# Gender and cycling in Sydney : a gender perspective of cycling : space claiming and infrastructure use and preference

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# Gender and Cycling in Sydney

## A gender perspective of cycling: space claiming and infrastructure use and preference

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A thesis in fulfilment of the requirements for the degree of Master of Philosophy


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**ORIGINALITY STATEMENT**

'I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.'

Signed .....

Date 13/9/13

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### 1.1 Preamble:

If I recall my fondest memories of growing up in a semi-rural neighbourhood on Sydney's urban-rural fringe they repeatedly come back to the bicycle. These images (memories of handle bar streamers and spokey-dokes: Figure 1) include: learning to ride as a small child on a pink and white plastic trike; the exhilarating moment when the training wheels came off my first bicycle and I didn't fall off; speeding around an asphalt velodrome trying to keep pace with my siblings; packing five bicycles onto the car at holidays; and mountain biking somewhere that was more remote and exotic than home. Of course the bicycle was sometimes the cause of bruises and tears as I tried to fit three of us onto a 1990s step-through and fell off, or lost control and flew over the handlebars. The bicycle has remained a constant source of recreation and exercise whilst at home on Sydney's peri-urban fringe, and has come to be my most favoured means of transport as an adult at home in the inner part of the city. This movement from city-fringe to inner-urban cyclist occurred after I bought a BMX, decided it was far too impractical for Sydney's hills, and followed my sisters in buying a 'big girl's bike'. Finally, owning my own bicycle and cycling around the city led me to examine the women's urban experience of cycling.

Figure 1: Image of fond childhood cycling memories (N.McNamara, October 1992)

## 1.2 Introduction:

This research originated from the notion that the intersection of gender and cycling in the city poses important and timely challenges to more conventional concepts of gender norms, the manner in which we think about the city, and mainstream planning systems (Rahder & Altilia, 2004). This chapter sets out the research problem, briefly outlines the current booming economic and political context for the City of Sydney (COS) Council, provides an overview of cycling planning on a national scale, describes the challenges of retrofitting for cycling in urban settings, and explains how the thesis is ground in planning discourse, theory and practice. The chapter then introduces the research statement and key questions, identifies the aims and significance of the research, documents the methodology for the research, and provides an overview of the thesis document.

## 1.3 Problem Statement:

The introduction of cycling plans and strategies at Federal, State, and Local government levels in Australia, and the subsequent implementation of physical and social cycling infrastructure, has gone some way to legitimising cycling in cities and increasing participation rates. Yet female cyclists remain underrepresented and under-researched in Australia (Bonham & Wilson, 2012). Women are continuously highlighted as the largest potential market to increase cycling participation rates in Australian cities, yet they remain on the margins of this alternative transport mode (Pucher et al, 2011a; Bonham & Wilson, 2012). Active modes of transport, such as cycling, have well documented health, social, economic, and environmental benefits for the individual and the broader community (Rissel, 2009; DIT, 2011; Kent, Thompson & Jalaludin, 2011).

It is necessary to define what is meant by the terms physical and social infrastructure. Physical infrastructure commonly refers to *hard* infrastructure such as roads, rail, footpaths, energy, telecommunications, water and sewerage works, whereas social infrastructure commonly refers to *soft* infrastructure such as health and social services, open spaces, public education, public housing, community services, and cultural and financial services as well as the public administration

required to support these. 'Infrastructure has historically been viewed as a public good' (Gleeson, Dong & Low, 2007: 311) in Australia, providing all the essential services to maintain and support communities, and has been provided by each of the three tiers of Government.

Physical cycling infrastructure has altered the spaces of our cities and generated new opportunities to explore the relationship between top-down infrastructure provision and space claiming from a 'gender perspective' (Greed 2005: 247). The view from the bicycle saddle challenges the dominant influence that automobility exudes on the urban environment (Sheller & Urry, 2000). Additionally, the 'women's urban experience' (Davidson & Fincher, 1998: 188) of cycling can help us begin to re-make the exclusionary influence of automobility on public space (Koglin, 2011), and also understand how 'citizenship' is re-negotiated (Iveson, 2007). 'Citizenship' can be defined as the complex 'relationship[s] between individuals and the community and/or the [nation] state' (Knox & Pinch, 2006: 317). It has traditionally encapsulated certain rights and obligations that come with having membership of a particular group and is therefore inherently exclusionary (Holston & Appadurai, 1999). For this thesis, 'citizenship' has come to mean the cyclists' need for a right to the city dominated by automobility, a re-imagining of public space, and the social cohesion of cities.

The city 'is integral to the construction of citizenship and of the public' (Staeheli & Dowler, 2003: 73) and cyclists are a part of this public. Iveson (2007: 13) argues that whilst 'many kinds of "public space" exist, none exists in isolation – rather, these spaces develop and mutate in complex relation to each other'. It is the mutation and development of these spaces, and the formation of 'new combinations' (ibid) of different kinds of public spaces which are of most interest. Sydney's growing cycling network is characteristic of the re-making of public space that Iveson proposes. As the city is historically a site of contestation and a locus for the re-negotiation of citizenship (Soja, 2010; Marcuse, 2009; Mackenzie, 1989), the view from the bicycle saddle, becomes central to examining conflicts such as space claiming and gender inequalities in a changing city.

### 1.4 Planning and population increase – broader Sydney:

This thesis examines cycling in inner Sydney. The Greater Sydney Capital City Statistical Area (GSCCSA) is defined by the Australian Bureau of Statistics (ABS) as incorporating 43 Local Government Areas (LGAs), including the COS LGA, in New South Wales. The GSCCSA is intended to 'provide a stable and consistent boundary that reflects the functional extent of' (ABS, 2012d: 2) the capital city, Sydney. Research participants and respondents were drawn from within the GSCCSA (the Sydney region). Geographically the Sydney region extends from Wyong in the north, to Picton in the south, incorporates the Blue Mountains City Council in the west, and is bordered by the Tasman Ocean on the east (Figure 2).


**Figure 2: Map of the Local Government Areas that make up the Sydney Region**
Source: http://www.cityofsydney.nsw.gov.au/AboutSydney/documents/cityresearch/MetroLGAs.pdf

The region has seen great changes to its urban form, as planners have accommodated population change over the course of the 20th century. Population density remains high in the inner ring (Figure 3), which is the focus for this research. The 1948 *County of Cumberland Planning Scheme* intended to contain Sydney's urban sprawl through maintaining a green belt and a 'district open space scheme' (Freestone, 2010: 22) around the more urbanised centre of the region. However this scheme was unable to accommodate Sydney's population explosion post World War II and was superseded by the *Sydney Region Outline Plan* (SROP) in 1968 (Freestone, 2010). The SROP has been criticised for its 'expansive metropolitan planning' (Freestone, 2010: 154), and 'bullish growth strategies' (Freestone, 2010: 156), which favoured a car-dependent city (Mees, 2012).


**Figure 3: Map depicting the Outer, Middle and Inner rings of the Sydney region – the study focuses on the Inner ring**
Source: *State of Australian Cities Report* 2011: 45

According to the ABS as of June 2011, 68% of New South Wales' (NSW) population resided in the Greater Sydney region (ABS, 2012a). The most recent ABS figures place the estimated resident population of the region at 4.39 million people (ABS, 2012a). The population of the region is forecast to grow to close to 7 million by 2056 (ABS, 2012c). The NSW Government's approach to accommodating this forecast growth combines the *Sydney Metropolitan Strategy* (NSW Department of Planning 2005), and sub-regional strategies such as the *North-West* and *South-West Growth Centre* plans (DOP, 2007), with policies that deal with urban consolidation, renewal, and urban infill projects (Randolph, 2006). It is prudent to recognise that even though the current NSW Sate Government is re-designing the planning system in the State, the long term strategic planning efforts to accommodate population increase and the ensuing challenges of this is still high on the State's agenda (Transport for New South Wales, 2012). The Government is also particularly concerned with infrastructure provision (TNSW, 2012). The Draft *NSW Long Term Transport Master Plan* released in September 2012 highlights the need to ensure the provision of a 'transport system [that] can keep up with growth and meet our changing needs' (TNSW, 2012: 23).

Population increase serves as one driving factor behind the need to think about urban resource use and creating sustainable cities. The governance of cities is also increasingly important for future sustainability, as Australia is one of the highest energy consumers per capita of the Organisation for Economic Co-operation and Development (OECD) countries. Notions of sustainable cities or of urban sustainability vary greatly as the city is an elastic concept, and what is being sustained can be contentious (McManus, 2006). For the COS sustainability denotes creating 'a green, global, and connected city' (COS, 2008: 7), and cycling forms part of this vision. The Lord Mayor of Sydney, Clover Moore, was re-elected to Council for a third-term and stated in a media release on September 19th 2012: 'Having won the majority of the vote I have clear a mandate from the community to continue with the City's leading progressive work' (COS, 2012). In 1990 the Federal Government defined sustainability in terms of ecologically sustainable development (ESD) (Department of Sustainability, Environment, Water, Population & Communities, 1992). ESD is 'development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on

which life depends' (DSEWPC, 1992) as well as maintaining the quadruple bottom line (i.e. environment, economy, culture and society).

### 1.5 Planning for cycling: National level

Cycling has a long history in Australian cities. Mees (2012: 378) recalled how 'in the 1950s, cycling was mainly a working-class mode [of transport] … as important as the car for workers employed in the suburbs'. Over the ensuing decades, bicycle use experienced a spatial shift as it decreased in the outer suburbs and increased in the inner suburbs (Mees, 2012; Bonham & Wilson, 2012), to create what Mees (2012: 378) termed 'the widespread belief that there is currently a cycling boom in Australian cities'. It has been well documented that there exists a disparity between bicycling participation figures and bicycle ownership figures (Bauman et al, 2012). Bicycle sales figures certainly indicate a boom in ownership, as 'there appear[s] to be many more bicycles sold in Australia than are used' (Bauman et al, 2012: 145). In 2001, 37% of households in Sydney owned a bicycle (Bauman et al, 2012). This increased to 47% in 2011 (Department of Infrastructure and Transport, 2011), illustrating the perceived boom. However Sydney lags behind other major cities in Australia, as it has 'the least proportion of people who regularly ride' (DIT, 2011: 188) as well as the lowest number of households which own a bicycle of all the capital cities (ibid).

The current Australian Federal government has set a national target to double cycling rates in all states and territories between 2011 and 2016 'to improve the quality of life for all Australians' (Australian Bicycle Council, 2010: 20). This aspirational aim has been set in order to improve the liveability of cities, and forms part of wider emission reduction schemes to reduce the nation's ecological footprint (Austroads, 2011). For the purposes of this thesis, 'liveability' is defined by the Commonwealth Department of Infrastructure and Transport (DIT, 2011: 7) in the following way: 'Liveable cities are equitable, socially inclusive, affordable, healthy, safe and resilient… and provide a diversity of choices and opportunities for people to live their lives…' Urban cycling is gaining prevalence in planning and policy discourses both nationally and internationally, as governments design, plan, and manage sustainable cities. Increasing cycling participation rates in Australian cities

can form part of a holistic approach to planning sustainable cities and creating healthy and active communities (Thompson, 2007).

### 1.6 Cycling and planning at the local scale: City of Sydney

In February 2007 the City of Sydney Council published its *Cycle Strategy and Action Plan 2007 – 2017,* and embarked upon the construction of a 'high-quality cycleway network' (COS, 2007: 11). The network conforms to the city's *2030 Vision* of a 'green, global, and connected city' (COS, 2008a: 7), by providing an opportunity for residents and non-residents to cycle wherever possible in Sydney. In 2007 Council 'allocated $70M … to build an effective cycle network … [in order] to make cycling a real transport alternative that will reduce road congestion, cut emissions and improve public health' (COS, 2009: 2). Council has been constructing 200 kilometres of cycle network across the city, of which 55 kilometres are separated cycle lanes. To date Council has constructed 10 kilometres of completed separated cycleways, completed 60 kilometres of shared paths, and is collaborating with 14 adjoining councils to improve cycling facilities and grow cycling numbers across the region (COS, 2013b; Campbell, 2012; COS, 2011). Two maps, one of the proposed cycle network and one of the network to date (completed and currently underway), are shown over the page in Figure 4 and Figure 5. The cycle network is estimated to be completed by 2017, and Council is working with numerous state and local bodies to complete the network (COS, 2007). This top-down model of infrastructure provision is intended to help the region 'cope with growth… [and give] people a transport option if they want to have it' (Clover Moore, SBS, 2012).


**Figure 4: Proposed Cycle Network Route Map for Sydney**
Source: http://sydneycycleways.net/the-network/the-routes *Route Map* 2012


**Figure 5: Map depicting the completed network (green) and sections of the network currently under construction or investigation (blue)**
Source: http://sydneycycleways.net/the-network/the-routes *Progress Map* 2012

## 1.7 Where are all the women cyclists?

In spite of the improvements in cycling infrastructure in Sydney, it is commonly accepted that women cycle less than men. In Sydney females account for 17% of commuter cyclists (Pucher et al, 2011) and comprise a mere 13% of cyclists overall in the city (Environmetrics, 2006). According to the Australian Bicycle Council (ABC) (2011) the ratio of male to female cyclists is more than double in Australia, leaving one to ask the question; where are all the women who ride? Recent observational and quantitative studies of cycling in Melbourne (Garrard, Rose, & Lo, 2008) and Sydney (Environmetrics, 2006 & 2007), suggest that in urban Australia female cyclists prefer to use dedicated cycleways or paths that provide the most separation between vehicular traffic and the bicycle. These studies propose theories of women's fear in public urban space and self-preservation as primary reasons for choosing cycling infrastructure (Day, 1999; Bowling et al, 1999; Burgess, 1998; Valentine, 1989). However, little attention has been paid to cycling communities in Sydney to better understand the infrastructure use and preferences of females who cycle.

Two comprehensive surveys were conducted in 2006 and again in 2009 with cyclists and non-cyclists on behalf of the COS which suggest top-down cycling infrastructure provision and traffic-separated cycleways as appropriate options for retrofitting Sydney for cycling (Environmetrics, 2006 & 2007). Existing literature also suggests that the build-it-and-they-will-come model of infrastructure provision is concurrent with increasing cycling participation rates overall (Nelson & Allen, 1997; Dill & Carr, 2003; Stephens, 2010). Given these studies, it would follow that by retrofitting existing cities with cycling infrastructure which offers separation from vehicular traffic and visibility for cyclists, governments can increase cycling participation rates. Indeed, Sydney's increased cycling rates have widely been attributed to the improvements in infrastructure, especially within the COS LGA (COS, 2011). Although to date there has been little research to support this top-down provision of infrastructure that identifies what types of infrastructure cyclists are using, with the exception of bicycle counts (see RMS, 2012), research into why individuals choose certain routes over others, and little research which focuses on

females who currently cycle, their infrastructure preferences, route choices, and experiences of cycling in Sydney.

### 1.8 Thesis statement:

This thesis is underpinned by the statement: *Women's rights to the physical and social spaces of the cycling city need to be legitimised in order to increase women's cycling participation rates in Sydney.* From this statement, four sub-questions emerge which help address this statement:

1. How is space re-made and claimed by cyclists?
2. How is citizenship re-negotiated by cyclists?
3. Do these claims and re-negotiations differ for female cyclists? AND
4. What is the role of infrastructure in space claiming?

The core arguments of the thesis are derived from these sub-questions, they are: that cycling makes claims to citizenship and contributes to the formation of community; and that infrastructure helps cyclists make these claims, whether male or female.

