The role of culture and evolving attitudes in travel behaviour assimilation among south asian immigrants in Melbourne, Australia

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Abstract

A range of studies have found that immigrants generally start out using different travel modes but over time they 'assimilate' toward adopting similar travel modes to the general population. These studies tend to focus on 'when' and 'if' travel assimilation occurs, with some studies using socioeconomic factors to explain 'why' this occurs. But few studies have explored the role of culture, attitudes and other 'soft' factors in shaping the process of travel assimilation among immigrants. In Australia, South Asians have been the largest and fastest growing immigrant group, and as skilled migrants they face few 'hard' barriers to car use. The aim of this paper is to explore the interaction between cultural influences, attitudes and initial travel experiences upon arrival in Australia on long-term travel assimilation amongst South Asian immigrants. Qualitative interviews with 20 South Asian immigrants were used to identify a range of cultural and psychosocial factors, such as perceptions towards travel modes and gender-based cultural norms. Attitudes and behaviours evolve during their early years in Australia, beginning with a 'honeymoon period' – a phase where all travel modes are seen as positive – before car use begins to dominate. The findings have implications for how we understand the interactions between attitudes, cultural practice and travel behaviour and how they evolve over time. They also imply that policymakers have only a narrow window of time to encourage sustainable transport among South Asian immigrants before the travel 'honeymoon period' wears off.

Introduction

Australia is a nation built upon immigration. Almost 30% of people in Australia were born overseas (Australian Bureau of Statistics (ABS), 2020) and its rapid population growth is driven more by immigration than births. Although studies on the travel behaviour of immigrants to Australia are still few (Shafi et al., 2017, Klocker et al., 2015, Yoo et al., 2015,

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Waitt et al., 2016), research from other countries has shown that immigrants usually drive less, carpool more and use active travel and public transport more than native-born peoples (Blumenberg and Smart, 2011, Chatman, 2014). However, over time, the travel behaviour of immigrants tends to become more and more similar to native-born residents, which generally translates to greater car-dependency (Pisarski, 2007, Chakrabarti and Painter, 2019). This tendency for immigrant travel patterns to become similar to those of native-born residents is referred to in the literature as 'travel assimilation'.

To date very little research has directly explored why this travel assimilation occurs. The existing research focuses on socio-economic explanations (such as income or literacy barriers) and most studies take a quantitative approach (Blumenberg and Smart, 2010). Some of these studies point out that 'soft' factors, such as attitudes, cultural norms or past travel behaviour *may* play a role (Cline et al., 2009, Hu, 2017) but studies cannot explain a residual 'immigrant effect' on travel behaviour. The influence of culture or attitudes on travel assimilation is seldom explored, let alone how they might change over time as immigrants assimilate to their new home. Existing theories that explore attitudes and norms, such as the Theory of Planned Behaviour (Ajzen, 1991), were not originally designed to explore the dynamic process of how these factors and their relationships might change when people move to a new country.

In this paper, we explore the interaction between cultural influences, attitudes and initial travel experiences upon arrival in Australia on long-term travel assimilation amongst immigrants in Australia. The study focusses on South Asian immigrants because, as will be elaborated shortly, they have been the largest and fastest growing immigrant group in Australia[1]. This study is guided by three research questions set in the context of South Asian immigrants to Australia:

1. What 'soft factors' such as attitudes and cultural influences affect travel and residential decisions amongst South Asian immigrants?
2. How does travel assimilation unfold among South Asian immigrants, comparing pre-arrival and initial experiences in Australia?
3. How might we conceptualise the relationship between soft factors and travel assimilation processes?

A qualitative research approach allowed us to address these questions. The paper is structured as follows. First, a summary of relevant literature is presented. This is followed by a description of the research approach and methodology, after which is a presentation of results. The paper draws to a conclusion by identifying key insights and study limitations, along with future research considerations and policy implications.

Travel behaviour assimilation amongst immigrants

Immigrants tend to have different travel behaviour compared to their native-born counterparts. Although it depends on the country of origin and destination, in general immigrants tend to drive less and carpool, take public transport, walk and cycle more (Blumenberg and

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[1] This paper refers to the period up to the start of the COVID-19 pandemic. Since March 2020 Australia largely closed its borders. Inbound travel is returning from late 2021 and immigration may return in 2022.

Smart, 2014, Blumenberg and Smart, 2010, Pisarski, 2007, Smart, 2015, Chatman, 2014). These differences are most pronounced for recently arrived immigrants. There are a range of explanations for these differences, including lower income, language and driver licensing barriers, attitudes and cultural influences[2] (Smart, 2010, Syam et al., 2012, Matsuo, 2019, Chatman and Klein, 2013, Tal and Handy, 2010, Shafi et al., 2020).

Over time, immigrants undergo what is known as 'travel assimilation' (Blumenberg, 2009). For example, research has found that over time immigrants tend to become more car-dependant while moving away from transit (Pisarski, 2007). In the process, their travel patterns start resembling closer to that of native-born residents. This was confirmed in research studying immigrants' household auto ownership and residential location choice (Bhat et al., 2013). Even when compared to fellow immigrants residing for a longer time, recently-arrived immigrants tend to spend more time making trips (Beckman and Goulias, 2008), contributed the most to transit ridership (Chakrabarti and Painter, 2019) and showed the most gender-segregated travel differences (Heisz and Schellenberg, 2004). Longer residing immigrants, on the other hand, have been found to move away from public transport (Heisz and Schellenberg, 2004) and rely more on driving.

However, not all immigrant communities assimilate in the same manner. Research has shown that single-person households and more recent immigrants assimilate faster than other immigrant cohorts (Ma and Srinivasan, 2010). Asian immigrant groups generally have been found to assimilate to the automobile culture more than any other immigrant groups (Hu, 2017). However, in some cases, East Asian immigrants were found to be less likely to assimilate away from transit in a study by Tal and Handy (2010). The same study concluded that travel behaviour largely assimilates in about five years. In contrast, another study found that immigrants never fully assimilate to the travel behaviour of native-borns; even after 20 years immigrants are less likely to buy a car or hold beliefs such as 'walking is important to save money' (Blumenberg and Smart, 2011). This long-term unexplained difference in travel behaviour between native-born citizens and immigrants is sometimes referred to as the 'immigrant effect' (Chatman, 2014).

Although a range of studies have explored 'if' and 'when' immigrants assimilate their travel behaviour, fewer studies have explored 'why'. Present research primarily focuses on socioeconomic barriers, demographic differences and geographic or spatial assimilation. When exploring Asian immigrants in the United States (Hu, 2017), factors such as income and literacy were mainly discussed when referring to travel habit differences between recently-arrived and longer-residing Asian immigrants. In the US for example, it is relatively common for recently arrived immigrants to reside in lower-income neighbourhoods, often in city centres, before relocating to high-income suburban neighbourhoods over time – this also correlates with higher automobile use (Blumenberg and Smart, 2010, Handy et al., 2009). In Australia, research has highlighted that young Asians actually prefer to live a suburban lifestyle, which also translates to a more car-oriented lifestyle (Kerstens and Pojani, 2018).

Indeed, the location of a household is an important determinant of travel behaviour. Many immigrants choose to reside in ethnic enclaves – regions where immigrant populations, usually from the same ethnic background, tend to live together (Nguyen, 2004).

