Walking and transport in Melbourne suburbs

Recommended citation

Eady, J and Burtt, D (2019). *Walking and transport in Melbourne suburbs.* Victoria Walks, Melbourne, November 2019.
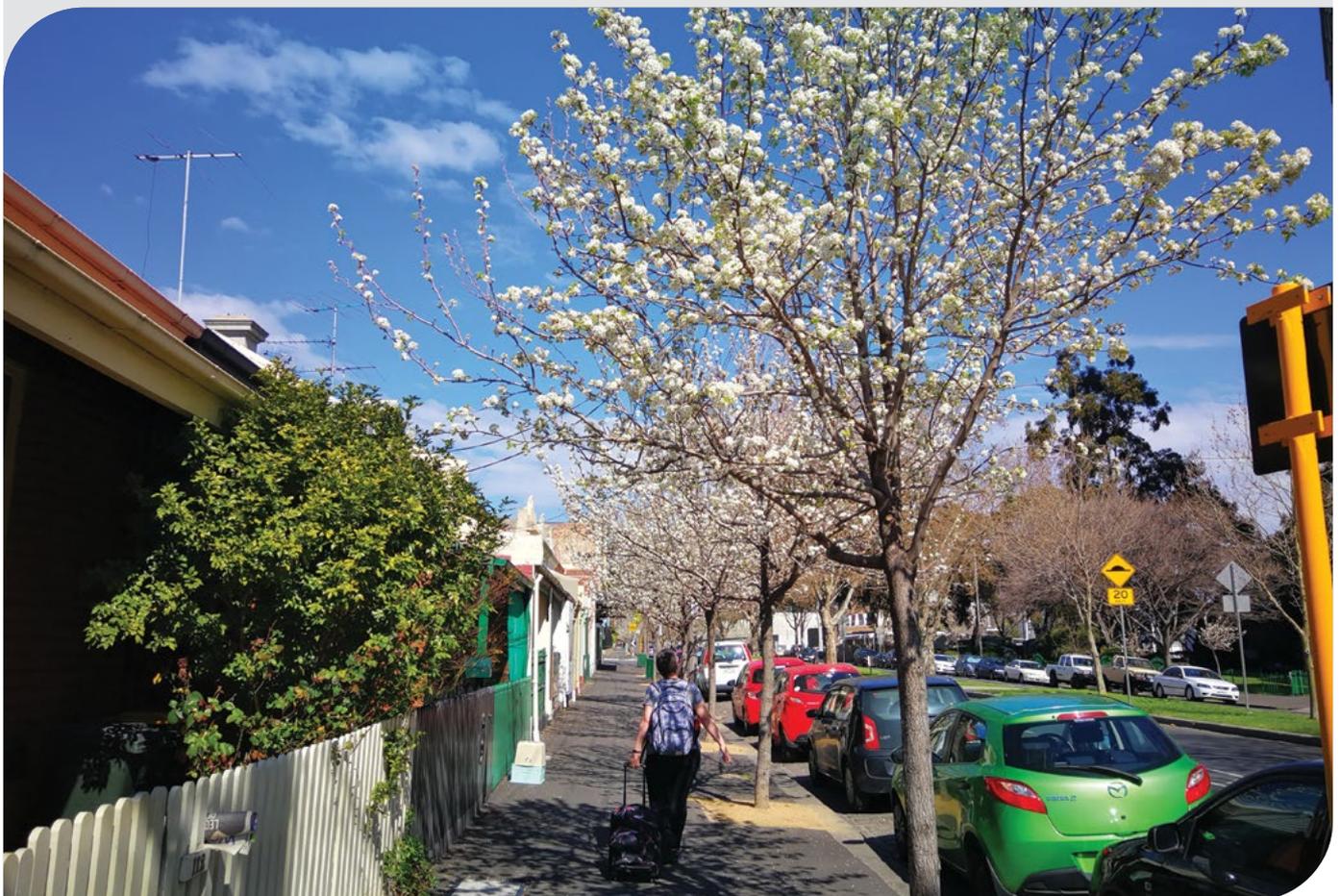
Table of Contents

Executive Summary

This report looks at how people travel around Melbourne, with a particular focus on the role of walking and access to suburban shopping centres. It includes analysis of Melbourne household travel data captured through the Victorian Integrated Survey of Travel and Activity (VISTA). No publicly available, detailed analysis of this data set has previously been carried out to understand the role of walking in the transport system. Like all household travel surveys, VISTA underreports short trips including walking, but it is one of the best sources of data on walking currently available.

In addition to a literature review of published reports, Victoria Walks also sourced a range of unpublished data to gain the strongest possible understanding of access to suburban shopping centres.

Walking in the transport system

Walking is an important way for people to get around. The VISTA analysis finds that 16% of trips in Melbourne are walked and an additional 8% have at least one walking stage (24% involve some walking), usually combined with public transport.

For every group between 20 and 90 years of age, around one in three people who leave home on a given day will do some walking. For those aged 10-19, the proportion is higher at 44%, reflecting their increased reliance on walking.

Walking is of course used primarily for short trips. Almost two-thirds of total transport trips under 1 km are walked. However, people will commonly walk more than a kilometre, with almost one third of all trips between 1 and 2 km in length walked.

While most trips under 1 km are walked, 21% are still driven. If half of these short driving trips were replaced with walking, 223,000 short vehicle trips could be avoided every weekday in Melbourne.

In inner Melbourne, 39% of trip stages are walked, more than twice that of outer Melbourne (17%), but the median walk distance is shorter (563 m compared to 710 m). This partly reflects design. Housing in inner Melbourne is generally high density with high quality public transport and shops, services and employment within short distance. Outer Melbourne generally has poorer walking environments and people have to travel further to access shops and services, with public transport and employment options limited or not available.

Even in the growth areas, town centres do not have to be car-dominated. This main street town centre is in Point Cook, one of Melbourne's newest suburbs.

Executive Summary

Walking and public transport

The VISTA analysis highlights the walking is a fundamental part of the public transport system. Nearly every trip involving public transport made in Melbourne also includes some walking at either the origin or destination.

The analysis finds that for trips from home, the median length of a walking trip to a train station is 721 metres, while the median walk to a bus stop is 390 m and to a tram stop is 360 m. These are in line with the commonly accepted distances of 800 m to a train station and 400 m to a bus stop.

Despite ongoing efforts by state and federal governments to facilitate driving to train stations through increasing numbers of free car parks at suburban stations, walking is easily the most common way for people to access stations. Almost half of people walk from home to the station (48%), compared to about one in five (21%) who drive a private vehicle and a further 14% who are a vehicle passenger. When trips to train stations from all locations (including from workplaces) are considered, two thirds of people accessing the train system walk.

Walking is particularly important for accessing bus and tram stops, with the VISTA analysis finding that 94% of trips from home are walked.

Travel to shops and services

A number of studies have looked at travel to strip shopping centres in Melbourne, but most are unpublished. These studies mostly report on travel to inner or middle suburban centres, such as Brunswick, Coburg, Camberwell, Fairfield and Northcote. Although there is substantial variation, a high proportion of people walk to these centres – typically 30-40%, but sometimes more than half. Generally speaking, the proportion of people walking to inner suburban centres is similar to those driving, with public transport the other key access mode. A study of the five main shopping areas in the City of Yarra, for example, found 33% of people walked, 42% came in a car and 22% came via public transport. Considered another way, consistently less than half of people shopping in inner suburban centres get there by car and an even smaller proportion of people shopping (not traders or those passing through) drive.

Analysis as part of this work considers shorter trips (less than 2 km) to shops and services across Melbourne. This reveals significant variation between business types, with people walking for almost two-thirds of short trips to restaurants, cafes, pubs and bars. Half of short trips to milk bars, newsagencies and general retail are walked, compared to 37% to supermarkets.

The research finds that the primary factor in people's choices regarding how to travel to centres is perceived convenience, irrespective of the mode they used to travel.

International research consistently finds that retailers under-estimate the number of people walking to their centre and over-estimate the number of people driving. Two Melbourne studies looked at these perceptions, with the same outcome. For example, surveys on Sydney Road in Brunswick and Coburg found traders over-estimated the number of people arriving by car at 61%, compared to the actual value of 39%. Traders under-estimated walking at 14%, less than half of the actual value of 31%. This may be influenced in part by high driving rates of traders - about two in three drive so they assume their customers do the same.

Perceptions of how people get to centres are reflected in the value people place on car parking. In Northcote, for example, half of traders (47%) were not prepared to lose any parking for improved amenities at the centre, whereas only 28% of shoppers felt the same. Surveys of over 17,000 people across mostly eastern Australia found walking, cycling and public transport options are more important in town centres than car accessibility and parking. Shoppers tend to value other factors like vegetation and cleanliness most highly of all.

Executive Summary

Travel to suburban centres

One of the goals of this research was to better understand travel patterns to centres in middle and outer suburbs, and the impact of centre design on people's mode choice. A range of selected centres were classified into mainstreet style strip shopping centres (like Altona, Blackburn, Reservoir and Mount Waverley), self-contained, car-oriented centres of similar size (such as Casey Central in Narre Warren South, Croydon Central and Westfield in Airport West), and larger self-contained, car-oriented centres.

It is 3.5 times more likely that a trip to a strip centre will be walked than to a car-oriented centre. Even in middle and outer suburbs walking represents one in five trips to strip centres (21%), while 5% of trips use public transport and 73% are by car, despite average trip lengths in excess of 3 km. However, for similar-sized car-oriented centres, only 6% of trips are walked and 92% are by car.

The analysis also considered short trips (less than 2 km) and found 60% of short trips to car-oriented centres are still driven (the same proportion as for trips of all lengths) and only 17%

are walked. In comparison, short trips to strip shopping centres are most likely to be walked (43%), with 40% driven. This suggests that the design of a centre has a substantial influence on how people choose to get there.

While this study finds car parking and vehicle access is typically not a high priority for shoppers and discourages walking, the Victorian planning system encourages the development of vehicle oriented suburban centres. Moreland Council found that 24% of the Coburg activity centre within 200 m of the station is dedicated to ground level parking. It is important to change the direction of activity centre and train station planning to develop multi-modal, people-oriented centres in the suburbs and growth areas.

Overall, the evidence supports policy approaches which seek to integrate land use and transport, with housing, activity centres and public transport located in close proximity. Where we have made driving convenient, people drive. If urban design is not car-dominated and destinations are within walking distance, a high proportion of people will walk, even in the outer suburbs.

TRAVEL TO SHOPS IN MIDDLE/OUTER SUBURBS < 2 KM

43%	54%	3%
17%	83%	0%
Walking	**Vehicle Driver/ Passenger**	**Bike/Other**

MAINSTREET CENTRES	SIMILAR-SIZED CAR-ORIENTED SHOPPING CENTRES
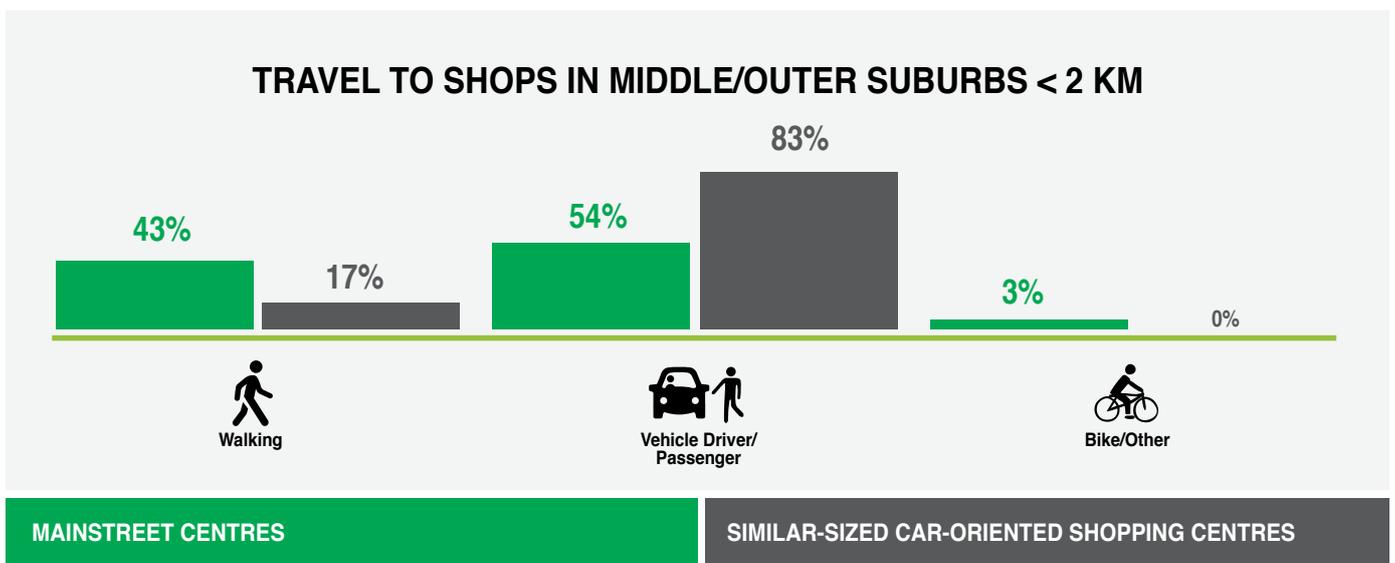
Average trip distance to mainstreet centres is 0.87 km and to car-oriented centres is 1.32 km

Recommendations

Recommendations are set out below. Victoria Walks believes that these actions are not only entirely consistent with the Victorian Government's broader policy settings including Plan Melbourne and 20-Minute Neighbourhoods, they are necessary to achieve them.

Recommendations to facilitate walking

The Victorian Government should:

1. Adopt a target for walking mode share. Based on this research, a target of 20% of all trips to be walked in their entirety by 2035 would be appropriate.

2. Develop a walking strategy with action plan and attached funding.

3. Establish a fund for the development of safe, convenient walking routes (Principal Pedestrian Networks) within 800 metres walk of train stations and/or activity centres. This should be an ongoing investment, with $100 million over 4 years as a minimum starting point.

4. Maintain, strengthen and implement policies that seek to locate housing within convenient walking distance of activity centres and high frequency public transport. This is likely to be within 800 metres of activity centres and train stations and 400 metres of tram and high frequency bus stops.

Recommendations for activity centres and train stations

5. Planning of activity centres and upgrades to existing centres need to reflect what is important to people – pleasant, direct, high-quality walking environments with street trees and vegetation, both within and to centres.

6. The Victorian Department of Environment, Land, Water and Planning should review planning provisions relating to private vehicle access around activity centres, including arterial road design and car parking requirements for retail, commercial and residential uses, with a view to reducing car parking requirements and vehicle dominance to create more pedestrian-friendly environments that encourage people to walk.

7. Planning for road access to activity centres in growth areas, and management of roads in and around existing centres, should prioritise place values and movement of pedestrians rather than the vehicle through-movement function.

8. State and federal governments should not create substantial new, free car parking at suburban train stations, except where rigorous cost benefit analysis comparing alternatives, including improved bus services and use of land for transit-oriented development, finds that it meets broad policy objectives.

Data related recommendations

9. Councils and other relevant agencies should conduct before and after evaluations when significant changes are made to streetscapes in activity centres.

10. Data collected by local and state governments in relation to travel behaviour, including evaluation of projects, should be published and made available online.

11. The state government should implement the Walking and Cycling Data Framework and Action Plan being developed by VicRoads.

12. Traffic modelling assumptions for new developments should reflect that significant numbers of people walk to access shops and services, particularly for social destinations like cafes and pubs, even in middle and outer suburbs.

Introduction

This report looks at how people travel around Melbourne, with a particular focus on the broader role of walking in Melbourne and access to suburban shopping centres. It includes analysis of Melbourne household travel data captured through the Victorian Integrated Survey of Travel and Activity (VISTA). No publicly available, detailed analysis of this data set has previously been carried out to accurately understand the role of walking in the transport system.

In addition to a literature review of published reports, Victoria Walks was also able to source a range of unpublished data to gain the strongest possible understanding of access to suburban centres in particular.

To gain an insight into the impact of urban design, travel patterns to a selection of highly car-oriented centres or shopping malls were analysed and compared to more traditional main-street focused centres.

> " Walking is the most common form of transport; nearly everyone is a pedestrian for part of their trip, even if they are driving. Despite this, walking as a means of transport is often overlooked and neglected "
>
> (Moving People 2030 Taskforce 2013)

Introduction

Benefits of walking

The role walking plays in the transport system is not well understood, little researched and often undervalued. However, walking provides significant benefits to the individual and society, including economic productivity.

Walking is an important activity for many people. This can be to get to certain places such as work, school, shops (referred to as 'walking for transport') or for other purposes including recreation, exercise or to walk the dog. Recreational walking is by far the most common physical activity for Australians aged 15 years or over, with nearly 45% of the population actively walking for recreation at least once a year (Sport Australia 2019).

There are a large range of benefits associated with walking, particularly improved health outcomes. The connection between physical activity and improved health has been well researched. A brisk walk for 20 minutes each day reduces the chance of early death by 25% (Sport Australia 2019) and walking for half an hour five times a week can add 1.5 to 3 years to a person's life expectancy (Australian Medical Association 2014). Physical activity helps prevent chronic diseases such as heart disease and type 2 diabetes as well as reducing the risk of stroke and some cancers (Heart Foundation 2015).

Walking is easy to include as part of everyday activities. Increases in walking also have benefits for:

- Community – through creating social cohesion and improving both the actual and perceived sense of safety as well as quality of life. There is also 'safety in numbers', with more people walking making walking safer.

- Equality – by addressing gender equality and providing intergenerational connections and opportunities for the socially disadvantaged. Although housing costs in walkable places are typically greater, transport costs are lower, and residents have better access to jobs.

- Environment – through reduced vehicle emissions and improved air quality.

- Traffic conditions – by displacing vehicle trips.

- Economic development – resulting in increased retail spend, revitalisation of retail areas and transport savings for both individuals and governments.

- Choice – giving people the option to walk and access to mobility without a private vehicle, especially when combined with public transport (Badawi, Maclean and Mason 2018; Transportation Research Board 2005; Walz-Chojnacki 2017; Becker, Bernstein and Young 2013).

Introduction

Walkable places make good economic sense

Places that are easy and pleasant to walk around are places where people want to be. There have been several US studies which link the walkability of an area to economic output. Per square foot, housing in walkable areas commands higher rents than driveable urban suburbs (Loh, Leinberger and Chafetz 2019). A one-point increase in the Walk Score (a measure of walkability) increases the value of a typical home by between $700 and $3000 (Becker, Bernstein and Young 2013). In Melbourne, research found an increase of five points in the Walk Score of a suburb correlated to an increase of nearly $300 per square metre for house prices (Walker and Lock 2013).

The effect is even greater for retail and office rents. Rents per square foot for these spaces in walkable, urban places in the US are more than twice those in driveable suburban locations (Loh, Leinberger and Chafetz 2019). Other US research found 83% of office tenants want to be based in walkable locations with mixed land uses because this is what their employees want (Smart Growth America 2015). A UK study found that walking interventions can increase trade by up to 40% and retail rents by 20% (Lawlor 2018).