The current cycling boom, with regards to cycling policy, cycling participation rates and cycling infrastructure in the region, has gone some way to legitimising cycling as an important activity in the city. It has been widely acknowledged that a large disparity exists between the numbers of men and women who cycle in Sydney (Pucher et al. 2011a; Garrard et al. 2008). Bonham and Wilson (2012: 60) remind us that countries such as Australia, New Zealand, The United Kingdom (UK), the United States of America (US), and Canada, which have 'low rates of cycling … have significantly lower rates of cycling amongst women'. Predominant discourse indicates several reasons for why women ride less than men: theories of self-preservation and fear are two major reasons previously mentioned in this chapter. However, there is little ethnographic research of cycling communities in Australia which refutes these claims, and little Sydney-based research that explores space claiming for cyclists or citizenship and cycling. The

research agenda proposed by this thesis produces a better understanding of what motivates females who currently cycle, whilst highlighting the physical and social infrastructure needs of women cyclists in Sydney.

### 1.9 Thesis aims:

The thesis aims to understand the processes of space claiming and re-negotiations of citizenship which cyclists encounter and engender in Sydney. In addition to this, the thesis aims to gain a gender perspective of the cycling-related built environment by investigating what kind/s of infrastructure enable female friendly cycling in a city which is retrofitting for cycling. This will be achieved through qualitative research methodologies that examine how the existing infrastructure is or is not being used by male and female cyclists. Furthermore, through investigating the cycling practices, preferences, and opinions of a broad sample of the cycling community in Sydney, and conducting [in-depth qualitative discussion-groups] the thesis aims to provide recommendations to increase female participation rates in Sydney.

### 1.10 Research methodology overview:

This thesis adopted a range of quantitative and qualitative research methods to build a robust image of cycling in contemporary urban Sydney. A thorough review of theoretical and practical discourses concerning cities, citizenship, the production of space, cycling, gender, feminism, planning, ways of measuring social cohesion and characteristics of the built environment, was conducted in order to inform the direction of the research and identify best practice alongside innovative methods. Literature gaps are identified. Chapter 2 is a review of the relevant literature.

Ethics approval was sought from the Faculty of the Built Environment's Human Research Ethics Advisory Panel (HREAP) in March 2012. Approval was granted on the 15$^{th}$ of March 2012 (reference number 125004) for human research that consisted of: documenting (photographing) bicycle spaces in the study area; a

comprehensive web-based survey; two discussion-group sessions; and a Nelessen-style Visual Preference Survey (VPS).

Research methods were qualitative in nature, incorporating a web-based survey of cyclists from across the Sydney region, and two discussion-group sessions, divided by gender, which were combined with a Nelessen-style VPS. These methods focused on the view from the bicycle saddle, and focussed on social cohesion and infrastructure use and preference. The first aim of the research was to engage as large a cycling audience as possible to provide a broader view of current cycling habits, and the attitudes, behaviours, and opinions of cyclists in Sydney. As limited information on gender differences in urban cycling in Sydney exists, the web-survey also aimed to provide an indication of similarities and differences between men and women who cycled, as well as a context for more in-depth methods. The Nelessen-style VPS and group discussions concentrated closely on infrastructure, cycling narratives and social cohesion, to provide a micro view of issues which cyclists felt were important to them.

### 1.11 Research significance:

Through exploring citizenship, space claiming, and infrastructure use and preference from the bicycle saddle, this thesis provides a snapshot of the cycling community across Sydney. The thesis makes in-roads into areas of gender and transport research on the local scale, both of which are important for planners and local governments in the move towards sustainable and socially cohesive cities.

The research is significant for women who currently cycle, and those women who are considering cycling, as it highlights issues which are specific to women cyclists and identifies possible avenues of support or means of encouragement, and strategies for increasing female cycling participation rates that can be implemented at a range of local levels, not only at the LGA level by Council.

### 1.12 Thesis overview:

This chapter has explained the planning and cycling contexts for the research, and outlined the thesis aims, methodology, research statement, and research significance. It sets up the roadmap for subsequent chapters.

Chapter 2 expands upon the planning and cycling contexts for the research, to provide an extensive review of the relevant literature. The chapter is organised into two main parts. The first section of Chapter 2 includes a review of the theoretical discourses which informed the direction of the research, encompassing; cities and citizenship discourse, public-private space debates, the right to the city discourse, relevant feminist discourse and women and mobility. This is followed by a review of practical discourses including; pertinent healthy built environment discourse, literature on contemporary cycle spaces and planning for cycling, and ways of measuring cycle spaces, and measuring social cohesion.

Chapter 3 documents the methodologies employed for the research. It situates the research in urban Sydney and justifies the use of both qualitative and quantitative methods. The chapter explains the stages of the research process, and details: empirical data gathering, the development and implementation of a web-based survey of cyclists, the creation and application of a Nelessen-style VPS, and the planning and running of discussion groups.

Chapter 4 details the research findings. This chapter provides a broad descriptive snapshot of cycling in Sydney based on empirical findings from the web-based survey. It also describes gender differences and similarities in terms of cycling practice and behaviour. This chapter examines the infrastructure use and preferences of participants, focussing on the Nelessen-style VPS, and identifies preferred elements of the built environment that can influence route choice. This chapter analyses the results with regards to social cohesion, top-down infrastructure provision, the right to the city, and shifting cycling cultures in contemporary cities. This chapter describes the myriad ways in which female and male cyclists claim space for cycling in Sydney. Additionally, this chapter explores the impact that both space claiming and the re-negotiations of citizenship cyclists experience and engender have on the broader community in Sydney in order to argue that women's right to the physical and social spaces of the cycling city need to be legitimised in order to increase women's cycling participation rates in Sydney.

Finally, Chapter 5 brings together the results with pertinent literature and theories explored in Chapter 2 and makes conclusions based upon the research. This chapter offers recommendations for increasing female cycling participation in Sydney across a range of government and community levels, suggests areas for future research, identifies the limitations to this research, and provides final reflections.

## *Chapter 2: Literature review – Gender, cycling and cities discourse*

### 2.1 Introduction:

A contemporary 'gender perspective' (Greed, 2005: 247) of the urban argues that the 'responsibilities and experiences of women are different from those of most men, resulting in their using space differently' (ibid). The hegemonic discourse surrounding women and cycling in urban areas argues that women prefer certain cycling spaces to men. However, when examining cycling from the bicycle-saddle, this dominant view can tend to oversimplify how different individuals use space. This thesis originated from debates about public and private space, and the right to the city. Moreover this thesis is informed by the long and often convoluted history of feminism, thus this chapter begins with a brief discussion of feminist thinking which locates feminism in the city. Following this, the chapter then explores feminist thought in Geography and Planning discourse in terms of the divided city, to firmly locate discussions of women and cycling in urban environments, challenge traditional patriarchal conceptions of the city, and come to an understanding of *space*. This chapter then discusses relevant public-private space debates, as well as the right to the city and explores the importance of social cohesion for this thesis. The chapter then discusses the broader sustainability context for examining cycling in Australia. This is followed by an exploration of cycling participation rates in cities, using international and national examples, to illustrate the gender gap in Australian cycling. Finally, the chapter explores how cycling is planned for in Australia, and outlines how cycling in cities has been measured or quantified. This chapter explores these discourses to provide a context for an examination of both gender and cycling in inner-metropolitan Sydney.

### 2.2 Locating feminism:

It is essential to acknowledge that contemporary feminism is not necessarily a cohesive field of theory (McDowell & Sharp, 1999: 88) rather it is a 'diffuse political [and theoretical] movement, which has varied over space and time' (Gregory et al, 2009: 243). The locations, social environments, and institutions that engendered feminism are important for firmly establishing the foundations of

feminist discourse within the city, as the city is the historical site for contestation and re-negotiation (Mackenzie, 1989; Marcuse, 2009; Soja, 2010). The city has been the axis 'of emancipation for women' (Knox & Pinch, 2010: 238), however the city is also inherently patriarchal. The city, then, becomes essential for examining a gender perspective of the built environment and women's experiences of urban space.

> *Feminism has always been a spatial practice: to disrupt traditional organizations of space, to forge productive dislocations and to reconfigure conventions of scale: "The dichotomy between the private and the public is central to almost two centuries of feminist writing and political struggle; it is, ultimately, what the feminist movement is about"* (Pateman, 1989: 118) *... The feminist slogan "the personal is the political", expresses a refusal to accept both conventional boundaries between public and private, and scalar distinctions between the body and spaces of politics.* (Gregory et al, 2009: 244)

Geographers first encountered feminist thought during the 1970s (Burnett 1973; Hayford 1974; Enjeu & Save, 1974), whereas feminism entered planning discourse in the 1980s and 1990s (McDowell & Sharp, 1999: 202). Feminist (urban) geographies and feminist planning are closely related to the gendering of the built environment through social constructions as well as physical design (McDowell & Sharp, 1999). Gender became important for geographers and planners as – despite its shifting definition from being in contrast to sex (De Beauvoir, 1949), to that of interlinked with or subsumed within sex (Butler, 1990; Rose, 1993; Nicholson, 1995; McDowell & Sharp, 1999) – it is embedded in space. Feminist geographic theory has a distinct tendency towards the private, personal, and the local – all of which are bound up in the everyday lived experience of the city (Butler, 1990; Hayden, 1981; Law, 1999 & 2002; Massey, 2004; McDowell, 1999; Rose, 1993; Valentine, 1995). Feminist geographers and planners urge us to re-think, re-consider and re-construct the urban realm in order to better understand what the city is and how we conceptualise space and gender relations.

## 2.3 Women in urban environments:

### *The historical 'divided city'*

'The divided city was first seen as a city separated into men's spaces and women's spaces…public and economic … [versus] private and social' (Mackenzie, 1989: 113). These dichotomies of public-private space, notions of production and reproduction (Nightingale, 2006; Rose, 1993), and nature-culture (Butler, 1990; Rose, 1993) are a useful starting point for examining urban spaces as they form the foundation of contemporary discussions of gender and re-negotiations of the city. According to Rahder and Altilia (2004) feminism in planning enjoyed a peak in the early 1990s and feminist analysis highlighted the gender assumptions inherent in planning discourse and practice. Hayden (1981: 167), whilst discussing the traditional American city from a neo-Marxist perspective, connected city planning and architecture to capitalism, and to the production of power and wealth, to imply that 'dwellings, neighbourhoods, and cities designed for homebound women constrain women physically, socially, and economically'. Indeed, it has been widely contended that modern town planning, which grew out of 'patriarchal and paternalistic ideology[ies]' (Knox & Pinch, 2010: 135), and as such cities: reinforce and 'embod[y]… gender inequalities' (Knox & Pinch, 2010: 136).

The creation of the divided city was further enabled through post world war two urban expansion and suburban sprawl. According to Iveson (2000: 219), in Australia planning has stood 'accused of giving us high rise office towers, dead spaces and suburban loneliness'. This is a loneliness that was exacerbated through the construction of a car-centric city, where suburban sprawl was interlinked with 'the domestic suburban sphere [and] … the providence of women' (Knox & Pinch, 2010: 238). In a post-sprawl era, where sustainable development and urban infill are familiar terms for planners and policy makers, there is emerging discourse surrounding the new or renewed spaces of the city that pose new questions for researchers, as the old notion of a divided city is updated to incorporate the myriad 'different kinds of differences' (Iveson, 2000: 221) within the city.

***Changing definitions of 'gender'***

More recently the terms 'gender' and 'gendered/ing' have been replacing 'feminist' and 'feminism' in planning and geographic discourse, representing this broader shift in thinking (Rahder & Altilia, 2004; Greed, 2005) to recognise the cultural geneses of the term 'gender' (Greed, 2005). Law (1999), and Rahder and Altilia (2004) suggest that the binaries of nature-culture, public-private, and production-reproduction 'risk the oversimplification of difference' (Rahder & Altilia, 2004: 114). The use of the term 'gender' then is an acknowledgement of these binaries and a move to reverse the aforementioned oversimplification. Furthermore, Bowlby et al (1989: 169) highlighted a turn in feminist theory away from examinations of gender *roles* toward gender *relations* in the 1980s and into the 1990s, in order to further challenge in 'feminist theory and practice the crude dichotomy of polar opposites' such as public-private space. Nicholson (1995) proposed a similar feminist analysis to outline that 'gender' surpassed biological differences (sex) to incorporate an understanding that female or femininity, and thus gender, is socially constructed in the sense that de Beauvoir (1949 trans 1979: 525) claimed 'one is not born but rather becomes a woman'. Jarvis et al (2009: 1) maintain that 'cities are themselves shaped by the gendered embodiment and social reality of daily routines – at home, in public, and on the move'. It can be then understood that women's daily activities 'merged the dichotomies of a divided city' (Mackenzie, 1989: 114) and the 'wide ranging interrogation of the feminist geographer' (Johnson, 2008: 570) captured these challenges across spaces.

Given the constant shifts in feminist thinking, a contemporary understanding of gender can no longer simply refer to 'women or to [the] differences between men and women' (Nightingale, 2006: 171). More precisely, and specific to the social sciences, gender is seen as a process (Butler, 1990 & 2004) whereby gender is socially constructed and simultaneously malleable. As this construct is not fixed, gender is not fixed either, as space does not provide 'a static background for social relations' (Nightingale, 2006: 171). It is therefore understood that each informs the other and is constantly changing depending on one's vantage point (Massey, 1994; Nightingale, 2006). Massey (1994: 22) posited that space was a composite of 'stretched out social relations', which allows for examinations,

contestations, and (re)productions of gender in differing political, social, cultural, and spatial contexts (Nightingale, 2006: 171). When examining gender in contemporary urban Australia, an exploration of gendered spaces must take into account the intersecting planning, social, and cultural histories that shape the city. For the purposes of this thesis, *space* is understood in the human geographical sense, whereby it 'acknowledge[s] the socially constructed nature of environments' (Knox & Pinch, 2010: 340).

## 2.4 Public and private space debates, the right to the city and social cohesion in the city:

Public space is broadly defined as 'space that is owned by the state or local government and in theory is accessible to all citizens but which in reality may be policed to exclude some sections of society' (Knox & Pinch, 2010: 336) and thus private space is space which is privately owned. It is commonly understood that the spaces of the city are both historically gendered and socially constructed, and even the divide between public and private is constructed. These notions are explored below in terms of discourse on public-private space, citizenship, the (women's) right to the city, and social cohesion.

### *Public/Private space: challenging the divided city*

As previously discussed, the city has historically been conceptualised in terms of dichotomies: nature-culture, production-reproduction and public-private. These dichotomies are being increasingly challenged by geographers and planners. For the purposes of this thesis it is useful to discuss public-private space and how it relates to the creation of the cycling city and gender. Warner (2002: 26) states that 'throughout the Western tradition, private and public [spaces] have been commonly and sensibly understood as distinct zones… [that have] physical boundaries.' It is commonly accepted that the public realm ideally should be, as Warner (2002: 29, cited in Cuthbert, 2011: 100) outlined; open to everyone, accessible for money, political, official, common, impersonal, national or popular, international or universal, in physical view of others, outside the home, circulated in print or electronic media, known widely, and acknowledged and explicit. These are of course

in contrast to the private realm. Warner (2002: 24) also highlights that public and private spaces have also been traditionally gendered, where 'masculinity, at least in Western cultures, is felt partly in a way of occupying public space … [and] femininity, in a language of private feeling.' As outlined in Chapter 1, Iveson (2007) argues that in contemporary cities there are a multitude of different kinds of public spaces that constantly shift form and meaning and impact upon each other. The developing cycling spaces in Sydney are one such example of Iveson's (2007) re-making of public space. This thesis is concerned primarily with the public spaces of the city and how they are used, misused and appropriated by cyclists in Sydney, and moreover how cyclists' actions in these spaces impact upon our understandings of citizenship and social cohesion, and the policy implications of these complex interactions.