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[2] Note that 'cultural influences' in this context refers to the customs and social practices established in an immigrant's country of origin, and how these influences might interplay with their experience in the countries they immigrate to.

There are several reasons why ethnic enclaves are formed. One is the cultural reassurance of living in an area with others of the same ethnic origin (Nguyen, 2004). There is research documenting the value of ethnic social networks as a form of emotional support (Andersen, 2010), or to meet transport needs (Blumenberg and Smart, 2014). The initial formation of ethnic enclaves may be due to historical factors such as initial access to jobs or even historical racial policies (Nguyen, 2004), but once they have been established their built environment and transport characteristics may have impacts on the travel behaviour and travel assimilation among newer waves of immigrants. For example, Asian enclaves in particular are known to have higher levels of employment and lower population density than Hispanic enclaves (Shin, 2017b). American research has highlighted that the highest reliance on carpooling often arises from living in ethnic enclaves (Shin, 2017b, Smart, 2015). Immigrants can also assimilate spatially (i.e., adopting a suburban lifestyle further away from the city). Many studies point out socioeconomic factors and duration of stay guiding this (Andersen, 2010, Allen and Turner, 1996), although there is research suggestion cultural preferences may play an important role as well. For our South Asian participants, we believe the latter may be more critical as economically and academically, they are on par if not better off than native-born Australians (Shafi et al., 2017).

The importance of 'soft factors' and pre-arrival travel attitudes

Most studies on travel assimilation focus on 'hard' factors such as socioeconomic differences and geographic location. Yet a range of studies have found that 'soft' factors, such as cultural norms, past travel habits and travel attitudes are likely to play an important role in shaping the travel assimilation process.

Although some studies have *implied* that cultural preferences may be at play (Tal and Handy, 2010), to date the impact of cultural norms on travel assimilation are rarely explored directly. Yet cultural norms and expectations can translate into different travel preferences and behaviours. For example, interviews with Hmong, Somali and Spanish-speaking communities in Minnesota found that Latino groups were comfortable with more 'social' types of travel whereas Hmong and Somali communities valued privacy while travelling (Douma, 2004).

In addition to broader cultural norms, many immigrants arrive from places with very different transport systems, which is likely to shape different past travel habits than native-born citizens. This is especially the case in Australia, where the majority of immigrants come from Asia, where the transport system is likely to be very different to the system in place in Australia. The transport systems in Asian countries are also more likely to be dominated by public transport, 'microtransit' (such as rickshaws) and chauffeur-driven cars (at least among the upper economic class) (Enam and Choudhury, 2011). These past travel behaviours are very likely to influence attitudes and beliefs about Australian transport modes, at least initially.

These past experiences can also influence travel attitudes. Research from Asia, for example, has found that a very high-status value is placed on car ownership. People with higher education or in a 'respectable' occupation want to purchase a car (Verma et al., 2016) whereas 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, in many developed countries young adults no longer see a car as a status symbol (Delbosc and Currie, 2014).
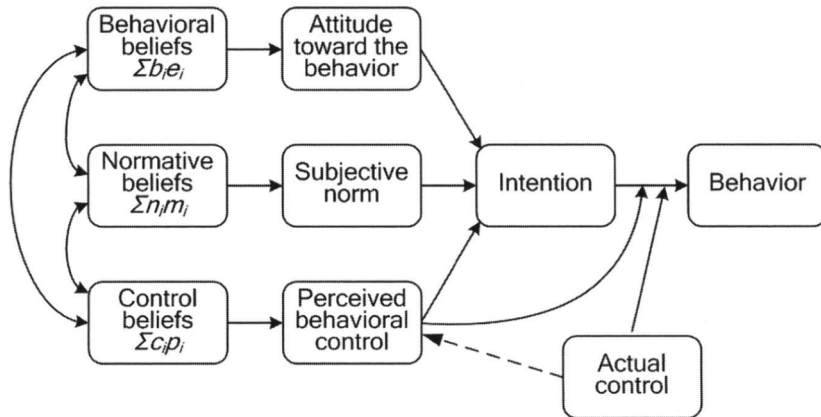
Fig. 1 Basic structure of Theory of Planned Behaviour (Ajzen, 2012)

There is research on social exclusion (Chung et al., 2014) amongst certain migrant workers within communities. There is also research suggesting driving skills in a new environment can be challenging, and often becoming a decisive factor in immigrants choosing to use a car (Chatman and Klein, 2013). Knowledge of, or rather lack of, road rules and local laws has also been raised as potential issues for recently-arrived immigrant (Chung et al., 2014). Such factors are very likely to influence day-to-day travel behaviour in Australia.

To our knowledge, no such research on immigrants' driving skills or comfort with driving have been undertaken. There is some evidence of such factors playing important roles. For example, it was previously established that Australian immigrants experience more road risks and accidents than locals (Dobson et al., 2004). While there is a some research that studied immigrants integrating into the Australian culture and their roles in the community (Liu, 2011, Koleth, 2010), there is very little in explaining how that translates to their daily travel habits. As such, this qualitative study is intended to uncover some of these unknown, 'soft' factors that could potentially explain their mobility choices beyond socioeconomic reasoning.

The Theory of Planned Behaviour

One of the components of this study was designed to examine the influence of 'soft' factors on travel assimilation among immigrants. Soft factors refer to the non-economic factors that influence travel choices amongst immigrants – these include cultural norms, past habits, attitudes, and perceived behavioural control. One of the most common frameworks used to explore the role of attitudes and norms in travel behaviour research is the Theory of Planned Behaviour (Ajzen, 1985). Fundamentally at its core, the concept is that behaviour is guided by intention, which in turn is influenced by a set of personal and societal beliefs, as presented in Fig. 1.

Further into the analysis (presented later in this paper), it emerged that the Theory of Planned Behaviour provided a useful framework to explain travel assimilation among immigrants, something that will be discussed towards the end of this paper.

Gaps in literature

In summary, research on travel assimilation among immigrants tends to focus on 'if' and 'when' assimilation occurs, with fewer studies exploring 'why'. Fewer still directly explore the potential role of 'soft factors' – attitudes, cultural norms and beliefs – in shaping the process of travel assimilation. These factors may be of particular importance among skilled immigrants who face few (if any) economic barriers to their travel behaviour. There is also very limited (if any) research on the role of pre-arrival travel habits of immigrants on their travel behaviour in their new country of residence.

Study context: South Asian immigrants in Melbourne

Australia's rapid population growth is strongly fuelled by high rates of overseas immigration. One of the largest and fastest-growing immigrant groups in Australia are South Asians, most of whom are first-generation immigrants. The South Asian immigrant population has grown by 89% between 2006 and 2011 (Australian Bureau of Statistics (ABS), 2011), when they were the fastest-growing immigrant group, and 56% between 2011 and 2016 (Australian Bureau of Statistics (ABS), 2016). Melbourne has seen the highest population growth of any Australian city as of 2019 (Capuano, 2019), and has a population of over five million as of 2021 (Population Australia, 2021). Melbourne has the largest population of South Asian immigrants in Australia (Australian Bureau of Statistics (ABS), 2011, Australian Bureau of Statistics (ABS), 2016).

Figure 2 highlights the growing importance of South Asian immigrants among the working population of Greater Melbourne in the state of Victoria.