The economic impact of walkable areas is not limited to inner cities. Businesses are choosing to move to walkable areas with good public transport connections in suburban locations (Smart Growth America 2015). A US-wide study found that of office tenants who want to locate in suburban areas (as distinct from CBDs), 83% prefer being in walkable, mixed use areas rather than typical single-use suburban office locations (Malizia 2014). The main reason for this is to attract and retain quality workers and provide them with transport choices (Smart Growth America 2015). Boston has reached the "end of drivable suburban sprawl" with nearly all new office space since 2010 located in walkable urban places, 40% of which is located in the suburbs (Loh, Leinberger and Chafetz 2019).

Factors influencing travel behaviour

Individual preferences and lifestyles are very important factors in a person's travel decisions (Krizek, Forsyth and Baum 2009). Sociodemographic factors, personal and cultural factors, feelings of safety and time pressures also influence an individual's travel behaviour (Transportation Research Board 2005). For example, children in Melbourne are less likely to travel actively to school if the adult accompanying them continues elsewhere afterwards, for example, to work (Carver, et al. 2019).

People's preferences with respect to how they travel are changing. Car ownership rates by population in Melbourne have fallen since 2006 and vehicle licencing rates in Victoria have been falling since 2011 (Loader 2017). New vehicle sales in Victoria are also declining, falling 2.8% between July 2018 and July 2019 (Federal Chamber of Automotive Industries 2019). By comparison, over the 12-month period to the end of December 2018 the Victorian population increased by 2.2% (Australian Bureau of Statistics 2019). This trend is not being driven by people being unable to afford cars, but rather people choosing not to own cars. As young people are less likely to get their driver licence, walkability and access to destinations and public transport are increasingly likely to drive property values (Badawi, Maclean and Mason 2018).

It is difficult to determine exactly how physical characteristics of the built environment such as land use, density, road design and footpaths influence walking (Transportation Research Board 2005). There are multiple factors with varying levels of influence, but the relative importance of each is often subject to debate.

How a place is designed influences the way people think of it. For example, a shopping centre surrounded by car parking sends the message that this is a place to drive to. Car parks require large amounts of public space for moving and parking vehicles, and are very visible even when they are not in use. In comparison, walking requires little infrastructure and is less visible.

Introduction

> **"** The most activity-friendly environments could help the average resident to achieve 45–59% of the 150 min/ week of physical activity recommended [by UK guidelines] **"**
>
> (Sallis, et al. 2016)

Areas with physical characteristics otherwise conducive to walking but which are unpleasant places (for example, covered in graffiti, litter or poorly maintained and lit) can discourage walking (Transportation Research Board 2005). Other people's behaviour can also influence perceptions of walking. People loitering in the area, dogs off leash or not under control, drivers who do not give way and bicycle riders on paths shared with pedestrians can all be barriers to walking (Garrard 2013).

Therefore, continuing to plan as we have in the past with single-use areas designed around car access will not provide what people want, which is to live in clean, walkable areas with shops, services, jobs and transport close by.
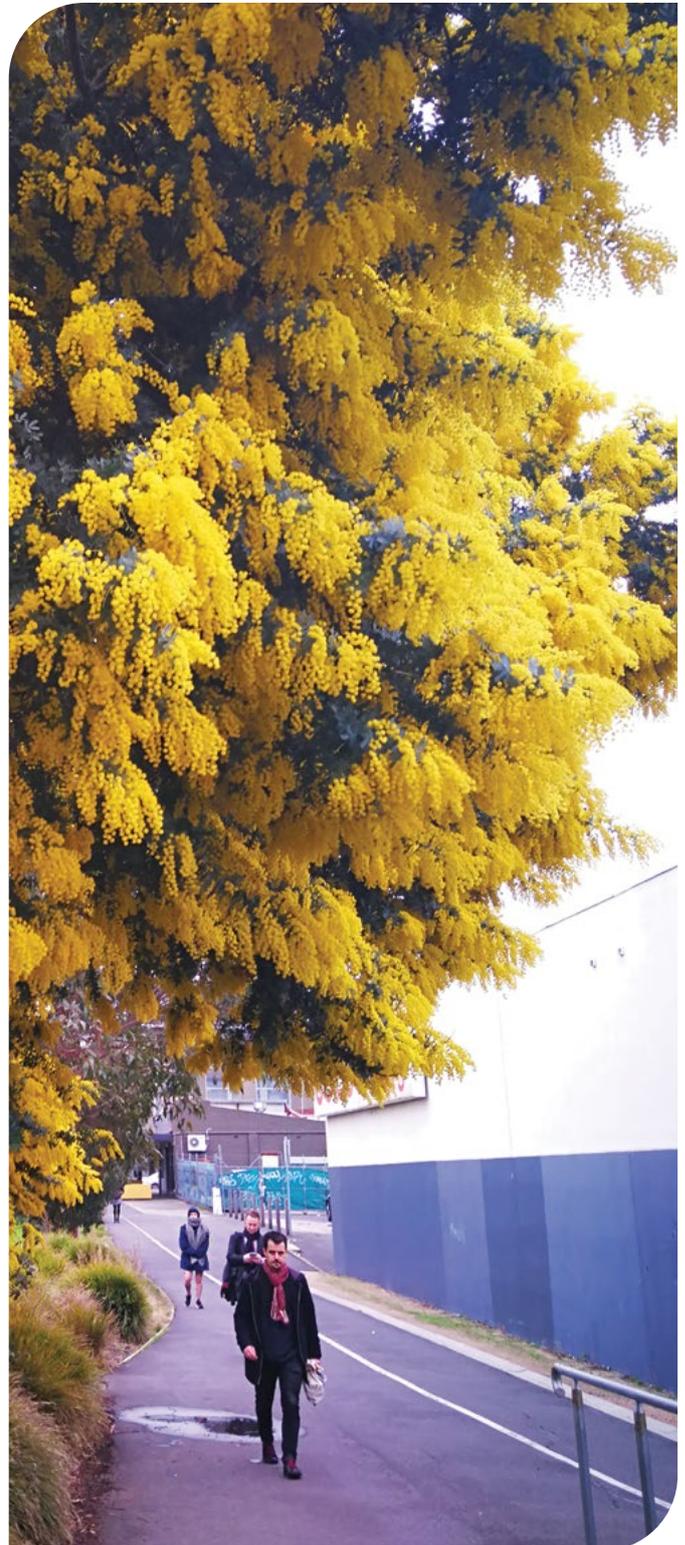
Introduction

Availability of information on walking

Walking is an important part of travel, especially for accessing public transport and suburban shopping areas. However, it does not receive the corresponding amount of recognition or investment and there is currently no walking strategy or plan for Victoria.

An Australian study found much of the literature on distances people walk is from the US and so has limited relevance to Australia as walking mode share here is higher (Burke and Brown 2007).

Australian information that exists on the broader role of walking is often gathered from household travel surveys such as the Victorian Integrated Survey of Travel and Activity (VISTA). However, these surveys are self-reported, meaning trips are under-reported (Wolf, Oliveira and Thompson 2003) and short trips in particular are forgotten or the length underestimated (Fairnie, Wilby and Saunders 2016). As walking trips tend to be short, they are likely to be particularly affected. Variations in the information collected by household travel surveys make it difficult to compare walking levels between places (Burke and Brown 2007).

Although travel surveys can be used to gauge physical activity, this is not their primary purpose (Fairnie, Wilby and Saunders 2016). They significantly underestimate walking for exercise, sport and recreation (Burke and Brown 2007).

Other local sources of walking data include the City of Melbourne's automatic pedestrian counting system, which provides information about pedestrian movements in the municipality, by location and over time (City of Melbourne 2019). The results are published online. Some other Victorian Councils carry out regular pedestrian counts and pedestrian intercept surveys at particular locations, however these results are usually not publicly available.

The Victorian state government, led by VicRoads (now Department of Transport), are preparing a Walking and Cycling Data Framework and Action Plan. This includes initiatives to count pedestrians. However, it is unclear how well resourced it will be and how extensively walking information will be collected as a result.

> " Whilst it is a part of almost every transport trip, walking could be aptly described as the invisible mode, left largely uncaptured in transport data collection "
> (Badawi, Maclean and Mason 2018)
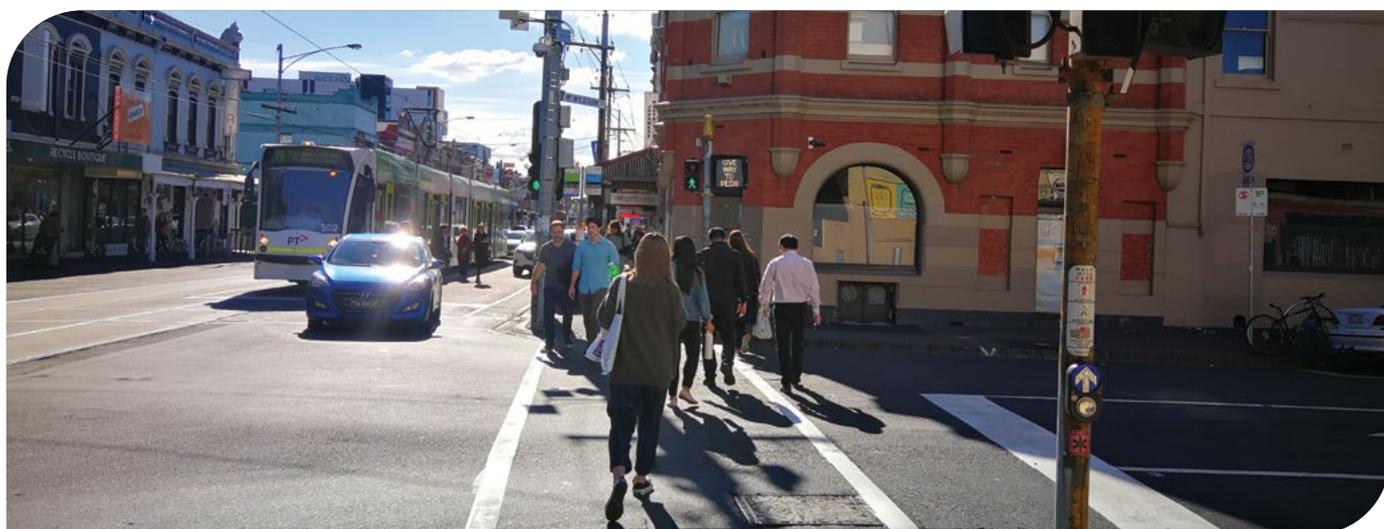
Introduction

An often-quoted Australian source for travel behaviour is Census data from the Australian Bureau of Statistics. The publicly available Census data is of limited value in understanding the broader role of walking as it considers only people travelling to work who walk the whole way. These trips represent only a fraction of all walking trips (see Figure 7). The Census data ignores the fact that nearly all public transport trips involve some walking (see section Public transport and walking).

The Victoria Walks report 'Measuring Walking: A Guide for Councils' provides an overview of the what, where, when and how to measure walking for various situations (Eady 2013). It includes discussion of technologies which can be used to measure walking, including mobile device detection to understand how people move about an area and how long they spend there. A limitation of this type of technology is that older people and children are less likely to be carrying a mobile phone, but they are the most vulnerable pedestrian groups.

A common issue for understanding walking is that it is often grouped together with cycling and sometimes also public transport as 'active transport'. But the needs of each of these people differ and the infrastructure and services provided for them should differ accordingly.

Councils and state agencies regularly make changes to the street environment that could encourage or discourage walking, often to improve road safety or local economic development. However, local projects are not usually evaluated and so data is rarely collected on changes in walking behaviour as a result.

> **❝** Walking remains an important but largely ignored mode in planning for moving people **❞**
> Moving People 2030 Taskforce 2013)
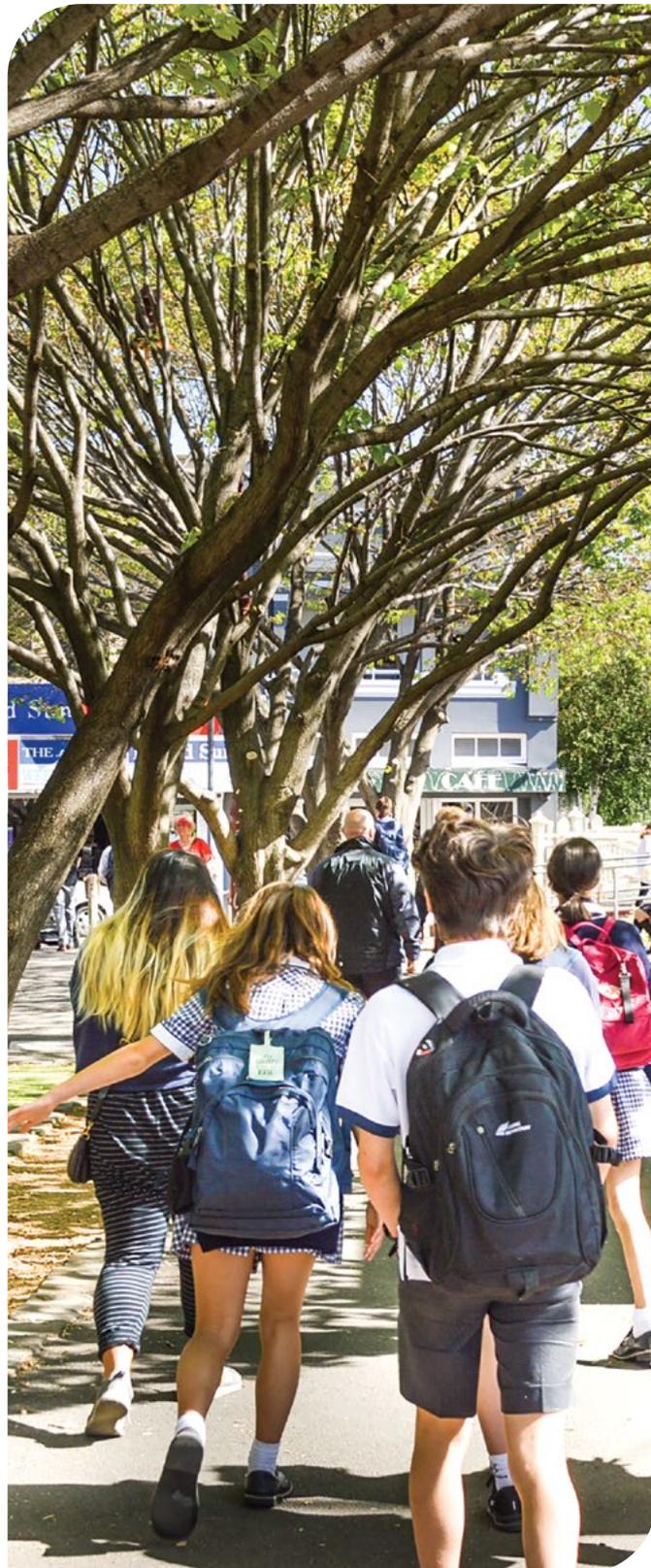
Walking in Melbourne

Walking is fundamental to the lives of Melbourne's residents. The CBD and inner suburbs were designed before the car and so planned around people rather than vehicles. Melbourne City Council and several other inner councils now prioritise the movement of people above the movement of vehicles. The inner suburbs also tend to be high density with high quality public transport and shops, services and employment within short distance of housing. In comparison, the middle and outer suburbs have been designed around vehicle access, with high speed, wide roads, low density housing and shops and services generally concentrated in standalone locations rather than integrated where people live. Public transport and employment options are limited or not available in many outer suburbs.

To give an idea of the scale of people walking in the CBD, consider Collins Street and Spencer Street opposite Southern Cross train station. This is the busiest CBD pedestrian intersection for which data is available. On an average weekday, more than 4,800 people use the north-eastern corner alone in the hour between 5 and 6pm (City of Melbourne 2019). This compares to an average of 1,700 northbound vehicles on King Street at Collins Street (the busiest CBD traffic intersection) during the peak hour (VicRoads 2019).

To better understand walking outside of the CBD, Melbourne-wide transport and walking data is available from the Victorian Integrated Survey of Travel and Activity (VISTA).[1] This ongoing survey asks people to report all their travel behaviour for one day, and unless otherwise stated it is the basis for the analysis in this report. The weightings included in the VISTA data set have been used in the analysis to provide figures representative of Melbourne.

Even when all travel is otherwise reported accurately, household travel surveys will not capture all walking for transport. VISTA generally does not include walking as part of interchanging where a car is involved (for example, from a car park to the train station entrance) or walking within a building or shopping centre. It also estimates trip distances by factoring the shortest distance between two points. This may not accurately reflect actual distances walked.

Definitions from VISTA documentation

Trip: a one-way travel movement from an origin to a destination for a single purpose (including picking up and delivering passengers), but perhaps by multiple modes. For example, to go from home to the local shops for the purpose of buying lunch.

Trip stage: a one-way travel movement from an origin to a destination for a single purpose (including change of mode) and by a single mode. For example, a person who walked from home to the bus stop, took the bus, then walked to the shop is one trip with a main mode of bus but the trip is made up of three segments – home to bus stop (walking), bus stop to bus stop (bus), bus stop to shop (walk).

Stop: a place where an activity (including change of mode) is undertaken (for example, home, public transport stop, destination).

Walk only trip: a trip where the person walked from their origin to their destination. For example, a person who walked from home all the way to work would be included under 'walk only' but not a person who walked from home to the train station and then took the train to work.

[1] The surveys which form the VISTA data set analysed for this project were conducted over four financial years between 2012 and 2016. 43,616 people in 16,894 households were surveyed across Greater Melbourne to understand a single day of their travel during the period, representing about 1% of the population. The data and further information can be found at https://transport.vic.gov.au/about/data-and-research/vista/vista-data-and-publications. Surveys by households in Geelong have been filtered out, however a quick analysis of the Geelong data shows similar levels of walking as for Melbourne.

Walking in Melbourne

Walking mode share and distance

Walking is an important way for people to get around. The analysis of VISTA found that 16% of trips are walk-only trips and an additional 8% had at least one walking stage (24% in total with some walking involved). These additional 8% of trips are mostly public transport trips, but also include some trips by other modes. An example is a person going to the city who drives most of the way, parks in an off street car park and walks the last 15 minutes to their destination.

By comparison, Figure 1 shows a similar proportion of trip *stages* are also walked (25%). More trip stages are walked closer to the central city, but further from the city walking stages tend to be over longer distances. Across all areas of Melbourne, the average walking distance is more that the median distance, meaning there are lots of shorter walking stages. Short walking trip stages facilitate longer trips by multiple modes, for example walking combined with public transport.

Figure 1 Percentage of trip stages that are walked and distances (VISTA data)

Location	Percentage of trip stages walked	Average length (m)	Median length (m)	85th percentile (m)
Inner Melbourne	39%	770	563	1320
Middle Melbourne	25%	858	656	1498
Outer Melbourne	17%	941	710	1647
All Melbourne	25%	844	630	1460

Table note: The median is the distance below which 50% of people walked and the 85th percentile is the distance below which 85% of people walked. Inner, Middle and Outer Melbourne are categories in the VISTA data based on statistical areas defined by the Australian Bureau of Statistics.

