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Cycling in Australia and Japan: some preliminary perspectives

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Introduction

Cycling remains a marginalised mode across most of Australia with less than 1% of daily trips made by bicycle (Pucher, Garrard, & Greaves, 2010). The reasons behind this are well-documented as are potential policy options for increasing cycling levels (Pucher, Garrard, & Greaves, 2010). However, the reality is that Australian cities have been much less effective in mirroring/sustaining recent increases in cycling in cities without a strong cycling culture, such as London, Paris, Vienna, Buenos Aires and San Francisco (Pucher & Buehler, 2017). More worryingly, the objectives of the latest National Cycling Strategy to double cycling participation from 2011 to 2016, have not been achieved with declines in most Australian states (Munro, 2017). This demise has been attributed to various reasons including an aging population, safety concerns, and legislation that has significantly increased the penalties and enforcement for 'cycling misdemeanours' in some jurisdictions, particularly New South Wales (Standen, Greaves, Collins, Crane, & Rissel, 2019). Musings on the state of cycling in Australia invariably focuses on Northern Europe, where bicycling mode shares range from a high of 27% in the Netherlands to 18% in Denmark and around 10% in Finland, Germany, Sweden, and Belgium (Pucher & Buehler, 2008). Invariably, one of the main conclusions reached is that we will not achieve meaningful increases in cycling, without investing heavily in infrastructure. Recent evidence from Sydney does highlight the importance of dedicated infrastructure for *retaining* cyclists (Standen, Crane, Collins, Greaves, & Rissel, 2016), but the reality is that it is unlikely we will be able to replicate this on the scale of Amsterdam or Copenhagen.

Often overlooked in academic discourse around cycling, Japan has received increasing attention from the Australian popular press as a country that has achieved significant cycling mode share (around 15% of all trips made in Japan are by bicycle) without investing in extensive networks of dedicated cycling infrastructure [1]. Commentators argue that while there have been important policy decisions to encourage cycling in Japan and discourage car ownership and usage, bicycles have largely emerged as an informal, private, and practical means of transportation for the majority of the population, without significant government planning (Steele, 2012). This

[1] https://www.news.com.au/technology/innovation/motoring/sydney-really-needs-to-learn-from-japans-cycling-culture/news-story/9498770e43c53156504211e500560c68

development and maintenance of a 'cycling culture' in a nation, which has strong links with the motor car (e.g., Toyota, Honda) and high levels of car ownership (0.62 vehicles/capita compared to 0.7 vehicles/capita in Australia)[2] is particularly interesting as it contravenes the misconception that bicycles cannot retain a meaningful transportation role in car-dominated societies.

Within this context, the current paper compares/contrast characteristics of cycling in Japan and Australia. We review overall trends in cycling, bicycle ownership and usage, other transport modes, cycling environment, safety trends, and rules and regulations. The paper takes advantage of a collaboration between the University of Sydney and University of Nagoya to incorporate data/information that would otherwise be challenging to obtain and interpret, providing objective measures of these differences.

1.1 Cycling History and Trends

Both nations witnessed the introduction of bicycles in the 1860s. In Japan, bicycles were originally a 'plaything' of the wealthy, but soon became a vital component of personal transportation in both urban and particularly rural areas, as well as contributing to the wider economy through overseas exports (Steele, 2012). Following World War II, with much of Japan's transportation infrastructure destroyed, the bicycle became a key component of post-war construction. This resurrection continued during the motorisation boom of the 1960s, with 39 million bicycles by the time of the 1973 oil crisis. This period also marked a population shift from rural to urban areas and substantial growth in female bike riders. In turn, this gave impetus to the development of the 'mama-chari' (mother's chariot), the functional, relatively cheap bicycle for everyday travel, which still dominates (with some modifications) today. The rapid growth in bicycles and cars in the face of inadequate safety counter-measures lead to a spike in accidents during the early 1970s. Unlike the Netherlands, Japan's response, was not to invest heavily in bicycle infrastructure but rather to 'tolerate' pavement cycling for 'safety reasons' through an amendment of the Road Traffic Act in 1978 (Berent & Yoshida, 2017). This was also the period, when faced with mounting challenges around anti-social parking of bicycles, Japan toughened up on cycling parking laws and began to provide dedicated bicycle parking areas near public transport interchanges and other key locations. Since the 1990s, bicycle sales have continued to rise, peaking at around 85 million in 2005 (Steele, 2012). More recent trends have seen growth in high-end cross bicycles, increasing bicycle electrification, and introduction of bicycle share schemes.