Public space within a Sydney cycling context can be understood from the literature to refer to what Iveson (2007: 4-5) terms as 'topographical' public space. These are the 'material space[s]' (Mitchell, 2003: 51) of the city, the mapped 'places such as streets, footpaths, parks, squares, and the like' (Iveson, 2007: 4-5) where one is visible, and are referred to as 'urban cycling spaces' or 'cycling spaces' throughout this thesis. The notion of visibility is crucial to claiming and re-claiming public space, as Mitchell (2003: 35) contends it is through *appearing* in and *taking* public space by the 'very act of representing one's group … to a larger public [that] creates a space for representation', and thus representation for cyclists. The bicycle-view, indeed the very act of cycling, is able to intersect what are traditionally understood as the public and private spaces of the city, as it sits 'in-between the two predominant means of moving around cities' (Jones, 2005: 816), namely walking and vehicular travel. Iveson (2000: 228) noted that 'not all needs are met by the provision of other spaces that are ostensibly for "everyone"', so one must take into account that public cycling spaces may not necessarily suit the whole public.

***Women and the right to the city: citizenship, mobility, fear and scale***

As feminist analysis extended further into geography and planning disciplines in the 1990s, discourses surrounding women and mobility and the right to the city emerged (Law, 1999; Sandercock, 2000). By exploring planning through

the intersecting lenses of gender, mobility, and the right to the city, one can examine how certain behaviours and acts of mobility (cycling) in public spaces can disrupt and start to question traditional conceptions of space in addition to social norms. It has been suggested that the city acts as the locus for the 'production, consumption and reproduction of gendered norms' (Jarvis et al, 2009: 1), and the right to the city must question whose 'norms' in a city where 'urban diversity and difference' (Iveson, 2000: 219) are increasingly important, and potentially problematic, for planners and policy makers.

Koglin (2011: 227) suggests that 'developing bike-friendly policies and providing cyclists with good infrastructure are matters of equity in the city … [as] the city is for everybody and all have the right to be in the city'. Yet the developments of these policies and bike-friendly infrastructure and the right to access these, in Australia, has traditionally not been given much consideration. Indeed, Mees (2012: 366) argues that 'contemporary transport planners need to consider environmental, health and equity issues' for sustainable urban transport planning, in order to start to address these important issues of equity and access. Mees (2012: 367) attributes some planning inequalities in Australia to the practice of Federal Governments having 'historically … funded roads more readily than public transport … [which] has led state government transport plans to favour roads in order to gain federal funding'. The right to the city's infrastructure which Koglin (2011) refers to, is echoed the Mees' (2012) discussions of contemporary transport planning in Australia.

This notion of a right to the city is tied up with understandings of citizenship as more than rights and obligations, the re-claiming and re-imagining of public spaces of the city, and ideas about social cohesion. Much research has engaged with the notion that 'women suffer disadvantage within a built environment that is developed with little reference to the[ir] needs' (Greed, 2005: 248), thus embedding gender inequalities within the city. Traditional understandings of citizenship also carry these gender inequalities. Indeed, according to Isin (2000: 3) 'modern citizenship was born out of the nation-state' emphasising certain rights and obligations of individuals. It is commonly accepted that citizenship is inherently exclusionary. Isin (2000: 1) reminds us that over the course of history marginalised

groups such as women have 'fought to expand their citizenship rights to include social rights such as access to … pay equity and safe cities … making claims to citizenship'. Rather than relying on more traditional, exclusionary conceptions of citizenship, Isin (2000: 5) argues for a contemporary understanding of citizenship 'as a social process through which individuals and social groups engage in claiming, expanding or losing rights … [where] the emphasis is … on norms, practices, meanings and identities.' This social definition of citizenship is useful for examining cycling in cities as norms, meanings and identities are changing, and the everyday practices of citizens within the city are disrupted or altered by developments in cycling infrastructure.

'For many geographers and planners the empowering aspect of mobility is straightforward' (Hanson, 2010: 9). Indeed, Hanson (2010: 5) quotes Frances Willard on learning to ride a bicycle again; 'I did it from a pure love of adventure – a love long hampered and impeded... from a love of acquiring this new implement of power'. This idea that the act of cycling is empowering for both men and women is commonly accepted (Bonham & Wilson, 2012). However a focus on fear and safety have tended to overshadow empowerment in contemporary discussions of women and cycling (Garrard et al 2008; Bonham & Wilson, 2012). When exploring questions of the right to the city, Law (1999 & 2002) suggests that two main streams of feminist geographic discourse emerged in transport geography, namely the journey to work and the geography of women's fear (Valentine & Bell, 1995; Day, 1999; Burgess, 1998). Law (1999 & 2000) argues that these two streams are limiting, and Hall (2004) extends Law's position, to argue that gender and transport should consider more than simple binaries of men do this women do that.

Hall (2004: 245) posits that more qualitative approaches to research are useful 'to help us learn more about people's everyday travel choices and experiences', to gain a greater understanding of the micro scale. Similarly, Sandercock and Forsyth (1992) place much emphasis on the importance of storytelling (i.e.: of the subjective/lived experience of citizens in planning practice) as well as the everyday micro-scale. Moreover, mobilities research, as Bonham and Wilson (2012) discuss, has offered a challenge to the more conventional understanding of 'transport' and the way that transport is researched. Bonham and

Wilson (2012: 3) argue that this focus on the everyday and qualitative storytelling in transport research has resulted in a broader acknowledgement that transport is merely 'one way of thinking about everyday mobility'. According to Hanson (2010: 5), 'feminists have long known that gender and mobility are inseparable' as mobility is a form of empowerment for women.

Women's fear in public urban space has customarily been approached from an Anglo-American perspective (Day, 1990) or a western perspective (Valentine, 1989). Most women negotiate public spaces alone on a daily basis (Valentine, 1989), and cycling represents one such act of negotiation. It is commonly accepted that an increased perception of safety can influence one's decision to cycle, whereas deterrents often comprise a feeling of a 'lack of safety, threat of violence, danger and risk' (Bonham & Wilson, 2012: 13) for both men and women. When considering dedicated-separated cycle lanes, Saitta (2009: 11) has suggested that even where bicycle lanes 'are respected, they imply (regardless of the law) that cyclists are not to use any other part of the street'. This is an interesting notion given that the separated cycleway is becoming an increasingly popular option for planners and Councils to attract and encourage more people to cycle, especially women.

Current research suggests that in urban Australia, as in the United States of America (USA) and Canada, female cyclists prefer to use dedicated cycleways or paths that provide the most separation between cars and bikes (Garrard et al, 2008; Environmetrics, 2006 & 2007). These findings are of little surprise, given the discourse on female 'self-imposed precautionary measures (which) limit mobility' (Law, 1999: 570). Garrard et al (2008) conclude their study of the role of bicycling infrastructure in female cycling by suggesting that more separated infrastructure is necessary. Their observational study of female riders at selected points in inner-metropolitan Melbourne indicated that female cyclists display a preference for separated or off-road routes (Garrard et al, 2008: 56). Safety concerns then, whether perceived or real, have been documented to contribute to the number of females who cycle in the urban region where car use is high (Garrard et al, 2008). Yet we must remember that these are only assumptions, and have been challenged by more recent work into Bikeability (Winters et al, 2011; Winters & Cooper, 2008) and research into the Life-Course of women's cycling (Bonham & Wilson, 2011 &

2012). It is possible to link the underlying ideologies behind the right to the city discourse with cycling, and in particular to women's cycling. Notions of female-friendly cycling or women's cycling are about having access to resources – to the road, to the footpath, to physical and social cycling infrastructure, and to systems or networks of support. Yet access forms only part of the right to the city.

The right to the city is about recognising the divided city (as previously explored in this chapter), the inherent conflicts and contradictions within the urban realm, and seeking access (Saitta, 2009) as well as 'spatial justice' (Soja, 2010; Iveson, 2010). Women, Greed (2005: 250) argues, have always been interested in the seemingly 'unequal nature of towns and cities', and as such are concerned with the right to the city. Keeping Lefebvre (1991 & 1996), Marcuse (2009) and Soja (2010) in mind, cycling is about having access to the city and to its roads, footpaths, cycleways and maps, as well as 'the right to a future city' (Marcuse, 2009: 193). For planners this future city is imperative and is closely linked to public spaces and community development. When interrogating the city, the vantage point from which this is done is significant (Lefebvre, 1996; Stahl, 2009; Mumford, 1996 & 1961) as a removed (macro) view often overlooks the various contradictions and conflicts of the micro (community or neighbourhood) scale. One experiences space quite differently from the bicycle-saddle in comparison to on foot, driving, by public transport, or by examining a map, and it is this specific spatial experience which is the focus of enquiry: a view from the bicycle or cycle.

The micro scale is significant for exploring cycling through gender, as the (sometimes) everyday act of cycling takes one from home, to work, to study, to shop, to socialise and to relax. These everyday trips, a more functional definition of 'trips' (explored later in this chapter), predominately take place around one's home, or 'geographical backyard' (Head & Muir, 2007: 170). Saitta (2009: no page number) noted that 'when you interact with the city, you deal with one small corner of it', and like Saitta, Law (1992 & 2002), Amin and Thrift (2002), and Head and Muir (2007) all stress the importance of scale, of the micro over the macro, for urban enquiry where human activity is central. Where space, movement and gender are the foci of enquiry, conceptions of everyday mobility are interlinked with the geographic backyard. In seeking scale, the Australian Bureau of Statistics (ABS)

offers citywide (i.e. the Greater Capital City Statistical Division – Sydney), Local Government Area (LGA), and Mesh Block level statistics on travel mode choice, which is important for gaining an understanding of broader trends across the region.

***Social cohesion and cycling***

When exploring new spaces for cycling and what cyclists *do* in public space in Sydney, it is also necessary to explore social cohesion as cycling re-interprets social norms, re-claims and re-makes space – disrupting the city. Isin's (2000: 5) definition of citizenship 'as a social process' recalls recent discourse on social cohesion and social sustainability as ongoing processes (Jenson, 1998; Jupp et al, 2007; Colantonio & Dixon, 2011). Jenson (1998: 15) acknowledges that there is no one approach to defining social cohesion and places much emphasis on how the term *social cohesion* describes a process rather than an ultimate state for governance. Jenson's (1998) five dimensions of social cohesion are drawn from best practice international definitions of the term and encapsulate the core themes of social cohesion discourse.

Jenson's (1998:15) five dimensions of social cohesion are belonging, inclusion, participation, recognition and legitimacy. These five dimensions have been adopted by many theorists and researchers as best practice measures and indicators of social cohesion, and contribute more broadly to the social as well as environmental sustainability of cities (Jupp et al, 2007; Colantonio & Dixon, 2011). Sustainability and cycling is explored further in this chapter in section 2.5 below.

Social cohesion is commonly measured through four broad indicators; economic well-being, perceived personal well-being, participation (generally civic participation), and social dislocation (Jupp et al, 2007). There exists extensive international and national literature on the various ways of measuring social cohesion at the neighbourhood or community-level through questionnaires or surveys based on Jenson's definition of the five dimensions of social cohesion (Colantonio & Dixon, 2011; Jupp et al, 2007, Cantle, 2001; Buckner, 1988). Best practice examples often include Buckner's (1988) neighbourhood cohesion index or make reference to the index (Cantle, 2001). Australian examples of cohesion

indicators at the neighbourhood level have included; well-being, perceptions of safety, neighbourhood/local area satisfaction, social interactions, social inclusion/isolation, participation, and local area amenity (Wood et al, 2008; Pope & Zhang, 2010; HNSW, 2011), all of which can be applied to cycling communities and cycling infrastructure.

## 2.5 Why cycling? The influence of healthy built environments and gender:

### *Sustainable cities*

The growing fields of health and environmental sustainability research espouse that cities which depend heavily on their fringes and the distant elsewhere for resources, particularly oil and gas for transport (Mees, Sorupia & Stone, 2007), have unsustainable ecological footprints (McManus, 2004). Inherent within these discourses is the urgent need for sustainable resource use including active transport initiatives within cities. For the purposes of this thesis, *sustainability* refers to lessening the impact that patterns of consumption and production currently have on the environment.

A common planning response to the car-centric and resource-dependent city model is the creation of the compact city (Mees, 2010; Elvik, 2009; McManus, 2004; Jarvis et al, 2001; Newman & Kenworthy, 1999). The compact city idea was developed out of the Rio Summit in 1992 as a specific response to reducing the city's impact upon climate change through seeking everyday solutions to reducing energy consumption through transport, building design, building materials and heating and cooling (Jarvis et al, 2001: 21). Cycling remains, as Bauman et al (2008: 22) argue, an effective, yet 'underutilised form of physical activity, providing significant contributions to public health' and the livability of cities. Limiting dependence on the distant elsewhere is central to making locality more sustainable, to 'reducing the [city's ecological] footprint and increasing the resilience of city dwellers' (Larsen et al, 2008: 114), yet it is also imperative for improving the health of cities (Rissel, 2009). This thesis is concerned with increasing cycling participation rates in cities as part of Australian governments' responses to ensuring the sustainability of our cities well into the future.

***Australian responses to urban sustainability: examples***

According to the NSW House Standing Committee on Environment and Heritage (2005), recent ecological footprint analysis estimates the footprint of the Sydney region to be 150 times greater than its land area or 7.21 hectares per capita (DECCW, 2009). Regardless of debates surrounding the accuracy of the technique and manner in which it is applied, ecological footprint analysis is invariably able to provide an indication of the broader impacts of consumption (McManus & Haughton, 2006), thus reinforcing the importance of localised solutions. Through a process of outward suburban sprawl, with low-density suburbs, and a large separation of land uses, which was once seen as typifying the 'Australian dream' (Scheurer, 2004: 89), planners 'have thus "engineered" physical activity out of our daily lives' and embedded an intense degree of automobile dependence in the outer suburbs that is in conflict with sustainable development goals. Butterworth (2000: iii) contends that a sense of community can be 'enhanced by urban planning that encourages … diversity[,] … easy access to [a range of] amenities[,] … [and] offers pedestrian-friendly spaces, … to encourage social interaction' as well as reduce vehicular traffic, all of which contributes to a healthier city.

An urban village approach to planning, much like the 'community model of public space' (Iveson, 1998: 23), hinges on public spaces that foster a sense of community. The popularity of a community-centric planning model is evidenced through new urbanism and urban village developments (Newman, 1993; Iveson, 1998; McManus, 2004; Scheurer, 2004) particularly for new developments in North America and local urban renewal/gentrification schemes. Recent Australian examples include the COS' City of Villages scheme as part of the City's *2030 Vision* to revitalise inner-urban communities (COS, 2008a). These planning models incorporate the 'localization of transit' (Newman, 1993: 32), and notions of transit-oriented development (TOD) to increase land use mix and density around public transport and sustainable transport modes, as well as incorporate community-based solutions for sustainability (WHO, 2011; Curtis & Scheurer, 2010). Indeed, Mees (2010) upholds that the only two sustainable modes of transport are walking and cycling, combining these with TOD principles and compact city ideas form the core of a sustainable city model with regards to transport.