Figure 2 shows that most trips less than 1 km in total length are walked. The proportion of people walking reduces as the distance gets longer.

Figure 2 Mode share by trip length (VISTA data)

Total trip distance (km)	Walk	Vehicle driver	Vehicle passenger	Public transport	Cycle	Other
Less than 1	63%	21%	13%	0%	2%	1%
1-1.99	31%	40%	25%	1%	2%	1%
2-2.99	13%	50%	31%	3%	2%	1%
3-3.99	4%	54%	33%	6%	2%	1%
4-4.99	2%	55%	32%	8%	2%	1%
5-9.99	1%	57%	31%	9%	2%	1%
10 or more	0%	59%	24%	15%	1%	1%
All Melbourne	**16%**	**48%**	**26%**	**7%**	**2%**	**1%**

Walking in Melbourne

On an average weekday in Melbourne, 2.094 million trips less than one kilometre are made (Department of Transport 2019). About 21% of these are driven, according to the VISTA analysis. Walking will not be a reasonable substitute for some of these trips, such as a person driving to work who drops someone at the station on the way or a person with a disability that limits their ability to walk. For others, walking will be a very reasonable alternative for example by replacing a driving trip between two shops in the same shopping strip. If half of short driving trips were replaced with walking trips, close to 223,500 short vehicle trips could be avoided *each weekday*.

As walking trips tend to be short, walking represents only a small proportion of the total distance travelled by the Melbourne population, and vehicles account for the majority of distance travelled.

An analysis of travel data from Brisbane found that half of walking trips from home were at least 780 m long (median) and 15% were more than 1.45 km (Burke and Brown 2007). These findings align with other studies which suggest people walk much further than the commonly cited 400 m (Krizek, Forsyth and Baum 2009).

An alternative way to evaluate walking is by considering people rather than trips. VISTA found more than one-quarter of people (27%) walked on the survey day, including to get to or from other transport (for example, bus). However, 22% of people didn't leave their accommodation on the survey day, meaning one in three people (34%) who travelled on the survey day did some walking.

Walking rates by age group

Walking is particularly important for people who don't drive, including people with disabilities, young people, and older people. Data suggests that older people tend to walk most for recreation and exercise (Sport Australia 2019) while young people walk mainly for transport, including to get to public transport (Garrard 2017).

According to VISTA analysis, the demographic group most likely to walk as part of their travel are young people, with one in three people (34%) between 10 and 19 reporting walking on the survey day (Figure 3). This supports Victoria Walks' earlier research which found that walking, often combined with public transport, provides a critical opportunity for young people to lead independent lives (Garrard 2017).

Figure 3 Percentage of people who walked on the survey day - by age group (VISTA data)

Age group	People who travelled and walked	People who travelled but didn't walk	People who didn't travel
0-9	20%	58%	23%
10-19	34%	43%	23%
20-29	28%	48%	24%
30-39	31%	54%	15%
40-49	28%	58%	14%
50-59	26%	55%	19%
60-69	26%	51%	23%
70-79	23%	44%	33%
80-89	17%	39%	44%
90-99	6%	29%	64%
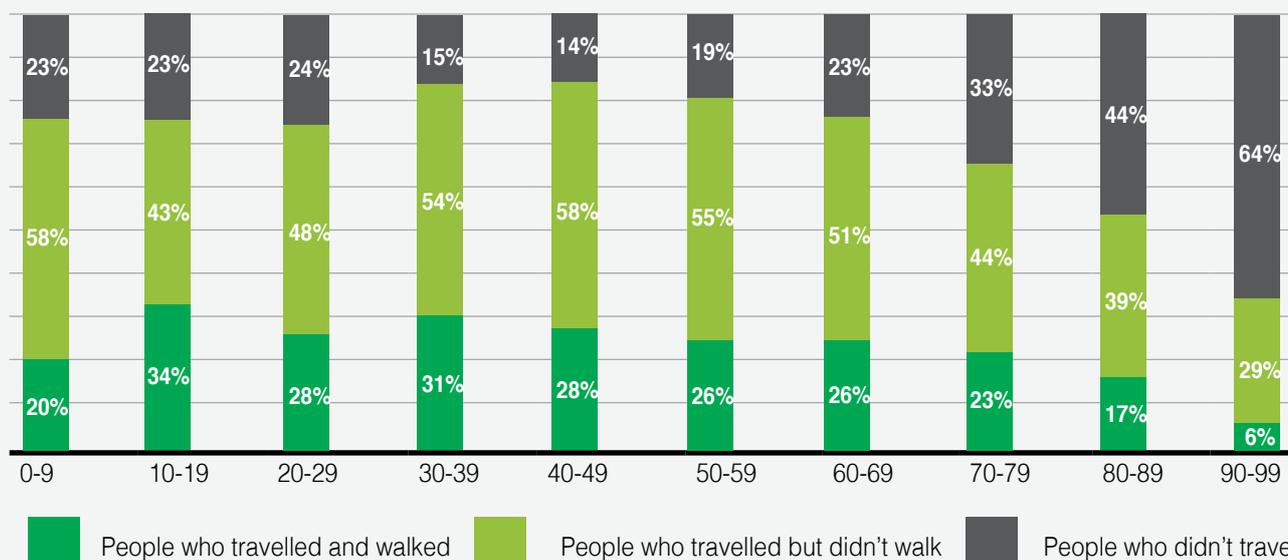
Walking in Melbourne

There is substantial variation between age groups in whether they are likely to leave home on any given day (Figure 4). People aged between 30 and 50 are most likely to travel, while older age groups are the most likely to stay at home. However, for every age group between 20 and 90, around one in three people who leave home (Figure 4) will do some walking, compared to 44% of those 10-19. There is some variation within the 10-19 age range, with a higher than average rate between ages 14 and 18. The low walking rates for young children (0-9) reflects limited independent mobility for children in Australian society.

Surveys focused on recreational walking find that walking increases with age, with a peak of 71% of Australian women between 55-64 and 57% of Australian men aged 65 or older, actively walking for recreation in the past year (Sport Australia 2019).

Figure 4 People who walked as a proportion of those who recorded travel on the survey day - by age group (VISTA data)

0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
25%	44%	37%	36%	33%	32%	34%	35%	31%	18%
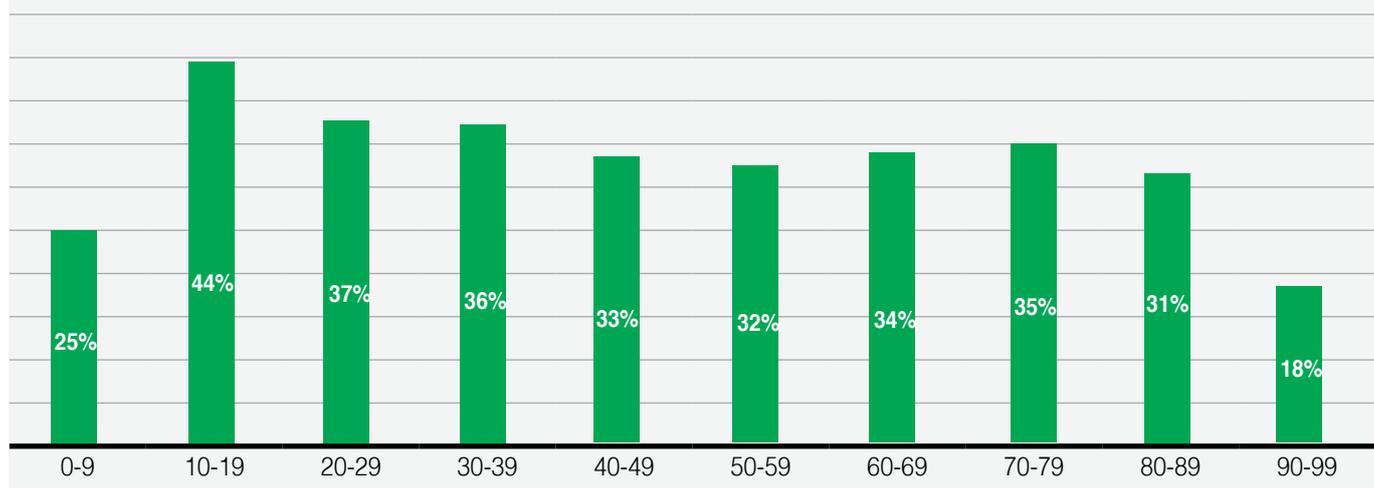
Walking in Melbourne

Mode by gender

In the VISTA dataset, 28% of women and 26% of men reported walking on the day of the survey. The gender difference was more pronounced in a Victorian survey of physical activity, which found 55% of females and 47% of males walk (for any purpose but fast enough to raise the breathing rate) in an average week (VicHealth 2016).

Considering other modes of transport, women are much more likely than men to travel as a vehicle passenger (58% of trips where the main mode is vehicle passenger are by females) or tram passenger (56% female). Conversely, men are much more likely than women to ride a bicycle as their main mode of transport (64% of trips where the main mode is bicycle are by males). Driving a vehicle, using a train and using a bus are relatively evenly split between the genders.

Walking rates by car ownership and licence

Several international studies have found that car ownership has the strongest relationship to active travel, usually defined as walking or riding (Bennie, et al. 2018; Fairnie, Wilby and Saunders 2016). People who do not own a car are most likely to walk or ride. The likelihood decreases with increasing number of cars owned.

In line with these international studies, VISTA finds that the more vehicles owned per adult in the household, the less likely people are to walk (Figure 5).

Unsurprisingly, the analysis also found that adults without a car license were more likely to walk (33%) than those with a full licence (26%).

Figure 5 Proportion of adults who walk compared to vehicles in a household (VISTA data)

Description of household[1]	Proportion of all households	Proportion of adults in these households who walked[2]
No vehicles owned	17%	49%
More adults than vehicles	40%	36%
Equal number of adults and vehicles	40%	31%
More vehicles than adults	2%	26%

Table notes:

[1] Vehicles include all motorised vehicles (for example, car, motorbike, truck, etc) owned or used by members of the household parked at or near dwelling the previous night. It includes vehicles owned by the household as well as company cars.

[2] As a proportion of those that travelled on the survey day; those who did not leave home have not been included.

Walking in Melbourne

Purpose and length of walking trips

Most trips with any walking component are made to get somewhere i.e. for transport. Key purposes are work, social trips and shopping trips, which when combined make up half of all trips (Figure 6). Trips classed as social include activities such as going out to eat or drink, visiting someone, watching a concert, movie, sport, etc.

Recreational (i.e. non-transport) trips are more difficult to quantify. For example, it is very difficult to differentiate between a person walking to a park because they want to go to the playground (a transport trip) and a person walking to the same park because they want to go for a walk and get some exercise. In VISTA, trips classed as 'recreational' includes both people going for a walk (exercise in itself) as well as people going to the gym (a trip to go do exercise).

In comparison, for trips where walking was the only mode, the proportion of work-related trips drops significantly but trips for recreational, social and shopping purposes remain important (Figure 7). In Melbourne, walk-only mode share for people travelling to work has grown over the past decade while travel by private vehicle is shrinking (Department of Transport 2019). Walking all the way to work is most common for people who live in the inner city, with a mode share greater than 40% in some areas. Apart from the CBD, high levels of walking to work are seen around Monash University, Clayton; the Police Academy, Glen Waverley; Box Hill; and Swinburne University, Hawthorn (Loader 2018). This could be reflective of the number of people who live on campus and the high densities of housing and jobs in these areas.

Figure 6 Purpose of trips with any walking, including public transport trips (VISTA data)
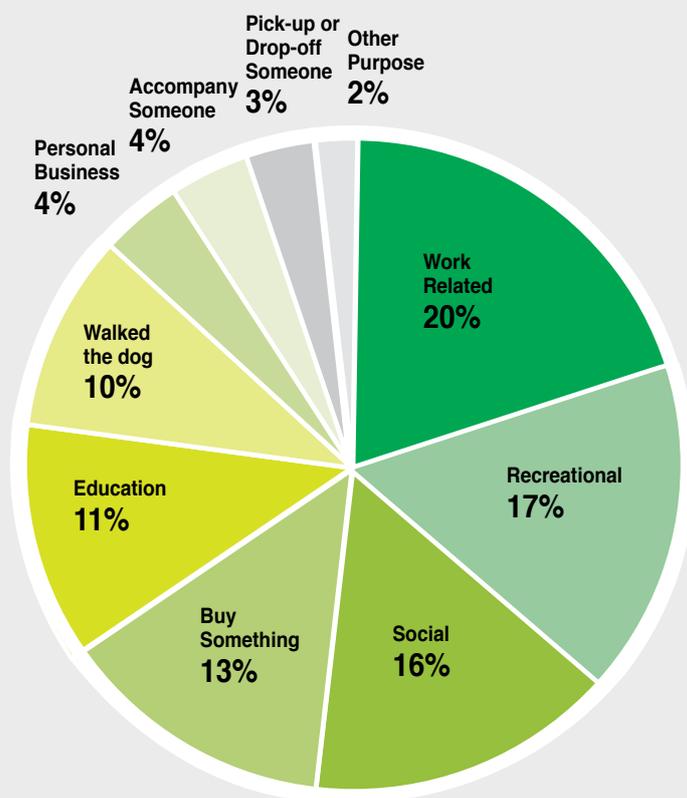
Walking in Melbourne

Figure 7 Purpose of walk-only trips (VISTA data)

- Other 2%
- Pick-up or Drop-off Someone 4%
- Accompany Someone 5%
- Personal Business 11%
- Walked the dog 8%
- Education 8%
- Buy Something 15%
- Social 15%
- Recreational 23%
- Work Related 9%
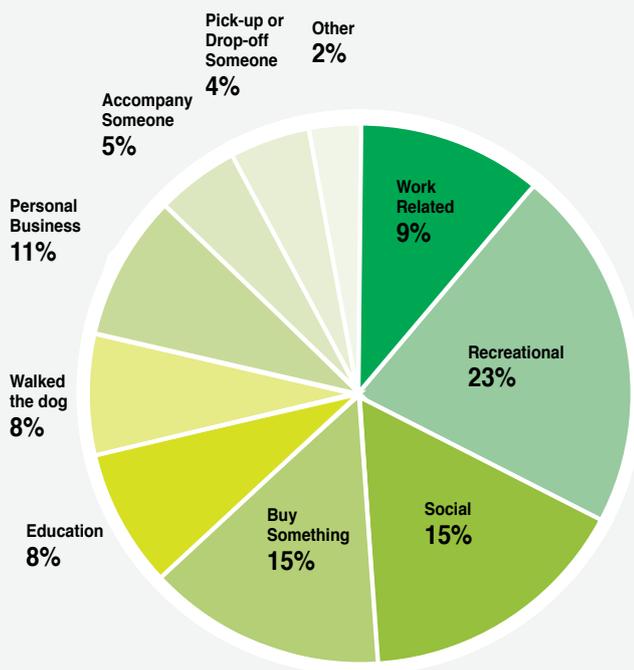
Figure 8 shows people walk the longest distances for exercise or recreation, compared to work and personal business trips, which are about half the length.

Figure 8 Distance of walking stages by purpose (VISTA data) [1]

Purpose	Average length of walking stage (m)
Recreation, generally for exercise [2] – includes going for a walk, going to the gym	1378
Walked the dog	1163
Recreation, generally for transport – includes organised sport, going to the pool	873
Accompany Someone	835
Pick-up or Deliver Something	833
Education	779
Social	750
Pick-up or Drop-off Someone	737
Buy Something	714
Personal Business (except 'walked the dog')	695
Work Related	685
TOTAL All purposes	**845**

Table notes:

[1] Only categories with 100 or more trips are listed

[2] Note that for round trips, the total distance walked will be about twice that recorded for the single trip stage.

Walking in Melbourne

Walking throughout the week

Trip stages on weekdays are more likely to be walked (27%) compared to weekends (21%). Weekday and weekend walking differ by time of day, as shown in Figure 9. Weekend walking is concentrated in the middle of the day, compared to walking on weekdays, which has three peaks:

• between 8 and 9am

• between 3 and 4pm

• between 5 and 6pm

This is due to people walking for work related purposes, including trips using public transport (24% of trips involving walking are walked on weekdays compared to 4% on weekends) and education (14% and 1% respectively).

Figure 9 Comparison of trip stages walked on weekdays/weekends by time of day (VISTA data)
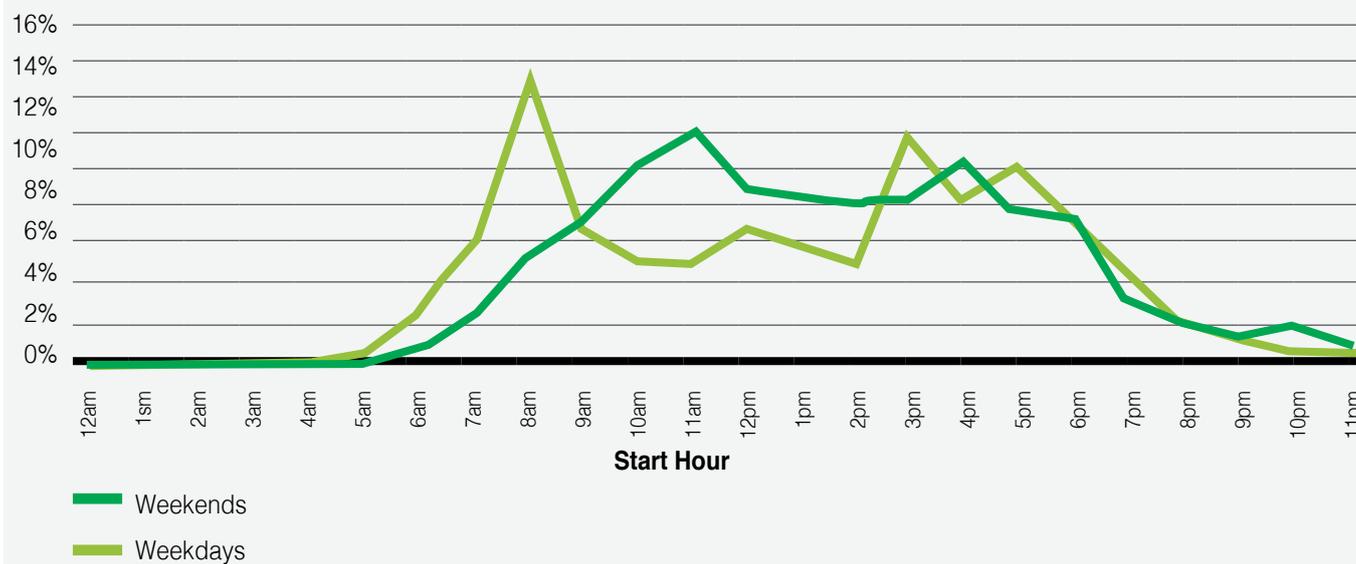
People are more likely to walk on weekends than weekdays for:

• social reasons, for example to visit someone or go to a restaurant/café (27% of trips involving walking on weekends compared to 12% on weekdays)

• to buy something (22% and 11% of trips involving walking respectively)

• exercise (18% and 12% of trips involving walking respectively)

Walking in Melbourne

Public transport and walking

Nearly all trips involving public transport made in Melbourne also include some walking (97%), at either the origin or destination. If trips by school bus (which often carry students directly between their house and school) are excluded, then basically all public transport trips include some walking (99%). This is partly to do with the way VISTA records trips – it generally requires a walk stage when accessing or leaving public transport. An exception is when changing mode to/from car, such as walking from the train station car park to the station entrance. This walking trip is rarely recorded in VISTA, even though it can sometimes be a reasonable distance.

