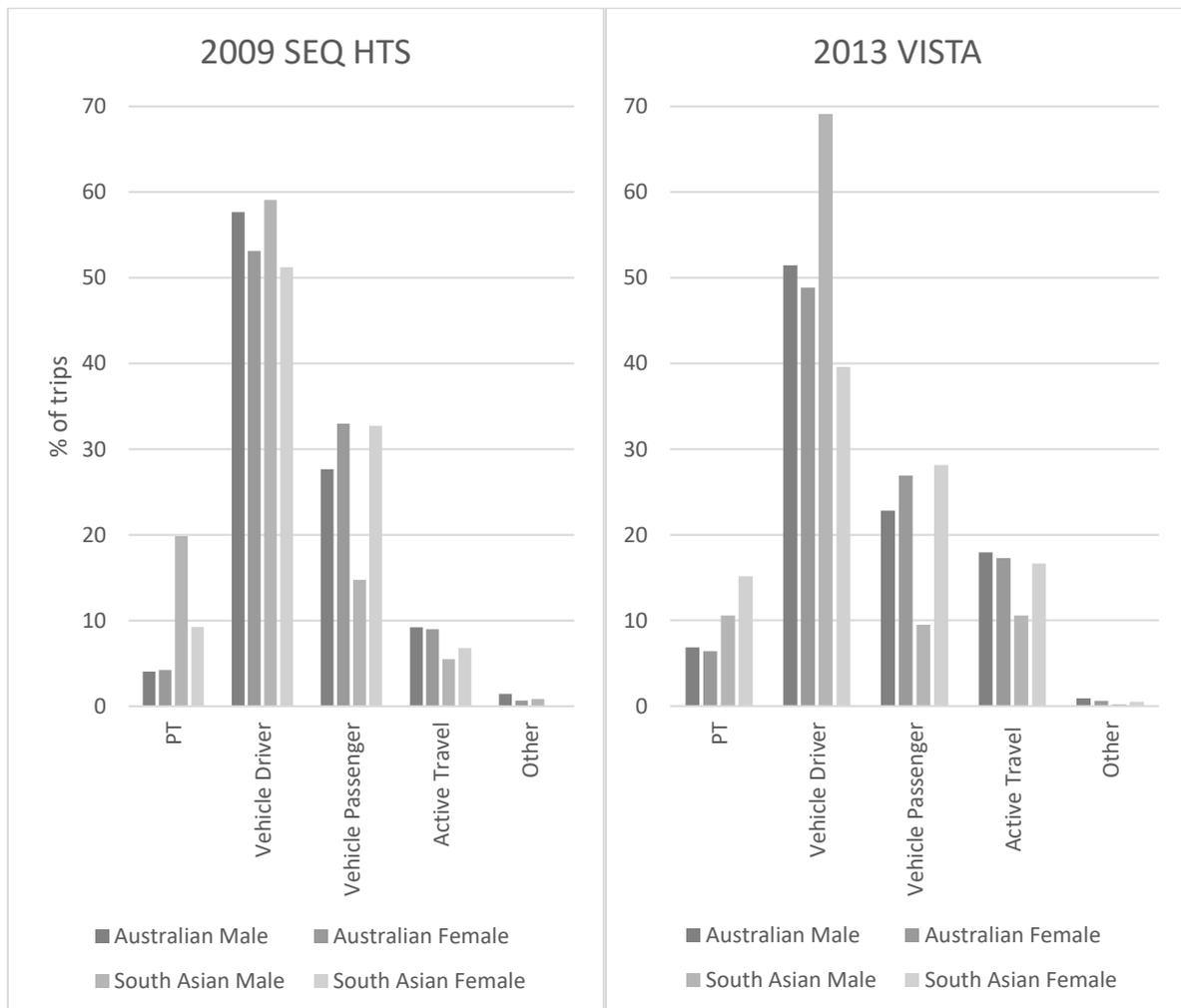


Figure 5 Travel Mode for all trips: Australians vs South Asians (Source: 2009 SEQ HTS, 2013 VISTA)

The figure suggests South Asians may drive more than the census suggests, but not necessarily for work. Proportionally, South Asian males drive the most, even more than Australians. However, this dataset includes respondents of all ages, while the census covers those above 15. This might explain the lower proportion of Australians choosing to drive, and more vehicle passengers. For South Asians however, because very few of them come before they turn 15 (See Figure 1), the composition is likely to be unaffected significantly.

