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The travel attitudes and behaviours of South Asian international students: a study from Monash University

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Abstract

In recent years, the Australian transport system is struggling to cope with increased demand driven by population growth, which in turn is driven by immigration and much of this immigration occurs through international students who settle in Australia. Yet there isn't much research on the travel behaviour of immigrants in Australia, let alone international university students. One of the fastest-growing immigrant groups in Australia is from South Asia, where the travel circumstances are distinctly different to the Australian context. This study is an attempt to explore the past and present travel habits, attitudes and related variables that may influence the travel behaviour of South Asian international students in Australia. We found an increased importance and significance of owning and using a car among international students from South Asia when compared to native-born Australians. They have lower car access yet a higher rate of licence holding than Australian students; more importantly, car use increases and catches up with native-born Australians within three years, which has important implications for transport policy. This is one of the first studies that looks at immigrants' travel habits in Australia, and it is clear that more work needs to be done to build upon this under-researched topic in Australia.

1 Introduction

Australian's population grew by 12.2% between the years 2011 and 2016. This has been largely driven by the large influx of immigrants; during the same time period, the overseas-born population grew by 16.5% (ABS 2016b). The profile of Australian immigration has also changed dramatically over time. Traditionally, most immigrants came from UK and the developed world; on the other hand, today's immigrants from Asia and from other developing countries are arriving at an accelerated pace. A large proportion of these immigrants arrive as university students (ABS 2011, ABS 2016b) before settling to work here (Delbosc, 2018) or applying for permanent residency (DIBP

2015), meaning that their time at university likely plays an important role in shaping their long-term travel behaviour in Australia.

The growth and changing composition of the Australian population is placing large strains on Australia's public transport infrastructure and road network (iRAP 2008). We know very little about the travel habits of immigrants in Australia but based on research from other countries (Blumenberg and Smart, 2010, Tsang and Rohr, 2011, Liu and Painter, 2012, Tal and Handy, 2010) they likely travel differently to native-born Australians. It is important to understand how they may shape the transport system of Australia by exploring their travel habits and perceptions.

Each immigrant group is likely to have unique characteristics that influence their transport attitudes and behaviour. South Asians were chosen for this study because they are the largest culturally assimilated group of immigrants in the country, and one of the fastest growing (ABS 2011, ABS 2016b). In this paper, we explore how travel behaviour and travel attitudes differ between South Asian international students and native-born Australian students at Monash University in Victoria, Australia. In particular, we are interested in knowing if:

- South Asian and Australian students think differently or alike.
- They travel differently today or have travelled differently in the past.
- South Asians' travel habits are evolving, and if so, how this affects the transport system as whole

The outcomes of this study will give us further motivation to explore the travel habits of immigrants in more detail, a dimension which is rarely explored in travel surveys and studies in Australia.

2 Literature review

Because of the lack of similar research in Australia and how the results of immigrant travel habit studies around the world would be different to what we might find in the Australian, the literature review was very open-ended and exploratory. We chose a wide variety of literature, from studies on immigrants to ones on the role of attitudes and social norms, and included research in South Asia and research in the developed world.

A lot of research suggests that immigrants and ethnic minorities do not travel or live in the same way as native-borns would. Most of such research have been undertaken in the United States (Handy et al., 2008, Blumenberg and Smart, 2011, Blumenberg and Smart, 2010, Liu and Painter, 2012); some in the UK (Tsang and Rohr, 2011). These researches typically arrive to similar conclusions concerning immigrants – presence of ethnic enclaves amongst immigrants often living in larger household. Often immigrants choose to live with other immigrants who are culturally-alike, and this leads to increased carpooling and/or carsharing, as research in United States has shown (Blumenberg and Smart, 2010) These findings are often explained by income, ethnicity and gender. Yet, such variables could not explain travel differences between native-borns and immigrants (Kerr et al., 2016, Klocker et al., 2015).

2.1 The need to study immigrant travel behaviour in Australia

Recent Australian news is placing great emphasis on increasing population growth driven by immigration and its impact on the transport system (Kelly, 2017, Knight, 2018). Yet in Australia, there is very limited research on immigrants. In fact, most travel surveys avoid questions on ethnicity and country of birth for perceived intrusiveness (Department of Transport and Main Roads Queensland, personal communication, May 2017) or political incorrectness (Monash University Campus Access and Transport, personal communication, June 2018).

Australia is unique for the demographics of immigrants coming in. In the United States for example, the focus is mainly on Hispanic communities and other low-income immigrant groups. On the other hand, many of Australia's immigrants arrive from China and South Asia (ABS 2016a). Most (over 65%) enter Australia through skilled migration programs (Phillips and Simon-Davies, 2017) or as students (DIBP 2015). The immigration system ensures that virtually all South Asians (all immigrants for that matter) who come to Australian have a certain level of education, professional skill or financial capability (DIBP 2015). Similarly, just taking their travel research from South Asian countries is not sufficient either as only a very specific subset of South Asians makes it to Australia; this is shown by the demographics of South Asians in Australia (Shafi et al., 2017) compared to the typical income and education levels of South Asians back home (UNDP 2016).

Any particular immigrant group itself is a large and diverse prospect to study regardless of ethnicity, exploring which may require years of research. However, it needs to be done as the arrival of immigrants is outpacing natural population growth. In Melbourne, public transport only made up for 4% of all weekday trips (Transport for Victoria, 2018), and it is likely that most were CBD-based trips. If immigrants in Australia were to settle in suburban environments similar to immigrants in other countries, this would result in increased car-based trips. For this reason, the focus is on international students, for this paper at least.