Over the course of the 20th century the population of Australia's capital cities increased more than tenfold to 11 million (Davidson, 2006: 203). According to the New South Wales Department of Planning (NSW DoP, 2010) the region's population is forecast to reach 6 million by 2036 and the Australian Bureau of Statistics (ABS) forecasts this growth to reach 5.6 million by 2051 (Knowd et al, 2006). These figures equate to an increase of more than 40,000 people per year from 2005 to 2022 (ibid), although the most recent ABS figures place the 'estimated resident population' of the region at 4.58 million people (ABS, 2011). The NSW government's approach to accommodating this forecast growth combines the Sydney Metropolitan Strategy (see NSW DoP, 2005), sub regional strategies such as the North-West and South-West Growth Centre plans (NSW DoP, 2010), with urban consolidation and urban infill projects (Randolph, 2006). Population increase serves as one driving factor behind the need to think about urban resource use and transportation and prompts debate about how the city can, or is able to reduce its impact and create healthier environments. Promoting active travel, such as walking and cycling, is one such measure that it designed to help counter balance the consumption practices of the urban region.

***Planning for healthy life-styles: cycling as an active mode of transport***

It is widely understood that the physical environment, and hence planning, can 'facilitate or deter a healthy lifestyle' (Barton & Tsourou, 2000: 11). Much of the growing literature surrounding public health policy clearly associates increased levels of daily activity with the creation of 'health-promotive environments' (Frank & Engelke, 2001: 214) and improvements in public health. In Australia, the 'geographical relationship between socioeconomic factors and health indices' (Butterworth, 2000: 5) has been well documented, closely associating place with health outcomes. Butterworth (2000: ii) outlined that 'the built environment provides the setting and backdrop by which we live our lives' and much of the healthy built environment literature focuses on schemes to encourage the small, everyday changes necessary to improve the health of cities. Further to this, Frank and Engelke (2001: 251) argue that in order to encourage and increase levels of physical activity, such as bicycling and walking, it would be essential for planners 'to reintroduce development practices that make it easier to engage in … [physical]

activities during the course of one's daily activities'. It follows then, that cities designed to encourage daily physical activity through the provision of infrastructure would not only promote healthier lifestyles, they could positively influence the number of people who would take up cycling.

## 2.6 Contemporary cycling – International and National discourse:

### *Heterogeneity and homogeneity in cycling*

It is necessary to acknowledge that 'there are many different kinds of cycling' (Horton, Cox & Rosen, 2007: 1) and what one recognises as cycling might differ greatly for another. The majority of the literature has a commuter cycling focus, influenced by transportation research, however the term 'urban cycling' can be employed to encompass many forms of cycling that take place in an urban environment. Urban cycling should encompass commuter, non-commuter, recreational, utility, social and everyday cycling. Everyday life in cities is all about mobility (Jarvis et al, 2009), 'we have moved into an era where we are not simply concerned with the trip to work and back but with the multiple journeys that have become ... necessary in order to sustain our lifestyles each and every day' (Miles & Hall, 2003: 92). Although there are many different kinds of cycling, the term *cycling* is often used to homogenise a vast and varied range of activities, behaviours and meanings across time and space (Horton et al, 2007). As previously discussed, cycling is increasingly viewed by planners and policy makers as an active mode of transport, imbedded within this definition is the idea that cycling for travel replaces vehicular transport.

In a large number of countries cycling remains as a 'marginal mode of travel' (Pucher et al, 2011a: 344; Fleming, 2012) and has been considered as a 'deviant' (Jones, 2005: 815) activity in some highly urbanised areas. 'The massively automobilised … regions of North America and Australia/New Zealand are often seen as especially hostile to cycling' (Horton et al, 2007: 2) in comparison to countries in Northern Europe and Asia which have a long history of cycling and highly visible cycling cultures. As has previously been discussed in Chapter 1, for many cities 'the age of the car … produce[d] new kinds of town plans, serpentine

and sprawling … [and] produced car-specific buildings' (Fleming, 2012: 43) – car-centric design whereby the bicycle was excluded or forgotten. Regardless of the negative image which cycling has received in some countries, in recent decades there has been a vast increase in popularity in terms of bicycle sales (Rissel et al, 2012), participation, infrastructure and policy development (Pucher et al, 2011a&b; 2010a&b; Pucher & Buehler, 2007; Fleming, 2012). Indeed, bicycle planning is becoming mainstream.

***The gender gap: international and national cycling figures***

The practice of cycling 'exists almost everywhere; it is global' (Horton et al, 2007: 3), however it is essential to acknowledge that different countries, regions, and cities have different levels of cycling and cycling cultures at different times (Horton et al, 2007). In order to provide a context for Australian cycling, and in turn cycling in Sydney, it is useful to first contemplate cycling internationally. Approximately 40% of trips are made by bike in Beijing (Horton et al, 2007), and 36% of work trips are undertaken by bike in Copenhagen, a city which has experienced a 70% increase in all cycling trips from 1970 to 2006 (Pucher et al, 2010a). Similar figures exist for Amsterdam, in The Netherlands, where bicycle share has increased from 25% of all trips in 1970 to 37% in 2005 (ibid). Berlin, in Germany, again has seen comparable increases in cycling participation, where participation rates for all trips 'almost quadrupled from 1975 – 2001 (275% increase)' (Pucher et al, 2010a: 118-20). Barcelona, in Spain, experienced an increase from 0.75% in 2005 to 1.76% in 2007 of cycling overall (ibid). London, between 2003 and 2006, has seen an overall increase in trips from 1.2% to 1.6% (ibid). Paris saw similar growth rates, from 2001 to 2007 of 1% to 2.5% (ibid). Yet with the introduction of Velib, their bicycle hire scheme in partnership with the JCDecaux group (Patterson & Radbone, 2012), cycling in the City of Paris has seen a '46% increase in bicycle trips from June to October 2007' (Pucher et al, 2010a: 118-120). Cities in the USA and Canada have experienced increases in cycling participation and journey to work mode share, with New York for example, experiencing a '153% growth in bike commuters between 1990 and 2008' (Pucher et al, 2010b: 4).

It has been widely acknowledged and accepted that countries with high rates of cycling participation such as The Netherlands, Denmark, and Japan, generally have an even gender split amongst participants (Bonham & Wilson, 2012; Garrard et al, 2008). In comparison, countries with much lower rates of cycling, and here we are referring to Australia, New Zealand, the USA and the United Kingdom (UK) in particular, have proportionately lower rates of female participation in cycling (Bonham & Wilson 2012; Pucher et al, 2011a). For example, 'Dutch, German, and Danish women cycle as often as men, and rates of cycling fall only slightly with age' (Pucher et al, 2011b: 454). A gender split is evident in cities in the USA and cities in Canada (Pucher et al, 2011b). In 2006 women made 29% of daily bike commuter trips in Canada compared to 24% in the USA, which is significant given that women account for approximately the same proportion of the work force in both countries (Pucher et al, 2011b). National data for both countries is available for commuter trips, whilst the USA also conducts national Household Travel Surveys (HTS) so more comprehensive information on cycling is available for the USA than Canada. Both countries have higher rates of commuter cycling in cities in contrast to rural areas (Pucher et al, 2011b), however it is necessary to acknowledge that as the scale changes, so does data. Spatial variations will and do occur between regions, be they rural/urban, inner-urban or intra-urban (Pucher et al, 2011b; Bonham & Wilson, 2011 & 2012). Horton et al (2007: 1) would remind us that cycling figures, whilst useful as they are 'indicative of the relative state of cycling', are also slippery and thus are seen as a representation rather than an ultimate measure. The inherent problems in measuring cycling have been attributed to myriad of different forms that exist of the activity and the manner in which quantitative data collection is undertaken (Rissel et al, 2012).

***Addressing Australia's gender gap in cycling***

Amongst researchers and planners it is commonly accepted and understood that, in Australia, a distinct gap exists between the numbers of men and women who cycle. Indeed, the ratio of male to female cyclists in Australia is almost double (Australian Bicycling Council, 2011). Commuter cyclists make 1% of daily trips across Australia, and of these only 21% are made by females (Pucher at al, 2011a). Although when comparing journey to work at the city-level these figures vary from

city to city, as females comprise 17% of commuter trips in Sydney and 25% of commuter trips in Melbourne (ibid). Bauman et al (2008) note that bicycle journeys to work across Australia's capital cities have experienced a 22% increase between 2001 and 2006. At the city-level, these increases vary from Melbourne's 42.57% increase to Darwin's 7.08% decrease (Bauman et al, 2008), and over the same period Sydney saw a 8.99% increase in bicycle journey to work trips (ibid).

Irrespective of the growth in cycling participation in Australia, if all modes of urban cycling are examined, both commuter and non-commuter trips, then according to the COS, in 2006 females made fewer trips than males in Sydney again: a mere 13% (Environmentrics, 2006). As such, females have been identified as the most under-represented section of the Australian population in urban cycling (Pucher et al, 2011a), and the gendered experience of urban bike spaces is seemingly elusive. Irrespective of the aforementioned gender gap in cycling participation statistics, especially in Australia, 'there is evidence of latent demand amongst women to engage in cycling' (Bonham & Wilson, 2012: 4). Recent studies on cycling activities within urban environments identify women as a target group for growing cycling numbers (Bonham & Suh, 2008; Pucher at al, 2011a; Pucher et al, 2011b; Daley & Rissel, 2011). As a result, this research endeavours, through engaging with the female cycling community, to understand why this is, despite recent increases in the numbers of cyclists in Sydney and increases in cycling infrastructure.

There is a vast array of influencing factors on cycling participation rates, including topography or landscape, weather, climate, political climate, infrastructure availability, and cultural and social norms, as well as personal attitudes and habits (Heinen et al, 2010). Understandably, these factors influence participation rates in the different cities and countries outlined above. Heinen et al (2010) surveyed existing literature on commuter cycling to identify the determinants of cycling and broadly these are; the built environment, the natural environment, socio-economic factors, psychological factors, and cost, travel, time, effort and safety. Much space has been given to particular determinants, including cost, travel, time, effort and safety. However Heinen et al (2010: 82) note that 'relatively little [is known] when it comes to specific determinants for cycling

frequency [,] … the presence and the extent of the effect[s] of the built environment, psychological factors and the weather on cycling frequency.' Althouh, Van Ween and Maat's (2010: 68) recent review of commuter cycling literature found that in Australia 'more people cycle in summer (over 20% of all travellers) and autumn, compared with winter (less than 10% of all travellers) and spring.'

When examining the participation rates of female cyclists, discussions of safety often link higher rates of cyclists overall to increases and improvements in end-of-trip facilities and cycling infrastructure. Dill and Carr (2003) argue that there is a positive correlation between higher levels of bicycle infrastructure, such as dedicated cycleways and on-road lanes, and increases in bicycle commuters. Although specific to an American context, the findings of Dill and Car's (2003) study of 43 large US cities suggests that if public health infrastructure provision is increased in cities, then cycling has the potential to increase as well. Pucher et al (2011b) also propose the existence of a positive relationship between increases in infrastructure and cycling trends exists in smaller cities in the US. It is commonly understood from research into infrastructure provision that potential cyclists 'prefer bicycle paths to bicycle lanes or cycling on roads that do not have bicycle facilities' (Heinen, et al, 2010: 64). Furthermore, it has been suggested that the physical 'presence of a striped lane or separated path can increase a cyclist's perception of safety' (Dill & Car, 2003: 116). Yet increasing cycling is also reliant on a number of individual, built environment, physical, and social environment factors (Handy & Xing, 2011; Pucher et al, 2011b; Stephens, 2010; Dill & Carr, 2003; Nelson & Allen, 1997), rather than on infrastructure alone. Moreover, Garrard et al (2008: 58) suggest that 'research is needed to identify and quantify additional personal, environmental, cultural and economic determinants of transportation cycling for females and men in countries with low bicycle transport mode share' including Australia, the USA and Canada. These research agendas would result in a greater understanding of why females cycle, where they cycle, and what infrastructure could necessitate female-friendly cycling.

Notwithstanding the perception of safety that is gained from separated cycleways and improved cycling infrastructure, a body of health research exists which disputes safety concerns. Pucher, Dill & Handy (2010: 106) argue that 'the

health benefits of bicycling far exceed the health risks from traffic injuries', thus challenging the 'widespread misperception that bicycling is a dangerous activity'. It is commonly understood that as cycling levels increase then injury rates should fall (Pucher et al, 2010; Elvik, 2009). As bicycling levels increase and injury rates fall, making cycling safer and 'providing even larger net health benefits' (Pucher et al, 2010: 106). For the COS the 'perceived safety that [separated cycleways] … offer[s] to cyclists from general traffic' (AECOM, 2010: 6) is an important avenue for encouraging greater numbers of people to take up cycling. In order to encourage greater cycling participation rates through improving cyclists' perceptions of safety, the COS has constructed 10km of greenway, which is a cyclists' 'own two-way dedicated lane…[or lanes] on the road which are separated from vehicles by a raised separator (usually a concrete median strip)' (COS, 2011). Although the very provision of the separated cycleway or greenway has its own critics (Forester, 1993), cycling numbers have increased by 82% from March 2010 to March 2012 at key cycle count points along the City's greenways (COS, 2013b), yet women still cycle significantly less than men in urban Sydney.

***Gendered images of cycling***

Gender is explored within the literature on cycling with regards to the images implied by different forms of cycling. Steinbach et al's (2011: 1123) recent case study of cycling in London posited that cycling, as a form of 'active transport... is publicly gendered in a way that more normalised modes of transport are not'. Their research took into account the image of cycling in London as still belonging to 'affluent, White men' (ibid). Similar images of urban cyclists as 'serious', 'lycra-clad', and 'elite' male riders have been documented by Daley and Rissel (2011), and whilst the COS' greenways do much to counterbalance this dominant image of cyclists, it is necessary to recognise that there are many different cyclists, and 'cyclist' merely refers to someone who rides a bike, no matter how often, how far, or for what purpose. 'Women participate in cycling at different moments … [and] are not "fixed" in their cycling' (Bonham & Wilson, 2012: 196) or fixed in a particular image of a cyclist. Winters et al (2011: 9) have noted that 'cyclists are a heterogeneous population and not all will make the same route choices'. Thus it can be assumed

that not every cyclist, regardless of gender, will use the entire available infrastructure and will make different choices.

Women cyclists, as Bonham & Wilson (2012: 4) contend, exist in at least two margins in Australia, 'disrupt[ing] prevailing norms' and occupying a space (cycling) which is worthy of investigation. As has been previously mentioned in this chapter, cycling has been marginalised as a form of travel in Australia, and when one considers that women have experienced numerous marginal spaces or places, then it follows that 'women cyclists' can be considered as an 'alternative mobility culture' (ibid), neither defined by gender or by choice of cycling.

Garrard et al (2008: 58) suggest that 'further research is required to identify and quantify the characteristics of female-friendly cycling infrastructure in a range of urban environments'. It has been suggested that whilst women travel less and their trips tend to be shorter than men's, their trips are more complex and have multiple purposes (Lang, 1994; Greed, 2008). In their stop-start Life-cycle study of female cyclists, Bonham and Wilson (2011: 202) distinguished between utility and recreational riding as 'many [of their] participants, [had experienced] learning to ride and subsequent riding … [as] a part of everyday life as a form of entertainment, being part of a friendship network ... or going on errands'. Furthermore, Greed (2008), describes women's travel behaviours and patterns as 'complicated trip-chaining rather than a simple mono-purpose commute.' These multiple uses for the bicycle are illustrative of the complex and malleable nature of cycling.