However, if trips are analysed for each purpose, the mode shares are significantly different, as presented on Figure 6a and 6b. When analysing the total number of trips by Australians and South Asians, and the trips purposes, several interesting conclusions can be made.

- For social, recreational or shopping trips, mode choice is similar between South Asians and Australians.
- For education purposes, most Australians get a lift (60% of trips in SEQ HTS, 56% in VISTA). Most South Asians on the other hand get by with public transport (57%) according to SEQ HTS, whereas according to VISTA, a significant proportion rely on a combination of getting lifts (36%) and public transport (36%).
- All other charts have shown that South Asians usually don't prefer active travel. However, when accompanying others, it is their preferred mode according to the SEQ HTS (52%). In contrast, over 80% of 'accompanying' trips by Australians are as the vehicle passenger according to this dataset. In VISTA, however, active travel is not the top modal choice.

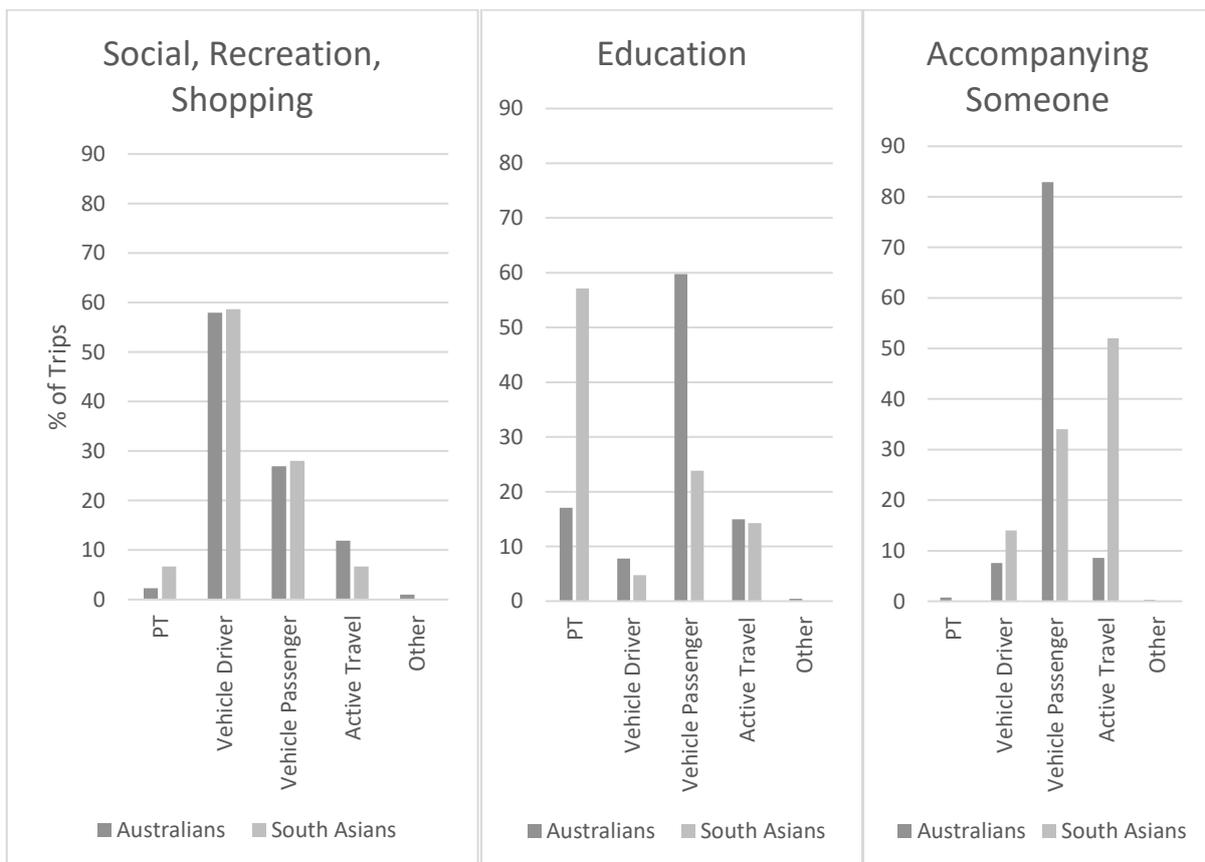


Figure 6a Mode split based on purpose of trips (Source: 2009 SEQ HTS)