2.2 International students, and the importance of understanding their travel habits

Australia is considered an attractive destination for international students, top-ranked university and some of the most liveable cities in the world. The state of Victoria is referred to as the Education State, and is home to one-third of all international students in Australia (Minister for Training and Skills, 2016). In 2017 alone, more than 200,000 students from 170 countries came to Victoria for higher education (Minister for Training and Skills, 2016). Education-related services were the largest service-based export (DFAT 2016) and fourth largest export overall for Australia (DFAT 2017).

Amongst first-generation South Asian immigrants in Australia, about 20% are students (ABS 2016b). Along with other international student groups, their travel habits should be an important consideration for transport planners, and they are in large numbers at present. Many choose to settle in Australia upon the completion of their studies; even if they don't, this current group will depart and a new group of students will arrive, essentially resetting the counter. As a result, the study was narrowed down to international students, as any immigrant group is a broad proposition

South Asians living in Australia on average have more postgraduate qualifications than the native-born population (Shafi et al., 2017). Yet, when the 2013 Victorian Integrated Survey of Travel and Activity was analysed in another paper, only 15 out of the 345 South Asian people who responded were studying in either part-time or fulltime roles (4.3%), showing great under-representation (Shafi et al., 2017, Transport for Victoria, 2013). Recent immigrants are usually underrepresented in travel studies (Tal and Handy, 2010), as are young adults (Stangeby, 2000) and university students (Wang et al., 2012). It should be noted that not many studies on immigrant and ethnic minority travel habits exist in Australia (Kerr et al., 2016, Klocker et al., 2015). Neither of those studies could confirm that differences in travel habits exist due to sociodemographic factors.

2.3 South Asians, the role of attitudinal factors and the importance of country of birth

Most travel-related surveys usually ask questions income, household demographics, car access etc. Questions on attitudes and social norms are seldom asked in major travel surveys in Australia such as VISTA (Victorian Integrated Survey of Travel and Activity) or the SEQ HTS (South East Queensland Household Travel Survey). Past travel habits are also often ignored yet should be of importance, as found in Japan (Muromachi, 2017).

Different immigrant groups will think and behave differently (Varasteh et al., 2015), hence the focus is only on South Asians in this study due to their distinct culture and transport infrastructure. In this context, South Asia includes *India, Bangladesh, Pakistan, Sri Lanka, Maldives, Nepal and Bhutan*. South Asians are, at present, the largest immigrant group in Australia (ABS 2016b), and were one of the fastest growing with a growth rate of 89% between 2006 and 2011 (ABS 2011). As of 2016, South Asians made up for 3.02% (ABS 2016b) of Australia's population – and this only includes first generation immigrants. It is likely they retain strongly pre-arrival travel mode attitudes.

2.3.1 The perceived importance of car ownership amongst South Asians

Australia has one of the highest motor vehicle ownership rates in the world, while South Asian countries have some of the lowest (WHE, 2016). Public transport is South Asia is also quite unreliable and unsafe (Wang et al., 2012, Enam and Choudhury, 2011), and a lot South Asians aspire to car ownership (Verma et al., 2016, Raza, 2016). However, public transport use remains quite high (Enam and Choudhury, 2011) as the majority of the population simply cannot afford other modes of transport (UNDP 2016).

Students from developing economies in general have shown a very strong desire to purchase a car (Belgiawan et al., 2014). Other researchers have found that car ownership is associated with education level and occupation in developing economies (Verma et al., 2016, He and Thøgersen, 2017), something not observed in Australia (Delbosc and Currie, 2014). Car use is also quite different due to the low car-ownership rates amongst families; furthermore, with associated affluence comes a chauffeur-oriented culture that increases car-sharing and carpooling (Enam and Choudhury, 2011), and this is a habit they likely brought over to Australia (Shafi et al., 2017). Cars are typically associated with self-presentation, status (Getersleben, 2007) and self-

esteem (Sheller, 2004, Thigpen and Handy, 2015) and are known to provide greater privacy, safety and security than public transport (Ellaway et al., 2003). This may hold true for both South Asians and Australians, although existing research suggests the such feelings being much stronger for South Asians.

If South Asians' (and other immigrant groups) strong positive feelings towards car-ownership and use were to extend in Australia, then it would further hinder our transition towards a less car-dependant society. We need more people on public transport and choose walking and cycling as a mode to relieve pressure off the transportation system of the country, and encouraging international students to do so will facilitate that transition. In this paper, we try to answer the following questions:

- How do South Asian and Australian students perceive different modes?
- How do two groups' past and present travel habits differ?
- How do South Asians' travel habits evolve during their stay in Australia?

3 Methodology

This study is an attempt to explore the past and present travel habits, attitudes and related variables that may influence the travel behaviour of South Asian international students in Australia. Since such a study had not been taken prior to this research in Australia, or in the context of students elsewhere, a survey was designed and distributed. We chose Monash University as the case study for this research. Monash University is a public university; with over 70,000 students it is the largest university in the state of Victoria. Its largest campus is located in the suburb of Clayton, 17 km from the city centre (Middle Melbourne), while there are other campuses in inner-Melbourne (Caulfield, Parkville, AMREP) and outer-Melbourne (Peninsula).

3.1 Survey design

The survey questionnaire itself was comprehensive – it asked 27 attitudinal, habitual and intention-based questions, and multiple questions on past and present travel habits, and socio-demographics. These questions have been heavily influenced by the Theory of Planned Behaviour (Madden et al., 1992). The theory associates one's attitudes and beliefs with his/ her actions; since socio-demographics could not previously explain travel differences between immigrant and native-born groups in Australia, this study focuses on perceptions and other non-sociodemographic factors that may explain travel differences. The questions asked on the survey covered, but was not limited to:

- Socio-demographic factors (age, household structure, car access, license)
- Attitudinal factors (mode perceptions, perceptions of friends/family)
- Past travel habits (during high school, including school, family and social trips)
- Future intentions (settle in Australia/overseas, car ownership)
- Travel habits (mode use frequency, mode choice for trip purpose)

The survey was open mid-year during the winter semester break, and was closed two weeks into August. While participants responded during the holiday, the questions were geared towards, day-to-day general travel habits.