The factors commonly influencing travel assimilation, such as differences in income or language barriers, are unlikely to fully explain the changes in travel behaviour among South Asians in Australia. This is because in Australia, South Asian immigrants are almost exclusively skilled migrants with similar income and higher education rates to native-born Australians (Shafi et al., 2017).

Transport context experienced by South Asian Immigrants

This section provides further context to the past travel experience of South Asian immigrants to Australia. While Australia has one of the highest motor vehicle ownership rates in the world (731 motor vehicles per 1000, (World Heritage Encyclopedia, 2016), South Asia in comparison had some of the lowest, ranging from 3 to 1000 (Bangladesh) to 76 per 1000 (Sri Lanka). As a result of the lower car ownership rates and higher economic inequality, in South Asian countries a car is seen as a symbol of status and economic success (Belgiawan et al., 2014, Verma et al., 2016). In sharp 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).

World region of birth by year of arrival into Australia, Greater Melbourne workers, 2016

chartingtransport.com
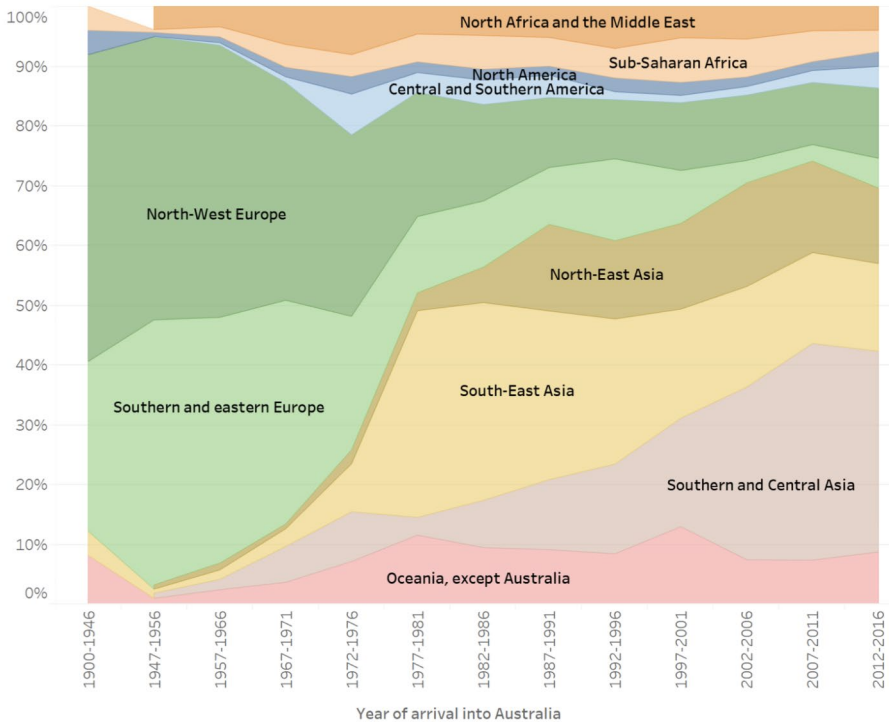data source: ABS Census

Fig. 2 World region of birth by year of arrival into Australia, Greater Melbourne workers, 2016 (Loader, 2020)

Although car ownership in South Asia is low, within-household carpooling is very common (Enam and Choudhury, 2011). This is especially true amongst women. Iin India, only 11% of drivers are female (Ram and Dhawan, 2018, Ministry of Road Transport & Highways India, 2016) while in Bangladesh, less than 1% of all license holders are female (Mostafa, 2018). There is also a heavy reliance on motorcycles in many South Asian cities, as evidenced by research from India (Iyer and Badami, 2007) and Pakistan (Raza, 2016).

Public transport in South Asia, on the other hand, is almost exclusively bus-oriented while only a few large cities in South Asia have operating metro systems (Singh, 2015). Services are dated, poor and unreliable as research from India and Pakistan has highlighted (Bandyopadhyay, 2008, Hameed and Anjum, 2016). Paratransit services such as rickshaws or autorickshaws, known as "informal" public transport, also serve a crucial role in the South Asian transport system (Shimazaki and Rahman, 1995). Walking and cycling infrastructure are also generally quite poor in South Asia. Those modes are used almost exclusively by those who are so poor that they don't have a choice.

Given this very different transportation context, it is no surprise that recent South Asian immigrants to Australia tend to drive less and use public transport more than native-born Australians (Shafi et al., 2017). However, Australian census data suggests that South Asians,

Fig. 3 Mode of choice to work comparison between South Asians compared to Australians. (Source: 2016 Census)[4]

[4] The dataset represents ~ 400,000 trips by first-generation South Asian immigrants and ~ 6 million trips by native-born Australians (aged > 15, method of travel to work on Tuesday, August 9, 2016)
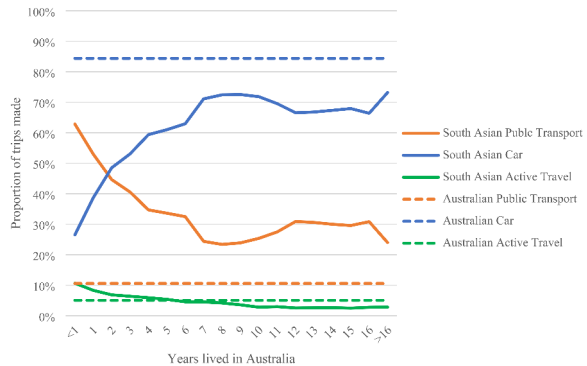
like most immigrant groups, assimilate toward the travel behaviour of native-born Australians over time (see Fig. 3).

Because of their growing presence in Australia, their similar socio-demographics but very different past travel experiences (compared to native-born Australians), South Asians are an ideal group for the role of past behaviour, attitudes, and cultural influences in travel assimilation.

Data collection and analysis

Data collection and participant recruitment

The study was conducted with immigrant families from South Asia who were living in Greater Melbourne in Victoria. The survey and recruitment were approved by the Monash University Human Research Ethics Committee (Project ID # 17,351).

The data collected was performed in an interview format. Each household was represented by one or both adult heads of the family (the *father* and/or the *mother*), leading to 20 participants recruited from 13 households. Each participating household received an AU$60 gift voucher in recognition of their participation in the interview. Interviews typically lasted up to an hour. All sessions were recorded, and later transcribed for analysis.

Initial contact with cultural communities was facilitated by a representative of the Multicultural Advisory Committee at the City of Monash Council. This included distribution of marketing material at libraries and personal contacts with community members. The first few interviews were also conducted within the council office premises. However, the COVID-19 outbreak in 2020 in Melbourne and consequent 'stay at home' orders resulted in the interviews moving online via Zoom or telephone calls. The lack of marketing (due to closure of many public places) and uncertainties surrounding mobility and employment led to a sharp drop in interest in the study. This led to recruiting beyond the City of Monash by snowballing through the existing participants and their contacts.

Note that the interviews were conducted within the first month of COVID-19 restrictions in Melbourne. The discussions did not touch on the impacts of COVID-19.

Interview script and design

The interviews were structure broadly into three key segments, and explored a range of topics as detailed below:

- Past travel habits and mobility choices (prior to and soon after arrival in Australia).

    – Year of arrival, license acquisition.
    – Travel habits in country of birth (or before arriving in Australia).
    – Travel habits after first landing in Australia..