## 2.7 Measuring the built environment – tools and discourse:

> *A feature often overlooked in everyday discussions of health and community affairs, perhaps because it forms the setting and backdrop by which we live our lives, is the impact of the physical and built environment on our senses, our emotions, our sense of community, participation in community life, and general wellbeing.* (Butterworth, 2000: 3)

Saelens et al (2003: 81) argue that 'researchers in transportation, urban design, and planning have long understood that neighborhood design and the way land is developed and used may affect transport choice'. It is commonly understood that 'the built environment is an enabler or disabler of physical activity' (Frank &

Kavage 2009: 186). Researchers and planners measure the built environment through a number of means, the most interesting and challenging of these efforts relates to identifying and categorising the complex characteristics of the built environment that influence residents' travel decisions (see Cervero & Kockelman 1997; Ewing & Handy, 2009; Frank & Kavage, 2009; Frank, Sallis, Saelens, Leary, Cain, Conway & Hess 2010a; Wood, Frank & Giles-Corti 2010).

This type of research has predominately focused on quantifying design characteristics of the urban with regards to walking, however more recently it has been translated into research surrounding the built environment characteristics which enable or discourage cycling (see Winters & Cooper 2008). The elements of the built environment that influence physical activity have come to be understood by planners and researches as 'the three Ds: Density, Diversity, and Design' (Frank & Kavage, 2009: 186). Cervero and Kockelman's (1997 & 1999) three D's are density, diversity, and design. Where density relates to the population density of an area, diversity refers to land-use mix, and design refers to the design of the built environment.

The three D's aim to encapsulate the elements of the built environment that influence individual decision making, and as such, transport choice and path or route choice. Studies conducted in the 1990s into walkability examine the design aspects of the built environment which encourage walking, including the three D's. However these are predominately concerned with the broader characteristics of the urban form, rather than the smaller changeable characteristics, such as the level of light, the line of sight, or the vegetation along side a cycleway and also personal preference. Stephens (2010) argues that the growing networks of cycling paths both on and off road, in urban and regional areas in Australia, whilst boosting cyclist numbers, need to produce a desirable cycling experience as well. The notion of desirability is essential for encouraging new cyclists and maintaining interest in urban bike spaces.

There exists a vast discourse on aspects of the built environment which make living in, and experiencing the city enjoyable. Recent developments into Walkability and Bikeability indexes provide a top-down city-wide analysis of the elements of a city that impact upon the overall walkability and bikeability. Frank et

al (2010a&b) has spearheaded the development of an index that measures the walkability of the urban form. Whilst there exists a range of possible characteristics that would contribute to walkability, the most common aspects examined are street connectivity, land use mix, population density, and (given that walkability studies tend to focus around neighbourhood centres) retail floor ratio.

The Bikeability Index (see Winters et al, 2011) was developed by the Cycling in Cities research program at the University of British Columbia (UBC) which started in 2006 and was adapted from the UBC's Walkability Index (Frank et al, 2010a&b). The Walkability index considers the design aspects of urban neighbourhoods that are more likely to encourage pedestrian-friendly behaviour and support public transport, whereas the Bikeability Index aims to help researchers understand what makes a neighbourhood 'bikeable' and to map bikeability. The Bikeability Index considers the positive and negative influences of characteristics including: bike route density, traffic, neighbourhood land use, topography, bike route separation, connectivity and destination density, environment en-route, distance, and population density, and has been implemented in metropolitan Vancouver in Canada, to physically map the 'bikeability' of the city. Whilst these forms of indexes are useful for identifying streetscapes and neighbourhoods that are bike-friendly, particularly for the less-experienced rider (Winters & Cooper, 2008) they leave room for further research into why certain cyclists ride where they do, and may not be transferrable to *all* cities developing cycling infrastructure as topography, seasons, density and street connectivity are never the same in every city.

Similar research into streetscape complexity, or rather the elements within the built environment which individuals find interesting and thus encourages people to engage with the environment, thus influencing decisions to walk or cycle are also useful. Nasar (1998: 74) uses complexity in evaluative mapping (explored in more detail below) to determine that 'humans … prefer some visual arousal and complexity', and 'interest [and] … preference should increase with complexity' (Nasar, 1998: 75). Numerous elements of the built environment have been identified as contributing to streetscape complexity. According to Ewing and Handy (2009: 79) streetscape complexity 'is related to the number [of] noticeable differences to which a viewer is exposed per unit time', meaning that the *variation*

(Nelessen, 1994) within a streetscape is related to how fast one moves through the built environment and thus to the level of interest a pedestrian, cyclist or car driver/passenger has. Elements of the built environment that have been documented to contribute to complexity and create variation include, building design and materials, signs, people, activity, street-trees and vegetation, street furniture, and 'changing light patterns and movement' (Ewing & Handy, 2009: 79). These elements, and many more, can be separated into perceptual, qualitative and quantitative components (Ewing & Handy, 2009), Whilst quantifying the built environment is indeed useful for determining streetscapes and urban environments which encourage physical activity, the quantifying process can be too complex and lengthy and is beyond the scope of this thesis.

Nasar's (1998: 62) Evaluative Image of the City, is a more personal approach to measuring the city, in which individuals map how they perceive the city to be, provide 'reasons for their evaluations' and are 'interviewed … about their likes and dislikes in the city' (Nasar, 1998: 81). Nasar (1998: 28) notes, whilst individuals can choose to experience certain events or scenes, such as an art exhibition or listen to music, urban design does not offer such a choice, rather 'in their daily activities, people must pass through and experience the public parts of the city environment'. As such, the form and appearance of the city 'must satisfy the broader public who regularly experiences it' (Nasar 1998: 2). Nasar's (1998: 81) work provides a 'public image of the … [city] and derive[s] some directions for design for improving community appearance'. Elements of Nasar's (1998) evaluative image are useful for thinking about the personal experience of the city, however mapping an evaluative image could possibly be too wide-ranging for cycling environments in Sydney.

Nelessen's (1994) Visual Preference Survey (VPS$^{TM}$) represents a compromise between the highly conceptual and subjective evaluative image and the incredibly specific and highly quantitative ways of measurement previously explored. Nelessen (1994) uses visual images to understand the desirability of the landscape from the user or potential user's point of view, whilst also addressing elements or characteristics of the built environment which contribute to personal preference. The VPS$^{TM}$ is a visual research tool for developers, councils, planners and landscape architects developed by Anton Nelessen and Associates in the United

States (US). Nelessen (1998: 6) highlights the importance of a sense of community, quality of life, and accessibility for walking and cycling in contemporary public spaces for communities, and argues that 'communities should accommodate, not surrender to, the automobile.' Whilst the model has been widely used to garner community opinions and preferences on the design of new developments and urban regeneration projects in the US, is has not been used in an Australian context. Zacharias (2011), Ewing (2001), and Ewing and Handy (2009) have used the VPS$^{TM}$ model to conduct walkability studies, yet the model has yet to be used purely for cycling or cycling path choice. The model relies on images that form part of 'the public viewshed' (Nelessen, 1994: 85) to provide a common vision. Moreover, this common vision speaks to Jenson's (1998) five dimensions of social cohesion, specifically inclusion and belonging, whilst the model provides practical information on image preferences which can inform planning decisions.

## 2.8 Planning for cycling – recent government initiatives, plans and strategies:

Pucher et al (2011a: 340-1) state that given recent planning and policy developments in NSW 'there is the prospect of considerable improvement in cycling conditions in Sydney and its inner suburbs in the coming years'. As has been outlined in Chapter 1, at the Local government level the COS in 2007 allocated $70million towards funding their cycling network in Sydney and launched a *Cycling Strategy and Action Plan* for 2007 to 2017. This was followed in 2008 by the development of the *Inner Sydney Regional Bike Plan* (AECOM, 2010) in conjunction with 14 neighbouring LGAs. The plan aimed to 'provide greater connectivity and segregation for cyclists between key destinations and along key arterial routes within inner Sydney' (AECOM, 2010: i) through the development of an Inner Sydney Regional Bike Network, and aimed to expand upon the then State government's 'Sydney Metropolitan Strategy by promoting greater levels of cross-regional cycling … [a]cross Council boundaries.' (AECOM, 2010: 17) Further to this, the COS has developed a Bicycle Network for the City, comprising 200 kilometres of cycle lanes, cycleways and shared-paths.

***Government cycling strategies and plan***

The deliverance of different forms of infrastructure has been the responsibility of different levels of government over time, and can be impacted upon by the government of the day (Gleeson, Dong & Low, 2007). Section 51 of the Constitution sets out the division of responsibilities between the Commonwealth (Federal) government and State Governments for infrastructure provision, whereby the Federal government is largely responsible for large-scale and long-term infrastructure and national social and human services, and the States are responsible for the management of natural resources, land use planning and development.

Over the course of the 20th century and into the 21st century these traditional boundaries have blurred, as infrastructure governance has become more complex (Gleeson et al, 2007), Commonwealth involvement has declined and increased throughout the decades, and the roles of State and Local Governments have altered. Dodson (2009: 11) identifies a shift or turn in 'Australian urban planning … [towards an] 'infrastructure turn' in which a resurgence of interest in spatial strategy making and land-use planning has given way to a new and increasingly dominant focus on urban infrastructure as the key mechanism to shape urban outcomes.' Indeed, as will be outlined below, NSW has experienced an infrastructure turn with regards to planning for cycling in all three tiers of government.

- **Local level**

Local Governments have traditionally been responsible for local land use, and as such have been heavily involved in the maintenance of infrastructure and provision of local services. According to the NSW RMS (2012), 19 LGAs within the Sydney region have cycling plans, strategies or in draft or in place. However, planning for cycling at the Local government level in NSW has been spearheaded by the City of Sydney Council and their goals for a sustainable and liveable future for Sydney (COS, 2008a). As previously outlined in Chapter 1 the COS in 2007 launched a *Cycle Strategy and Action Plan 2007 – 2017* (COS, 2007) in line with the City's *2030 Vision* released in 2008 (COS, 2008a), which has been followed by the construction of physical cycling infrastructure in the LGA, and collaborations with the 14

adjoining LGAs to colour coordinate, connect and sign post cycle routes. This top-down model of infrastructure provision is intended to help the region 'cope with growth… [and give] people a transport option if they want to have it' (Clover Moore on SBS, 2012).

The *Cycling Strategy and Action Plan* aims to grow cycling trips by 2016 to 10% of all trips made in the COS LGA. This is an ambitious target, and currently participation is between 1-2% (Campbell, 2012). According to the City, 84% of potential non-riders would cycle on separated cycleways, and whilst the greenway may not be for everyone, it is the best public health infrastructure solution for Council (Campbell, 2012). At present the network is not completed and not fully connected up, yet Council has documented an average growth in cyclist counts of 82% between 2010 and 2012 across the network (COS, 2013), and an increase of 249% on Bourke Road alone (Campbell, 2012).

Whilst the COS does not have a dedicated cycling policy, Council's (2006: 2) *Social Policy 2006* outlines in Principle 2.6: *Accessible public transport* that along with 'working with other levels of government to improve … transport across the City of Sydney', Council will 'continue to develop safe and accessible footpath networks, and encourage pedestrians and cyclists.'

- **State level**

State Governments have historically been responsible for the planning and delivery of urban infrastructure. In 2010 the then NSW State government released its *New South Wales BikePlan* (TNSW, 2010) which came out of the *New South Wales State Plan* (NSW DPC, 2010). The *State Plan* (NSW DPC, 2010: 13) outlined that government 'will boost active transport by ... delivering a Bike Plan for NSW to promote cycling as a practical, safe and enjoyable option for short personal trips, including for commuting and recreation.' In line with this goal, the *BikePlan* (TNSW, 2010: 3) aims to 'increase the share of short trips [made] by bike in Greater Sydney for all travel purposes to five per cent by [the year] 2016 and … double the use of cycling to get to work, across all of NSW, between 2006 and 2016.' The *BikePlan* details actions to improve education and bicycle awareness, safety, and skills across the State. Within the NSW schools system this will be achieved by providing 'support [to] school communities in encouraging safe bike-riding by primary and

secondary school age children' (TNSW, 2010: 25). The plan proposes NSW government support of community groups and of adults new to cycling or who are taking up cycling after a long leave of absence through 'the development and improvement of safe cycling skills by new, returning and experienced cyclists' (TNSW, 2010: 26), with a focus on outer metropolitan Sydney. The NSW government's Centre for Road Safety is responsible for these actions, as well as implementing road safety campaigns and conducting '"Share the Road" activities to encourage mutual respect among road users' (TNSW, 2010: 27), along with a raft of measures which include; the 'ongoing enforcement of cycling-related road rules … directed at both cyclists and drivers' (ibid), and 'appropriate coverage in the Driver Knowledge Test' (ibid). The *BikePlan* (TNSW, 2010: 16) also states that 'Councils across NSW are supported by the RTA's [now the RMS] local council cycleways program which has provided an average of at least $5 million in 50/50 funding each year' from 2005 to 2010. The plan also supports a raft of measures which encourages Councils to include cycling-friendly design into their strategic plans (TNSW, 2010).

More recently the NSW government released the *NSW 2021: A plan to make NSW number one* (NSW DPC, 2012: 20) which aims to 'more than double the mode share of cycle trips made in the Greater Sydney region, at a local and district level, by 2016' by prioritising 'the construction of the *Metro Sydney Bike Network* and work with local councils to complete local cycle networks as part of an integrated transport network' lead by Transport for NSW.

- **Federal level**

Federal governments in Australia have had differing levels of involvement in urban infrastructure provision at different points throughout history, depending on the political climate of the time. Traditionally the role of Federal government has been in providing major infrastructure projects such as federal highways, providing funding, and providing grants to State and Local governments through government agencies. Increased Federal involvement in cities, such as the Building Better Cities Program from 1991 – 1996, or the development of Infrastructure Australia in 2008 and the Major Cities Unit (MCU, 2012) represents Dodson's (2009) infrastructure turn, and heightened Federal involvement in policy directions for Australian cities.

From this infrastructure turn at the Federal level, the Federal government has set targets to double cycling participation rates in all Sates and Territories by 2016 which 'all Australian governments have agreed to' (MCU, 2011: 188) and provides support in the form of grants and urban policy to support growing cycling. Further to this, Austroads sets out the guidelines for all states and territories in Australia for road design and specifications, which includes cycling infrastructure design and specifications. All three tiers of government, through organisations such as the NSW Roads and Maritime Service (RMS), the Commonwealth Department of Infrastructure and Transport (DIT) are amongst its members, including the Local Governments Association of Australia. Austroads provides 'the design guidelines for the planning, design and construction of cycling facilities' (Austroads, 2011a) for these organisations to implement. Australian guidelines, according to McDonald (2012: 32), were 'developed for road networks built in greenfield sites … rather than a congested and confined urban environment' such as inner Sydney. The guidelines require the minimum lane width to be 3.0 metres for areas with 'low speeds and truck volumes' (ibid), and between 3.3 metres and 3.5 metres for all other roads (McDonald, 2012). As such, the standard cycle lane width is 1.5 metres wide, 'with an acceptable range of 1.2-2.5m for 60km/hr roads.' (McDonald, 2012: 32) It is necessary to note that these are only guidelines, and variation in cycle lane and car lane widths are also 'typically determined by the local authority' (Austroads, 2009: 33).

## 2.9 The current state of cycling in Australia:

### *Participation in 2011*

The Federal government in 2011 through the Australian Bicycle Council and Austroads, which is the peak body providing 'expert technical input to national policy development on road and road transport issues' (Austroads, 2011a), set national targets to double cycling participation rates by 2016 in all states and territories (Austroads, 2011a). Indeed, 'the 2011 *National Cycling Participation Survey* found that 17.8 per cent of the population or more than four million Australians ride a bicycle in a typical week' (MCU, 1012: 358). The survey was

conducted as a benchmarking study and will be repeated in 2013 and again in 2015 in order to measure participation against Federal cycling participation rate targets. There has not been any comprehensive data released on cycling numbers Australia or NSW-State wide since the 2011 *National Cycling Participation Survey* and the 2011 Census which looks at journey to work alone.