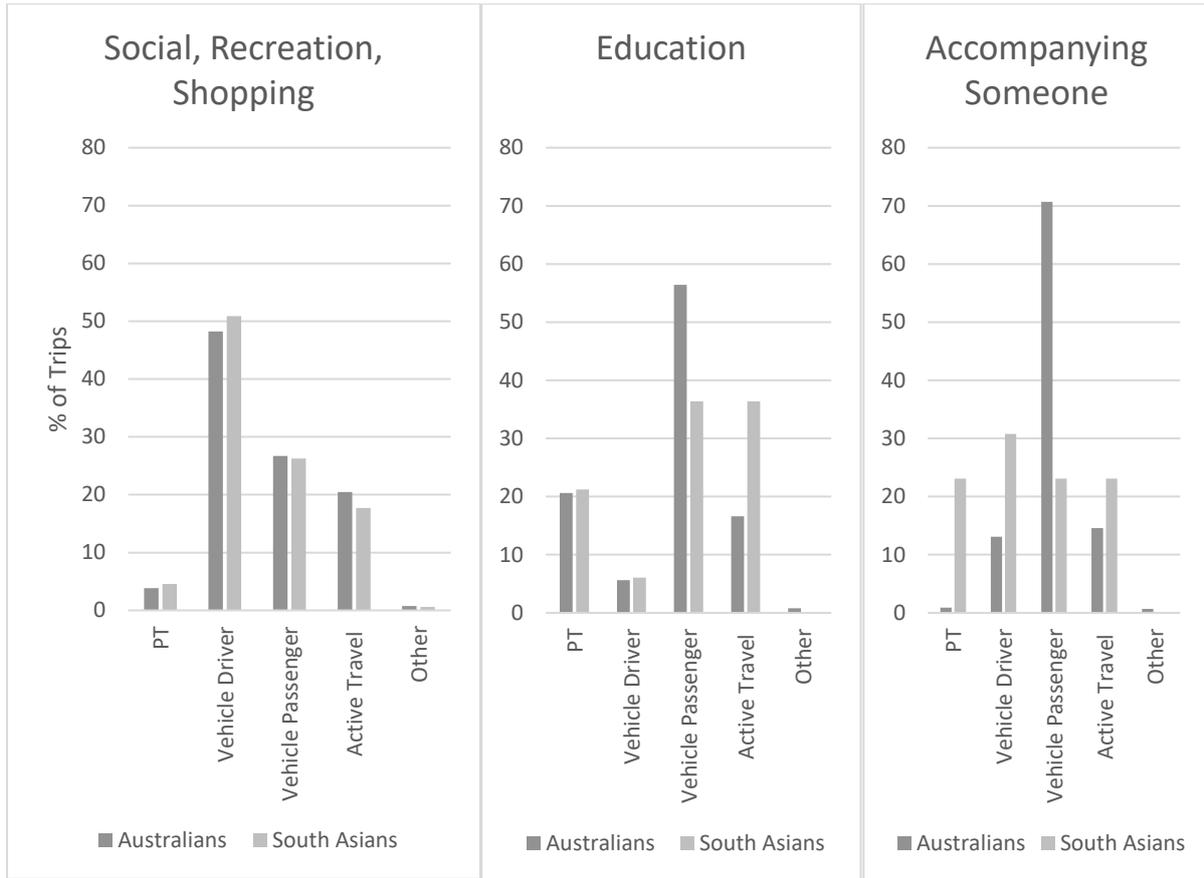


Figure 6b Mode split based on purpose of trips (Source: 2013 VISTA)

The comparison is different when all trips are analysed in the SEQ HTS and VISTA, and just work-only ones. Purpose of trip proportions was very similar amongst Australians and South Asians, males and females: notable differences include South Asian females travel lowest for social, recreational and shopping purposes, and South Asian males are lowest to 'accompany someone'. Most noteworthy, however, is that that work-related trips accounted for only 12% of all trips in the SEQ HTS survey.

5.3 Licensing and vehicle ownership

The census did not collect data on licensing rates or personal vehicles. Vehicle ownership at household level was collected, but could not be distinguished based on nationality.

Licensing rates amongst 21+ year olds were analysed from the 2009 SEQ HTS (14,174 Australians and 168 South Asians) and the 2013 VISTA (5,011 Australians and 360 South Asians). In South East Queensland, a larger proportion of Australians had full licenses, at 92%, compared to South Asians, at under 77%. Only 68% of South Asian females over 21 had full licensees there, while the corresponding number for Australian females was 91%. The numbers are very similar in Victoria, where 87% of South Asian males had full licenses (compared to 91% of Australians), while 63% of South Asian females had could respond the same (compared to 89% of Australian females).