- Present day mobility choices (at the time of the interview).

    – Residential location and decision-making factors involved.
    – Car ownership and use.
    – Public transport availability and use.
    – Barriers limiting use of particular modes..

- Future travel habit intentions and evolution of travel behaviour.

    – Participant's perceptions of what changed over the years.
    – Future intentions – residential relocation, car purchase.
    – Motivations for increased public transport or active travel use.

On occasions, additional 'impromptu' questions were asked in response to issues raised by respondents. Those questions have not been presented on the sample script.

When interview sessions were undertaken during 'stay at home' orders, participants were asked to recall their 'normal' travel patterns as part of the present-day mobility choices discussion. Since the interviews were done at the early stages of these orders, participants were quite comfortable with recalling their travel patterns before COVID-19.

Analysis methods

A phenomenological approach was used, sometimes in conjunction with a narrative approach, to understand different life stages and events in immigrants' lives. That approach helped to distinguish the way they perceive and view different travel modes. Thematic analysis was used to identify recurring themes and patterns across respondents from the transcripts of conversations (Braun and Clarke, 2006). This was followed by "overlaying" all interview scripts chronologically to reveal common experiences and uncover themes and life stages that were relatable to many or most participants.

This analysis was supplemented with various forms of observational analysis such as body language, non-response or attempts at redirection of questions. While well-documented in other fields of research such as nursing (Manookian et al., 2014) or international business (Welch and Piekkari, 2006), this form of data collection is less common in transportation and travel behavioural research. Once the findings were summarised and concepts were generated, a technique commonly referred to as deductive reasoning (Elo and Kyngäs,

2008) was used to structure these concepts around existing frameworks (in this case, the Theory of Planned Behaviour).

Households and participants

A full breakdown of the 13 households and 20 participants has been presented in Table 1.

Although qualitative studies are generally designed to uncover themes and factors rather than ensuring representativeness, there was diversity within the existing dataset. The sample included families arriving in Australia via non-South Asian countries (Singapore, Kenya, UAE, UK), one single-parent household, and a spectrum of years when participants arrived (between 1992 and 2018). Most of the participants in this study arrived on permanent visas (as skilled immigrants), while a few arrived as students before applying for permanent residency. The participants were all born and raised in South Asian countries, although some had the experience living of elsewhere prior to arriving in Australia (Column 3, "Country of Origin" on Table 1.

The household locations of the participants are illustrated in Fig. 4. The figure highlights the Melbourne CBD (or city centre) in red. The participants lived in either the southeast regions or the west, areas typically where most South Asian immigrants reside in Melbourne.

Key findings

This section is structured around three key findings: cultural influences, evolution of travel behaviour and evolution of perceptions that influence travel behaviour.

Cultural influences and the role of past travel habits

All the participating households owned cars and most participants were very reliant on cars for making trips. While socioeconomic factors and demographics are commonly associated with short-term (trip choice and characteristics) and long-term (residential preferences) travel decisions, the influence of culture is seldom investigated in Australia. Our interviews allowed us to uncover new insights into the cultural influences on mobility choices.

Importance of proximity to friends and fellow community members

Because of the role that home location plays in determining travel behaviour (Shin, 2017a, Chatman, 2014), this study explored how households chose their home location. All participating households lived in detached, single-family homes; the general locations were shown in Fig. 4. In this study, all participants were either homeowners or outlined clear intentions to purchase a home in the future. Home ownership is considered very important mainly for financial and asset building purposes, an opinion which also resonated amongst non-owners.

A range of factors influenced the choice of home location. Most important to many households was the location and neighbourhood characteristics. For recently arrived immigrants, who generally tended to live further away from the city centre, they cited the importance

Table 1 Characteristics of participating households

House-hold #	Year of arrival to Australia	Country of Origin	Residency status during arrival[a]	Household structure	Cars in household	Australian Full License Holder	Participants in this interview[b]
1	2018	India (IN)	PR	3 2 adults; 1 child<18	1	M	M
2	2009 (M) 2017 (F)	Bangladesh (BD)	PR (M) Spouse (F)	3 2 adults; 1 child<18	1	M	M
3	2007 (M) 2019 (F)	India (IN)	Student (M) Spouse (F)	3 2 adults; 1 child<18	1	M	B
4	2007 (M) Post-2007[c] (F)	India (IN)	Student (M) Spouse (F)	4 2 adults; 2 children<18	1	B	B
5	2007	India (IN) (arrived from Singapore)	PR	4 2 adults; 2 children≥18	3	B	B
6	2006	Sri Lanka (SL)	Students	3 2 adults; 1 child<18	1	M	M
7	2005[d]	India (IN)	PR	3 1 adult, 2 children<18	1	F	F
8	2001 (M) 2005 (F)	Bangladesh (BD)	Student (M) Spouse (F)	4 2 adults, 2 children<18	2	B	B
9	2001	India (IN) (arrived from UAE)	PR	4 2 adults; 2 children<18	2	B	M
10	2000	India (IN) (arrived from Kenya)	PR	4 2 adults; 2 children≥18	2	B	B
11	1996 (M) 2006 (F)	Pakistan (PK) (previously resided in UK)	PR (M) Spouse (F)	4 2 adults; 2 children<18	2	B	B
12	1995	India (IN)	PR	3[e] 2 adults, 1 child≥18	1	B	F
13	1992	Sri Lanka (SL)	PR	4 2 adults, 2 children≥18	3	B	B

a. For families arriving as permanent residents (PR) together, the main applicant, male (M) of female (F) was not identified.

b. Participants in this household refer to whether the male (M) or female head (F), or both (B), of the household participated

c. Arrived after male participant, exact year not recorded.

d. Arrived with partner from India, now separated and living in single-parent household

e. Assuming household of 3 adults; living arrangement was unclear from conversation; husband travels interstate for work
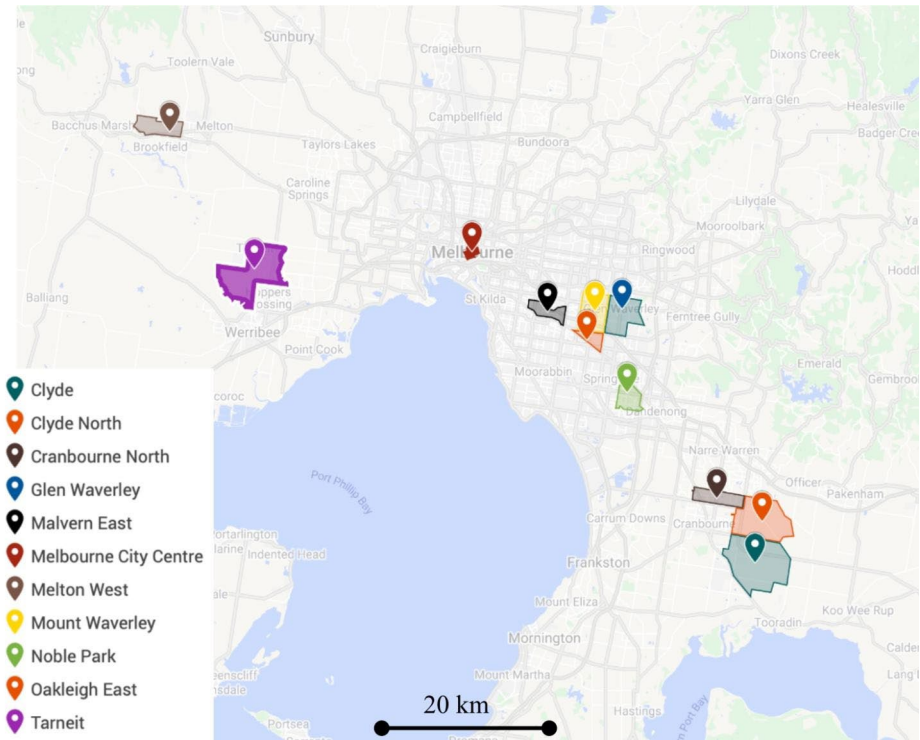
Fig. 4 Location of participating households in Melbourne, Australia

of having friends and relatives nearby. One participant discussed how he chose a location *solely* based on his friends and fellow community members buying houses in the same area.