When examining cycling participation rates in Australia it is necessary to acknowledge that there are inherent problems in measurement (Rissel et al, 2012). Rissel et al (2012) posited that the way in which questions are posed to participants has the potential to influence the survey results, yet when each survey is consistent over a long period of time, then the results of course are useful for indicating cycling participation across the population. The ABS' *Sports and Physical Recreation Report*, the Australian Sports Commission's (ASC) national *Exercise, Recreation and Sport Survey* (ERASS) report, and the Australian Bicycle Council's (ABC) *Cycling Participation Survey Report* are the three largest national surveys which address cycling numbers or rates of cycling. These organisations all measure cycling, but in different ways and at different intervals, therefore have different results which are explored below.

According to the ABS (2011b), 6.5% of Australians aged 15 years and over in 2011 participated in cycling, which equates to approximately 1.14 million Australians who cycle. In comparison, the ASC's annual ERASS survey for 2010, identified that the national cycling participation rate based on persons 15 years of age and over who engaged in any physical activity in 2010 was 11.9% (ASC, 2011: 19). This is much greater than the ABS's data, and when separated by gender males were cycling more than females (15.5% of males and 8.4% of females). The ASC (2011: 5) measures participation on a large scale which starts at 'any physical activity' and ranges to regular participation in 'physical activity for exercise, recreation or sport over the 12-month period' to calculate a total participation figure. The ASC recognises that there exists a 'significant level of cycling participation underreporting in ERASS' (ASC, 2011: 61) given the broad focus of the survey.

The Australian Bicycle Council (ABC, 2011: 1) divides cycling into 'participation' and 'travel' and considers them 'to be two related, but distinct,

terms'. Participation indicates that a respondent has cycled during any number of given time periods (past seven days, past month and past year), whereas travel is more complex, concerned with how often an individual has cycled and involves much closer examination, such as Household Travel Surveys or Census Journey to Work data (ABC, 2011: 1). The Australian Bicycle Council's average participation rates for each of the three time periods used as a percentage of the national population for the *past week, past month*, and *past year* were 17.8%, 26.5%, and 39.6% respectively (ABC, 2011: 16). In comparison, the NSW participation rates were lower at 14.5%, 23.3%, and 36.6% (ibid). These figures are further disaggregated by age to conclude that in NSW as a whole the percentage of the adult resident population participating in cycling activities at the time the survey was conducted, was much less than the national levels. In NSW 8.7% of adults had ridden in the past seven days, 14.9% in the past month, and 27.3% in the past year (ABC, 2011: 22). When examining Sydney alone, 11% of adults had ridden in the past seven days, 20.6% in the past month and 34.8% in the past year (ABC, 2011: 32). Of those adults who had ridden in the past seven days in Sydney, 18.4% were male and 10.8% were female (ABC, 2011: 32), compared to 22% male and 14% female for the whole state (ABC, 2011: 22). The Australian Bicycle Council concludes that males are more likely to participate in cycling activities over each of the given time periods than females in both regional and metropolitan NSW, as well as nationwide (ABC, 2011: 22&32).

It is necessary to acknowledge that rates of cycling and reasons for cycling differ as one moves from the inner-metropolitan to the outer-metropolitan to the peri-urban regions of a city (Bonham & Wilson, 2011; Pucher et al, 2011b; Bonham et al, 2008; Garrard et al, 2008). Bonham and Wilson's (2011) intra-city analysis of cycling trips in metropolitan Adelaide stress the differences that exist within the city itself. Indeed, they highlight that whilst journey to work Census data can reveal much about the numbers of people who commute by bike and can be disaggregated by age, gender, and locality, the physical data does not tell us *why* people are choosing certain modes of transport over others. Intra-city or intra-urban level analysis looks more closely at the difference in rates of cycling between and across inner-metropolitan suburbs. Bonham and Wilson then, are concerned with the

everyday mess of the city in the same sense that Lefebvre, Marcuse and feminist geographers are concerned with the micro-scale.

## 2.10 Conclusion:

A gender perspective has taught many of us to 'examine the politics of knowledge production, to ask who is producing knowledge for whom and what authority is invested in particular knowledges' (Peace, Longhurst & Johnston, 2010: 646). Whilst Peace et al (2010) paid particular attention to the teaching of feminist geography in New Zealand in the 1990s, their call to examine who knowledge is produced by, and for whom, is an important one. If applied to the city and to urban planning, then who plans for public spaces becomes imperative. Moreover, we may question how 'women's needs may be put on the political agenda' (Rakodi 1991: 546). Greed (2008: 1) noted that urban planning processes, such as zoning, have traditionally been 'heavily influenced by historical attitudes as to the proper 'place' of women within the city of man'. Similarly, Watson (2000: 104) asked 'who has the power to define and describe and delineate the spaces of the city and where is this power located?'. This begs the question, who plans for bike spaces.

Females continue to be highlighted as the way forward for urban cycling, as the least represented and therefore the most available for increasing cycling participation rates. The literature explored in this Chapter highlights the complex processes of rights claiming, space-claiming and role of social cohesion in developing and encouraging cycling in Sydney. Furthermore, this chapter has explored the sustainability and health implications that cycling can have, highlighting the importance of cycling for urban governance from a social as well as a practical perspective.

## *Chapter 3: Methodology: The view from the saddle – Inner-metropolitan Sydney*

### 3.1 Introduction:

When exploring the notion of a gender perspective of space, and in particular the 'women's urban experience' (Davidson & Fincher, 1998: 188) of cycling, we can posit numerous questions surrounding what constitutes female-friendly cycling for cyclists, planners, and policy makers. For Sydney, a city experiencing rapid growth in physical and social cycling infrastructure and active transport planning, these questions should consider how females negotiate public bicycle spaces, the routes that individuals take, and types of journeys that are made on bicycles. Conversely, one can think about whether the composition of the urban environment in which we ride influence decisions to take to the road or to the path. As a female researcher, a bicycle rider, and road user, how do I negotiate and indeed navigate the urban realm by bicycle, and moreover what infrastructure or route choices do other female cyclists make? To address these questions, and the arguments outlined in Chapter 1 regarding claims to citizenship, the formation of community, and social and physical spaces in the cycling city, research was highly qualitative in nature and had a strong emphasis on unique visual methods.

For the purposes of this thesis the gender perspective relates to women's rights, however research undertaken for the thesis engaged with both female and male cyclists. Letherby and Reynolds (2009: xviii) contend that any discussion of gender 'has to consider both femininities and masculinities … and the interrelationship between gender and other signifiers of social difference'. Similarly, Fincher (1998: 66) argues that 'any one aspect of identity and difference is expressed and understood through others'. Given these two insights, it would follow that a focus wholly on females would have inevitably encountered discussion of male cyclists. Surveying both genders allowed for a broader understanding of identity and difference in which to position a closer examination of the female urban experience and provide a basis for comparison of cycling practices.

Furthermore, by surveying both male and female cyclists, it will be possible to establish whether or not, irrespective of the differences in cycling participation rates in Sydney, males and females use space differently. It is well documented that females have been recognised as the most under represented section of the Australian population in urban cycling (Pucher et al, 2011a: 336). Through engaging with the cycling community, the research endeavoured to understand how cyclists claim and re-claim space for cycling, how cycling contributes to community, whether space claiming differs for male and female cyclists, how our understanding of citizenship can be altered by the view from the bicycle-saddle, and the role of infrastructure in these claims to space. The terms 'cycle spaces' and 'urban cycle spaces' are used throughout the thesis to position the research firmly within the urban region and on the city's cycle lanes, road network, cycle paths and cycleways. The research focuses on the inner-metropolitan area of Sydney, however some respondents were from outside the original study site parameters. The thesis shifts the focus from the reasons women don't cycle to the experiences of women who do.

### 3.2 Site Selection – Inner Sydney:

Head & Muir (2007: 170) propose a 'turn towards the domestic' with respect to locating geographic research in the investigator's own neighbourhood or locality. The choice of inner-metropolitan Sydney, as the central focus for exploring a gendered experience of space through cycling, has been influenced by the aforementioned domestic turn. The population density and land use mix of the inner LGAs of Sydney also influenced the site selection as these LGAs have a population density of 3,000 – 4,000 plus people per square kilometre (ABS, 2012b). The inner LGAs represent a range of land use functions, population densities, have high estimated residential populations, and incorporate the Central Business District (CBD), major universities, hospitals, numerous shopping strips, transportation hubs, and are often sites of traffic congestion. In summary, these LGAs are complex, messy, and changing environments. Whilst the geographical boundaries of the study are fluid, the core of the study remains in the inner suburbs of the Sydney metropolitan region. The metropolitan region was re-named the Greater Sydney

Capital City Statistical Area for the 2011 Census (ABS, 2012a), and can be seen in Figure 6 over the page. Garrard et al (2008: 58) suggest that 'further research is required to identify and quantify the characteristics of female-friendly cycling infrastructure in a range of urban environments', the chosen LGAs present such a range. Moreover, inner Sydney is particularly significant as a case study location as Council dedicated $70 million in 2007 to transform inner Sydney into a cycling-friendly city (COS, 2009). The top-down provision of infrastructure, through Council's construction of a cycle network, is dramatically altering the physical form of the inner city – a foci worthy of inquiry.

As has previously been discussed in Chapter 1, the region includes 43 LGAs (ABS, 2012) however the focus of the study is on the urbanised core of the city. Law (1999 & 2002), Amin & Thrift (2002), and Head & Muir (2007) all stress the importance of scale, of the micro over the macro, for geographic enquiry where space, movement and gender are the focus of enquiry. The inner-metropolitan region is this researcher's own geographical backyard. As one travels from suburb to suburb, from home to work to university to shop and to socialise, the experience of the urban differs with respect to one's mode of travel. One experiences space quite differently from the saddle in comparison to on foot, driving, or by public transport, and it is this specific spatial experience, which is the focus of enquiry: a view from the bicycle saddle.

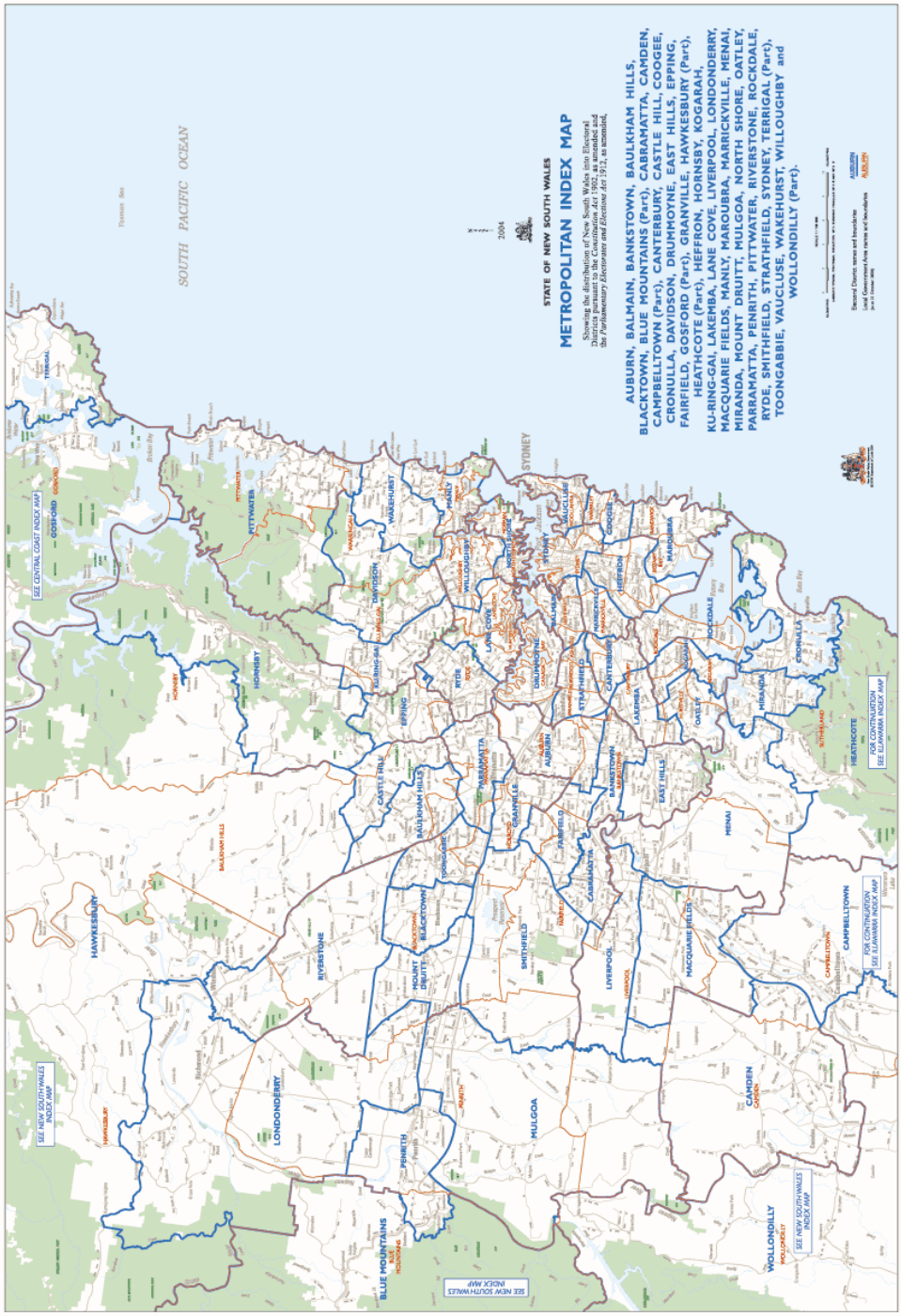



**Figure 6: Sydney Metropolitan LGAs**
Source: http://www.elections.nsw.gov.au/__data/assets/image/0003/75297/sydmetro.gif *State of NSW Metropolitan Index Map*

### 3.3 Conducting social research through surveys and discussion groups – methods:

Research methodologies used in this thesis were qualitative in nature, incorporating a web-based survey of cyclists from across the Sydney region (Figure 6: Sydney Metropolitan LGAs) two discussion group sessions, divided by gender, which were combined with a Nelessen-style Visual Preference Survey (Nelessen-style VPS). These methods focused on the view from the bicycle-saddle, cycling practice and habits, infrastructure use and preference, and the new meanings that cycling can bring to social cohesion and citizenship. The first aim of the research was to engage as large a cycling audience as possible to provide a broader view of current cycling habits, and the attitudes, behaviours, and opinions of cyclists in Sydney. As limited information on gender differences in urban cycling in Sydney exists, the web-survey also aimed to provide an indication of any existing similarities and differences between the cycling practices and habits men and women who cycled in Sydney, as well as provide a context for more in-depth methods. The Nelessen-style VPS and group discussions concentrated closely on infrastructure, personal cycling narratives, and social cohesion. The Nelessen-style VPS and group discussions also aimed to provide a micro view (from the bicycle-saddle) of issues which cyclists felt were important to them. In order to achieve the project aims stated in Chapter 1, research was undertaken in three main parts.

Throughout the research process an ongoing review of relevant literature was conducted, forming the basis of Chapter 2, in order to place the research with respect to planning, policy, gender and feminism, citizenship and the right to the city, social cohesion and relevant sustainability discourses. The research was conducted in three stages. The first stage consisted of a ground-truthing process, which involved photo-documenting cycle path and route options across the city through my every-day riding and non-riding journeys, and on a number of fieldwork rides. These rides involved cycling around the city exploring new places to ride and participating in cycling-related activities or events so as to build riding confidence as well as capture more of the city. These activities enabled the documentation of paths and routes taken, and acted as the primary medium with which to collect photographs for the Nelessen-style VPS (explored further on in this chapter).