Most questions had a predetermined set of responses. Many of the responses were recorded on a scale of 1 to 5, where 1 represents “Strongly Disagree” and 5 represents “Strongly Disagree”. Mode use frequency was also recorded on a scale of 1 to 5, where participants could indicate if they use a particular mode “Always” (represented 5) or “Never” (represented by 1). Also, participants were allowed to choose a “mode” from a list of choices (drive, driven by someone else, public transport, walking, cycling, other/ NA). As for the socio-demographic questions, participants choose one or multiple of the options provided; i.e. gender (male, female, other), campus (one or multiple of Clayton, Caulfield, etc.) and other variables presented in Section 4.

3.2 Distribution and analysis

The survey was advertised through posters with tear-off tabs, postcards and distribution through personal contacts around Monash University campuses within Victoria. Social media, Facebook in particular, was used extensively to promote the research, with surveys links posted on multiple university social clubs and community pages. The survey was open for about a month. A total of 496 participants were recorded; we do not know exact response rate because of nature of recruitment. The analysis only includes responses that were complete (partial responses were discarded), and by respondents aged over 18. In addition, we only selected participants born in either Australia or South Asian countries. Some 251 responses were deemed appropriate for further analysis, 179 from Australian students and 72 from South Asians.

Since asking country of birth is considered intrusive by many (which we as researchers disagree, more in discussion), data was not available for how many South Asian international students there were in Monash University. Our judgement for studying South Asians in this research is solely based upon census data.

This paper only presents some of the primary preliminary findings. As such, the results primarily consist of descriptive tables and graphs, and t-tests to analyse the significance of differences, primarily between South Asian and Australian students for attitudinal and travel behaviour variables and to test the research questions outlined earlier.

4 Results

This section presents some of the key findings of the survey. As mentioned earlier, the survey only compares university students born in Australia and those born in South Asia. For ease of communications, “South Asians” in this section of the report refers to international students from South Asia. “Australians” refer to native-born Australians university students.

4.1 Demographic differences (amongst respondents)

Table 1 shows that there is a great underrepresentation of South Asian females; whether this is the case of Monash University or all universities, South Asians or all international students, remain to be explored. South Asians are, on average, older, and a larger proportion of them are enrolled in postgraduate degrees compared to Australians. Less than half of "Australians" were actually born to both Australian parents, suggesting second and later generation immigrants.

International students are more likely to be financially supported by family considering the high tuition and living expenditures in Australia, while Australia students were more likely to live with their families. As a result, income was not asked in this survey.

It should be noted that most participants studied in middle-Melbourne (suburban) campuses, such as Clayton. If the study were undertaken in a city-location, the responses may have indicated a preference for non-car modes such as public transport, walking and cycling. However, it should be noted that only 150,000 Melbournians live in the CBD (out of 4.4 million as of 2016).

Table 1: Socio-demographic factors of respondents

		Australians		South Asians	
		N	%	N	%
		179	*100.00*	72	*100.00*
Age		*Mean = 21.77*		*Mean = 24.07*	
Parents	Both born in Australia	89	*49.72*		
	One born in Australia	51	*28.49*		
	Both born overseas	39	*21.79*	72	*100.00*
Education	Diploma/ Undergraduate Degree	163	*91.06*	39	*54.17*
	Postgraduate degree (Master's or PhD)	16	*8.94*	33	*45.83*
University campus[ab]	Inner Melbourne	61	*27.93*	24	*32.00*
	Middle Melbourne	130	*70.95*	49	*65.33*
	Outer Melbourne/ Other	6	*3.05*	2	*2.67*
Gender	Male	74	*41.34*	55	*76.39*
	Female	104	*58.10*	17	*23.61*
	Other/ Prefer not to say	1	*0.56*		

a. Total percentage greater than 100% because multiple students have responded to attending more than one campus

b. Some students (Australian N = 10 and South Asian N = 15) were included despite not being from Monash University due to respondent pool being small.

4.2 Household structure, access to cars and licence-holding rate

Table 2 shows that South Asian student respondents have higher driver licensing rates than Australians. This may be because South Asian students in our study are older than Australians, and females made up for a much smaller proportion of the respondent pool. This also agrees with recent trends emerging in Australia where young adults are delaying the age at which they get their license (Delbosc and Currie, 2014). Despite this, more Australians have access to a car than South Asians do.

Table 2. Household and car access: South Asian vs Australian respondents

		Australians		South Asians	
		N	%	N	%
		179	*100.00*	72	*100.00*
People in Household	1 (alone)	13	*7.26*	11	*15.28*
	2	22	*12.29*	9	*12.50*
	3	32	*17.88*	8	*11.11*
	4	79	*44.13*	22	*30.56*
	5 or more	33	*18.44*	22	*30.56*
Household Structure	Alone on-campus	12	*6.70*	8	*11.11*
	Alone off-campus	5	*2.79*	6	*8.33*
	Off-campus with friends or roommates	22	*12.29*	41	*56.94*
	Off-campus with family	127	*70.95*	12	*16.67*
	With my partner/spouse	10	*5.59*	3	*4.17*
	Other	3	*1.68*	2	*2.78*
License	Provisional or full license	130	*72.63*	61	*84.72*
	Learner's permit or none	49	*27.37*	11	*15.28*
Access to a car you can drive	Yes	137	*76.54*	41	*56.94*
	No	42	*23.46*	31	*43.06*

South Asians also live in larger households on average than Australian student respondents. This is despite the fact that a larger proportion of them live in on-campus accommodation or other single occupant off-campus accommodations. Most Australians live with their families, while most South Asians live off-campus with friends or roommates. It is more likely that Australian students have to travel longer distances (and will naturally use car and public transport more), while South Asian students could use more active travel as a result of choosing to live near campus.