> Because of the community. .. there are a lot of Indians in this area, a lot of friends who are also buying in this particular area, so we just went with the majority with whatever everyone is doing

HH-3, M, IN[3]

Another very important consideration for older arrivals, particularly those with school or university-going children, was the proximity of educational facilities and healthcare.

The cost of housing was not brought up as a factor in house-purchase location (which doesn't necessarily mean that it is not an important factor). Public transport connectivity, (e.g. nearest bus stop or train station) or road connectivity (e.g. nearest freeway, distance to city centre) were also not raised by the participants.

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[3] This notation refers to the participant – "HH-3" refers to Household #3, "M" refers to males, "IN" refers to the country of birth, India. Please refer to Table 1 for further details.

The role of gender in employment, licensing and travel behaviour

In general, it was found that women worked less than their male partners. All male participants in our study worked full-time (or owned businesses which they were committed to on a full-time basis). Of the nine women we spoke to, two stayed at home and four worked part-time or casual hours; only three were full time employees. This appeared to be because the women almost always assumed greater responsibility for their children's upbringing and education, and also maintaining contacts with other friends and families. These differences in household responsibilities translated to travel behaviour differences between males and females.

All the male participants interviewed could drive, and most drove cars back in South Asia before immigrating. In contrast, most of the women interviewed never drove back in South Asia citing difficulties navigating through heavy traffic and the availability suitable alternative modes (such as paratransit services). Most of the women learnt to drive and obtained a license *after* coming to Australia.

> I think it's easier to driver here [in Australia] rather than there [in South Asia], but still, like more road rules you need to follow here

HH-7, F, IN.

Some women (at the time of the interviews) were still on their learner's permits despite living in Australia for years (see Table 1). Amongst the 13 women who were represented in the dataset, nine had full licenses, while three were on learner's permits and one had no license. Even those with full licenses generally did not drive on family trips, with the father or the adult child usually the one behind the steering wheel.

> I am working very close, like 4 km for me. My husband drives 40 minutes from my home to work. And my son is going, 45 km, it's very far.

HH-5, F, IN.

The differences outlined earlier could potentially be traced back to gender-based travel habit differences back in South Asia. The 'fascination' with driving expressed by men seemingly never appealed to the women interviewed. In contrast many of the men dreamed of car ownership and driving before coming to Australia.

> Unofficially I learnt to drive my car when I was 16 because I always used to be fascinated [with driving]. I used to sit beside him [referring to a family friend who owned a car] and used to watch him drive like any young boy who wants to drive.

HH-3, M, IN.

Beyond differences in past habit experiences by gender, there were no overt religious or cultural barrier preventing greater workforce participation or licensing that were apparent from our conversations. Nor were there any strong socio-demographic or economic factors behind this difference. The female participants spoke fluent English and were highly educated (in some cases, women were more qualified and were raised in wealthier households than their husbands).

However, we did not probe further into gender-based mobility and employment as such questions made some participants uncomfortable. Gendered travel behaviour is certainly not unique to South Asian cultures, although recent quantitative research suggests that it is having a stronger effect on travel behaviour among South Asians compared to native-born Australians (Shafi et al., 2017). Further research on this topic might be able to more clearly 'unpack' the complex interplay between gender, family roles and travel behaviour among South Asian or other immigrant groups.

Travel behaviour assimilation

The preceding sections have established that South Asians were highly dependent on cars, which in turn was strongly influenced by underlying cultural principals and beliefs which guided their residential and travel choices. This behaviour was not instantaneous from the moment participants arrived in Australia. Rather it, developed over the duration of their residency in the country through a process commonly referred to as 'assimilation'. This also led to beliefs and attitudes changing due to new travel experiences in Australia. This section explores the interplay between carpooling and car-driving that changed over time in many of the households interviewed.

Intrahousehold and interhousehold carpooling

Carpooling, as described in the interviews, could be differentiated into intrahousehold carpooling and interhousehold carpooling. Intrahousehold carpooling is where carpooling occurs amongst members of the household (commonly referred to as family trips). This played an important role in the travel behaviour of households, especially among the women and children in the family. Females are generally less willing to drive or take longer to acquire a full license, and children are unable to travel independently. In such cases, they were being driven for family trips and sometimes even work trips by their husband/ father, meaning they were dependant on car-based travel without actually driving.

> Yeah I have many times dropped her [referring to his wife] to work if she doesn't want to go by bus

HH-6, M, SL.

There was also a high level of interhousehold carpooling – carpooling across families, households and within the community more broadly. Often this type of carpooling began very early upon their arrival in Australia. In their early days in Australia, most participants had someone (a friend, a contact, a fellow community member) who they could rely on to show them around the neighbourhood, teach them about the public transport system and drive them around.

> Mainly it was like. .. he [referring to a known contact] helped me initially just to go to some restaurants or to just buy some groceries and stuff for our house. And also, that time I didn't have a car with me, and also I didn't know how to get to the shops here so couple of times they helped me to do that.
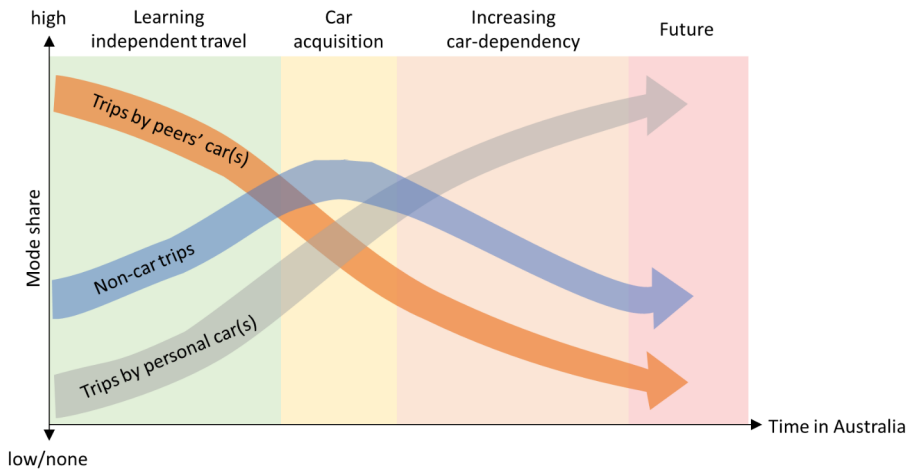
Fig. 5 The evolution of mode use by South Asian immigrants in Australia at a household level (long-distance trips). *Note: These trends are indicative only and do not reflect quantitative measures. The figure highlights trends at a household level, not at an individual level*

HH-1, M, IN.