Motor vehicle ownership rates at household level was separated based on country code in the 2009 SEQ HTS and 2013 VISTA, and a summary is presented in Table 5. The proportions are not based on the number of households, but rather the number of people who provided income and motor vehicle ownership data of the households they live in. This table therefore contains household duplications, representing multiple people living in the same household. The dataset included 20,735 Australians and 190 South Asians for the

2009 SEQ HTS, and 7,422 Australians and 415 South Asians for the 2013 VISTA. The findings from these datasets are:

- Australians live in households that have more motor vehicles on average. There are a significantly higher proportion of South Asian households with no motor vehicles.
- Although personal income levels are similar between Australians and South Asians, both surveys indicate a lower income for the latter on a household level. Income has been observed to be a key determinant for vehicle ownership for Australian and South Asian households alike.
- South Asians live in larger households, and very few of them live in single person households. Vehicle ownership amongst single-person South Asian households is significantly lower than corresponding Australian households.

Table 5 Household Income and Vehicle ownership characteristics (Source: 2009 SEQ HTS, 2013 VISTA)

Person Count	2009 SEQ HTS		2013 VISTA	
	Australian	South Asian	Australian	South Asian
Average MV/HH	2.07	1.63	2.00	1.65
% of HH with no MV	2.81 %	13.16 %	3.71 %	6.99 %
Average HH Income	\$ 1,822	\$ 1,754	\$ 2,180	\$ 1,970
Average HH Size	3.31	3.44	3.30	3.38
% of people in single HH	7.10 %	4.21 %	8.87 %	3.61 %
- % with 1+ MV	83.57 %	62.50 %	83.59 %	60.00 %
% of HH with 4+ people	46.18 %	51.05 %	47.80 %	49.64 %

6. Conclusions

Based on the data analysed here, South Asians and Australians appear to have different travel behaviours. South Asians make less use of active travel in general. Car use remains high despite lower ownership levels. Car sharing and larger household sizes have been observed in data from South East Queensland and Victoria, although whether this is case for the whole of Australia remains to be seen. South Asians females drive less compared to South Asian males or Australians. However, they do make a sizable proportion of trips in cars, often as vehicle passengers. South Asians do use public transport for commuting based on census data, with South Asian females more likely than males to use that mode. This could explain their inability to drive, or the better standards of transit in Australia compared to back in their country of birth, or a mix of both factors. Australians and South Asians alike have different mode choices for different trip purposes, but South Asians have unique choices contrasting to Australians. Most South Asians prefer transit for education-related trips, while choosing active travel when it comes to accompanying others.

Although this paper has identified some differences between South Asians and Australians in terms of travel choices, it is important to keep in mind that it is based on limited data. The 2011 census shows included information on 465,000 South Asian commuters, whereas the 2009 SEQ HTS survey studied only 190 and that, too in a region of the country where less than 10% of all South Asians reside. VISTA fared better, representing 415 South Asian

respondents. It cannot yet be confirmed whether those differences will be observed within a larger South Asian migrant pool. The existing data sources record household rather than individual car ownership and the census only considers mode choice for the journey to work. The 2009 SEQ HTS data is richer but only contains details for 399 South Asian trips separated across 11 transport modes (categorized into five in the analysis reported here) and 11 destination purposes (merged to seven in the analysis). VISTA recorded 966 trips. Samples of that size provide limited scope to identify statistically significant differences. Exploring that further is left to future research which can draw on more extensive data.

The migration system ensures that virtually all South Asians who come to Australia have a certain level of education, professional skill or financial capability (DIBP 2015). This makes existing research conducted in South Asia and focussed on the 'average' commuter less relevant. South Asians residing in Australia are certainly more educated and earn more on average than average South Asians residing in their birthplaces. This highlights that the comparison is more complex than simply considering 'South Asians in South Asia' vs 'South Asians in Australia'.

The results reported here have generated more questions than answers. If cars are in fact status symbols for South Asians back in their home countries, why is their motor vehicle ownership level lower than Australians? Is it because they earn less, something which the census does not suggest, or is it because they find public transport and other modes of travel acceptable to use in Australia but not in their home countries? Does car sharing really exist amongst South Asians? The literature suggests that should be the case, certainly more than Australians. There is lower motor vehicle ownership amongst households with South Asians, and yet the 2009 SEQ HTS and 2013 VISTA showed they make similar use of cars, if not more, than native-born Australians. Ethnic enclaves do exist and household sizes are larger, although how accurately the data for the latter portrays South Asians in Australia on a whole is debatable. Gender can be a factor in travel decisions amongst South Asians based on insight from the literature, and some cases observed seemingly supported this fact. Differences in personal income levels may help to explain that but further research is needed to unpack the underlying factors.