In Australia, bicycles were originally synonymous with touring and racing clubs. As with Japan, they became a vital part of rural farming life at the turn of the century, although the distances and endurance required in Australian conditions gave way to the automobile with cycling largely retaining a sporting legacy. Unlike Japan, Australia adopted a different response to growing safety concerns between cyclists and motorists, with the passage of mandatory helmet laws in the early 1990s. The debates of the efficacy of these laws and whether they have hindered growth in 'casual' cyclists continues (Fishman, Washington, & Haworth, 2012). In the 2000s, largely in response to growing sustainability concerns, particularly around population health and car-based externalities, cycling received a resurgence of interest in most urban areas of Australia. This resulted in a raft of policies and plans, underpinned by dedicated

[2] Note, all statistics cited are from Table 1 in the Appendix to this paper.

cycling infrastructure, which lead to significant increases in cycling (albeit off a low base) up until 2011. Since this time, cycling participation has declined despite continued infrastructure investment in pockets of cities complemented by increasing electrification of bicycles and bicycle share schemes of varying traction in all major urban areas by 2018.

1.2 Bicycle Ownership & Usage

In terms of bicycle ownership, the differences between the two nations are not substantial with 0.57 bicycles/capita in Japan, compared to 0.45 bicycles/capita in Australia. Similarly, both countries turn over a similar proportion of the bicycle fleet with 10 million new bicycles/year (14% of the bicycle fleet) in Japan and 1.2 million new bicycles/year (around 10% of the bicycle fleet) in Australia.

The real differences are in how bicycles are used. In Japan, roughly half the population cycles once per week, compared to 1 in 7 people in Australia (Munro, 2017). In Japan, around 15% of all trips are made by bicycle, around ten times the share of Australia. Commuter mode shares are similarly much higher with major cities such as Tokyo (14%), Osaka (28%), and Nagoya (17%) dwarfing Sydney (1%) and Melbourne (2%). In Japan, the main use of bicycles is for shopping followed by work/study, while in Australia, bicycles are primarily used for leisure followed by work/study. This is reflected in average trip lengths, which are generally shorter in Japan, reflecting the fact bicycles provide the quickest means to access day-to-day activities in many locales.

Cyclist profiles are quite different in Japan to Australia. The legacy of the 1960s and the development of ‘mama-charis’ (Figure 1) saw a rise in female cyclists, a trend that continues today with female cyclists outnumbering male cyclists overall[3]. This contrasts with Australia, where female participation rates are around 10% compared to 20% for males (Munro, 2017). The other striking difference is age, particularly the proportion of elderly (65+) who cycle in Japan (around 10% for males, 14% for females), where bicycles represent a means of retaining some independence (Berent & Yoshida, 2017). While comparable statistics do not exist for Australia, based on the recent cycling participation survey, it is evident elderly Australian’s are highly unlikely to cycle anywhere close to these levels.

[3] Note, we are trying to verify this assertion, but have yet to find comparable data for Japan.

Figure 1: A modern 'mama-chari' bicycle with infant seat

1.3 Other Transport Modes

Both countries have relatively high levels of car ownership. However, in Australia cars are used more with average kilometres driven of 11,700 km compared to 9,300 km in Japan (BITRE, 2017). While cars are cheaper to purchase in Japan, ownership and usage can be inconvenient and very expensive. Major cities require police-verified proof of a secured off-road parking spot, which typically requires renting out a space at a garage. In terms of public transport, bicycles often act as a complimentary mode in Japan, providing access for the 'last mile' connection from home to the station - for instance, in Osaka, six percent of work/school trips involve the use of bicycle and rail (Berent & Yoshida, 2017).

1.4 Cycling Environment

In 2015-16, Australian state and territory governments invested AU$122.3 million in cycling infrastructure and programs, equating to around AU$5.29 per capita (The Australian Bicycle Council, 2017). Putting this in perspective, AU$26.2 billion (AU$1,065) were spent on roads and $11.3 billion (460 per capita) on rail. While comparable information for Japan is unavailable at this time, investment in cycling has traditionally gone into end of trip facilities, particularly parking. It is fair to say that even without much in the way of dedicated bicycle infrastructure and the fact many local roads do not have pavements, the cycling environment is more pleasant in Japan. This seems to be down to the fact that most destinations can be reached using a network of low-speed, smaller streets (20 kph compared to 50 kph in Australia), pavement cycling is generally tolerated (Figure 2), and bicycles, pedestrians and motorists are typically more comfortable sharing the space than in Australia. It is also notable that in addition to a driving culture perceived as more tolerant towards cyclists in Japan, the vehicle mix is (arguably) more a greater proportion of low powered (under 1,000cc) and small vehicles compared to Australia.

Figure 2: Shared path in Japan (funny how the pedestrians are in the bike segment!)