In terms of accessing public transport, the majority of trip stages less than 1 km from home to a public transport stop are walked (94%). This lends support to policies which seek to concentrate housing around high frequency public transport, as it suggests they will be effective in increasing walking rates, reducing driving and possibly relieving congestion.

Melbournians who use public transport get more than five times the amount of physical activity as part of their travel than those who use private transport and no public transport. On average, these people meet the recommended 30 minutes of physical activity per day (BusVic 2010).

How far people walk to and from public transport varies, depending on the type of public transport. Train stations tend to be fewer in number and further apart than both bus stops and tram stops, and provide a fast, direct service to the CBD. In Melbourne, the median distance people walk from their home to a train station is 721 m, similar to the commonly accepted distance of about 800 m. In comparison, the median distance people walk from home to a bus stop is 390 m, and to a tram stop is 360 m. A Brisbane study similarly found that people walk about twice the distance to access train stations than bus stops: people travelling from home to a train station walked a median distance of 890 m (15% walk more than 1.57 km) and 440 m to a bus stop (15% walk more than 1.07 km) (Burke and Brown 2007).

Although people are likely to walk further to access the train, they are also more likely to drive to the train station than a bus stop. One in five Australians who take the train to work also travel in a car as part of the trip, compared to only 10% of people who take a bus (McCrindle Research 2014). The same research found that over half of people say they don't use public transport because there is none available or it doesn't operate at a convenient time. Improving public transport has

the potential to significantly reduce the number of vehicle trips, with only 10% of people requiring their own vehicle for work and 8% using it to carry work items or other people (McCrindle Research 2014).

Travel to the train station

Data from the state government's 2012 origin destination survey found that across Melbourne's metropolitan train network more than 63% of people arriving at a station walked all the way (not including those who arrived by train). The next most common method for getting to the station was in a car at 21%, either as a driver or passenger. This matches very well with the VISTA results (shown in Figure 10) which found 66% of people catching a train walk to the train station.

DISTANCE WALKED FROM HOME TO PUBLIC TRANSPORT

Train Station	Bus Stop	Tram Stop
721 M	**390 M**	**360 M**
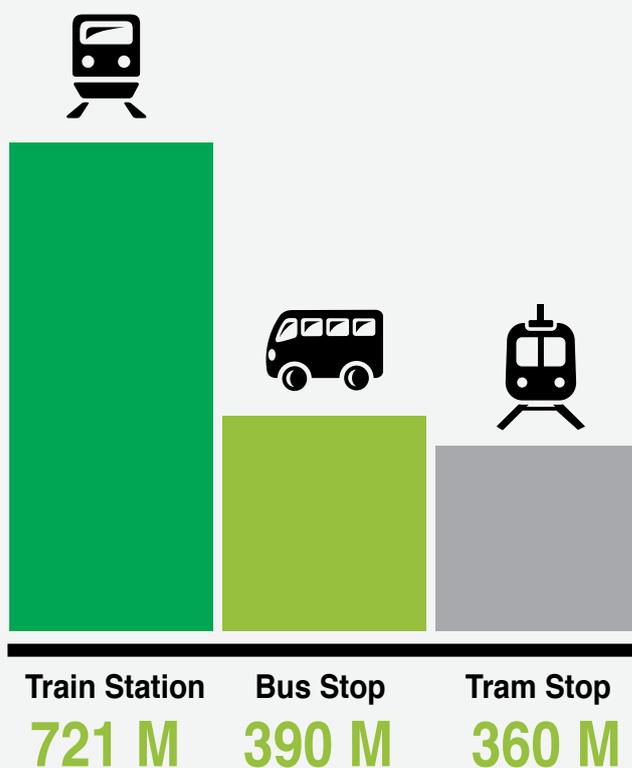
Walking in Melbourne

Figure 10 Trips by mode to the train station (VISTA data)

Mode	%
Walking (only)	66%
Vehicle Driver	11%
Vehicle Passenger	8%
Bus	8%
Tram	7%
Other	1%

■ Trips involving some walking
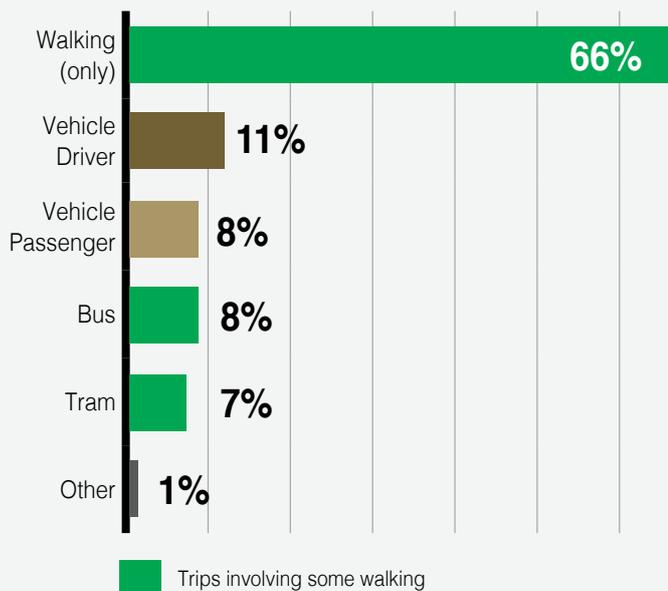
Rates of walking to train stations in regional centres are much lower, but in Victoria's regional city of Ballarat, 15% of people arriving at the train stations still walked there (Communication from City of Ballarat, 2019 survey). This is despite recent increases in free car parking at the stations of Ballarat and Wendouree.

When considering only the journey from home to the train station, walking is still the main choice, with close to half of people walking (Figure 11).

Figure 11 Trips by mode from home to the train station (VISTA data)

| Walking only	Vehicle Driver	Vehicle Passenger	Bus	Tram	Other
48%	21%	14%	12%	3%	2%

■ Trips involving some walking
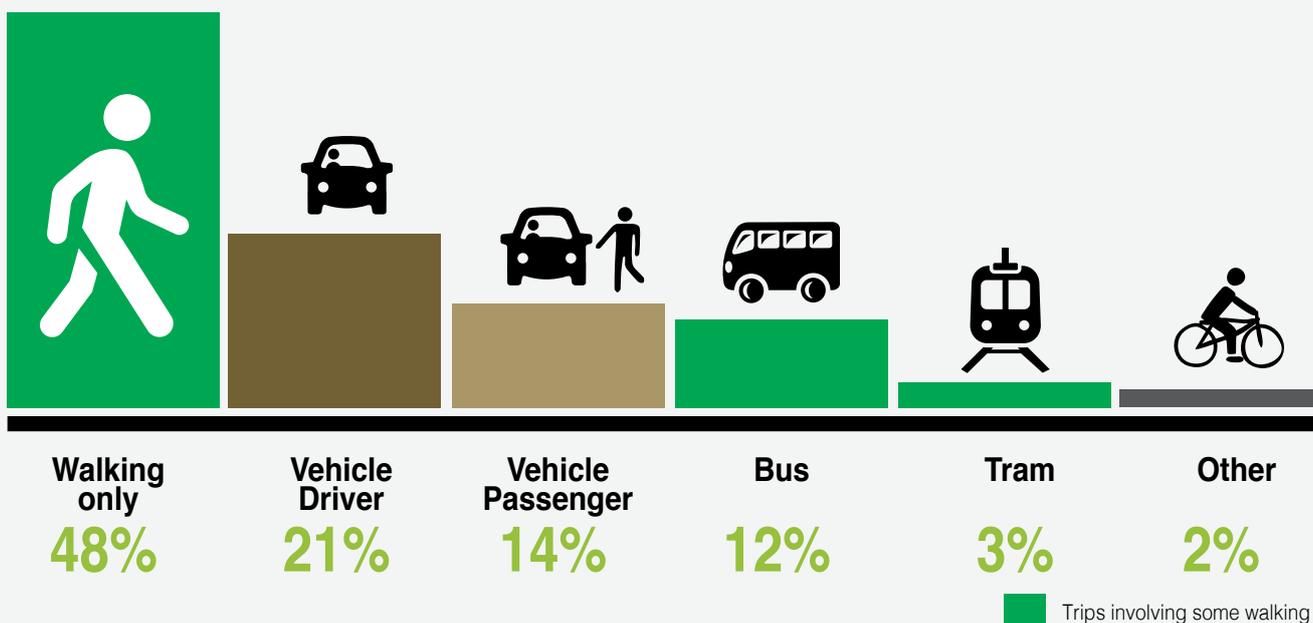
Walking in Melbourne

Figure 12 shows a strong correlation between the proportion of people who walk to each train station and the number of car parks provided (R^2 value of 0.5). This means that the number of car parks available explains about half of the reasons people walk to the train station. At train stations with fewer car parks, a greater proportion of people walk.

Similar to findings for walking in Melbourne, people who live further from the CBD (stations shown in green) are less likely to walk than those closer to the CBD (shown in blue). This is likely to reflect the broader urban design of the neighbourhood. However the observation still applies that the more car parks provided, the smaller the proportion of people walking to the station.

Figure 12 Number of people walking and the number of commuter car parks at each suburban train station

DISTANCES FROM EACH TRAIN STATION TO SOUTHERN CROSS STATION

● Less than 10 km   ● Between 10 km and 20 km   ● More than 20 km
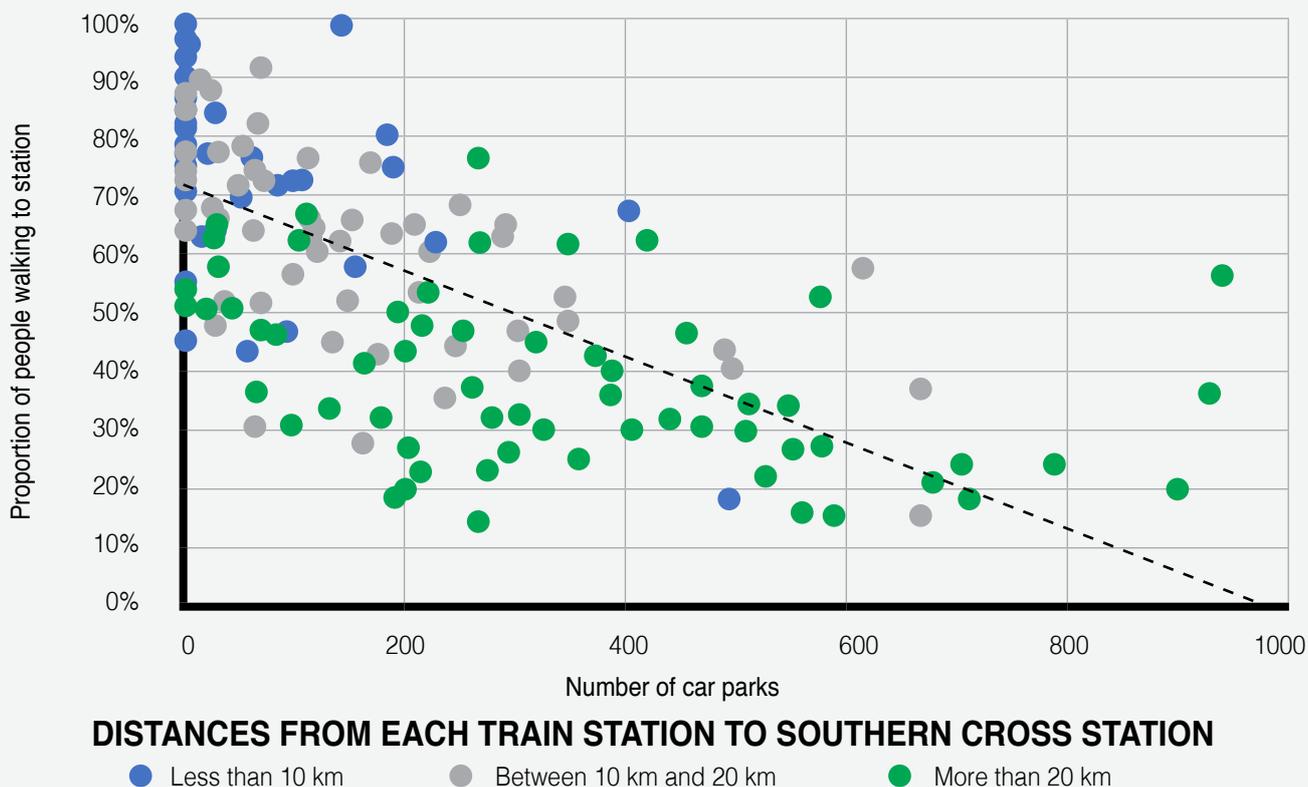
Figure notes:

The proportion of people who walk is from PTV's origin destination survey (https://transport.vic.gov.au/about/data-and-research/patronage) and the number of car parks is from PTV's classic website (https://classic.ptv.vic.gov.au/). Both data sets are from a comparable time (circa 2013).

Some people driving to the station travel only short distances, with nearly one in four people (24%) driving from home to a train station travelling less than 2 km. The average distance driven is 4.77 km. In addition, people do not always drive to their closest station due to service reliability and frequency, parking availability, etc. It is expected the majority of these short trips could be walked, although in some locations options for walking may be limited, for example missing footpaths, roads and train lines that create barriers and concerns about personal safety.

Walking in Melbourne

Travel to bus and tram stops

A simple analysis of VISTA data was carried out to understand how people get to bus and tram stops. People who went to a stop to drop someone else off but did not catch a bus or tram themselves were excluded. The results are not directly comparable to the analysis of travel to train stations in the previous section as it only captures trips where a single mode was used to access the stop. However, people are more likely to use only a single mode to access a tram or bus than a train, so the values likely include most travel to bus and tram stops from home.

This found walking is even more important for accessing buses and trams than it is for accessing trains. Nearly all trips stages to access a bus or tram are walked (Figure 13). When trip stages from all locations are included, 96% to bus stops are walked and 98% to tram stops are walked.

Figure 13 Access mode to bus and tram stops from home (VISTA data)

	Bus stop	Tram stop
Walking	94%	94%
Vehicle Driver	2%	3%
Vehicle Passenger	5%	3%
Bicycle	< 1%	0%
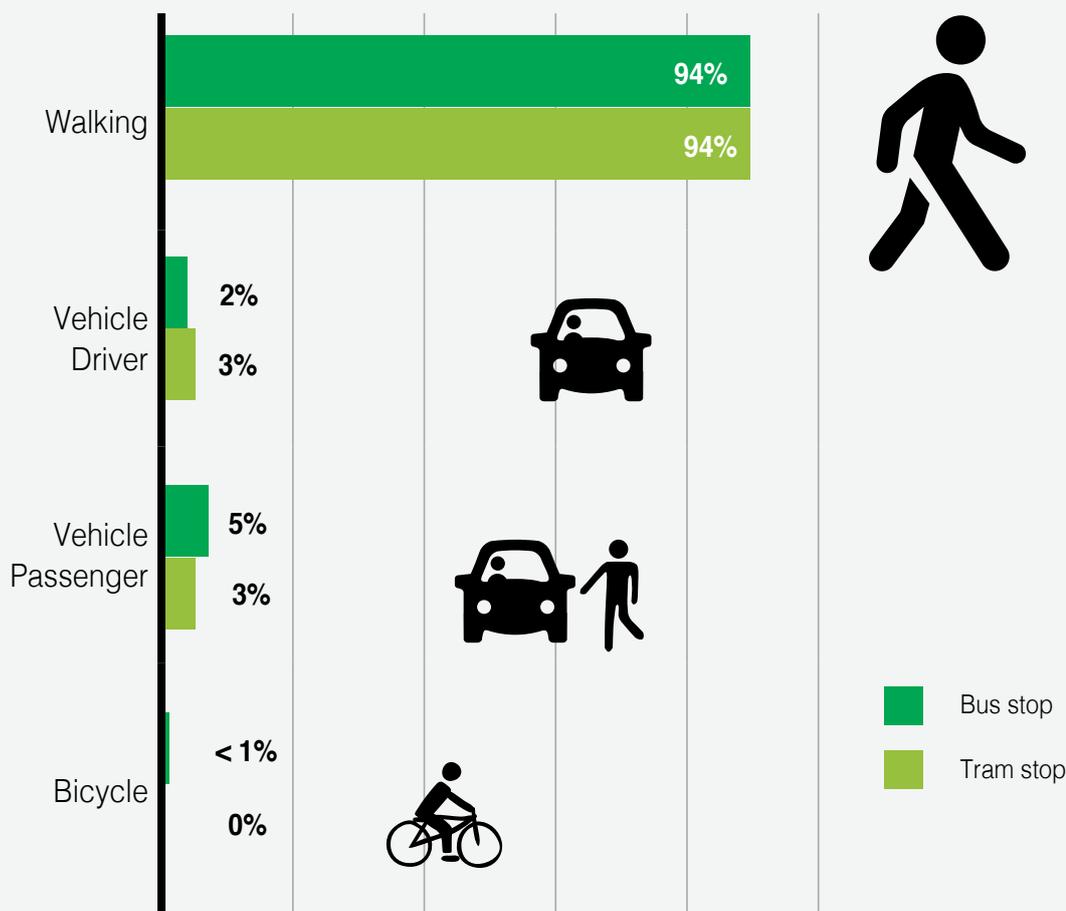
Travel to shops and services

The way in which people travel to work and to a lesser extent how they travel to education are well researched. However, little is known about travel behaviour to retail destinations in Australia (Nejad, Burke and Sipe 2012). This section considers the question of how people travel to shops and services, using local surveys and an analysis of VISTA data.

> ❝ Despite the fact that a large volume of personal travel directly or indirectly originates from retail activities, these types of trips have been largely ignored by researchers ❞
>
> (Nejad, Burke and Sipe 2012)

Consultation by Victoria Walks with councils around Melbourne found strong support for better understanding how people access local shopping areas. They emphasised the need for data to 'cut through' in discussions with councillors and traders to help them better understand the behaviour of their citizens and customers. Given the lack of data on travel behaviour, decisions about the streetscape can end up being based on opinions rather than fact.

Research from Brisbane suggests shops are an important destination, with retail representing the second most common category of trip on weekdays (16%, after the journey to work) and the most common on weekends (29%) (Nejad, Burke and Sipe 2012). VISTA findings for Melbourne are similar. Trips made with the purpose to buy something represent 15% of all trips on weekdays (second most common purpose after work related at 26%) and 27% on weekends (second most common purpose, after social trips at 29%). A third of social trips are made to cafes and restaurants. This highlights that these are important destinations to consider in addition to retail shops.