This means that recently arrived South Asian immigrants are never truly carless (illustrated in Fig. 5). This early stage is when South Asian immigrants were the most reliant on their peers helping them; and is also the period when they are *least* likely to own their own car. When their economic situation permits them to do so, they quickly purchase a car.

In addition, initially public transport, and active travel use (collectively referred to as non-car trips) increases, while inter-household carpooling (referred to as trips by peers' car) decreases; this is the time period when immigrants are trying to learn how to navigate their environment and independently travel without the help of friends or family. This period also sees little driving because they don't yet own a car; they may be familiarizing themselves with road rules or in the process of obtaining a license. When they acquire a car, initial public transport use remains reasonably high, while they are in the process of replacing carpool trips with trips by driving and intrahousehold carpool trips (collectively referred to as trips by personal car).

From that point onwards, public transport use decreases while car dependency by personal car increases. The small proportion of public transport trips are usually reserved for trips to the city, or for females who may not want to drive every day or need to commute longer distances. But otherwise, trips by this stage of the process are often made by using a car.

Faster assimilation across generations

The transition to car dependency shown in Fig. 5 is facilitated by fellow immigrants already in Australia. This relationship is illustrated in Fig. 6.

Once one household (e.g. 'Family 1') establishes themselves and purchases one or more cars, they are then able to help new households ('Family 2') that arrive from their same country of origin. This means that once the transition towards personal car-based travel is
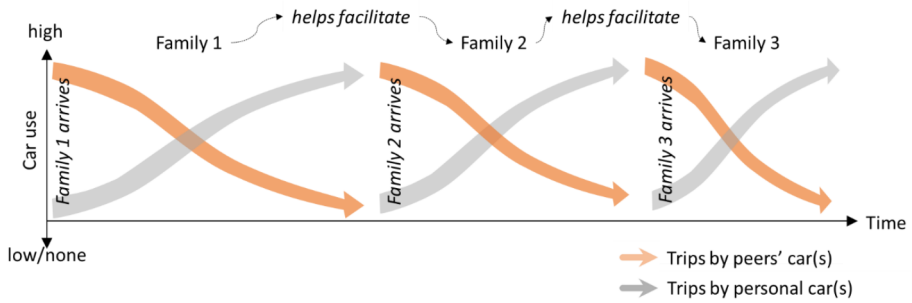
Fig. 6 The cyclical process of evolving mode use. *Note: The figure highlights broad indicative trends at a household level, not at an individual level*

complete (as illustrated earlier in Fig. 5), they are able to facilitate the travel assimilation of newly-arrived households.

Note that these 'evolution cycles' become more compressed as the years pass. Immigrants today seem to find it easier to adapt to car-dependent travel than those who arrived decades ago, and as a result generally tend to assimilate faster. Females take less time to obtain a driver's license today than they did in the past, while households are also quicker to purchase their first vehicle. Although there are several plausible explanations for this, from the interviews it appears that South Asian immigrants today have a greater chance of making friends and community contacts due to the growing South Asian population and the advent of technology and social media. These days it is becoming increasingly likely to have a friend or at least a contact in Australia *before* they arrive in Australia.

> [My friend] introduced me to one of her friends in Australia, Melbourne. I never saw them before but once I migrated here, they helped me lots. We stayed at their house five days.

HH-5, F, IN

> We didn't have much contact outside, other culture's people at the start. We talked with our community people mostly

.HH-13, M.

On a macroscopic level, this means that reliance on cars actually initiates before owning a car thanks to an ever-increasing community network. The importance of this 'social network' has been emphasised in research overseas as well (Blumenberg and Smart, 2010, Blumenberg and Smart, 2014).

Evolving attitudes and their role in travel assimilation

Throughout these interviews, some attitudes toward cars and public transport were common across different families. However, along with evolving travel behaviour (as outlined in the previous section), there was also evidence that there is also an evolution of perceptions and attitudes towards travel modes.

Cars are considered affordable, public transport expensive

Buying a car in Australia was considered 'cheap' according to the participants of this study. Participants did not face major economic hurdles to purchasing a car and considered car prices to be quite affordable compared to their countries of origin.

> Yeah, compared to [Sri Lanka and South Asian countries], they don't have much taxes on the car [in Australia].

HH-6, M, SL.

Maintenance and servicing of cars were perceived to be cheaper in Australia than in South Asia. Australia has 'excellent roads', which lead to less wear and tear on the vehicle (HH-1, M, IN), and lower operational costs. Travel times are also seen to be lower in Australia despite longer travel distances. This is due to a lack of congestion on Australian roads when compared to South Asian roads (HH-2, M, BD). Combined with the higher earning potential in Australia (compared to South Asia), this means that cars were considered cheap and more affordable – especially compared to public transport.

In contrast, public transport was considered 'expensive' by many participants. Families usually made social, recreational or shopping trips together, and multiple people each paying for public transport for one trip can be expensive. Given the longer travel times, including long waits for trips within suburbs, participants saw no reason to 'pay more' for public transport, rather than driving together.

> I think public transport is going to be higher [in costs] than to keep a car. If I use public transport all over the month, the money that I am going to pay for me, my wife and my kid, I think, it's going to be more costly than getting a car.

HH-6, M, SL.

The only real exceptions to this belief are long-distance trips (generally out of suburb or beyond Local Government Area boundaries), or regular trips to the city centre (e.g., for work) where driving can be difficult and expensive, but they only make up for a few round trips every week. Going shopping, catching up with friends or families form the bulk of their weekly trips and they are made by car. There were also concerns about safety on public transport. A male participant said that he felt public transport in Sri Lanka was safer because of the higher number of people who use those services later at night, and the presence of personnel throughout the day there.

> The public transport in Sri Lanka is great because there were buses all over the time, even in the evening, night-time as well. I would say safer [in Sri Lanka compared to Australia] even in the night-time because there were people around even till like 8–9 [P.M.].

HH-6, M, SL.

Another family raised concerns about encounters they had with drunk and unruly passengers, a sight they were unfamiliar with in Pakistan.

.. . sometimes when we use the public transport in Australia, we come across a lot of drunk people catching public transport.

HH-11, M, PK.

While not all participants explicitly discussed the 'unsafe' nature of using public transport, most participants did state that cars are a 'safer' mode of travel due to compliant drivers, disciplined yet clear rules, and good conditions of the road.

Other concerns surrounding public transport included connectivity, travel times and interchanges (especially in suburban areas) and included late-night service availability. No value was placed on environmental benefits, health benefits or productivity benefits.

No, I didn't see anything [speaking about environmental benefits of using public transport]

HH-10, F, IN.

However, overall attitudes toward public transport, as with other modes of travel, change over their time in Australia. First impressions of public transport were generally positive but dropped off over time. This phenomenon has been coined the 'honeymoon period' in this paper.

### The "honeymoon" period – initial euphoria of travel modes in Australia

In the realm of technology, a 'honeymoon period' is an informal term that refers to the initial euphoria of using a new device or a service, and typically can last for about four months before it wears off (Sparkes, 2013). It is also a term often used in politics, referring to a period of popularity that a new government or occupant of a post enjoys (McAllister, 2003), or even when one starts a new job or starts at a new workplace (Adonis, 2017). In the realm of transport planning and urban planning, this term is not commonly used, yet for the South Asian immigrants, this term is an apt description of their first impressions of Victoria's public transport and road conditions.