4.3 Present mode use

South Asians drive less than Australians for any given trip purpose, but also are driven more – suggesting that carpooling is higher amongst South Asian international students. For example, for recreational trips, over 17% of South Asians are driven by someone else, while less than 10% of Australians are driven. The same can be said about "other trips" – 13% for South Asians versus 10% for Australians. For work trips however, Australians are driven more. But these figures may also explain South Asians using cars at similar (albeit lower) levels to Australians (higher, however, for recreational trips), despite almost half the South Asian respondents not having access a car. We are more concerned about car-dependency in general. It has already been established that South Asians typically drove less in their home countries and were driving more. However, to accurately compare car-dependency, it would be simpler to combine all car trips (as a driver or passenger) before comparison. For this, Figure 1 presents car trip as driver or passenger together, and active travel accounts for walking or cycling. Non-car mode choice amongst the two groups of respondents were similar, although South Asians favour public transport more for work related purposes, and active travel more for education related trips.

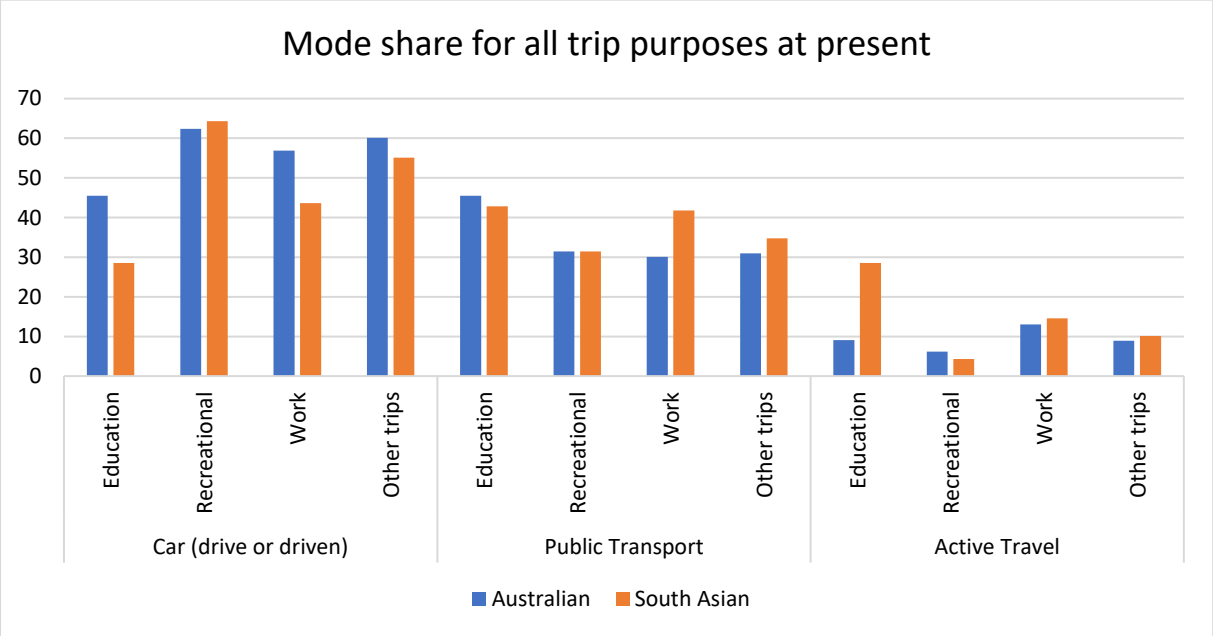

Figure 1. Present day mode use by trip purpose: South Asian vs Australian respondents

Australians were more car-dependant as they lived with family. South Asians, who have never lived in Australia before arriving, may choose to live closer to university for familiarity and convenience. This is suggested by the high active travel proportions for education-based trips amongst South Asians.

Figure 1 may be considered misleading because it does not control for car access, and Table 2 shows that car ownership rates are much lower for South Asians. Mode choices for only participants who have access to a car they can drive shows a different story (Table 3). If a South Asian student has a car, he/ she drives it more for non-university trips than an Australian counterpart. There is more walking and cycling as well. All

these increases come at the expense of using public transport, use of which decreases amongst South Asians with car access. This suggests that over years if South Asians in Australia were to acquire cars, which economically they are perfectly capable of doing in Australia (according to the census), they would transition to a car-based lifestyle, which is not unlike South Asian car-owners back in South Asia.

Table 3. Frequency of mode use amongst respondents with car access amongst respondents

		Australians	South Asians	Difference
Drive/ Driven	To/from University	3.20	3.22	0.02
	Non-university	3.74	4.17	0.43*
Public transport	To/from University	2.66	2.51	-0.14
	Non-university	2.36	2.20	-0.17
Walk	To/from University	1.35	2.34	0.99**
	Non-university	1.70	1.85	0.15
Cycle	To/from University	1.22	1.51	0.29*
	Non-university	1.30	1.54	0.24
Participants		*137*	*41*	

*** = p < 0.05** **** = p < 0.005**

Scores recorded on scale of 1 to 5, where 1 = Never and 5 = Always

4.4 Effect of years lived in Australia on mode choice

Because there is uncertainty over the long-term travel behaviour of immigrants, we wanted to explore this among South Asian students. As Table 4 shows, car use increases the longer a South Asian is in Australia, actually overtaking the Australian average after three years. Despite the small number of respondents, the trend is consistent with research from North America (Liu and Painter, 2012, Tal and Handy, 2010), which suggests that immigrants assimilate to native-borns' travel habits over time. And we already know that Australians are very car-centric.