Retail trips are more flexible in terms of destination and time compared to trips to school or work which usually have a set location and time. This may mean there is a greater opportunity to influence when and how retail trips are made (Nejad, Burke and Sipe 2012).

Although internet shopping is increasing, 95% of shopping in Australia is still undertaken in-store (Colliers International 2018). Localism is a factor which is becoming more important in people's decisions about where to shop and what to purchase, meaning local shopping centres are still important. The variety of goods and services available in shopping centres are increasing, with gyms, medical centres, entertainment, childcare, schools, showrooms, food retailing and supermarkets performing well. Australian research found that the best performing shopping centres are those that strongly engage their local community (Colliers International 2018).

> ❝ The debate between retailers and policy makers is usually based on emotions. Taking (investment) decisions based on emotions is usually not a good idea! ❞
>
> (Mingardo 2018)

Travel to shops and services

Local Councils in Melbourne sometimes collect information about people travelling to local centres, often through sporadic intercept surveys that ask about mode, purpose, frequency of being there, how much money people are likely to spend, etc. However, the results of these surveys are rarely made public. This section brings together evidence from some of these local surveys as well as analysis of Melbourne wide travel data (VISTA) and interstate examples.

Victoria Walks gathered predominantly unpublished data to better understand travel to and behaviour at suburban centres in particular. This data was generally from local councils and relates to specific shopping areas, often managed by the council and located along a main road (for example, strip shopping centre). VISTA was analysed to get a Melbourne wide perspective of how people travel to shops and services.

The terms 'local shops', 'local shopping centre', 'local centre', 'activity centre' and 'retail' are used interchangeably to refer to these locations. 'Shops and services' is used when referring to VISTA data, representing trips to relevant destinations to buy something, for personal business or social purposes (see Appendix A for more detail).

Mode share to shops and services

The choices about shopping destination and mode of travel is influenced by multiple factors. Some studies have found distance to be a key factor, whereby having shops within a short distance correlates to an increase in people walking to the shops (Krizek and Johnson 2006). Others suggest the relationship is not so simplistic and the decision to walk is a complex one, difficult to model and establish causality (Transportation Research Board 2005). The environment also influences how a person perceives the trip and how long they believe it takes. One study found a pleasant, stimulating walking environment reduces the perceived distance walked by 9-14% (Hillnhutter 2019).

Figure 14 summarises the results of surveys on how people travel to local shopping centres. The data is predominantly for strip shopping centres in inner suburban areas of Melbourne. Most are a short distance from a train station and have bus and/or tram access as well as car parking. It shows that walking is very important for accessing these activity centres and in some cases is the most common mode. Private vehicle is the other key mode, particularly for workers (where there is data available), who are much more likely to drive than get to work any other way. The remaining people tend to take public transport and a smaller number cycle.

MODE OF TRAVEL TO SHOPS - HIGH STREET, NORTHCOTE

Shoppers	Workers	Shoppers	Workers
36%	19%	33%	60%

WALK MODE SHARE   **CAR MODE SHARE**
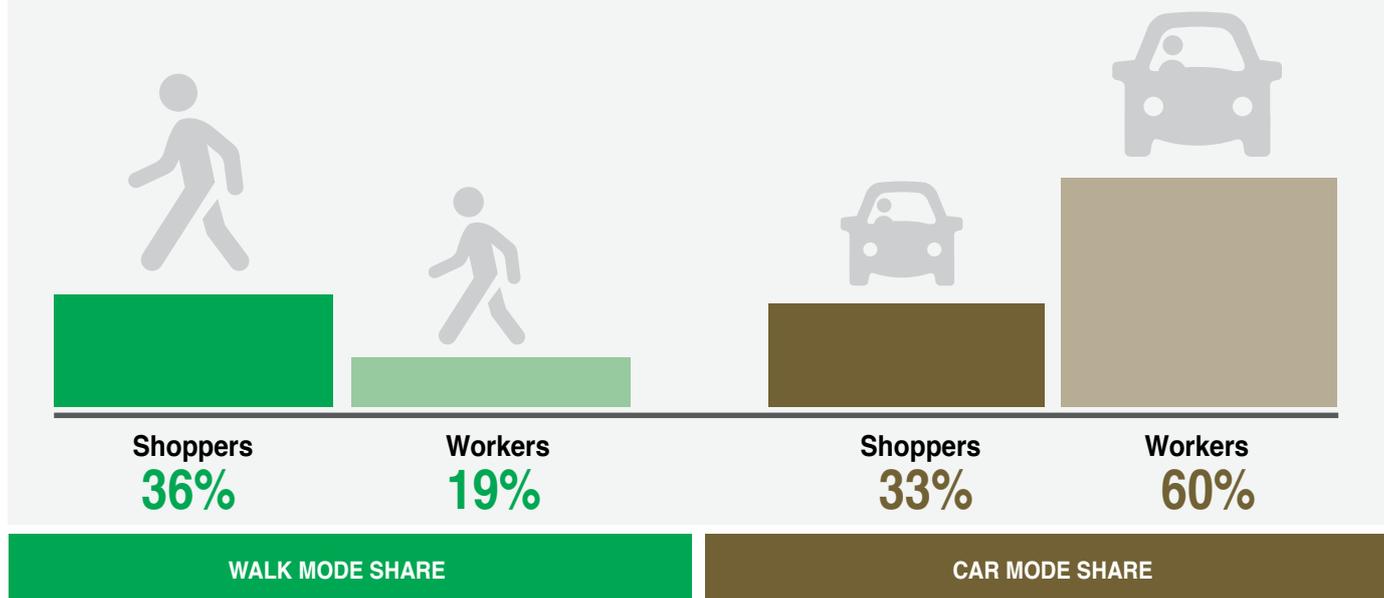
Travel to shops and services

Figure 14 Mode share to local shopping areas[1]

Location	Walk mode share	Car mode share[2]	Public transport mode share	Cycling mode share	Other comments	Source
Sydney Road, Brunswick and Coburg	31%	• 39% (car driver) • 68% of workers drove	18%	8%	• Bad weather meant walking underrepresented • 82% of people reported usually walking.	Conversation Caravan 2019)
Fairfield Village	38%	42%	14%	5%		(Metropolis Research 2018)
Acland Street, St Kilda	Not reported	38%	20%	Not reported	Walk and cycle were only reported as a combined total: 40%	(Metropolis Research 2018)
Sydney Road, Brunswick	• For those shopping: 57% • For those going to a destination along the street (for example, going to a cafe): 49%	• For those shopping: 13% • For those going to a destination along the street: 20%	• Not reported for those shopping • For those going to a destination along the street: 25%	• Not reported for those shopping • For those going to a destination along the street: 6%		(Munro 2016)
Camberwell	19%	48%	29%	Not reported		(City of Boroondara 2015)
High Street, Northcote	• 36% of shoppers to High Street strip shopping area • 19% of workers	• 60% of workers • 33% of customers (overall car mode share not stated)	22% of shoppers to High Street strip shopping area	Not reported		(Urban Initiatives and Hemisphere Design 2010)
Five main shopping strips in City of Yarra	33%	42%	22%	2%	68% of Yarra residents walk compared to 17% of local workers	(Lee 2008) quoting (Charter Keck Cramer 2003)

Table notes:

[1] Each of these surveys was conducted for a different purpose. They are not necessarily limited only to shoppers but may include interviews with traders and local residents passing through the area to get home or elsewhere.

[2] Car driver and passenger combined except where noted.

Travel to shops and services

Surveys of more than 1000 people conducted in strip shopping centres across five Melbourne councils (Boroondara, Brimbank, Moonee Valley, Moreland, and Mornington Peninsula) found that non-motorised travel (mostly walking) rates are fairly consistent at around 30% across all age groups (Figure 15). In comparison, private vehicle and public transport use varies substantially with age. For young people, fewer than 40% arrive in a private vehicle, with most instead walking, cycling and using public transport to access the shopping strip. For older age groups, private vehicles are the main mode for accessing strip shopping centres.

Figure 15 Mode of transport to access strip shopping centres by age group – five Melbourne LGAs (Vial and Prior 2013)
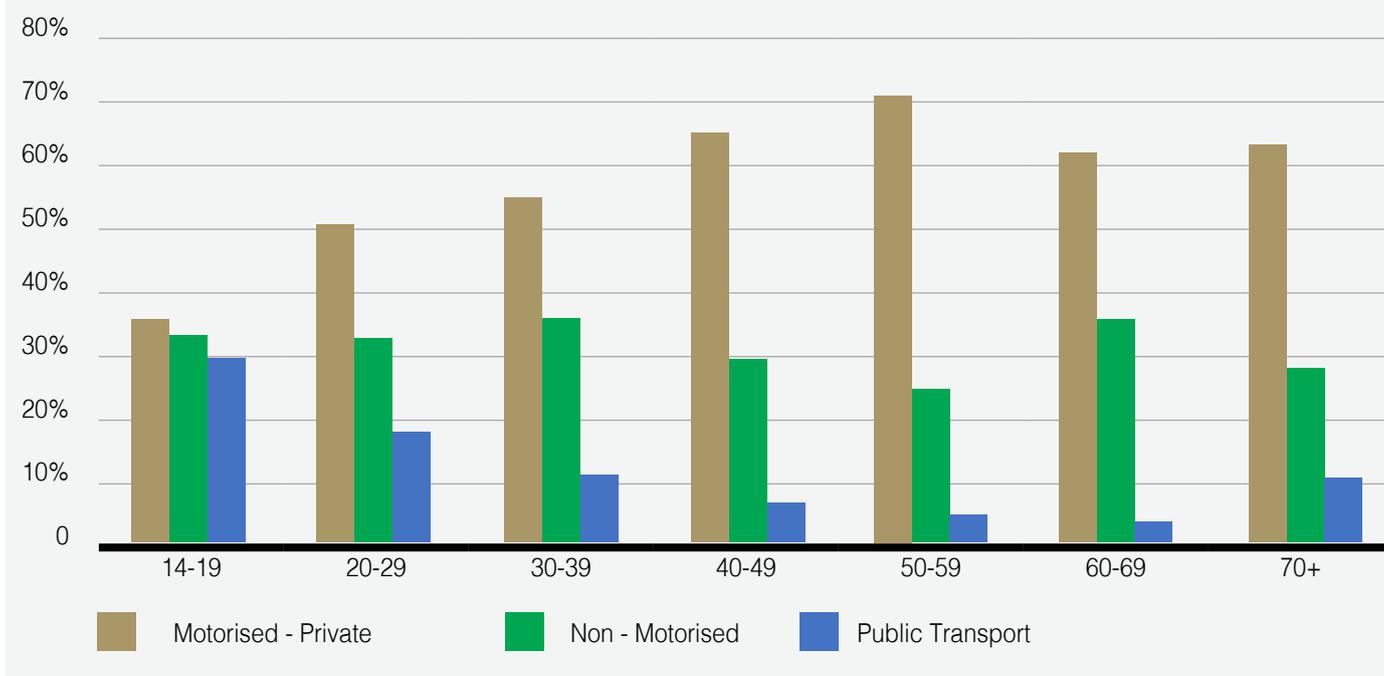
People visiting their local retail area commonly use the same mode to get there and back, but this is not always the case. For example, a person may get dropped off at the shops and then walk home, or catch public transport to a pub/restaurant and then take a taxi home.

VISTA provides Melbourne wide information about how people travel to different locations. Trips to shops and services were analysed by limiting the purpose and destination to relevant categories:

• To buy something

• For personal business (for example, bank, post office, medical)

• For social reasons (for example, café, restaurant, cinema, pub, library, swimming pool)

Appendix A provides further detail. Figure 16 shows that the vast majority of people access shops and services either in a vehicle or by walking, with little travel by other modes. Walking rates are lower than found in the surveys of inner suburban areas reported earlier (Figure 14) as shops and services across all of Melbourne are included, some of which are not in local shopping areas.

Travel to shops and services

Figure 16 Proportion of trips to shops and services by mode, Melbourne wide (VISTA data)
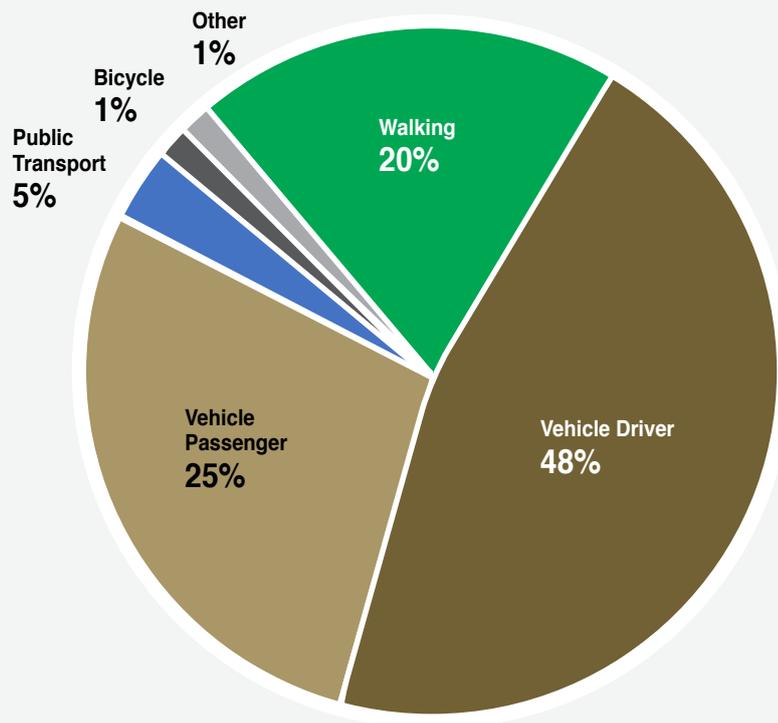
For shops and services with more than 100 recorded trips (see Figure 17):

• Walking is most common for trips to local shops like milk bars (43% of trips are walked) and newsagencies (37%).

• Driving is most common to hairdressers and beauty (72% of trips are as a vehicle driver) and hardware stores (70%).

• The most common trips made as vehicle passengers are to the cinema (43% of trips as a vehicle passenger) and unspecified social destinations (41%).

• Public transport is most commonly used to access pubs or bars (17% of trips), department or discount stores not classified as within a shopping centre (12%) and markets (11%).

The analysis found a large proportion of trips are driven to supermarkets (59%), food stores (51%) and markets (46%) in Melbourne. These three categories are all within the ten most common shopping destinations, representing a large proportion of trips. This reflects Brisbane findings that grocery and food shopping are the main purposes of retail trips on both weekdays and weekends (Nejad, Burke and Sipe 2012).

Travel to shops and services

Figure 17 How people travel to shops and services commonly found in local shopping areas (VISTA data)

| Category	Walking	Vehicle Driver	Vehicle Passenger	Public Transport	Other
Milk bar (n=133)	43%	44%	9%	2%	
Newsagency & Book store (n=191	37%	50%	6%	1%	
Restaurant of Cafe (n=4535)	30%	34%	26%	6%	
Postal Facility (n=110)	30%	56%	10%	2%	
Chemist (n=242)	29%	52%	16%	0%	
Pub or Bar (n=365)	24%	31%	25%	17%	
Food Store (n=565)	22%	51%	22%	2%	
Bank or Financial Institution (n=164)	22%	56%	13%	7%	
Clothes & Shoes (n=117)	20%	44%	28%	7%	
Retail NEC (n=1086	20%	52%	20%	5%	
Supermarket (n=2931)	20%	59%	18%	2%	
Department or Discount Store (n=245)	19%	43%	26%	12%	
Club (n=119)	15%	46%	33%	2%	
Hairdresser & Beauty Salon (n=214)	12%	72%	12%	4%	
Community Centre (n=115)	12%	47%	33%	4%	
Fast Food (n=691)	12%	47%	37%	4%	
Market (n=428)	11%	46%	30%	11%	
Social NEC (n=139)	10%	35%	41%	7%	
Cinema (n=134)	8%	39%	43%	9%	
Place of Worship (n=506)	8%	49%	40%	2%	
Other Service (n=233)	8%	48%	41%	4%	
Health Service (=1360)	6%	59%	26%	6%	
Hardware (n=461)	2%	70%	27%	1%	

Figure notes: Only categories with more than 100 recorded trips are shown (see Appendix A for further detail).

Travel to shops and services

Reasons for choice of mode to local shops

The research also finds that people generally do not choose a mode because they have no other options available. Instead, mode choice is mostly related to convenience. This applies for every mode – walking, car driver, car passenger, public transport and cycling.

- The travel survey of people at Fairfield Village (inner Melbourne) found between 80 and 90% of people listed convenience as a factor in their mode choice (Metropolis Research 2018).
- Surveys of suburban shopping areas across five Melbourne councils found convenience was one of the two key reasons in mode choice, the other being distance (Vial and Prior 2013).
- Sydney Road surveys found walking was the preferred mode for local residents, who reported finding it easier and more time efficient compared to driving because of traffic congestion and car parking (Conversation Caravan 2019).

This underlines the importance of making walking, cycling and public transport more convenient and attractive modes.

People who choose to walk also consider the health benefits it offers, with 27-28% of walkers reporting walking for health and/or fitness (Metropolis Research 2018; Vial and Prior 2013). VISTA does not capture a person's reason for choosing a particular mode.

Distance travelled to shops and services

Analysis of Brisbane data found the median distance people walk from home to the shops is 680m, with 15% of people walking more than 1.24 km (Nejad, Burke and Sipe 2012).

Data available for Melbourne suggests that people who visit shopping strips tend to live locally. Analysis of survey results of people visiting Fairfield Village found 52% of people were from Fairfield/Alphington and 84% were from suburbs within about 4 km (Metropolis Research 2018). Similarly, surveys along Sydney Road found 69% of people were local (Conversation Caravan 2019).

Analysis of VISTA data found that 42% of Melbourne trips to shops and services are less than 2 km in total. Figure 18 shows that for destinations within 2 km, walking mode share is relatively high for social places (restaurants, cafes, pubs and bars), but lower for food and grocery shopping (food store, supermarket, fast food and market).

WHAT SHOPS DO PEOPLE WALK TO?