1.5 Safety Trends

A higher portion of people are killed on roads in Australia (53 fatalities/million) than in Japan (37 fatalities/million) although on an exposure basis, Australia ranks better at 5.2 fatalities/100 million km compared to 6.4 fatalities/100 million km in Japan. On a per capita basis, cyclists are at greater risk in Japan (4.3 fatalities/million) compared to 1.2 fatalities/million in Australia. However, accounting for exposure (bicycle kilometres ridden), we might anticipate cycling is riskier in Australia, but this clearly needs verification. In Japan, accidents involving cyclists have been reduced from 188,338 in 2004 to 109,269 in 2014, as have fatal accidents (870 to 542) [4]. However, the ratio of fatal accidents, which includes pedestrians and other cyclists, has actually risen slightly. Much of the 'blame' has been attributed to reckless cyclists, with the result that many jurisdictions are tightening rules and penalties around traffic violations such as ignoring lights or riding through stop signs

1.6 Traffic Regulation & Enforcement

Both nations have strict rules and regulations when it comes to cycling, with some of the highest penalties in the world for misdemeanours (Table 2). However, the main difference is that in Japan, perpetrators have traditionally only been cited if the infringement causes an accident. Japan has much stricter rules around bicycle parking, particularly in the major cities, where illegally bicycles will be impounded by police and require payment of up to 2,000 Yen to retrieve. Japan requires all bicycles to be registered with the authorities, primarily for retrieval of the bicycle if it is impounded or stolen. Both nations are grappling with requiring cyclists to carry identification and in the case of Japan, as a foreign tourist, this is already a stipulation.

[4] https://www.japantimes.co.jp/news/2015/06/29/reference/law-gets-serious-cycling-safety/#.XQhnZo8RU2w. Accessed 12/06/19.

2 Contribution

This brief paper contributes to ongoing dialogue around arresting the stagnation and in some cases decline in cycling in Australian cities by looking to Japan, a nation that has achieved comparatively high levels of cycling without large-scale infrastructure investments. Evidently, we cannot ignore historical legacies with the bicycle embraced by large sections of the populace in Japan without large-scale government planning, primarily due to the efficiency and convenience offered for short day-to-day trips over (initially) walking and increasingly the car. Australia, by contrast, still has a cycling culture rooted in a sporting/fitness legacy, which despite valiant efforts, continues to play a marginal role in day-to-day travel. Evidently, to change this perception, we need to make cycling more appealing and car-use less appealing by creating low-risk environments through traffic calming, design modifications to intersections and lower speed limits. The role of bicycles as complementary to public transport appears another promising option, rather than continuing the current trend of constructing large parking areas around stations. Shared pedestrian/cyclist options appears to have traction, particularly in the congested parts of cities, but clearly this must not compromise pedestrian safety, which is a significant issue in Japan. Helmet laws are another area of contention and review and it appears key to differentiate the type of cycling to establish whether they should be optional or mandatory.

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4 Appendix: Tables Referred to In-Text

Table 1: Summary demographics and cycling-related information

	Australia	Japan
Demographics (2016)[5][6]		
Population	24,600,000	126,800,000
Population Density (/sq km)	3.2	336
Average household size	2.55	2.71
0-19	25%	18%
19-65	60%	56%
65+	15%	27%
Male:Female	0.98	0.95
Vehicles/Capita	0.7	0.615
Bicycles[7]		
Bicycles/Capita	0.58	0.57
Total Bicycles	14181176.47	72,000,000
New Bicycle Sales/Annum	1,162,408	10,000,000
New Bicycle Sales/Capita	0.047	0.079
Cycling Participation Rates	15% (weekly), 34% (annually)	57%
Cycling Mode Share to Work/School	1.2%	12%
Safety[8]		
Road deaths/million people	53.4	37
Road deaths/billion km	5.2	6.4
Cyclist deaths/million people	1.2	4.3

[5] https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3105.0.65.0012016?OpenDocument. Accessed 12/06/2019.

[6] http://www.stat.go.jp/english/index.html. Accessed 12/06/2019.

[7] (The Australian Bicycle Council, 2017). The Australian Bicycle Council. (2017). *Implementation Report 2016*. Accessed 12/06/2019

[8] (BITRE, 2016)Accessed 12/06/2019. BITRE. (2016). *International Road Safety Comparisons*. Canberra: Department of Infrastructure, Regional Development and Cities. Accessed 12/06/2019

Table 2: Cycling rules and penalties in Japan - Source: (Berent & Yoshida, 2017)

Traffic Rules	Penalty
Riding a bicycle on right side of the road	Imprisonment for up to three months or a fine of up to 50,000 yen*
Riding on a sidewalk when circumstances are not 'exceptional'	Imprisonment for up to three months or a fine of up to 50,000 yen
Not yielding to pedestrians and/or cycling slowly on a sidewalk	A fine of up to 20,000 yen or pecuniary penalty
Cycling under influence of alcohol	Imprisonment of up to five years or a fine of up to one million yen
Riding double on a bicycle (except with a child under 6 years old)	A fine of up to 20,000 yen or pecuniary penalty
Cycling side by side	A fine of up to 20,000 yen or pecuniary penalty
Cycling without lights (headlights and rear lights or reflectors) during evening hours	A fine of up to 50,000 yen
Not obeying traffic lights	Imprisonment for up to three months or a fine of up to 50,000 yen
Not stopping and checking for safety at an intersection	Imprisonment for up to three months or a fine of up to 50,000 yen
Using an umbrella or mobile phone	
Wearing of helmets (children under 13 are 'strongly encouraged')	

**1,000 Yen is around AU$13 at time of writing.*