Table 4. Years lived in Australia vs frequency of mode use (scale of 1 to 5=Always) for South Asian participants

Years in Australia	*N*	Drive		Public Transport		Walking		Cycling	
		University	Other	University	Other	University	Other	University	Other
Less than 1	*22*	1.55	1.95	3.23	3.27	3.32	2.64	1.32	1.55
> 1 and < 2	*17*	2.00	2.59	2.82	3.47	2.94	2.12	1.35	1.35
> 2 and < 3	*16*	2.50	3.00	3.06	2.81	2.37	1.94	1.37	1.31
More than 3	*17*	3.41	4.35	2.35	2.18	2.35	2.06	1.65	1.71
Australian average	*137*	*3.20*	*3.74*	*2.66*	*2.36*	*1.35*	*1.70*	*1.22*	*1.30*

Scores recorded on scale of 1 to 5, where 1 = Never and 5 = Always

The change is more noticeable for non-university trips (Figure 3) compared to 12 university trips (Figure 2). Regardless of car access as accounted for in Table 3 earlier, driving increases, walking and public transport use decreased.

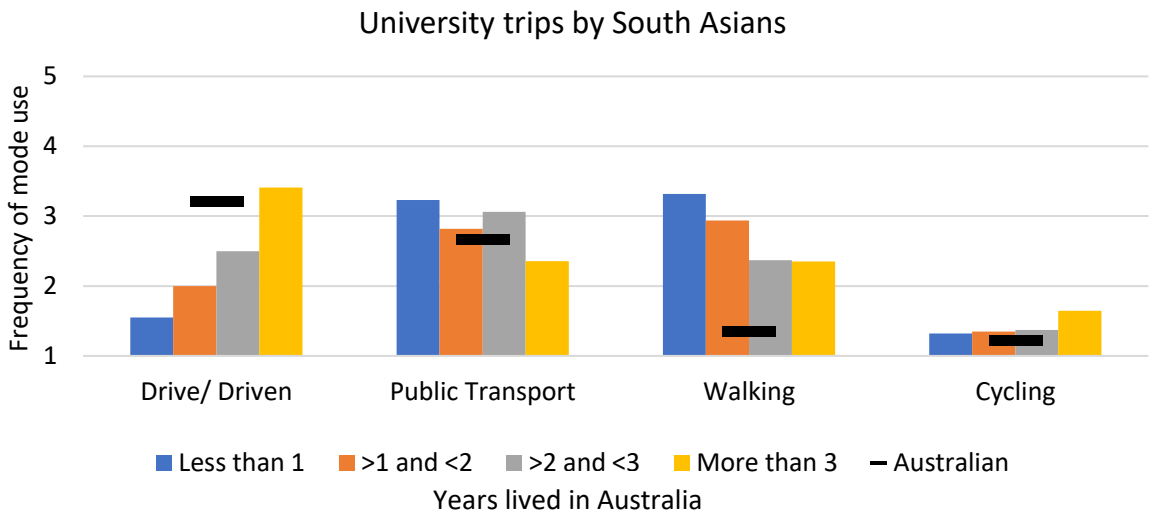

Figure 2 Years lived in Australia vs mode choice for university trips amongst respondents

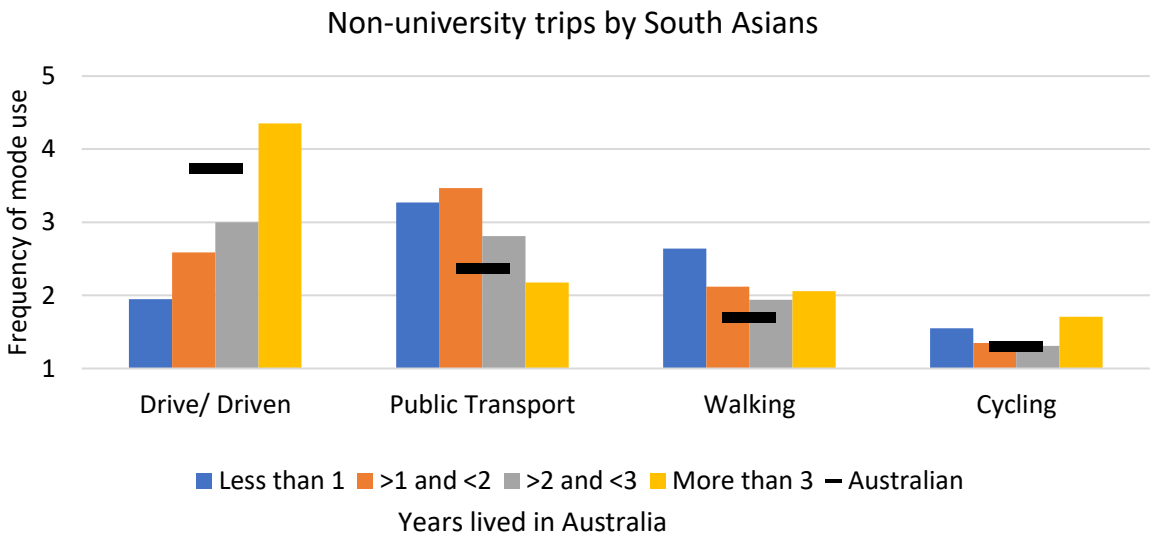

Figure 3 Years lived in Australia vs mode choice for non-university trips amongst respondents

4.5 Past travel habits

Past travel behaviour is an element rarely looked at in immigrant studies. Research conducted within South Asia shows that public transport is in use, yet not desired, whereas cars are desired, but are not affordable to most people (Enam and Choudhury, 2011, Pucher et al., 2005, Iyer and Badami, 2007, Raza, 2016) due to low income. Yet the South Asians who immigrate to Australia are clearly not representative of South Asians within their country of origin. As discussed earlier, the survey asked about their use of travel modes for certain trip purposes, and the responses were recorded on a scale of 1 to 5 (=Always). This is shown in Table 5 below.