Understanding the differences in travel behaviour between South Asian migrants and native-born Australians provides scope for a range of research studies. In a country built by generations of immigrants, only the relatively recent arrivals have come from South Asia (DIBP 2015). Despite them being the fastest growing migrant group, very little is known about their travel behaviour or the travel behaviour of migrant groups in general. There is evidence they travel differently and that has potential implications for urban transport policy in Australia. Further research is needed to understand the potential impact of those differences on the effectiveness of initiatives designed to get more people to use transit and active travel or to discourage use of single-occupant motor vehicles. The assumption that native-born Australians and migrants, particularly South Asians, will think and behave in the same way is likely to be a poor one on which to design transport policy initiatives. Further research has the potential to provide valuable insight into this under-researched topic area.

7. References

- ABS. (2016, 30/03/2016). "3412.0 - Migration, Australia, 2014-15." Retrieved March 6, 2017, from <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3412.0/>.
- Australian Bureau of Statistics (ABS) (2011). Findings based on use of ABS TableBuilder Pro data. Findings based on use of ABS TableBuilder Pro data. TableBuilder.
- Australian Government Department of Immigration and Border Protection (DIBP) (2015). A History of the Department of Immigration: Managing Migration to Australia. Australia, Communication and Media Branch.
- Bandyopadhyay, K. R. (2008). "Implication of Fuel Price Deregulation on Fuel Demand and CO2 Emission: A Case Study of Car Ownership and Utilisation in India." Munich Personal RePEc Archive.
- Blumenberg, E. and M. J. Smart (2011). Migrating to Driving: Exploring the Multiple Dimensions of Immigrants' Automobile Use. Auto Motives: Understanding Car Use Behaviours, Emerald Group Publishing: 225 - 251.
- Campbell, M. (2012). "Young people choose computers over cars " Retrieved April 23, 2017, from <http://www.drive.com.au/motor-news/young-people-choose-computers-over-cars-20120402-1w7xw.html>.
- Chatman, D. G. and N. J. Klein (2013). "Why do immigrants drive less? Confirmations, complications, and new hypotheses from a qualitative study in New Jersey, USA." Transport Policy **30**: 336 - 344.
- Currie, G. and A. Delbosc (2015). "Spiral Plot Analysis of Variation in Perceptions of Urban Public Transport Performance Between International Cities." Transportation Research Record: Journal of the Transportation Research Board(2538): 54-64.
- Delbosc, A. and G. Currie (2014). "Impact of Attitudes and Life Stage on Decline in Rates of Driver's License Acquisition by Young People in Melbourne, Australia." Transportation Research Record: Journal of the Transportation Research Board(2452): 62-70.
- Department of Economic Development, J., Transport and Resources, State Government of Victoria, Australia (Victoria State Government) (2013). The Victorian Integrated Survey of Travel and Activity 2013.
- DIBP. (2014). "The People of Australia - Statistics from the 2011 Census." Retrieved March 6, 2017, from <https://www.border.gov.au/ReportsandPublications/Documents/research/people-australia-2013-statistics.pdf>.
- Ellaway, A., S. Macintyre, R. Hiscock and A. Kearns (2003). "In the driving seat: psychosocial benefits from private motor vehicle transport compared to public transport." Transportation Research Part F **6**: 217 - 231.
- Enam, A. and C. F. Choudhury (2011). "Methodological Issues in Developing Mode Choice Models for Dhaka, Bangladesh." Transportation Research Record: Journal of the Transportation Research Board **2239**: 84 - 92.
- Getersleben, B. (2007). Threats from Car Traffic to the Quality of Urban Life, Elsevier Ltd.
- Handy, S., E. Blumenberg, M. Donahue, K. Lovejoy, C. Rodier, S. Shaheen, K. Shiki and L. Song (2008). "Travel Behavior of Mexican and Other Immigrant Groups in California." Berkeley Planning Journal **21**(1).
- Haustein, S., C. A. Klöckner and A. Blöbaum (2009). "Car use of young adults: The role of travel socialization." Transportation Research Part F **12**: 168 - 178.
- He, S. Y. and J. Thøgersen (2017). "The impact of attitudes and perceptions on travel mode choice and car ownership in a Chinese megacity: The case of Guangzhou." Research in Transportation Economics: 1 - 11.
- International Road Assessment Programme (iRAP). (2008). "Transport in Australia." International Transport Statistics Database Retrieved April 4, 2017, from <http://www.iraptranstats.net/aus/>.
- Iyer, N. V. and M. G. Badami (2007). "Two-wheeled motor vehicle technology in India: Evolution, prospects and issues." Energy Policy **35**: 4319 - 4331.