The second stage of the research involved the development and implementation of a web-based survey tool targeted towards both male and female cyclists 18 years of age and over in inner-Sydney. This was intended to obtain quantitative data on current cycling practices, habits, interactions and infrastructure use and preferences of cyclists in Sydney, and provide a basis for comparison between the genders.

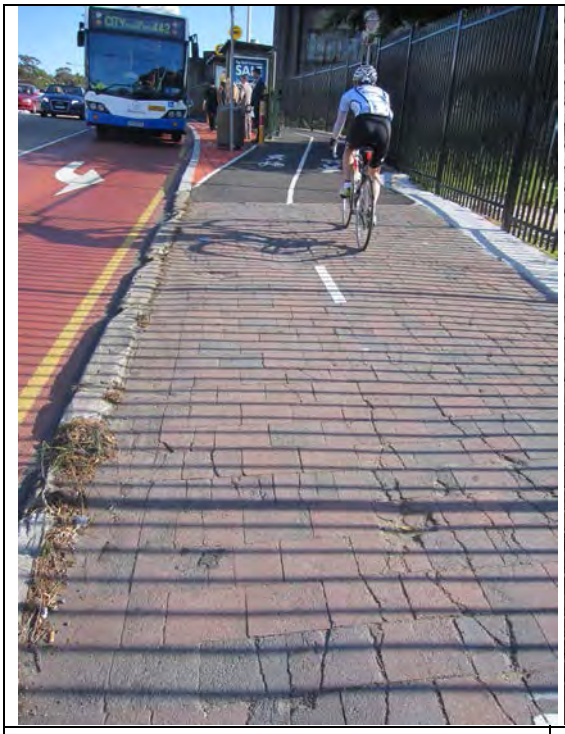
The third stage of research focussed wholly on qualitative data collection. This stage elaborated on the web-based survey through discussion group sessions that included a Nelessen-style VPS. The Nelessen-style VPS was held at the beginning of each session, whilst the discussion portion of each session explored the lived-experience of cycling in Sydney. Participants for this third stage were recruited from the questionnaire respondents as well as the general cycling public through social networking media.

As previously mentioned, ethics approval for the human research elements of the project was sought and granted in March 2012 by the Built Environment Human Research Ethics Advisory Panel (reference number 125004). The methodologies and participant recruitment processes are explored by stages below.

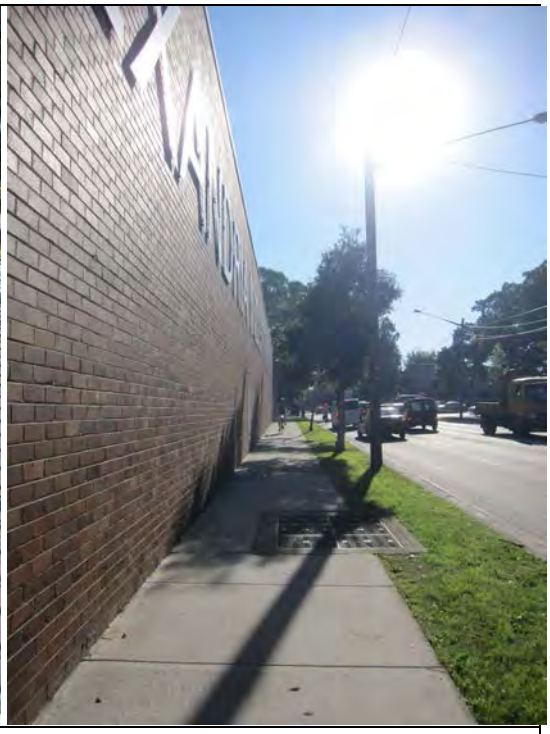
***Stage 1***

***: Fieldwork – Image collection***

Preliminary fieldwork was highly qualitative in nature and centred around exploring bicycle spaces across the study area, paying particular attention to inner-metropolitan Sydney where the large majority of new cycling infrastructure is located. These journeys, undertaken on foot and by bicycle, provided opportunities for directly observing cycling behaviours, experiencing first-hand more areas of the city and the Sydney region's cycle network where I would normally not venture by bicycle, and were an integral part of the Nelessen-style VPS image collection. Images for the Nelessen-style VPS were taken over a period of months, from September 2011 to April 2012, to capture a range of weather, traffic, and road conditions, as well as a range of human activity and route types throughout the study area (see Figure 8 for examples of images).



Shared path alongside arterial road: Victoria Rd, Rozelle, Leichhardt LGA. Uphill, poor quality surface treatment, obstacles (bus shelters)



Shared path alongside Bourke St, Alexandria, Sydney LGA. Short path connects to Greenway, building wall = decreases sense of space

**Figure 7: Images taken for the Nelessen-style VPS data base: example 1 (N.McNamara, 2011-2012)**

On-road (bike/car lane) Cardigan St, Stanmore (Marrickville LGA. In the door zone after rain, wide local street often with through traffic from Parramatta Rd and Salisbury Rd

Path alongside Buckland St, Alexandria near Alexandria Park, Sydney LGA. Wide and shaded, unclear if bicycles can use, posts denote car-free zone

**Figure 8: Images taken for the Nelessen-style VPS data base: example 2 (N.McNamara, 2011-2012)**

During the image collection phase notes describing the built environment characteristics of each photo; path type, weather, vegetation, level of activity, level of light, signage, as well as geographical information to place each photo were recorded to help build a database of some 400 images from which to draw images for the Nelessen-style VPS. Image gathering journeys and recording exercises enabled the creation of a classification system for bicycle spaces (see Figure 9 over the page) and helped inform a set of variables which were used in the Nelessen-style VPS compilation process (see Table 1 below).

**Table 1: Variables used to compile the Nelessen-style VPS**

| SIGHT LINES | | VEHICULAR TRAFFIC | | PEDESTRIANS | | SHADE/STREET TREES | | EVIDENCE OF CYCLING SIGNS | |
|---|---|---|---|---|---|---|---|---|---|
| CLEAR | UNCLEAR | PRESENT | ABSENT | PRESENT | ABSENT | PRESENT | ABSENT | CLEAR | UNCLEAR |

| INFRASTRUCTURE | | | ROAD/PATH SURFACE | | OBSTACLES | |
|---|---|---|---|---|---|---|
| GREENWAY | ON-ROAD | FOOT PATH | GOOD | POOR | PRESENT | ABSENT |

By photographing cycling street-scapes, recording the details of each image, the location and the elements that make up each picture, as well as the suburb and LGA, vegetation, street classification (lane, local road, major road, arterial road etc.), existence or non-existence of traffic calming devices, and presence of road users, the images used in the Nelessen-style VPS were broadly representative of the range of cycle spaces across inner-Sydney. The images used in the Nelessen-style VPS fall into three categories: Signposted cycle spaces, Ambiguous cycle spaces and Shared cycles spaces (Figure 9 over the page).

Much of the preliminary field work involved cycling around Sydney and exploring the urban region by bicycle, as prior to starting the research most personal trips were made on foot, with few made by public and private vehicular transport. As I began to increase the number of trips made on my bicycle I started to document trip routes, reasons for each trip and length of trip, much like keeping a cycling diary. This particular notion of recording a dairy is drawn from Letherby and Reynolds' (2009: ivxxiii) 'auto/biographical' explorations into their personal gendered journeys, albeit on trains, which explore 'social and cultural expectations, behaviours and relationships built upon and framed around differences of sex.'

The purpose of this exercise was to familiarise myself with more areas of the urban region from the position of a cyclist in the saddle, collect images, and reflect upon the gendered experience of urban cycling.

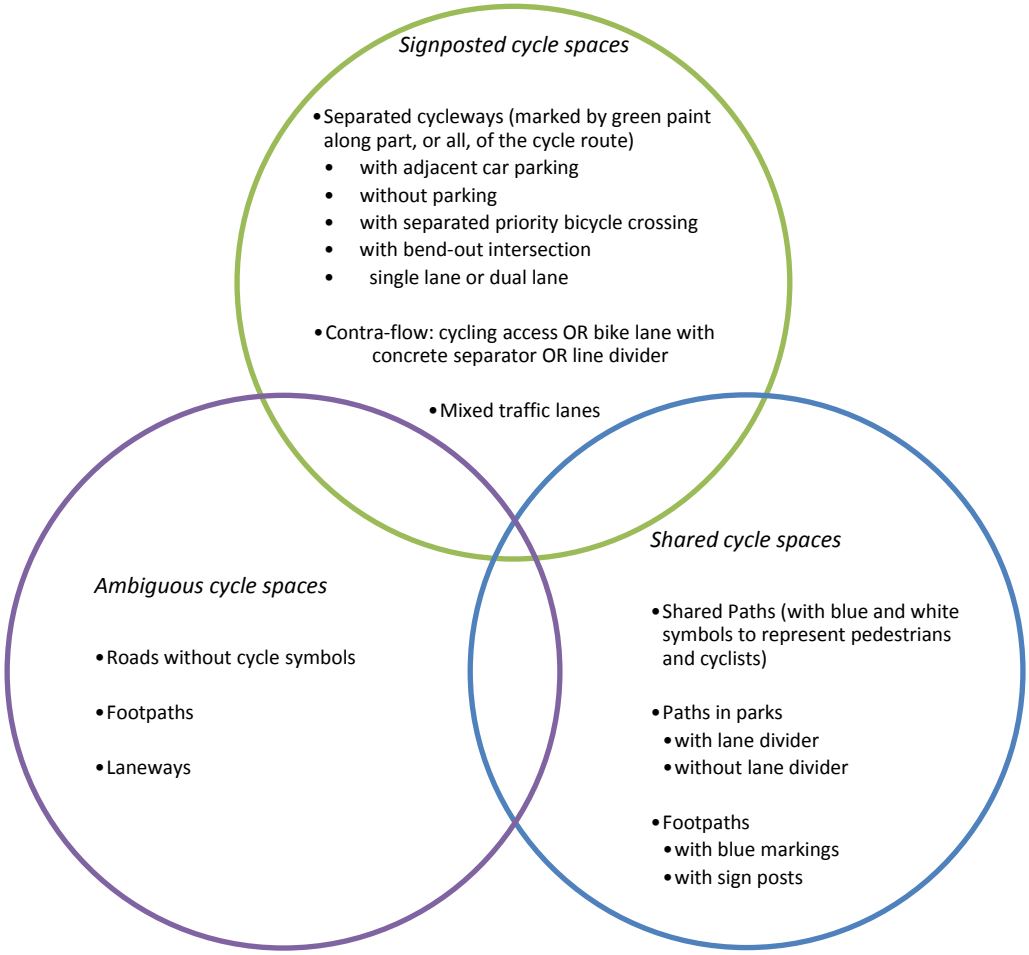



**Figure 9: Basic classification of Bicycle Spaces (N.McNamara, 2012 based upon the COS's Cycleways Network [COS, 2011] and Austroads [Austroads, 2009] definitions and guides.)**

Further preliminary research involved active participation in a range of cycling-related events and groups. Taking part in the 2011 Spring Cycle Classic from North Sydney to Homebush Bay on Sunday October 16th, covered 55 kilometres of numerous bicycle spaces with approximately 8,000 other cyclists. The ride, which was one event in the City of Sydney's Sydney Rides Festival, wove through areas of the COS and Leichhardt LGAs, and enabled participants to cycle freely across the Harbour Bridge, around Mrs Macquarie's Chair and Barangaroo (amongst many

others) with police roadblocks. This ride expanded my cycling knowledge of the region and the infrastructure in parts of Sydney I had previously not cycled through. Other examples of active participation involved biking excursions around Centennial Park with female friends new to cycling in the city, social rides at weekends along the Bourke Street greenway, and Blackwattle Bay shared path facilities with female friends. These were all opportunities to collect images and add local bicycle shops and community groups along bicycle routes to the recruitment list.

***Stage 2: Web-based survey***

The second stage of the research process was quantitative in nature. This stage utilised a web-based survey format to obtain data on both male and female cyclists to identify *who* was riding, *what* type of cycling they did, and *where* they were riding. The web-based survey was designed to obtain information on routes, route choices, infrastructure use and preferences, identify barriers and enablers to cycling, and to examine 'how the same [urban bicycle] spaces can be experienced and lived in entirely different ways by different people' (Watson, 2000: 102). It is necessary to define what one means by the term 'cyclist/s', for the purposes of this research it encompassed those people in the community who own or have the use of a bicycle and have ridden or ride in Sydney. Individuals may or may not identify as being a cyclist, and questions of identity and belonging were raised in the web-based survey to address this issue.

**- Participant recruitment**

Participant recruitment for the web-based survey was achieved through contacting bicycling organisations and groups that had access to a member database or mailing list of cyclists (see Table 2). These bodies have access to large numbers of people who cycle and are able to contact their members through a snowballing technique. By contacting these organisations and bodies I was able to disassociate myself from the recruitment process and reach a large number of cyclists to complete the web-based survey. Web-survey respondent recruitment was also achieved through advertising posters, flyers, and spoke cards (see Appendix 4 for samples) left in bicycle shops, cafes, and markets throughout inner Sydney LGAs. These posters asked the public:


**Figure 10: Sample advertising poster for web-survey stage of the research (N.McNamara, 2012)**

Respondents were then directed to a Wordpress site (see Appendix 5 for screenshots of the homepage) created to ensure ease of access to the survey, a point of contact with the researcher and also ethics forms and information on the research for potential respondents. The use of a Wordpress site allowed the survey to be introduced in a visually appealing way, whilst providing a short URL to use on social media sites to aid recruitment. A further aid to recruitment was the provision of incentives to participate. The chance to win one of ten $25 gift vouchers to a bicycle shop in Sydney was advertised on all the recruitment material and respondents were given a tick a box option to go in the draw to win a voucher at the end of the survey. Winners were drawn at random after the survey was closed from those who had opted into the draw.

Table 2: Groups, organisations and places for recruitment

| **Recruitment – snowballing, advertising/posters and flyers, and utilising social media (bicycle forums and blogs)** | | |
|---|---|---|
| **State-bodies** | **Social ride groups & Local organisations** | **Bicycle User Groups (BUGS)** |
| Bicycle NSW | ArtCycle | Ashfield BUG |
| Cycling NSW | Bicycle Babes | BICYCLEast |
| **Bicycle Clubs (racing)** | Chain Lynx | BikeNorth |
| Dulwich Hill Club | Cycle-re-cycle club | BikeSydney |
| Eastern Suburbs Club | Muggacchinos | Canada Bay BUG |
| Sydney Uni Velo Club | Sydney GreenUps | Dulwich Hill |
| Lidcome-Aurburn | Sydney University BikeSoc | Leichhardt |
| Sydney Cycling Club | University of New South Wales Bike Club | Liverpool BUG |
| Triathlon NSW | **Blogs/Forums** | Marrickville BUG |
| Randwick-Botany Cycling Club | I heart Sydney's Cycleways & Greenways | Sydney Spokes |
| BRATS | Sydney Cyclists | |
| **Bicycle Shops** | Sydney Cycle Chic | |
| Ashfield Cycles | Sydney Cycleways Network | |
| Balmain Bikes | **Other shops/cafes/public notice boards** | |
| City Cycles (Glebe) | UNSW Kensington notice boards | |
| Cheeky Transport | UTS Ultimo notice boards | |
| Clarence St Women's store | USYD Darlington/Camperdown notice boards | |
| Clarence St Cyclery | Azuri's, Wentworth Building, USYD | |
| Deux Ex Machina | Piccolo's, Darling St, Balmain | |
| Tokyo Bicycles | Lou Jack's, King St, Newtown | |
| Giant (City store) | Addison Rd, Markets, Marrickville | |
| King St Cycles | | |

The range of cycling clubs and organisations contacted had access, not only to a large number of cyclists, but also a wide range of cyclists. Cycling NSW and racing or velo clubs were more likely to attract respondents who were more experienced and confident riders who engaged in group road cycling activities. Whereas as organisations such as Bicycle NSW (BNSW), who provide accident and theft insurance support for members, and the local Bicycle User Groups (BUGS) under BNSW, would attract recreational riders, riders with families, and more occasional or social riders. Advertising in local shops, cycle workshops, cafes, on university campuses, and local weekend markets with flyers and posters was intended to attract a broader cycling demographic not necessarily involved in any

particular organisation (see Table 2 on the previous page). Again, the broader cycling community in Sydney was reached through social media, including cycling-related forums and Sydney City related forums. Therefore, by contacting larger organisations as well as local, grass-roots assemblages, as wide a range of respondents as possible who were involved in cycling activities in Sydney was recruited. For the purposes of this research, 'cycling activities' refers to things individuals do on or with their bicycles, for recreation, for transport, for health and wellbeing, and as a social activity.