Table 5. Mode use during high school amongst respondents

	School		Recreational Activities		Family Outings	
	Australians	South Asians	Australians	South Asians	Australians	South Asians
Drive or driven	2.77	2.93	3.50	3.40	4.27** (a)	3.64** (a)
Public Transport	2.84** (b)	2.19** (b)	2.40	2.31	1.58** (c)	2.00** (c)
Walking	1.75* (d)	2.18* (d)	1.83* (e)	2.13* (e)	1.62	1.76
Cycling	1.26* (f)	1.57* (f)	1.32** (g)	1.68** (g)	1.17** (h)	1.44** (h)

*** = p < 0.05 ** = p < 0.005**
Scores recorded on scale of 1 to 5, where 1 = Never and 5 = Always
Letters identify pairs compared for independent samples T-tests

Despite the low car ownership levels in South Asian countries and the large difference in income levels and transport infrastructure between South Asia and Australia, the past travel habits of South Asian international students at Monash University were found to be very similar to Australians. This suggests that the certain proportion of South Asians who do enter Australia, even as international students, are likely to be wealthier than the average South Asian population, especially when considering the high tuition fees. While car use and public transport use was similar on average, South Asians did walk and cycle more than Australians for all trip purposes.

4.6 Attitude questions

Over the next few subsections, we present the responses to attitude, social norm and behavioural control questions. The next bank of questions, presented in Table 6, are to capture the attitudes of South Asians and Australians towards various modes of travel. Since socio-demographics previously could not explain travel differences, we intend to see if there are any differences in attitudinal factors that could possibly help explain differences in travel habits.

Table 6. Comparison of attitudes towards different travel modes amongst respondents

To what extent do you agree with the following statements? *(Means)*	Australian	South Asian	Difference
Travelling by car is more comfortable than other travel modes	4.45	4.60	0.15
A car opens up more work opportunities	4.32	4.51	0.20
A car is faster than other modes of travel	4.09	4.54	0.46**
I enjoy walking to places	3.91	3.72	-0.19
Public transport is cost-effective	3.89	3.68	-0.20
Public transport means I can be more productive while travelling	3.36	3.26	-0.10
I enjoy riding a bike	3.27	3.25	-0.02
People who own a car have a better quality of life	2.94	3.53	0.59**
Car ownership is a symbol of wealth	2.88	3.03	0.15
Owning a car allows you to secure high-paying jobs	2.60	3.03	0.42*
Owning a car means someone is successful in life	2.51	2.97	0.47*
Taking public transport means you aren't successful in life	1.55	1.85	0.30*
Participants		*174*	*72*

*** = p < 0.05 ** = p < 0.005**
Scores recorded on scale of 1 to 5, where 1 = Strongly Disagree and 5 = Strongly Agree

South Asians associate car ownership with a better quality of life, securing high paying jobs and success, having significantly stronger feelings, even more so than Australians. They also think it is more comfortable, opens up more work opportunities and is a symbol of wealth, although these were not found to be statistically significant differences.

Although both groups responded negatively, Australians disagreed more strongly the idea that using public transport means you aren't successful in life. While it is logical for Australians, South Asians disagreeing was surprising as most research from those countries suggest otherwise. However, the questions did not specify which country's transit system we are referring to. Similarly, although both groups disagreed, Australians think public transport is cost-effective, more strongly than South Asians that is. This could be a result of long travel distances which make current fares attractive, or that South Asians perceive public transport costs higher than they should be. Again, the latter could be caused by public transport costs in South Asian countries.

The second bank of questions all loosely relate to perceived behavioural control, as presented in Table 7. It can be seen that South Asians feel much safer in public transport in Victoria compared to Australians. They also find roads to be safer for driving (although not statistically significant).

Table 7. Perceived Behavioural Control comparison – South Asians vs Australian

To what extent do you agree with the following statements? *(Means)*	Australian	South Asian	Difference
I feel it is safe to walk around where I live	4.22	4.10	-0.12
I feel Victorian roads are generally safe for driving	4.07	4.24	0.17
I feel safe on public transport in Victoria	3.80	4.25	0.45**
I feel cycling is safe around where I live	3.66	3.68	0.02
Participants	*179*	*72*	
**** = p < 0.005**			
Scores recorded on scale of 1 to 5, where 1 = Strongly Disagree and 5 = Strongly Agree			

The last bank of questions asks about social norms. The results are presented in Table 8. Compared to Australians, South Asians feel more strongly that their friends think that having a car is important while public transport is uncool. While South Asians are neutral on the social status of using public transport, Australians outright disagreed the statement. South Asian families strongly disagree that public transport is safe. Again, due to the open-ended nature of the question, we are assuming they refer to the Victorian public transport system because research in South Asia states otherwise. South Asian families of international students are quite neutral on driving to places, which is very surprising – except the driving distances, there aren't many explanations to that. More surprising is that the feeling is stronger for Australians when we thought the opposite might be true. Regardless, both sets of responses showed the participants' love for cars, and this should be considered by policymakers – if attitudes

towards cars do not change, then it will be very difficult to encourage people to shift away from cars.