When discussing their initial impressions of infrastructure and services after arriving in Australia, their reactions were quite positive. Public transport information was easily accessible through technology, services were 'always on time' (according to participants), services were clean and secure, and vehicles were not crowded – all big positives from their perspective.

This positive feeling also extended to other modes of travel in Australia, such as driving, walking and cycling. Well-built infrastructure and drivers adhering to road rules was all impressive to the participants. Participants did not walk or cycle as a main travel mode very often and it did not come up in the discussions very often. However, when asked they did note that the standard of walking and cycling facilities in Victoria was also higher compared to South Asian cities, with participants quite impressed with cycling lanes, pedestrian crossings and obedience to law of active travellers in the country.

.. . I prefer walking or cycling [in Australia] because you get footpaths and streets and everything. It's really hard back home because traffic, no footpaths and no proper roads.

Fig. 7 Mapping the evolution of travel mode perceptions for South Asian immigrants. *Note: These trends are indicative only and do not reflect quantitative measures*
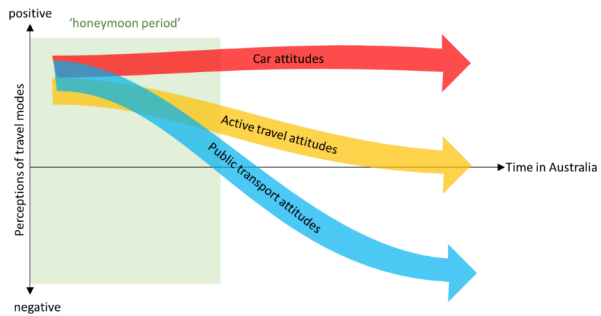
HH-7, F, IN.

It is important to understand, however, that these participants, when saying something is 'good in Australia' it is almost exclusively in comparison to South Asian cities during this honeymoon period. Driving is easy compared to the conditions in South Asia; walking/cycling is safer than in South Asia; public transport is cleaner and less crowded.

However, this honeymoon period does not last forever. Over time, they tend to make fewer comparisons between Australian and South Asian transport systems and instead compare driving, public transport or walking *within Australia.* This also tends to occur after they purchase their own car and are more able to compare the different modes. When this occurs, their attitudes change. These shifts are illustrated in Fig. 7.

Public transport sees the largest change in attitudes, where positive perceptions turn negative over time. Instead of comparing public transport in Victoria to public transport in South Asia (which generally makes public transport in Australia look good at first), participants start to compare public transport in Victoria to using a car in Victoria. Cars have a lot of benefits compared to public transport which participants were happy to discuss; however, the benefits of public transport compared to cars were often overlooked. Only two female participants discussed *having not to drive* as a benefit of using public transport, while the rest of the South Asian participants didn't mention any benefits. As a result, a one-on-one comparison with car-based travel simply sheds poor light on public transport services in Victoria.

The same occurs for active travel – the initially positive view of active travel infrastructure (compared to South Asian standards) evolve where they view active travel as time consuming and impractical, for example it's too hard to carry groceries home (HH-12, F). However, their views towards active travel tend to remain neutral rather than negative.

For cars, the perceptions still remain positive, but the underlying reasons change – while initially it was because of excellent roads and ownership possibilities in Australia, over time it changes to benefits compared to public transport such as comfort, convenience, cost etc. At first, it was the realisation of fulfilling a plan to buy a car:

> It depends on the ability because who have their ability, they always stick to their own vehicle. People who can't buy, they have to have share the commercial or other private vehicles. Based on the you know, socioeconomic position, my family, you know at that time, we normally used the local transport. But we had a plan I would buy my own vehicle

HH-2, M, BD.

However, once ownership dreams are realised and people start becoming dependant on cars, it is it is very difficult to move away from cars due to the convenience, comfort and time-saving benefits. It also becomes increasingly difficult to appreciate the benefits of public transport.

Using the Theory of Planned Behaviour to explain travel assimilation

The evolving processes that pushed participants toward travel assimilation could be explained, in part, by a modified version of the Theory of Planned Behaviour (Ajzen, 1991). This theory is generally used to explain behaviour in a static moment in time. We believe the framework could also be used to highlight the changing circumstances of the South Asian participants in our study (and, perhaps, for immigrants more broadly). It should be noted however, that this modification should be considered as a new hypothesis for future research, not an established re-framing of the Theory of Planned Behaviour.

Based on the interviews, all three constructs of the Theory of Planned Behaviour (attitude toward the behaviour, subjective norm, and perceived behavioural control) were found to play a role in the travel choices in South Asia before arriving to Australia. After using Australian transport options, this new behaviour changed some of their attitudes toward modes as they compared different modes *within Australia*. This in turned influenced behaviour again, and the process continued, pushing travel assimilation toward a high level of car dependency. This dynamic interaction is presented in Fig. 8.

Based on the recollection of interview respondents, when they lived in South Asia ('Stage 1' in Fig. 8), all three constructs of the Theory of Planned Behaviour (attitude toward the behaviour, subjective norm, and perceived behavioural control) were found to play some role in their travel choices (see Fig. 8). As mentioned previously in this paper, attitudes towards different travel modes played an important role in mode choice (e.g. public transport was seen as crowded and dirty). Social norms such as the status symbol of cars were often discussed.

"I can sense that some people (in India) think that it's like a status symbol - to go in their own car or go in a certain car like luxury car than going in a bus or train."-.

HH-4, F, IN.

And perceived behavioural control played an important role, for example through lack of driving license, especially among female participants or the difficulty of driving in South Asia.

Upon arriving in Australia (Stage 2 in Fig. 8), it appears that social norms played a lesser role in guiding travel behaviour *in Australia*. In particular, participants agreed that they don't feel *social* pressure to purchase a car in Australia. In contrast, perceived behavioural control (e.g. driver licensing status, knowing how to use transit) is very important while they familiarise themselves with the transport system in Australia. Furthermore, their attitudes towards travel modes *in Australia* were at first greatly influenced by their attitudes towards travel modes developed *in South Asia*.

However once participants moved beyond the 'honeymoon period' (Stage 3 in Fig. 8), most had overcome perceived behavioural control barriers to most travel modes. The pressure of travelling to impress friends and families are a thing of the past (back in their time in
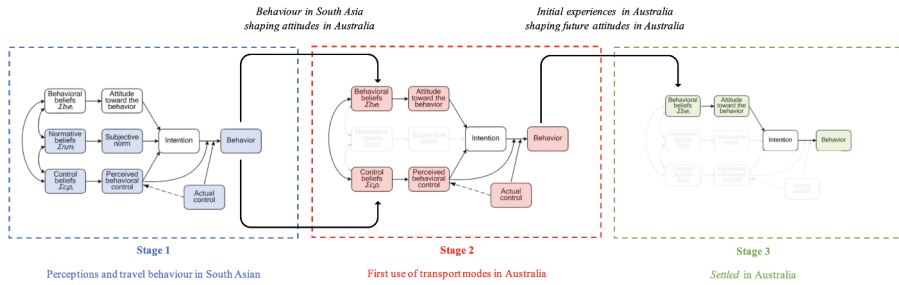
Fig. 8 Evolution of attitudes and behaviour, and the dynamic interaction between the two. Diagram (Ajzen 2012) retrieved and modified

South Asia). At this stage we hypothesise that attitudes, amongst the three constructs of the theory of planned behaviour, is the key factor in guiding mode choice.