PROPORTION OF TRIPS LESS THAN 2KM THAT ARE WALKED

64%	61%	50%	48%	37%	32%
Restaurant or café	Pub or bar	Milk bar	Newsagency and book store	Supermarket	Fast food

Travel to shops and services

Figure 18 Proportion of trips less than 2 km that are walked, by destination (VISTA data)

Destination	% walked
Restaurant or Cafe (n=2059)	64%
Pub or Bar (n=125)	61%
Milk Bar (n=102)	50%
Retail - Not elsewhere classified (n=431)	49%
Newsagency & Bookstore (n=139)	48%
Chemist (n=126)	46%
Food Store (n=256)	43%
Supermarket (n=1420)	37%
Fast Food (n=223)	32%
Market (n=116)	32%
Health Service (n=278)	29%
Place of Worship (n=150)	24%
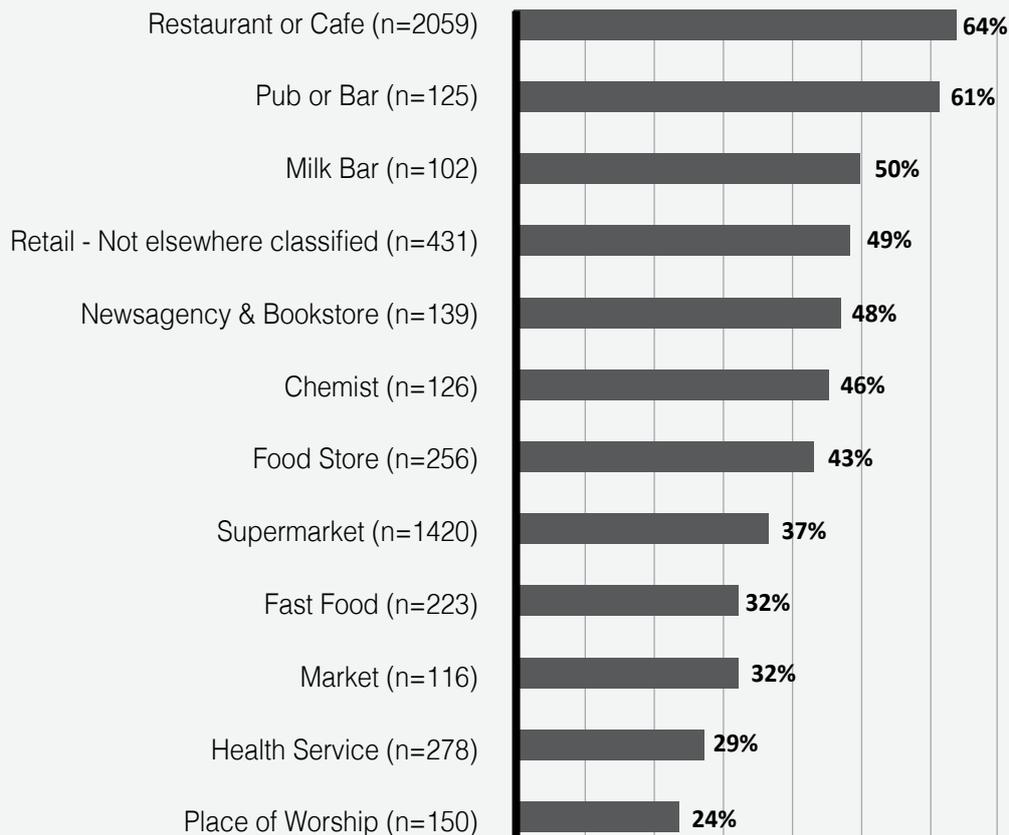
> **These findings strongly suggest that there are a high proportion of people who drive to Lygon Street because the car has been made the most convenient mode of transport**
> (Lee 2008)

Travel to shops and services

Reasons for being at the local shops

The survey of shopping areas across five Melbourne Councils found 74% of people were there to shop, 31% for social reasons (for example, a café or restaurant) and 15% for professional services (Vial and Prior 2013). This is supported by local council research:

• People surveyed along Sydney Road and at Fairfield Village were most commonly doing grocery shopping, followed by eating and drinking (Conversation Caravan 2019; Metropolis Research 2018).

• People surveyed at Fitzroy Street and Acland Street in St Kilda were most commonly visiting cafes, bars and restaurants (City of Port Phillip 2018; Metropolis Research 2017).

People may also be in the area for reasons that do not involve buying anything, such as they live in the area and are simply going for a walk or 'hanging out', or they are on their way to/from another place.

Length of time at local shops

How long people stay in a local shopping area seems to be dependent on the area and the survey. Some areas are destinations in themselves, with some people staying for most of the day (for example, shopping and dining). Also, the various surveys were designed for various purposes and so capture people who are there for different reasons. For example, a survey which includes people working in the area would be expected to find a longer average stay than one that interviews only shoppers.

Figure 19 How long people stay in local shopping areas

Location	Length of stay less than 30 min	30-60 minutes	More than 60 minutes	Source
Sydney Road, Brunswick and Coburg	Not stated	25%	26% spent between 1 and 2 hours 5% spent more than 8 hours (includes workers)	(Conversation Caravan 2019)
Fairfield Village	31%	32%	37%	(Metropolis Research 2018)
Acland Street, St Kilda[1]	8-20%	22-30%	50-69%	(Metropolis Research 2017)
Shopping areas across five Melbourne councils	58%	24%	18%	(Vial and Prior 2013)

[1] Values are shown as a range because they are from four different surveys conducted over 24 months

A study of people in Rundle Street (CBD of Adelaide, SA) found that the average stay in the street was about two hours, with pedestrians planning to stay the longest at almost 2.5 hours on average (Intermethod 2013). This was followed by cyclists at 2 hours 13 minutes, car passenger at 2 hours 7 minutes and car drivers at 1 hour 56 minutes (32 minutes less than pedestrians). Notably, pedestrians and cyclists interviewed had already been in the area for most of that time, where car occupants had only been there for a little over half the planned stay on average.

Travel to shops and services

Spend by mode

Some reports have found a relationship between how much people spend and the mode of transport they used to get there, namely that people who walk come more often and spend more overall (Tolley 2011).

Some local evidence suggests that people who walk to shops may spend more in total at those shops than people who drive. For example, at Fairfield Village, the estimated monthly spend was significantly higher for pedestrians ($405) than the other modes (cyclists $287, car $232 and public transport $208) (Metropolis Research 2018). Others have found no clear relationship (Conversation Caravan 2019; City of Port Phillip 2019).

In addition to going to the shops more often, studies have found that pedestrians are more likely to stop off at a greater number of shops than car drivers. In Rundle Street, Adelaide CBD pedestrians (and train users) visit the most businesses in an average trip, approximately 25% more than car users (Intermethod 2013). A UK study found that pedestrians (and bus users) were more likely to stop off at multiple shops than cyclists and car users (Sustrans 2006). Car users were four times more likely than pedestrians to visit only a single shop, often to pick up an item on the way to a different destination.

Perceptions of how people travel

The perception of how people get to the shops rarely matches up with the reality. A UK study comparing shopkeepers' estimates of mode share to actual mode share found that retailers believed nearly twice as many people drove to their shop as actually did (Sustrans 2006).

This misconception is found in study after study, both in Australia and internationally, with traders overestimating the number of customers driving to their business (Mingardo 2018; Lawlor 2018).

Northcote in Inner Melbourne is a local example. A study found retailers overestimated the importance of travel by car; estimating 56% of people drive to the area when only 33% of people on High Street (strip shopping centre) drove and 44% of people in the broader precinct (including shopping mall) drove. They also dramatically underestimated the number of people walking at 17% compared to an actual 36% to the strip shopping area and 30% in the broader precinct (Victoria Walks 2018).

Similarly, surveys on Sydney Road in Brunswick and Coburg (Middle Melbourne) found traders over-estimated the number of people arriving by car at 61%, when it was actually 39%. They also estimated walking at 14%, less than half of the actual value of 31%. Traders in busy areas were more aware of people walking and using public transport because they are more visible (for example, "see people getting off the tram" and "walk past and decide to come in"). However even in these busy areas traders overestimated the proportion of people who arrive by car (Conversation Caravan 2019).

Travel to shops and services

Figure 20 How people travelled to Sydney Rd compared to traders' perceptions (data from Conversation Caravan 2019)

| Car	Walk	Public transport	Bike	Other
39% 61%	**31%** 14%	**18%** 18%	**8%** 5%	**4%** 1%

Actual Mode of customer travel   Shopkeepers estimates
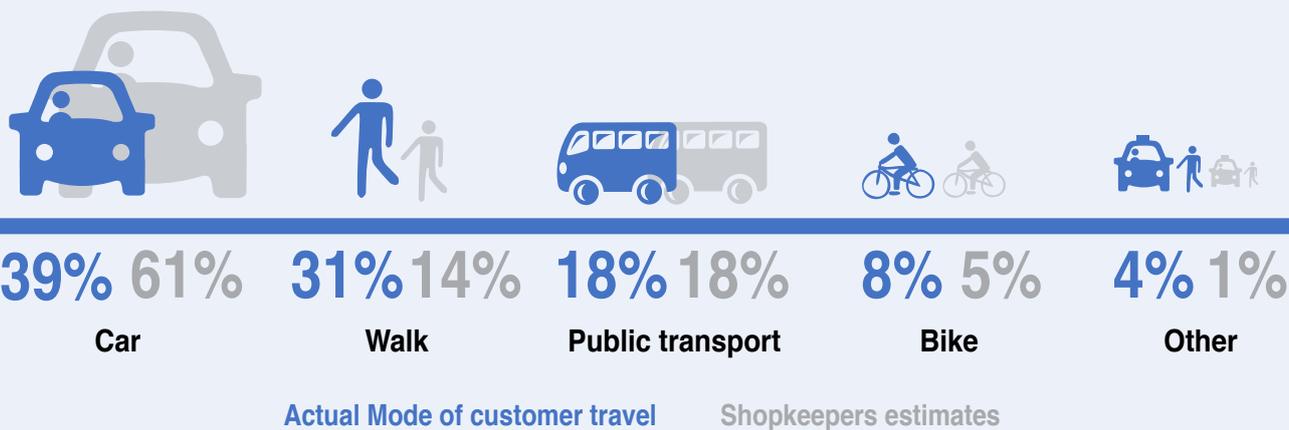
People who work in a shopping area are much more likely to drive than people coming to shop (refer to Figure 14). Therefore, it is somewhat understandable that they assume others do the same. However, this skews their perceptions of what is important to their customers.

Surveys of people in Rundle Mall in Adelaide's CBD asked traders for their perceptions about shoppers travel and behaviour (Intermethod 2013). They found that behaviour varied from business to business, but on average:

- Car users walk further than traders perceive; walking 320 m to a parked car compared to trader's perception of 190 m.

- Car users reported being willing to walk more than twice the distance to a car park than estimated by traders; 930 m compared to 380 m.

- People who walked to the centre plan to stay the longest on average, at two hours and 28 minutes. This compares to traders' perceptions that car users stay the longest (estimated at two hours and 15 minutes) and pedestrians only stay one hour and 43 minutes.

Travel to shops and services

Attributes people value in public space

Shoppers consistently identify measures to improve the amenity of the public space (cleanliness, vegetation, walkability) as their top priorities, including people who drive to the centre as they also walk around within it. This compares to retailers who consistently identify car parking as among their top priorities. Three local examples are included here.

Northcote Shopping Centre

The top three factors of importance in the shopping precinct identified by shoppers (average score out of 10) were cleanliness and maintenance (8.17), pedestrian access (8.14) and pedestrian safety (8.14). Shoppers average score for availability of parking was 7.1 compared to retailers who scored it 8.2.

In addition, people were also questioned about their willingness to lose parking for improved amenities such as wider footpaths, more street art/furniture and accessible tram stops. About one in four shoppers (28%) were not prepared to lose any parking, compared to nearly half of retailers (47%). For those willing to lose parking, the greatest proportion of shoppers were willing to lose up to 50 spaces (17%) compared to traders amongst whom the greatest proportion were willing to lose only up to 10 spaces (18%) (Urban Initiatives and Hemisphere Design 2010).

Sydney Road, Brunswick and Coburg

Conversations with shoppers found support for changes to improve amenity and the streetscape for walking, cycling and public transport by reducing the number of on-street car parks. Some traders supported these types of changes too, however their greatest concerns relate to parking; both the current parking situation and the possibility that changes could negatively impact on their business (Conversation Caravan 2019).

South Melbourne

Shoppers at three locations were surveyed on which place attributes are most important to them. Cleanliness, vegetation, a feeling of welcome and outdoor seating were all among the most important. At each location, car parking was ranked in the bottom three out of 50 attributes (City of Port Phillip 2019).

> **" Of course the views of retailers are important, but that does not mean that they should become the de facto transport planners in the city "**
> (Tolley 2011)

Place Score

Place Score conduct surveys across Australia asking people to select attributes that are most important to them in an ideal town centre. Figure 21 shows the results of over 17,000 surveys, mainly from the east coast of Australia. Having walking, cycling and public transport options are more important for all age groups up to 55 years than car accessibility and parking. Only people aged 65 and over strongly value 'car accessibility and parking' over 'walking, cycling or public transport options.' However, older people have a disproportionate influence on local government decision making, with about half of Victorian councillors aged over 55 (Municipal Association of Victoria 2017). This compares with only 27% of the state's population in this age group as at the 2016 Census (Australian Bureau of Statistics 2017).

Travel to shops and services

Figure 21 Importance of walking, cycling and public transport compared to car access by age group (Place Score, 2019, unpublished)
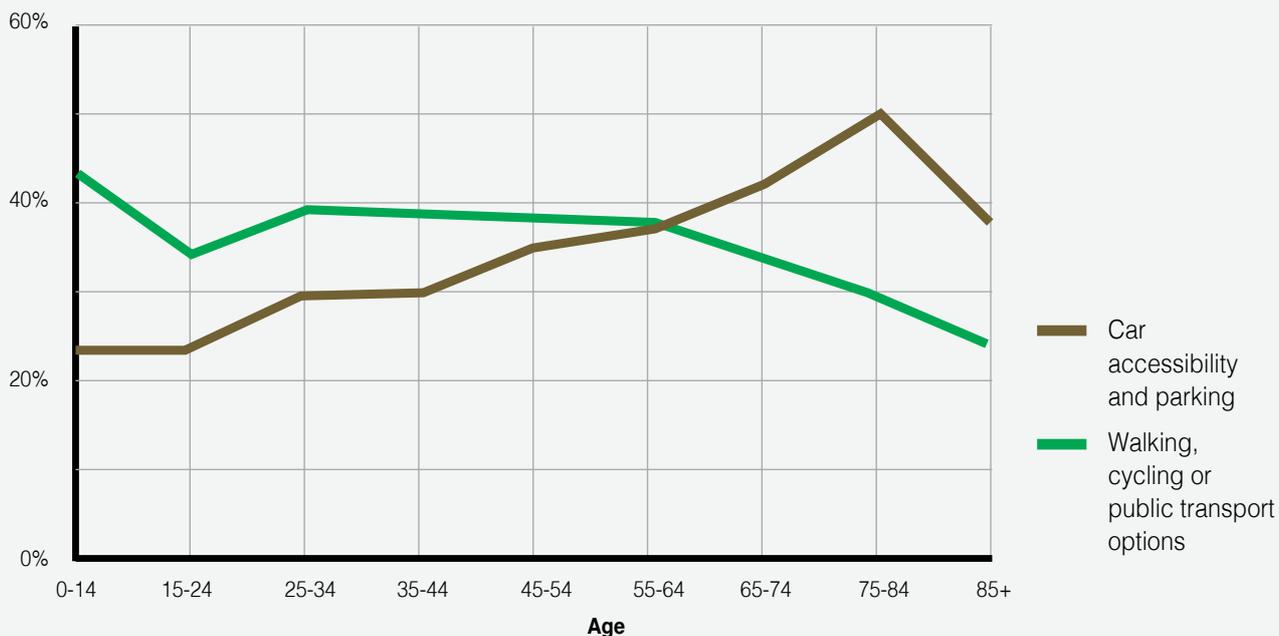
Place Score surveys conducted in Melbourne also find that walking is ranked as more important than car accessibility and parking. In the City of Port Phillip, people most highly ranked cleanliness, vegetation and walking, cycling or public transport options and ease of walking around. Workers ranked 'walking, cycling or public transport options' as less important than rated by local residents (42% compared to 52%) and 'car accessibility and parking' as more important (23% and 15% respectively) (Place Score 2017).

IMPORTANCE OF WALKING, CYCLING, PUBLIC TRANSPORT AND CAR ACCESS FOR PORT PHILLIP RESIDENTS AND SHOP WORKERS

Shop Workers	Residents	Shop Workers	Residents
42%	**52%**	**23%**	**15%**
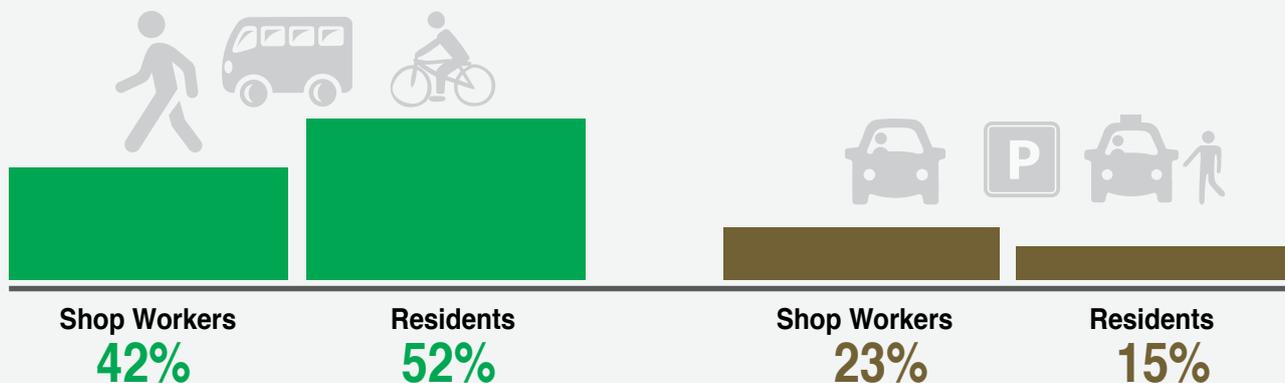
WALKING, CYCLING OR PUBLIC TRANSPORT OPTIONS	CAR ACCESSIBILITY AND PARKING

Travel to shops and services

## Allocation of public space

Public space is unevenly allocated between the various modes of transport and the number of people who use them. For example, on-street parking is public space used solely for storing private vehicles. In order to make it convenient to drive, a disproportionately large amount of space is dedicated to vehicles.

• In the Lygon Street case study area, 67% of the public space is allocated to cars but only 39% of people arrived in a car. Car drivers have 37 times the amount of space as cyclists but spend only twice as much per trip on average (Lee 2008).

• In the Hoddle Grid of Melbourne's CBD 58% of street space is roads and parking and 26% is footpaths, however 89% of trips within the area are walked (City of Melbourne 2019).

This pattern is repeated in the suburbs of Melbourne. Moreland City Council conducted a study of Coburg activity centre, a typical suburban centre with strip shopping as well as larger supermarkets, a library and train station. It found that 30,000 square meters of the area within 200 m of Coburg station is dedicated to ground level parking (Sheko 2018). This means 24% of the total ground area, including transport infrastructure and buildings, is used for storing vehicles. In addition, most of the remaining public space in the street network is dedicated to moving vehicles. Some have suggested that all road and council owned car park areas are public space and as such would ideally be available for all members of society to use (Lee 2008).