Table 8. Comparison of social norm questions – South Asians vs Australian

	Australians	South Asian	Difference
My friends think having a car is important	3.59	3.93	0.34*
My family thinks public transport is unsafe	2.69	2.24	-0.45*
My friends think public transport is uncool	1.86	2.40	0.54**
My family thinks I should drive to places	3.52	3.09	-0.43*
My family thinks I should avoid cycling to places	2.47	2.37	-0.10
My family thinks I should avoid walking to places	2.33	2.25	-0.08
*** = p < 0.05 ** = p < 0.005**			
Scores recorded on scale of 1 to 5, where 1 = Strongly Disagree and 5 = Strongly Agree			

5 Discussion and future research considerations

Australia is unique, and so are the immigrants who come here. South Asians in Australia have higher incomes and education levels than most immigrant groups usually studied around the world (Shafi et al., 2017), especially in the United States where there is more attention on Hispanic and other low-income immigrant groups. In addition, the findings from this survey suggest that that South Asians who study in Australia represent high-income households (who can afford to send their children overseas), rather than the average family. Going back to the research questions:

- How do South Asian and Australian students perceive different modes?
- How do two groups' past and present travel habits differ?
- How do South Asians' travel habits evolve during their stay in Australia?

In this survey sample, car ownership and use amongst South Asians in Australia was very high, certainly higher than the national average in South Asian countries. Most of the psychological parameters explored and presented in this study showed that South Asians (at least in this sample) may be more emotionally attached to their cars compared to their native-born Australians and have stronger desires to use them. They also have different attitudes, social norms and perceived behavioural control, suggesting that they do not see the transport system in the same way that native-born Australians do. This study showed that if provided with car access, South Asians are actually travel more with a car than Australians with car access do. In addition, in a relatively short period of time the travel behaviour of South Asian students becomes even more car-centric than native-born Australians.

5.1 Study limitations

This study has a number of limitations. Firstly, the study was only undertaken in one university. Although it is the largest university in Australia in terms of student enrolment, Monash University's largest campus (Clayton, Middle Melbourne), is located in a suburban area. It is quite likely that South Asians or other international student groups

may not assimilate into car driving because they are in more public transport accessible neighbourhoods. It should also be noted that respondent sizes were quite small due to resource constraints and a perceived lack of interest. The datasets were not sufficiently large to undertake any higher-level statistical analysis. Beyond respondent pool, the findings of this study are unlikely to apply to other student groups or immigrant sub-populations. This study was intended to use South Asian international students as an example to highlight the need of more research in this area.

Some of the responses to questions recorded require respondent interpretation. For example, mode use frequency was recorded on a scale from never to always; however, a participant may respond to using a car “rarely (=1)” to making 3 car trips out of 20 weekly trips, while another participant may respond to using a car “always =5)” if he/she makes 3 trips weekly, but always with a car. Public transport use back in Asia may also be considered confusing – the past travel habits seemed high, but many South Asians, including researcher, consider informal taxi-based services (such as rickshaws) to also be public transport (Kumar et al., 2016). The traditional definition of public transport in Australia, on the other hand, typically only considers bus, train and tram.

5.2 Future research considerations and policy implications

Despite the limitations, we believe these findings will help generate more interest in this subject matter and how we can serve the needs of diverse communities better. These findings, although preliminary, provide some potential suggestions for transport planning and policy. More important to flag is that this difference in attitudes may possibly translate into greater car dependency in the future, and there is already some evidence of that. The survey found that South Asian international students’ travel habits assimilated to that of the native-borns, which as it stands now, is very car-centric. However, South Asian international students are only one of the many immigrant sub-populations in Victoria, all of which require our attention.

Over recent years, immigrants are growing in numbers, and in the near future, they will impact the transportation network just as much as native-born Australians if not more. Simply improving the public transportation system will not get people to stop using their cars. We need more research on why immigrants travel the way they do. This holds truer in certain states and regions, were immigrants have a larger presence. For example, 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 (ABS 2011). Such areas that have more immigrants are generally referred to as ethnic enclaves in research material from the United States. Encouraging international students, temporary or recently arrived immigrants to use more sustainable modes could be a great starting point for encouraging different travel behaviour, one that shifts away from a car-dependant transport system. These groups could be used as “agents of change” (Tal and Handy, 2010) for a larger segment of the population to follow.

6 References

AUSTRALIAN BUREAU OF STATISTICS (ABS) 2011. Findings based on use of ABS TableBuilder Pro data. *In:* TABLEBUILDER (ed.) *Findings based on use of ABS TableBuilder Pro data.*

AUSTRALIAN BUREAU OF STATISTICS (ABS). 2014. *4102.0 - Australian Social Trends, 2014* [Online]. Available: http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4102.0main+features102014 [Accessed June 30 2018].

AUSTRALIAN BUREAU OF STATISTICS (ABS). 2016a. *3412.0 - Migration, Australia, 2014-15* [Online]. Available: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3412.0/ [Accessed March 6 2017].

AUSTRALIAN BUREAU OF STATISTICS (ABS) 2016b. Findings based on use of ABS TableBuilder Pro data. *In:* TABLEBUILDER (ed.) *Findings based on use of ABS TableBuilder Pro data.*

AUSTRALIAN GOVERNMENT DEPARTMENT OF IMMIGRATION AND BORDER PROTECTION (DIBP). 2014. *The People of Australia - Statistics from the 2011 Census* [Online]. Barton, ACT. Available: https://www.border.gov.au/ReportsandPublications/Documents/research/peopleaustralia-2013-statistics.pdf [Accessed March 6 2017].

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.

BELGIAWAN, P. F., SCHMÖCKER, J.-D., ABOU-ZEID, M., WALKER, J., LEE, T.-C., ETTEMA, D. F. & FUJII, S. 2014. Car ownership motivations among undergraduate students in China, Indonesia, Japan, Lebanon, Netherlands, Taiwan, and USA. *Transportation,* 41**,** 1227-1244.