That is not to say that other constructs of the Theory of Planned Behaviour are not going to have an impact in shaping travel behaviour. For example, subjective norms will still be relevant in later stages, but we hypothesise that there is less of an 'immigrant effect' on this construct after a particular time period and instead 'local' social norms will play a stronger role.

These interactions are still somewhat hypothetical, as they emerged through the course of the interviews. Some potential connections between concepts were not fully explored, and the relationships are based on the recollections of participants past attitudes and experiences. Future research could explore these potential interactions using quantitative methods.

Note *Constructs that we hypothesise play a stronger role among immigrants are highlighted.*

Concluding remarks

This study has provided valuable insight into the process of travel assimilation among immigrants, emphasising the role of culture, geographic location, attitudes and dynamic processes of change. Not only do we now know "if" travel assimilation occurs, but we also have some qualitative explanation of "why" it happens. Some of the findings expand on past research in the field, for example highlighting the role of geographic location and carpooling as important drivers of travel behaviour among immigrants (Lovejoy and Handy, 2011, Blumenberg and Smart, 2014). Other findings were unique contributions, including the increasing pace of travel assimilation across generations, the role of the 'honeymoon period' in shaping early attitudes toward travel modes, and exploring the interaction between attitudes and behaviour over time. The key findings presented in this paper can be summarised around the three research questions outlined in the introduction, as follows:

A range of 'soft factors' such as attitudes and cultural influences affect travel and residential decisions amongst South Asian immigrants. Gender roles shaped driving behaviour and the desire to live near friends and relatives was a strong factor influencing home location. Attitudes towards travel modes, such as cars being 'cheap' and public transport being

'expensive' upon initially arriving to Australia, stemmed from comparisons to pre-arrival travel standards (i.e. PT in South Asia is cheap and cars there are expensive), and this ultimately leads to a car-dependant travel lifestyle amongst other factors.

Travel assimilation among South Asians is facilitated by the car ownership of close contacts, who provide rides via carpooling until new immigrants can acquire their own car and license. This process was also influenced by attitudes toward different transport modes, which initially (during a 'honeymoon period') were all quite positive. However, upon exposure to and use of various modes, perceptions towards public transport become negative, while perceptions towards cars remain positive.

Many of these 'soft factors' fell under the framework of the Theory of Planned Behaviour, but their characteristics and how they influence travel behaviour appears to change over the time the immigrants' are in Australia. Over time, subjective norms and perceived behavioural control shift from being dominated by 'immigrant factors' (such as cultural norms and past experience driving) towards resembling the characteristics of native-born Australians. However, a cultural element may remain when it comes to attitudes, as participants still held distinct views towards mobility choices not discussed adequately in literature beforehand. Combined, these factors suggest that culture and mobility shift and interact in complex ways when immigrants move to a new country.

This research will provide an important springboard for future research into the travel behaviour of immigrants. While the Theory of Planned Behaviour typically illustrates the relationships between attitudes, norms, behavioural control and behaviour as static, our findings suggest that among immigrants the interactions are dynamic and evolve over their time in their adopted country. This is not the first paper to suggest that the attitude-behaviour relationship works in either direction (De Vos et al., 2018, Kroesen et al., 2017). But our research does propose a new hypothetical relationship between these constructs, and how the importance of the various constructs evolve over time. This is something that could be further explored with different immigrant groups using quantitative data.

Research limitations and future considerations

While qualitative data is very rich, it is only collected from a limited number of individuals – a shortcoming regularly flagged by other qualitative researchers in this field (Beirão and Cabral, 2007). This is less of problem with qualitative research where the aim was to uncover themes and propose new hypotheses for further study. The interviews were conducted among only one diverse immigrant community and may not represent other communities. Even within South Asia, different nations, religious groups, social castes and immigrant types (skilled vs. humanitarian) will likely have different experiences that were not fully captured in this initial study. It is important that this is acknowledged so that future researchers building on this work can be cautious about the transferability of our findings to other cultures and contexts.

All participants in our study live in households with at least one motor vehicle, and all of them have moved past the initial 'honeymoon period' as discussed earlier in the paper; as such most of their initial arrival experiences were recollected from memory as we spoke. Future work could focus more closely on very recent immigrant arrivals to gather initial impressions while people are still experiencing their first impressions of travel in their new homes.

The findings from this study can offer a starting point for future researchers wanting to explore cultural factors and travel assimilation amongst immigrants. In our study, this included pre-arrival cultural norms and travel habits, social networks and ethnic enclaves, gender-based travel/employment differences, and interhousehold carpooling. For different immigrants, these and other non-economic factors could be the key to deeply understanding participants' travel patterns.

Policy recommendations

With each arriving generation, our research suggests that immigrants are assimilating faster to higher car use. In some ways, this is a positive. It suggests that, at least among South Asians, recent immigrants are facing fewer barriers to using any mode and they are choosing modes out of choice, not necessity. This also suggests that skilled South Asian immigrants to Australia don't face as many of the challenges that immigrants elsewhere face, such as language barriers or social exclusion (Kim, 2009) or difficulties in adapting to a new driving culture (Chatman and Klein, 2013).

The problem with this is that in the context of climate change, we should be encouraging *all* people away from car-based mobility and toward more sustainable travel behaviour. Faster travel assimilation means that immigrants spend less time in the 'honeymoon period' when all travel modes are seen as positive, and more quickly become dependent on cars. If we can improve the appeal of alternatives to driving, the 'honeymoon period' provides a window of time in which we might be able to delay the process of assimilation toward car dependency.

One effective way to harness this honeymoon period is to provide affordable, frequent public transport services where immigrants tend to settle. Australian public transport systems are some of the most expensive in the world, with Sydney and Melbourne being in the top 10 most expensive cities for public transport monthly tickets (Reid et al., 2019). The cost of travelling in groups is likely to be felt more keenly among South Asian immigrants who tend to travel in family groups. Cost barriers could be reduced by providing discounted family tickets (currently not offered in Melbourne) to reduce the price of travelling as a family.

Related to this, the tendency for immigrants to form ethnic enclaves highlights the importance of understanding the locations where they tend to form. As Fig. 4 suggests, many South Asian immigrants settle in neighbourhoods far from the city centre where neighbourhoods are less dense and public transport connections tend to be poor. It is well-established in literature that densification facilitates more sustainable cities (Fatone et al., 2012) and better public transportation (Bertaud, 2004). As such, immigrants should be encouraged to settle closer to the city or where there is better public transportation. In Australia, however, national migration policy actually actively encourages immigrants to settle in regional and rural areas (Australian Government Department of Home Affairs (DHA), 2020). Some of these 'regional' areas are within the greater Melbourne area, but over 50 km from the city centre in places with poor public transport networks. Policies such as these could be reconsidered.

'Cheap' cars, 'expensive' public transportation, low urban density, high incomes – all these factors combine to align immigrants towards car-based travel. Indeed, these factors are not experienced only by immigrants but should be considered for all residents of Australia's cities if we are to encourage more sustainable travel into the future.

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