> **Businesses, high streets and urban centres are responding to the changing ways we shop and live with a range of actions to encourage footfall and increase sales. The most successful of these recognise the economics of place and the need to improve the pedestrian experience and accessibility**
> (Lawlor 2018)
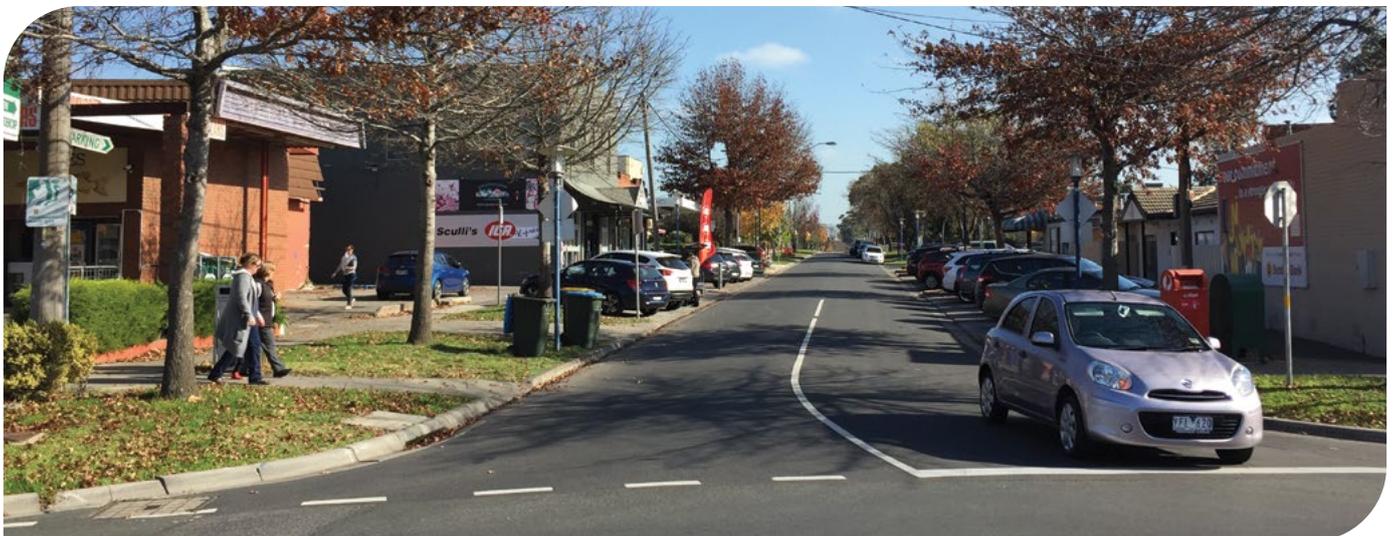
Design of shopping areas

This section seeks to better understand whether the design of a shopping area influences what mode people use to travel there. VISTA data was used to compare the mode share to different types of shopping areas. Locations spread across the middle and outer suburbs of Melbourne were selected to provide a total sample size of at least 500 trips for each category. Appendix B provides further detail about site selection, including criteria and locations for each category.

- **Select strip shopping centres.** These are designed around multimodal access (for example, near a train station) with store frontages facing the street. Parking is provided on street and off-street car parks are located behind the shops. Walking access to the centre is usually via nearby local streets.

- **Select car-oriented shopping centres.** These are generally designed with an emphasis on car accessibility, providing large numbers of off-street car parks surrounding the centre and separating it from the main road. The shop frontages are either inside a building or front a car park. Analysis considered both centres of a similar size to strip shopping centres as well as large, shopping mall type shopping centres.

Similar-sized car-oriented centres analysed are reasonably comparable to the strip shopping centres. They tend to have some larger stores not often found in suburban strip shopping centres (for example, chain stores or cinemas) and people tend to travel from slightly further away. Figure 22 shows that the average trip length to strip shopping centres is 3.7 km compared to 5.0 km for trips to Similar-sized,car-oriented shopping centres. Large car-oriented centres are less comparable as they have a greater number of stores and people travel further to access them.

Figure 22 Mode share of trips to different types of shopping centres (VISTA data)

Mode of travel	Strip shopping centres	Similar sized car-oriented shopping centre	Large, car-oriented shopping centres
Walking	20.8%	6.3%	4.1%
Vehicle Driver	52.0%	59.8%	55.8%
Vehicle Passenger	20.8%	31.6%	34.4%
Bus	1.7%	1.4%	3.5%
Train	2.5%	0.1%	1.7%
Bicycle	0.8%	0.3%	0.2%
Other	1.5%	0.4%	0.3%
TOTAL number of centres	10	12	9
TOTAL recorded trips	504	545	1567
Average trip distance (km)	3.7	5.0	7.8

Design of shopping areas

TRAVEL TO SHOPS IN MIDDLE/OUTER SUBURBS
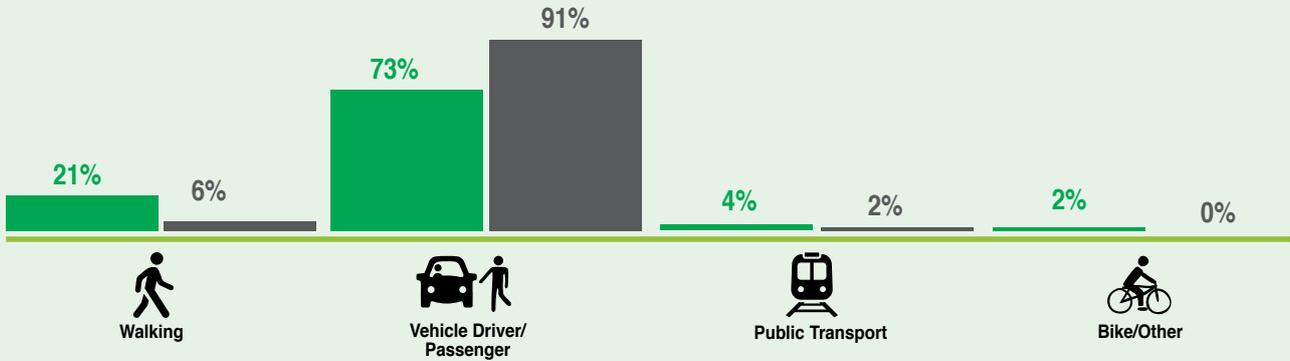
Walking: 21% / 6%
Vehicle Driver/Passenger: 73% / 91%
Public Transport: 4% / 2%
Bike/Other: 2% / 0%

MAINSTREET CENTRES

SIMILAR-SIZED CAR-ORIENTED SHOPPING CENTRES

Average trip distance to mainstreet centres is 3.7 km and to car-oriented centres is 5.0 km

The strip shopping centres have much higher walking mode share than the car-oriented shopping centres (21% compared to 4-6% respectively). This is largely related to lower passenger mode share in strip shopping centres of 21%, compared to car-oriented centres at 32-34%. Interestingly, the driving mode share does not vary so much between the different types of shopping centres.

These findings are supported by surveys undertaken in Northcote (Urban Initiatives and Hemisphere Design 2010). People interviewed with a destination on High St (strip shopping) were most likely to have walked there (36%). Conversely, people with a destination in one of the shopping centres (Northcote Plaza or Northcote Central) were most likely to have driven (51%).

Public transport accounts for about 5% of travel to both the strip shopping centres and large car-oriented shopping centres. For car-oriented centres similar in size to strip shopping centres, public transport mode share seems to be replaced by more driving. The analysis suggests that for large shopping centres located near train stations, the increase in train travel (from 1% to 4%) comes as a result of less bus travel (from 4% to 1%) compared to similar centres without a station. This could mean that people who take the train would have taken another form of public transport if the train was not a reasonable option, rather than having changed from driving.

Design of shopping areas

Figure 23 considers trips to these shopping centres which are less than 2 km, a walkable distance, to give an indication of trips for which walking may be a reasonable substitute to driving.

Figure 23 Mode share of trips less than 2 km to different types of shopping centres (VISTA data)

Mode of travel	Strip shopping centres	Similar-sized, car-oriented shopping centres
Walking	43%	17%
Vehicle Driver	40%	59%
Vehicle Passenger	15%	24%
Bus	0%	0%
Train	0%	0%
Bicycle	2%	0%
Other	1%	0%
TOTAL number of centres	10	12
TOTAL recorded trips	231	147
Average trip distance (km)	0.87	1.32
Percentage from home	56%	73%

This confirms the difference in walking rates, with people travelling to strip shopping centres 2.5 times more likely to walk than those travelling to car-oriented shopping centres. The vehicle driver rate remains at about 60% for trips to car-oriented centres, even when considering only trips within 2 km. In comparison, it seems people are less likely to drive to strip shops when they are travelling less than 2 km.

The design of a shopping area appears to be an important factor in people's decision about where to go and how to travel: shopping centres designed around vehicle access encourage people to drive, even for short trips. The majority of short trips to car-oriented shopping centres are from home, meaning walking is likely to be a realistic alternative for these trips.

Case study – Acland Street
(City of Port Phillip 2018)

Acland Street is a cosmopolitan shopping area located about 5 km from Melbourne's CBD.

A large variety of small businesses offer shopping, dining and entertainment throughout the day and into the night (nightclubs and restaurants). There are several accommodation options available in the area and Luna Park (Melbourne's iconic amusement park) and St Kilda beach are nearby. A Sunday market and special events attract large crowds.

The Acland Street upgrade project was completed in 2018 and included street space reallocation by closing a section of road and removing car parking to create a pedestrian plaza, improve the streetscape, and increase public space and footpath trading areas. In addition, the last two tram stops on route 96 were combined into a single terminus stop which provides level access onto a low floor tram. Lighting was also upgraded.

The project initially faced trader opposition due to the decision to close a part of the road to cars and repurpose on street parking to public space (Razak 2016).

City of Port Philip conducted comprehensive evaluation of the project both six months and twelve months after completion. Both reports are publicly available on their website. It found that 85% of people were satisfied with the upgrade to Acland Street. It also considered bank transaction data and found total spending in Acland Street Village grew at about 1.5% per month (approx. $330,000). This compares to the much lower growth of about 0.2% per month experienced in other similar regions. Most of the money spent was in 'dining and entertainment'.

> " Making the unpopular but necessary decision to close the road and remove car parking from one of Melbourne's premier shopping and dining strips enabled the creation of a sustainable, future orientated, pedestrian friendly public space that has surpassed original estimates of success."
>
> (City of Port Phillip 2018)

Photo credit: City of Port Phillip

Case study – Camberwell
(City of Boroondara 2015)

Camberwell is a strip shopping precinct located about 7 km east of the Melbourne CBD and serviced by both train and tram. More than 400 stores along Burke Road and around Camberwell Junction provide a variety of offerings. Retail, dining, entertainment and services are all available along with a Sunday market and the Rivoli Cinema.

In 2015, City of Boroondara improved infrastructure for walking along two corridors in Camberwell (shown in Figure 26) in conjunction with a program to encourage people to walk more called 'Try Walking'. The corridors were chosen because the number of people walking along them was low compared to the number of people living nearby that theoretically could walk. The aim was to increase the number of people walking and reduce the use of cars in the area.

Figure 24 Two corridors targeted as part of the Try Walking program (City of Boroondara 2015)

Along the Cookson Street corridor, pedestrian paths were poor quality or didn't exist at all. At one location, about half of all people walking were observed to walk on the road because there was no footpath on the southern side where people want to walk (it connects to Camberwell station and the shopping precinct). The project included narrowing the road to create formal, connected, high quality pedestrian paths. Some sections where footpaths did exist were poor quality and narrow. These were improved by re-landscaping the area to widen them, upgrading the lighting and planting new trees.
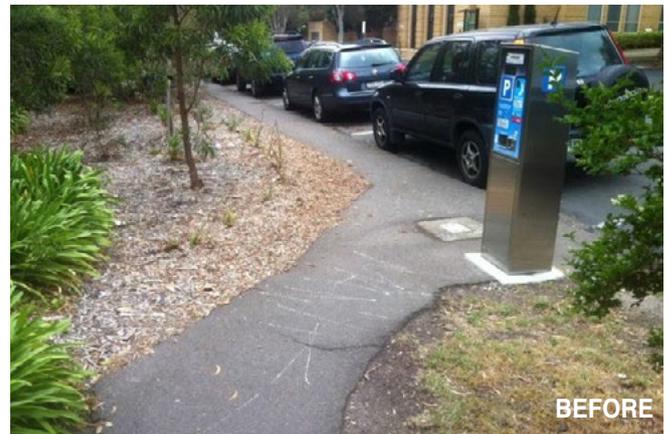
Photo credit: City of Boroondara.

Case study – Camberwell
(City of Boroondara 2015)

Improving the amenity of Camberwell Road was more difficult due to the nature of the road – an arterial road managed by the state government. Planting new trees was a "significant challenge" due to the perceived risks to safety of people in vehicles and resistance from VicRoads. New seating was provided every 200-300 m along the corridor and wayfinding signs installed at decision points, including time and distance to walk to places of interest. At four side road intersections with Burke Street, the crossings were raised to improve the pedestrian experience by providing a level surface and reduce the speed of drivers at the intersections.

The 'Try Walking' behaviour change program engaged local residents through a launch event, mail outs, media, incentives from local businesses, online and using a phone app for participants to log their walking.

City of Boroondara evaluated the project using before and after counts and observations, interviews with shoppers and surveys and feedback from 'Try Walking' participants. The evaluation found:

- Increase in the number of people walking along both corridors in the short term and the longer term.
  - o Short term (infrastructure upgrades complete and behaviour change program running): 12-42% increase along the Cookson Street corridor and 21-199% increase along the Camberwell Road corridor.
  - o Longer term (12 months after completion of 'Try Walking'): increases of 3-32% along the Cookson Street corridor and 80-145% along the Camberwell Road corridor.

- 88% of 'Try Walking' participants indicated that they walk more than previously.

- One in three people interviewed on the street indicated that they walk more than 12 months previous.

- Maximum vehicle speeds on Cookson Street were significantly reduced by 12 km/h. Traffic volumes also reduced.

- Changes in pedestrian and driver behaviour at the raised crossings along Camberwell Road were observed, indicating improvements to amenity as well as road safety.

- The project was calculated to deliver health benefits to the community of $6.60 for every dollar spent (30 year timeframe).

RESULTS OF TRY WALKING PROGRAM AND IMPROVEMENTS IN CAMBERWELL

COOKSON ST:
number of people walking increased by
9%

CAMBERWELL RD:
number of people walking increased by
90%

1 IN 3
PEOPLE IN CAMBERWELL SAID THEY WALK MORE THAN IN THE 12 MONTHS PREVIOUS

$6.60
HEALTH BENEFITS TO THE COMMUNITY FOR EVERY DOLLAR SPENT
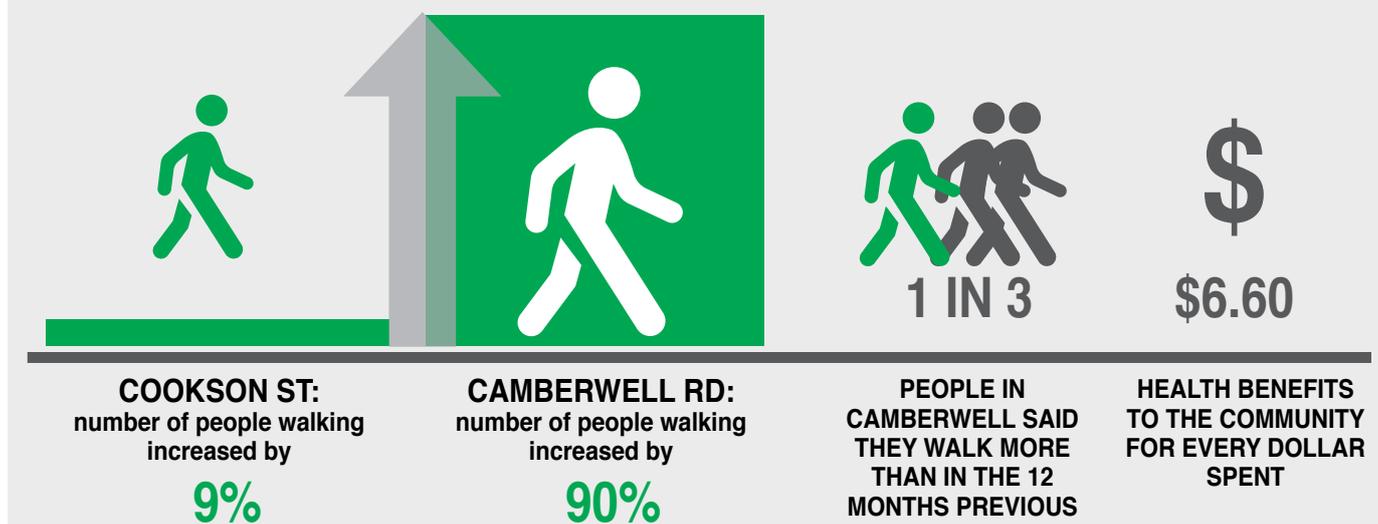
Discussion

The local examples included in this research tend to consider only small numbers of people, but they all tell a similar story- walking is important for accessing local shops and services. People who walk also benefit society through the health, community, equality and environmental benefits associated with walking rather than driving (Badawi, Maclean and Mason 2018).

Whatever mode people use to get to a local shopping area, they usually experience the area by walking around. Shoppers' prioritise attributes which make an area a nice place to be – cleanliness, trees and vegetation and the ease of walking around – irrespective of how they travel.

> **66 It is good quality pedestrian environments, not parking, that create successful retail centres 99**
>
> (Lee 2008)

Implications for design

Encourage walking and make it convenient

Making walking a convenient and pleasant option rather than simply providing basic infrastructure will encourage walking, with all the associated benefits (see section 'Benefits of walking'). When train stations and activity areas are surrounded by car parks, it sends the message that these are places to drive to, even in the middle of the night when no-one is parked there. Although most people access Melbourne train stations by walking, "it just looks like most people drive because the car parks take up so much damn space" (Bowen 2018).

During their lives, people are constantly making choices about where and when they and their family will live, work, study, shop, socialise, etc and creating walkable areas can help "tilt the balance" in support of people walking (Goodwin, Hass-Klau and Cairns 1998). Increasing walking depends in part on the potential for people to start walking instead of taking the car:

- Are lots of people making short trips by car?
- How can the environment be improved to encourage walking?
- How can some of the current incentives for driving be wound back? (Bennie, et al. 2018)

Improve public transport operations and access

Providing people with transport options means public transport services must be a viable alternative to the car, connecting places people want to go at times they want to go. Public transport is strongly connected with walking, so improving public transport operations and coverage will increase the number of people walking. The analysis has found that people walk further than the commonly accepted distance of 400 m to a bus stop and 800 m to a train station, even in suburban locations where conventional development does not generally facilitate walking. Improving walking conditions and increasing public transport service frequency is nearly always cheaper than building additional car parks (Public Transport Users Association 2019).

Discussion

Reconsider car parking provisions and street design

The Victoria Planning Provisions and related processes encourage activity centres to be vehicle-oriented.   Most notably, clause 52.06 requires off-street car parking to be provided with any new development and often even changes of use in existing buildings. For example, for every 100 m² of leasable floor area, shops and food and drink premises require 4 spaces, while offices require 3.5 spaces and supermarkets require 5.