BLUMENBERG, E. & SMART, M. 2010. Getting by with a little help from my friends… and family: immigrants and carpooling. *Transportation,* 37**,** 429-446.

BLUMENBERG, E. & SMART, M. J. 2011. Migrating to Driving: Exploring the Multiple Dimensions of Immigrants' Automobile Use. *Auto Motives: Understanding Car Use Behaviours.* Emerald Group Publishing.

DELBOSC, A. 2018. Civil Engineering undergraduate student english communication survey. Monash University.

DELBOSC, A. & CURRIE, G. 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***,** 62-70.

DEPARTMENT OF FOREIGN AFFAIRS AND TRADE (DFAT). 2016. *Importance of Australian services industries to the Australian export sector* [Online]. Available: http://dfat.gov.au/trade/services-and-digital-trade/Pages/the-importance-of-servicestrade-to-australia.aspx [Accessed June 28 2018].

DEPARTMENT OF FOREIGN AFFAIRS AND TRADE (DFAT). 2017. *Australia's top 10 goods and services exports and imports* [Online]. Available: http://dfat.gov.au/trade/resources/tradeat-a-glance/pages/top-goods-services.aspx [Accessed June 28 2018].

ELLAWAY, A., MACINTYRE, S., HISCOCK, R. & KEARNS, A. 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. & CHOUDHURY, C. F. 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., BLUMENBERG, E., DONAHUE, M., LOVEJOY, K., RODIER, C., SHAHEEN, S., SHIKI, K. & SONG, L. 2008. Travel Behavior of Mexican and Other Immigrant Groups in California. *Berkeley Planning Journal,* 21.

HE, S. Y. & THØGERSEN, J. 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* [Online]. The International Road Assessment Programme. Available: http://www.iraptranstats.net/aus/ [Accessed April 4 2017].

IYER, N. V. & BADAMI, M. G. 2007. Two-wheeled motor vehicle technology in India: Evolution, prospects and issues. *Energy Policy,* 35, 4319 - 4331.

KELLY, J. 2017. Migration surges pushes population to 24.6 million. *The Australian*, 2017.

KERR, S.-M., KLOCKER, N. & WAITT, G. 2016. Low Carbon Mobility Transitions. *In:* HOPKINS, D. & HIGHAM, J. (eds.). Oxford: Goodfellow Publishers.

KLOCKER, N., TOOLE, S., TINDALE, A. & KERR, S.-M. 2015. Ethnically diverse transport behaviours: an Australian perspective. *Geographical Research,* 53, 393 - 405.

KNIGHT, B. 2018. *'We've done an abysmal job': Australia is struggling to handle its swelling population* [Online]. ABC. Available: http://www.abc.net.au/news/2018-03-12/australia-isstruggling-to-handle-its-swelling-population/9535116 [Accessed March 14 2018].

KUMAR, M., et al., Informal public transport modes in India: A case study of five city regions. IATSS Research, 2016. 39: p. 102 - 109.

LIU, C. Y. & PAINTER, G. 2012. Travel Behaviour among Latino Immigrants: The Role of Ethnic Concentration and Ethnic Employment *Journal of Planning Education and Research,* 30, 62 - 80.

MADDEN, T. J., ELLEN, P. S. & AJZEN, I. 1992. A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and social psychology Bulletin,* 18, 3-9.

MINISTER FOR TRAINING AND SKILLS. 2016. *Record Number Of International Students Studying In Victoria* [Online]. Victoria, Australia. Available: https://www.premier.vic.gov.au/record-number-of-international-students-studying-invictoria/ [Accessed June 20 2018].

MUROMACHI, Y. 2017. Experiences of past school travel modes by university students and their intention of future car purchase. *Transportation Research Part A*.

PHILLIPS, J. & SIMON-DAVIES, J. 2017. Migration to Australia: a quick guide to the statistics. *Parliamentary Library Quick Guide.* Parliament of Australia.

PUCHER, J., KORATTYSWAROPAM, N., MITTAL, N. & ITTYERAH, N. 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.

SHAFI, R., DELBOSC, A. & ROSE, G. 2017. Do South Asian migrants in Australia travel differently to native-born Australians? . *Australasian Transport Research Forum.* Auckland, New Zealand.

SHELLER, M. 2004. Automotive Emotions : Feeling the Car. *Theory, Culture & Society*, 21 - 221.

STANGEBY, I. 2000. Methodology of travel behaviour research. *TØI report.* Oslo: Institute of Transport Economics.

TAL, G. & HANDY, S. 2010. Travel behavior of immigrants: An analysis of the 2001 National Household Transportation Survey. *Transport Policy,* 17, 95 - 93.

THIGPEN, C. & HANDY, S. 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.

TRANSPORT FOR VICTORIA 2013. Victorian Integrated Survey of Travel and Activity (VISTA). *In:* GOVERNMENT, V. S. (ed.). Victoria, Australia.

TRANSPORT FOR VICTORIA 2018. VISTA data and publications. Victoria: Victoria State Government.

TSANG, F. & ROHR, C. 2011. *Impact of Migration on Transport and Congestion*, Rand Corporation.

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP) 2016. Table 1: Human Development Index and its components. Human Development Reports.

VARASTEH, H., MARZUKI, A. & RASOOLIMANESH, S. M. 2015. International students' travel behaviour in Malaysia. *Anatolia,* 26**,** 200-216.

VERMA, M., MANOJ, M. & VERMA, A. 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.

WANG, X., KHATTAK, A. & SON, S. 2012. What can be learned from analyzing university student travel demand? *Transportation Research Record: Journal of the Transportation Research Board***,** 129-137.

WORLD HERITAGE ENCYCLOPEDIA 2016. List of countries by vehicles per capita World Heritage Encyclopedia.