- Johansson, M. (2006). "Environment and parental factors as determinants of mode for children's leisure travel." Journal of Environmental Psychology **26**: 156 - 169.
- Kerr, S.-M., N. Klocker and G. Waitt (2016). *Low Carbon Mobility Transitions*. D. Hopkins and J. Higham, Oxford: Goodfellow Publishers.
- Liu, C. Y. and G. Painter (2012). "Travel Behaviour among Latino Immigrants: The Role of Ethnic Concentration and Ethnic Employment " Journal of Planning Education and Research **30**(1): 62 - 80.
- Mahmud, M. and A. Rabbani (2012). *Travel Mode Choice Preferences of Urban Commuters in Dhaka: A Pilot Study*. Bangladesh Country Growth Program International Growth Centre (IGC). I. G. C. (IGC), London School of Economics and Political Science.
- Morrall, J. F., L. L. Ratnayake and P. N. Seneviratne (1991). "Comparison of Central Business District Pedestrian Characteristics in Canada and Sri Lanka." Transportation Research Record(1294): 57 - 61.
- Muromachi, Y. (2017). "Experiences of past school travel modes by university students and their intention of future car purchase." Transportation Research Part A.
- Peters, D. (2001). *Gender and Transport in Less Developed Countries*. Berlin, United Nations Commission on Sustainable Development.
- Pucher, J., N. Korattyswaropam, N. Mittal and N. Ittyerah (2005). "Urban transport crisis in India." Transport Policy **12**: 185 - 198.
- Raza, M. (2016). Exploring Karachi's transport system problems: A diversity of stakeholder perspectives, IIED.
- Sheller, M. (2004). "Automotive Emotions : Feeling the Car." Theory, Culture & Society: 21 - 221.
- Shimazaki, T. and M. M. Rahman (1995). "Operational Characteristics of Paratransit in Developing Countries of Asia " Transport Research Record **1503**: 49- 56.
- Singh, S. K. (2015). *Scenario of Urban Transport in Indian Cities: Challenges and the Way Forward*. Cities and Sustainability: Issues and Strategic Pathways. S. M. Dev and S. Yedla. India, Springer: 81 - 111.
- Smart, M. J. and N. J. Klein (2017). *Remembrance of cars and buses past: How prior life experiences influence travel*. 96th Annual Meeting of the Transportation Research Board. United States.
- Srinivasan, S. and P. Rogers (2005). "Travel behavior of low-income residents: studying two contrasting locations in the city of Chennai, India." Journal of Transport Geography **13**: 265 - 274.
- Tal, G. and S. Handy (2010). "Travel behavior of immigrants: An analysis of the 2001 National Household Transportation Survey." Transport Policy **17**: 95 - 93.
- The Urban Transport Institute (TUTI) (2008). *Survey Procedures and Documentation*. Victorian Integrated Survey of Travel & Activity 2007-08, I-view Pty Ltd: 121.
- Thigpen, C. and S. Handy (2015). *Driver's Licensing Delay: A Retrospective Study of the Impact of Attitudes, Parental and Social Influences, and Intergenerational Differences*. Transportation Research Board (TRB) 95th Annual Meeting. United States.
- Thomas, J. A. P. K. (2009). The Social Environment of Public Transport. Doctor of Philosophy, Victoria University of Wellington.
- Transport and Main Roads Queensland Government (TMR) (2009). *South East Queensland Household Travel Survey Data*.
- United Nations Development Programme (UNDP) (2016). Table 1: Human Development Index and its components. Human Development Reports.
- Verma, M., M. Manoj and A. Verma (2016). "Analysis of the influences of attitudinal factors on car ownership decisions among urban young adults in a developing country like India." Transportation research part F: traffic psychology and behaviour **42**: 90-103.
- World Heritage Encyclopedia (2016). *List of countries by vehicles per capita* World Heritage Encyclopedia.