There are a range of processes that can be followed, with varying degrees of difficulty, to attempt to reduce or waive car parking requirements. However the starting position is to provide extensive car parking, so that is the path of least resistance for development.

Typically, the cheapest way to provide the necessary car parks in new development is to provide it at ground level surrounding the businesses, where it dominates the visual character of the development and reduces the walkability of the area. Some provisions including design standard 5 of clause 52.06-9 now indicate that ground level car parking and access should not visually dominate public space. However, this is only one of many design requirements for car parking, many of which are precisely quantified, whereas this involves a subjective assessment, and it is not clear that it is effectively enforced.

In relation to street provision and design, clause 56.06 details the requirements for subdivisions. For streets with low or medium anticipated traffic volumes the planning scheme dictates design including, for example, minimum 3.5 m wide traffic lanes for connector streets. For streets with an anticipated traffic volume of more than 7,000 vehicles per day, design is at the discretion of the relevant roads authority (VicRoads and subsequent entities). Activity centres are typically identified as major traffic generators and are therefore designed to have major roads with multiple lanes and high design speed (60-80 km/h) to make vehicle access convenient. Wide roads with high traffic volumes and speeds are unpleasant places to walk and can be unsafe or inconvenient to cross.

Even in the growth areas, it is possible to develop new multi-modal centres with a mainstreet format that are not dominated by car parking and major roads. Reasonably positive examples in Melbourne are the Point Cook and Laurimar town centres.

This type of centre should be the standard, not the exception. For a larger scale example, Rouse Hill in Sydney provides a pedestrian friendly environment, although the arterial roads around it tend to create a barrier to walking from surrounding areas.

Reallocate some road space currently used by private vehicles to benefit all of society

The evidence in this report shows that people want public spaces which are designed for people, with car accessibility and parking a lesser priority. Councils should not be afraid of street space reallocation in activity centres to improve the pedestrian environment, even if it faces opposition from traders. Many of the factors to improve public space are within local government control. Some are quick and cheap to change, such as parking management. Others require more planning and cost more, such as streetscape reallocation. The City of Melbourne's Transport Strategy 2030 provides good examples of how to reallocate space for public benefit. It outlines a long-term vision for transport where some areas currently dedicated to vehicles are reallocated to become space for people.

Provide the evidence

Traders groups are well practiced at using the media to garner political support, including for car parking (Lee 2008). Emotive claims can be countered by:

- Gathering high quality before and after data. Examples include mode share, retail sales, perceptions of the area and feedback from users, property and rent values, retail occupancy and turnover, photos of improvements.
- Evaluating projects. Define what success will look like and how it will be measured.
- Publishing the findings and celebrating the success stories.

In spite of local areas which are designed to make it convenient for people to drive, significant numbers of people still choose to walk. Imagine what could be achieved if places were designed to be convenient for walking!

References

Australian Bureau of Statistics. 2017. "2016 Census QuickStats." Accessed October 2019. quickstats.censusdata. abs.gov.au/census_services/getproduct/census/2016/ quickstat/2?opendocument.

Australian Bureau of Statistics. 2019. 3101.0 - *Australian Demographic Statistics, Dec 2018.* 20 June. Accessed August 2019. www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3101.0.

Australian Medical Association. 2014. "AMA Position Statement: Physical Activity 2014." Canberra.

Badawi, Y, F Maclean, and B Mason. 2018. *The economic case for investment in walking.* Melbourne: prepared for Victoria Walks.

Becker, Sofia, Scott Bernstein, and Linda Young. 2013. *The New Real Estate Mantra: Location Near Public Transportation.* USA: prepared for American Public Transportation Association and National Association of Realtors.

Bennie, Jean, Olivia Crane, Adrienne Cullum, Karen Peploe, Clare Wohlgemuth, and Hugh McGuire. 2018. *Physical activity and the environment update.* NG90 Physical Activity and the Environment – Appendix 7: Expert testimony, UK: National Institute for Health and Care Excellence.

Bowen, Daniel. 2018. *Melbourne's station parking problem.* 2 November. Accessed July 2019. https://www.danielbowen. com/2018/11/02/station-parking-problem/.

Burke, Matthew, and Lex Brown. 2007. "Distances People Walk for Transport." *Road & Transport Research* (ARRB Group Ltd) Vol. 16 (No. 3): pp. 16-29.

BusVic. 2010. "Using public transport – a ticket to health." Edited by Chris Loader. *BusSolutions* (Issue 02): p. 3.

Carver, Alison, Alison Barr, Ankur Singh, Hannah Badland, Suzanne Mavoa, and R Bentley. 2019. "How are the built environment and household travel characteristics associated with children's active transport in Melbourne, Australia?" *Journal of Transport & Health* Vol 12: pp 115-129.

Charter Keck Cramer. 2003. *Retail Activity Centres: Performance, Function and Future Directions.* Unpublished report, Melbourne: prepared for City of Yarra.

City of Boroondara. 2015. "'Try Walking' Camberwell: Principal Pedestrian Network Demonstration (PPND) project." Unpublished report, Melbourne.

City of Melbourne. 2019. *Pedestrian Counting System.* Accessed June 2019. www.pedestrian.melbourne.vic.gov.au/.

City of Melbourne. 2019. "Transport Strategy 2030." Melbourne.

City of Port Phillip. 2018. "Acland Street: Twelve month post-construction evaluation." Melbourne.

City of Port Phillip. 2018. "Fitzroy Street CCTV Year One Evaluation Report." Melbourne.

City of Port Phillip. 2019. "South Melbourne Market Traffic Study." Unpublished report, Melbourne.

Colliers International. 2018. "Retail: Second Half 2018." Research and Forecast Report.

Conversation Caravan. 2019. *Sydney Road Intercept Survey.* Summary Report, Melbourne: prepared for Moreland City Council.

Department of Transport. 2019. *Victorian Integrated Survey of Travel & Activity (VISTA).* Accessed February 2019. public. tableau.com/profile/vista#!/.

Eady, Josephine. 2013. *Measuring Walking: A Guide for Councils.* Melbourne: prepared for Victoria Walks.

Ewing, Reid, and Robert Cervero. 2010. "Travel and the Built Environment." *Journal of the American Planning Association* Vol. 76 (No. 3, Summer): pp. 265-294.

Fairnie, Graeme A, David J R Wilby, and Lucinda E Saunders. 2016. "Active travel in London: The role of travel survey data in describing population physical activity." *Journal of Transport & Health* Vol 3 (Issue 2): pp 161-172.

Federal Chamber of Automotive Industries. 2019. "Media Release: FCAI releases July 2019 new vehicle sales figures." Canberra.

Garrard, Jan. 2013. *Senior Victorians and walking: obstacles and opportunities.* Summary report, Melbourne: prepared for Victoria Walks.

References

Garrard, Jan. 2017. *Young people and walking.* Melbourne: prepared for Victoria Walks.

Goodwin, Phil, Carmen Hass-Klau, and Sally Cairns. 1998. "Evidence on the Effects of Road Capacity Reduction on Traffic Levels." *Traffic Engineering & Control* Vol 39 (Iss 6): pp 348-54.

Heart Foundation. 2015. *Benefits of walking.* Accessed July 2019. walking.heartfoundation.org.au/benefits-of-walking/.

Hillnhutter, Helge. 2019. "Walking! Walking environment! Public transport...?" *presentation to Walk21.* Rotterdam: Norwegian University of Science and Technology.

Intermethod. 2013. *Travel Choice Study: Rundle Street.* Unpublished report, Adelaide: prepared for Adelaide City Council.

Krizek, Kevin J, and Pamela Jo Johnson. 2006. "Proximity to trails and retail: Effects on urban cycling and walking." *Journal of the American Planning Association* Vol. 72 (No. 1): pp. 33-42.

Krizek, Kevin J, Ann Forsyth, and Laura Baum. 2009. *Walking and Cycling International Literature Review*. Melbourne: prepared for Victorian Department of Transport.

Lawlor, Eilís. 2018. *The Pedestrian Pound: The business case for better streets and places.* Updated by Moira Tasker, Living Streets.

Lee, Alison. 2008. "What is the economic contribution of cyclists compared to car drivers in Inner Suburban Melbourne's Shopping Strips?" Masters Thesis, Faculty of Architecture Building and Planning, The University of Melbourne, Melbourne.

Loader, Chris. 2018. *Changes in Melbourne's journey to work – by mode (2006-2016).* 11 May. Accessed June 2019. chartingtransport.com/2017/12/10/changes-in-melbournes-journey-to-work-by-mode-2006-to-2016/.

Loader, Chris. 2017. *What does the census tell us about motor vehicle ownership in Australian cities? (2006-2016).* 30 July. Accessed August 2019. chartingtransport.com/2017/07/30/what-does-the-census-tell-us-about-motor-vehicle-ownership-in-australian-cities-2006-2016/.

Loh, Tracy Hadden, Christopher B Leinberger, and Jordan Chafetz. 2019. *Foot Traffic Ahead: Ranking Walkable Urbanism in America's Largest Metros.* USA: George Washington University and Smart Growth America.

Malizia, Emil. 2014. *Preferred Office Locations.* Final report, Washington D.C.: NAIOP Research Foundation.

McCrindle Research. 2014. "Getting to Work." Sydney.

Metropolis Research. 2018. *2018 Fairfield Village Travel Mode and Visitor Experience Survey.* Unpublished report, Melbourne: prepared for Darebin City Council.

Metropolis Research. 2017. *Acland Street Survey Report.* Unpublished report, Melbourne: prepared for City of Port Phillip.

Mingardo, Giuliano. 2018. "Mobility, Parking and Retail: an uneasy relationship?" *presentation to International City Retail Experience 2018.* Hoogeveen, Netherlands.

Moving People 2030 Taskforce. 2013. *MOVING AUSTRALIA 2030: A Transport Plan for a Productive and Active Australia.* Canberra: Bus Industry Confederation.

Municipal Association of Victoria. 2017. "MAV Councillor Census: November 2017." Melbourne.

Munro, C. 2016. *Evaluation of Car Dooring Symbol on Sydney Road, Brunswick.* Unpublished report, Melbourne: Prepared for VicRoads.

Nejad, Seyedeh Maryam Shobeiri, Matthew Burke, and Neil Sipe. 2012. "Analysing retail travel behaviour using an Australian data set." *presentation to Australasian Transport Research Forum.* Perth: Griffith University.

Place Score. 2017. *Community Insights Report.* Unpublished report, prepared for City of Port Phillip.

Public Transport Users Association. 2019. *Myth: Park-and-Ride facilities will encourage public transport use.* Accessed October 2019. www.ptua.org.au/myths/parkride/.

Razak, Iskhandar. 2016. *Acland Street traders protest against new St Kilda tram super stop.* 2 August. Accessed July 2019. www.abc.net.au/news/2016-08-02/traders-up-in-arms-over-new-st-kilda-tram-super-stop/7681874.

Sallis, James F, Ester Cerin, Terry L Conway, Marc A Adams, Lawrence D Frank, Michael Pratt, Deborah Salvo, et al. 2016. "Physical activity in relation to urban environments in 14 cities worldwide: a cross-sectional study." *The Lancet* Vol 387 (Issue 10034, 28 May–3 June 2016): pp 2207-2217.

References

Sheko, Alexander. 2018. "Moreland Integrated Transport Strategy (MITS)." *presentation to Smart Urban Futures.* Melbourne: Moreland City Council.

Smart Growth America. 2015. "Core Values: Why American Companies are Moving Downtown." Washington, DC.

Sport Australia. 2019. *Walking (Recreational) State of Play Report.* Canberra: Australian Government.

Sustrans. 2006. "Shoppers and how they travel." Information Sheet LN02, Bristol, UK.

Tolley, Rodney. 2011. *Good for Busine$$: The benefits of making streets more walking and cycling friendly.* National Heart Foundation of Australia. https://www.heartfoundation.org.au/images/uploads/publications/Good-for-business.pdf.

Transportation Research Board. 2005. "Does the Built Environment Influence Physical Activity? Examining the Evidence." Washington, D.C.

University of Melbourne. 2013. *Walk it out: Urban design plays key role in creating healthy cities.* 7 March. Accessed July 2019. www.sciencedaily.com/releases/2013/03/130307124427.htm.

Urban Initiatives and Hemisphere Design. 2010. *Northcote Activity Centre: Streetscape Master plan.* Melbourne: prepared for City of Darebin.

Vial, David, and Michelle Prior. 2013. "Shopping Precinct User-Profiles: Informing Streetscape Planning and Management." *presentation to Thriving Neighbourhoods Conference.* Melbourne: IOSS.

VicHealth. 2016. *VicHealth Indicators Survey 2015 Selected findings.* Melbourne: Victorian Health Promotion Foundation.

VicRoads. 2019. *Traffic Volume.* Accessed June 2019. vicroadsopendata-vicroadsmaps.opendata.arcgis.com/datasets/5512df2ff41e4941bacf868053dbfba9_0?geometry=144.916%2C-37.826%2C144.998%2C-37.814&selectedAttribute=ALLVEHS_AADT.

Victoria Walks. 2018. *Darebin shopping studies.* Accessed March 2019. www.victoriawalks.org.au/Darebin_shopping/.

Walker, Jodie, and Oliver Lock. 2013. *Wonderful Walkability.* Melbourne: Secret Agent.

Walz-Chojnacki, Greg. 2017. *Study suggests investment pays off in safety for walkers, bicyclists.* 27 July. Accessed May 2019. uwm.edu/news/study-suggests-investment-pays-off-safety-walkers-bikers/.

Wolf, Jean, Marcelo Simas Oliveira, and Miriam Thompson. 2003. "Impact of Underreporting on VMT and Travel Time Estimates: Preliminary Findings from the California Statewide Household Travel Survey GPS Study." *Transportation Research Record Journal* (Transportation Research Board) Vol 1854, 1: pp 189-198.

Appendix A
Evaluating which trips to include in travel to shops and services

This section discusses the method used to determine which trips to include in the analysis of VISTA data to access shops and services across Melbourne.

Other studies, most notably analysis of Brisbane travel surveys (Nejad, Burke and Sipe 2012), considered only trips with a destination place of 'shopping' and destination purpose of 'buying something' excluding petrol. The way trips are categorised in VISTA, if only trips with a 'shop' destination are included (13% of all recorded trips), then trips to other relevant destinations are excluded:

- Social places like cafés, restaurants, pubs and cinemas.

- Community facilities often provided by the local council such as libraries and swimming pools.

- Places that provide services rather than products such as banks, hairdressers, government offices, post offices and medical centres.

The study has found that cafes and restaurants represent a large proportion of trips and spend at local shops (see section 'Reasons for being at the local shops').

Trips for the purpose of 'buy something' represent 17% of all trips recorded in VISTA. Again, the purpose needs to be broadened to include people at destinations for social reasons or as part of a service. For the purpose of this project, only 'customers' have been considered, not people travelling to the same destinations for work or education. Therefore, the final analysis of VISTA to understand travel to shops and services uses the following criteria:

- **Destination:**
  - Limit to relevant destinations (DESTPLACE1 values):
    - Place of personal business
    - Shops
    - Social place
  - Exclude destinations accessed exclusively by vehicles (DESTPLACE2 values)
    - Car park
    - Car service
    - Petrol station

- **Trip purpose:**
  - Limit to relevant purposes (TRIPPURP values):
    - Buy something
    - Personal business
    - Social
  - Exclude 'Walked the dog' (DESTPURP2), which is included under 'Personal business' (TRIPPURP).

This categorisation will capture some destinations which are not in local shopping areas for example, shops which are stand-alone as well as some within shopping centres. The distinction between shops and shopping centres in VISTA is hazy and seems dependent on what the respondent recorded. For example, a trip where the person recorded 'Coles, Doncaster' as their destination would be classified under 'Supermarket' in DESTPLACE2. However, another person who went to the same shop but recorded 'Westfield Doncaster' would have their trip classified under 'Shopping Centre' in DESTPLACE2.

For analysis of travel to shops and services, the VISTA trip file was used rather than the stops file because the stops file doesn't reflect public transport usage well (most trip stages from a public transport stop to a shop or service are walked).

Appendix B
Shopping centre criteria and locations for VISTA analysis

This section sets out the criteria and process used to select shopping centres for comparison in the section 'Design of shopping areas'. The same criteria as outlined in Appendix A was used to limit the data to relevant trips (to shops and services but not other destinations such as houses, workplaces and education). It was then further limited geographically to selected shopping destinations based on Statistical Area Level 1 (SA1). All selected centres are in the middle and outer suburbs of Melbourne, approximately 10-15 km from Melbourne CBD.

Aerial photos along middle and outer suburban train lines were examined to identify locations with a strip shopping area, then further assessed using Google StreetView to determine if they met the criteria outlined below. Areas which were initially reviewed but did not meet the criteria, or where it was unclear, were excluded. The process tried to include locations spread across Melbourne until enough locations were found to produce a total sample size of around 500 trips for each category.

Select strip shopping centres

Strip shopping centres included in this category have traditionally been designed around multimodal access (they are all near a train station) with active store frontages along a main road. Parking is provided on street and any off-street car parks are located behind the shops. Walking access to the centre is usually via nearby local streets. They are locations with no car-oriented shopping centre immediately nearby, as VISTA data can't clearly differentiate trips to strip shops from trips to shopping centres where they are located in the same SA1.

Strip shopping centres included in the analysis:

- Altona
- Bentleigh
- Blackburn
- Clayton
- Glenroy
- Hampton
- Ivanhoe
- Mount Waverley
- Reservoir
- St Albans

Select car-oriented shopping centres

Included in this category are self-contained shopping centres generally designed with an emphasis on car accessibility, providing large numbers of off-street car parks surrounding the centre and separating it from the main road. The shop frontages are either inside a building or front a car park, rather than the main road and footpath. Walking access is usually via major roads and then through a car park, often without any designated path or priority.

Analysis considered both centres of a similar size to strip shopping centres as well as large, shopping mall type shopping centres.

Car-oriented shopping centres similar in size to strip shopping centres used in the analysis:

- Casey Central Shopping Centre, Narre Warren South
- Central Square Shopping Centre, Altona Meadows
- Croydon Central, Croydon
- Endeavour Hills Shopping Centre, Endeavour Hills
- Forest Hill Chase, Forest Hill
- Karingal Hub, Frankston
- Keilor Central, Keilor Downs
- Parkhill Plaza Shopping Centre, Berwick
- Sanctuary Lakes Shopping Centre, Point Cook
- Stockland The Pines Shopping Centre, Doncaster East
- Summerhill Shopping Centre, Reservoir
- Westfield, Airport West

Large car-oriented shopping centres used in the analysis (top ten by gross leasable area, excluding Chadstone because new centres of this scale are unlikely to be built in Melbourne):

- Eastland, Ringwood – near a train station
- Highpoint, Maribyrnong
- Northland, Preston
- Pacific Werribee, Hoppers Crossing
- Southland, Cheltenham (the Southland train station was opened in 2017 which is after the VISTA data was collected)
- Watergardens Town Centre, Taylors Lakes – near a train station
- Westfield Doncaster, Doncaster
- Westfield Fountain Gate, Narre Warren
- Westfield Knox, Wantirna South