**- Overview: web-based survey**

The web-based survey (see Appendix 2 for a full list of questions) was separated into six parts. The survey asked demographic and background questions (e.g. age, sex, location, cycling group membership, involvement in cycling activities, age when first started to ride etc.), and asked questions about respondents' current cycling practice (e.g. frequency of rides, purpose the bicycle/s is used for, whether they engaged in commuting etc.) and habits (e.g. riding with others, riding where they felt most comfortable, and the impact of seasons and weather on one's cycling). In addition, the survey asked respondents about their use of and experiences of physical and social cycling infrastructure in Sydney. The survey also asked questions about opportunities and barriers to cycling, and asked questions aimed at measuring social cohesion: questions concerning cyclists' social interactions, sense of community, feelings of belonging or sense of identity, and touched upon opinions about ownership of public space. Questions were mixed, using multiple-choice, single-choice, and comment options, with visual images used for two questions.

**- Process: web-based survey**

The survey ran from April 2012 to May 2012, with 355 respondents in all. Results were exported into Excel and SPSS. The results were tested in SPSS using an analysis of variance (ANOVA) and a Pearson's chi-squared test in order to ensure their validity. At the end of the web-based survey respondents were asked if they, or anyone they knew, would like to participate in further research, to help recruit participants for the final stage of the research. Those respondents who responded

positively to this question and provided a contact email address were contacted in early June in order to organise participants for stage three.

### *Stage 3. Nelessen-style Visual Preference Survey (Nelessen-style VPS) and group discussions*

#### - Participant recruitment: Nelessen-style VPS and discussion groups

Participants for the Nelessen-style Visual Preference Surveys and discussion groups were recruited through the web-based survey, the Wordpress site and through social media and poster advertising (see Appendix 4 and 5 for examples of advertising material).

#### - Overview: Nelessen-style VPS

The VPS$^{TM}$ is a visual research tool for developers, councils, planners and landscape architects and was developed by Anton Nelessen and Associates in the United States. The VPS$^{TM}$ has been used by 'forest managers ... [and] environmental psychologists' (Ewing 2001: 721) to measure community attitudes towards environments. Whilst it has been widely used to garner community opinions and preferences on the design of new developments and urban regeneration projects in the US and in particular in New Urbanist developments, is has not been used in an Australian context or for cycling to the researcher's knowledge. The driving notion behind using a Nelessen-style VPS for this research is the malleability of the medium (that of a slide show of images and participant evaluation) to be applied to differing urban contexts, its reliance on using the 'public viewshed' (Nelessen, 1994: 85) to inform decision making processes, and the view from the bicycle saddle which it has the potential to display. The form of the VPS$^{TM}$ has been adapted to an Australian cycling context, and is therefore referred to as a *Nelessen-style VPS* rather than the traditional *VPS$^{TM}$*. A typical VPS$^{TM}$ consists of 80-120 slides of paired images that represent the 'public viewshed', which is 'what people see when they move through the study area, along streets, sidewalks, and public spaces' (Nelessen, 1994: 6). Zacharias (2011), Ewing (2001), and Ewing and Handy (2009) have used the Nelessen-style VPS model to conduct walkability, path choice, and public transport facility use studies, yet the model has yet to be used purely for cycling or cycling path choice.

For Anton Nelessen and Associates the VPS$^{TM}$ is defined in the following way:

> *The Visual Preference Survey (VPS) is a research and visioning technique consisting of photographic images, evaluation forms, optional questionnaires, and evaluation/analysis techniques to understand and present the results. The purpose of the Nelessen-style VPS is to articulate the residents' impression of the present community image and to build consensus for its future character. The conclusion of the process is called a Vision Plan* (Nelessen, 1994: 83).

For Nelessen (1994: 85), the VPS$^{TM}$ employs a single image or pair of images per slide and some minimal text. Respondents are shown slides one at a time for approximately 30 seconds and are 'asked to rate [each] images from +10 to -10... [whereby] images that people do not feel strongly about are rated as zero'. This rating system requires respondents to 'give a positive rating to those images they would want to see in their town and negative ratings to those they do not. The degree to which an image is positive or negative is reflected in the value (i.e. +3 versus +9 or -2 versus -8)' (Nelessen, 1994: 85). In Ewing's (2001: 272) bus shelter study he used a variation of the larger Likert scale commonly used for the VPS$^{TM}$, and employed a smaller scale: '1 to 5 (1 = *least preferred*, 5 = *most preferred*)' which was found to be simpler for participants to use. Nelessen acknowledges that the larger scale can prove problematic where using a smaller sample size, as such the Nelessen-style VPS used in this thesis comprised 25 slides with an image pair per slide and the smaller 1 to 5 Likert scale.

> *…images must reflect what people see when they move through the study area, along streets, sidewalks, and public spaces, all of the integral components of the public viewshed… images that suggest alternative approaches to land use and design solutions other than those which occur in the study area should be included for the community response; if they test positive they have applicability* (Nelessen, 1994: 85).

The use of the visual image (static photographs) as a research method 'has been widely validated… [as it] allow[s] extremely realistic and accurate depictions of

potential settings and future conditions, in a format that is familiar and easily understood' (Manning et al, 2004: 558). To ensure that the Nelessen-style VPS was easy to follow for participants two draft Nelessen-style VPS PowerPoints were produced by the researcher and test-viewed by PhD and Masters students in the Faculty of the Built Environment within the University of New South Wales. The first Nelessen-style VPS draft contained image pairs to emulate path choice, a design choice that was also influenced by stated preference research (see Ewing, 2001), whereas the second contained a single image per slide in the more traditional Nelessen-style. Both drafts grouped images by road/path classifications and types, and separate images (and pairs) into groups based on lighting (day/night), weather (rain/fine) and terrain. The final Nelessen-style VPS contained one image pair per slide, as this provided greater opportunities for participants to evaluate images of bicycle spaces in Sydney, as well as state a preference for particular images over others.

All images used in the final Nelessen-style VPS and in the Nelessen-style VPS development process were taken during the image collection phase of the research and depict places participants may or may not have ridden or may or may not recognise. The intention of displaying both familiar and unfamiliar images was to help create ideas of the 'future city' (Marcuse, 2009: 193) as well as the existing city for participants. As previously underlined (refer to Table 1), images needed to be divided into categories determined by the features, or variables, evident in each photograph, to ensure that each group of image pairs would represent various aspects of the built environment which are of concern to cyclists. These variables were recorded for each of the 50 images used in the final Nelessen-style VPS in Appendix 7. Grouping images by similar weather conditions or similar path choices was intended to avoid unfair comparisons across suburbs, and understand preferences on more complex aspects of bicycle spaces.

**- Process: Nelessen-style VPS**

Two Nelessen-style VPS' were conducted: one all male and one all female group, with 9 and 11 participants respectively. At the start of the Nelessen-style VPS-discussion group participants were informed of the structure of the group, the approximate length of the Nelessen-style VPS (15 – 20 minutes), and the researcher

outlined the concepts behind the research method, and walked through how to assess a sample slide (see Figure 11 over the page).

Participants were asked to:

1. Make a choice between each pair: Left OR Right OR write *no preference* if applicable
2. Make a preference rating of 1 to 5, where 1 = Would not like to ride here, 3 = Wouldn't mind riding here, and 5 = Would like to ride here AND
3. Give a short reason/s for this choice

Please choose: LEFT or RIGHT or NO PREFERENCE
Please rate: 1 2 3 4 5
Give a reason for your choice: _____

**Figure 11: Sample slide from the Nelessen-style VPS group hand-out**

Participants were also asked to keep in mind their own cycling experiences when making these decisions and viewing the images of streetscapes and cycle spaces from across the inner-metropolitan region. The driving premise behind asking participants to rate images and give a reason for their choices was to understand what – if anything – the *right* or preferred kind of infrastructure was, why this was, and thus what was needed in terms of encouraging people to cycle.

The Nelessen-style VPS format used during the discussion groups consisted of five sections with five images pairs per section (= 25 slides and 50 images in total). Each section represented a differing concern for cyclists. These groups were informed by the open responses given in the web-based survey.

The sections used were:

1. Space
2. Level of activity
3. Route/path conditions
4. Level of light
5. Vegetation

Each pair of images presented participants with a choice and ranged from relatively mundane streetscape with few road users and intersections, to more complex streetscapes with different traffic calming devices, signs, traffic lights, pedestrians and complex and varied flows of competing traffic users. However they were all drawn from the public viewshed, reinforcing the Sydney-specific nature of the survey method.

The Nelessen-style VPS groups, although relatively small in terms of sample size, engaged a range of participants, with differing levels of experience, confidence and a wide age range. The Nelessen-style VPS results should show variations in preference for route choice based on personal preference, age, gender, cycling behaviours and cycling experience, rather than simply adhering to the dualisms of journey-to-work and an observed preference for females to choose 'safer' routes highlighted by Law (1999 & 2002) and Garrard et al (2008).

**- Overview: Group discussions**

Two discussion groups were conducted: one all male and one all-female group. Each discussion group had a facilitator (the researcher) and was guided by a semi-structured agenda. Questions or discussion points for each group were informed by results obtained from the open questions in the web-based survey. Key themes from the answers given in response to the open questions were identified and used to inform the direction of the group discussion where possible.

- **Process: Group discussions**

Daley and Rissel's (2005) qualitative study of perspectives and images of cycling in Sydney involved a series of 12 discussion groups, with groups ranging from 3 to 11 participants and comprising 70 participants in all. The size of the sample was sufficient for the researchers and participants to 'explore the topic in depth '(Daley & Rissel, 2011: 212), and to explore opinions and experiences of cycling in urban Sydney. Using Daley and Rissel (2005), and Litosseliti's (2003) work as a guide for conducting discussion groups, each group was kept to between 6 and 12 participants. The male group comprised of 9 participants whereas the female group comprised of 11 participants. The intention of the discussion group discussion was, apart from providing a forum to conduct the Nelessen-style VPS, to draw out further narratives and gender perspectives of urban bicycle spaces through discussion.

The discussion that occurred after the Nelessen-style VPS (referred to throughout the thesis as group discussion/s) was recorded using an audio recorder and all participants signed a consent form to take part. Discussion questions were as follows:

- What do you think are the physical and social spaces of the cycling city?
- What would you consider to be the perfect physical aspects of the city in order to feel comfortable riding?
- What has been your best experience of cycling? How did you feel?
- What do you think stops other women and/or men from taking up cycling?
- What do you think about male and/or women cyclists?
- Have you noticed more people cycling in Sydney?

The relaxed format of the discussion groups was intended to enable more in-depth discussion of participants' experiences of urban space and cycling, encourage story telling, and raise issues that participants felt were important to them.

### 3.4 Conclusion:

Further examination of cycling policies, strategies and plans, as well as social cohesion, citizenship, and the right to the city discourses will be required to draw out the gender perspective within the qualitative, visual and quantitative elements of this research in relation to contemporary cycling discourse and policy. The multiple methods proposed, that of ground-truthing, a web-based survey, and Nelessen-style VPS and discussion groups, each intend to highlight or indeed negate gendered discussions of space and cycling, whilst allowing for any comparisons to be made between the genders. If we understand that public (urban) bicycle spaces hinge on the contestation of equity, gender relations, planning, policy, politics, and infrastructure (physical: concrete, paint, sign posts, barriers, and traffic calming devices *and* social: support networks, cycling advocacy campaigns, community groups and organisations) then urban planning becomes the means through which embedded gender stereotypes can be examined and possibly altered.

## Chapter 4: Findings – Cycling figures, habits, and narratives for Sydney

### 4.1 Introduction:

This chapter presents the research findings and explores the contributions that cycling narratives can make to discourses on citizenship, space claiming, social cohesion, and gender and cycling. Throughout the research process the thesis statement: *Women's rights to the physical and social spaces of the cycling city need to be legitimised in order to increase female cycling participation rates* and these arguments were kept in mind:

1. Cycling makes claims to citizenship and contributes to the formation of community
2. Infrastructure helps cyclists make these claims, whether male or female

The information presented was collated from a web-based survey of 355 cyclists across the Sydney region, two group discussion sessions with a total of 19 cyclists, and two Nelessen-style Visual Preference Surveys conducted during the group discussions. Refer to Chapter 3 for a matrix of the group discussion participants, and Appendix 3 for a table of survey respondents. Where data for the web-based survey in this chapter is shown as a percentage, unless otherwise stated, it is presented as a percentage of the total number each of female respondents who answered each question and male respondents who answered each question in order to enable gender comparisons. Quotes from both the web-based survey and discussion groups are used (e.g. M/F#XXX for the web-based survey respondents and A to M for the Nelessen-style VPS-discussion group participants), and the Nelessen-style Visual Preference Survey results are presented as a number of respondents rather than a percentage.

Based on the results of the web-based survey, this chapter first presents a descriptive snapshot of cycling in Sydney, this is followed by discussions of what cyclists *do* in Sydney, focusing on the practices, habits, and actions and interactions of survey respondents. The results from the web-based survey provided themes for the discussion groups. These thematic results, from all of the research methods

(web-based survey, Nelessen-style VPS and discussion groups) are organised into three sections:

1. Creating space/s for cycling – space claiming and legitimising cycling
2. "Us and them" – normalising cycling in the city
3. (Non)belonging – identity, gender and difference within the cycling community

The chapter concludes by pulling together the positive and negative findings of the research to argue that: cycling makes claims to citizenship and contributes to the formation of community; infrastructure helps cyclists make these claims, whether male or female; and that women's rights to the physical and social spaces of the cycling city need to be legitimised in order to increase cycling participation rates in Sydney.

## 4.2 Sydney cycling snapshot:

The web-based survey provides a broad snapshot of cycling in Sydney from May 2012 to June 2012. As outlined in Chapter 3, survey respondents were drawn from a range of cycling groups and organisations, as well as the general cycling-public, and questions covered a range of demographic, behavioural, social cohesion, preference and opinion subjects. Of the 355 respondents, 38% (n=135) were female and 62% (n=220) were male, reflecting the gender gap in Australian cycling literature. All respondents, with the exception of three, currently resided within the Sydney region. The majority of respondents were located within inner (67%) and outer (29%) metropolitan Sydney (see Figure 12 and Table 3 over the page), with three outliers residing in the Wingecarribbee Shire, Wagga-Wagga and Wollongong LGAs.

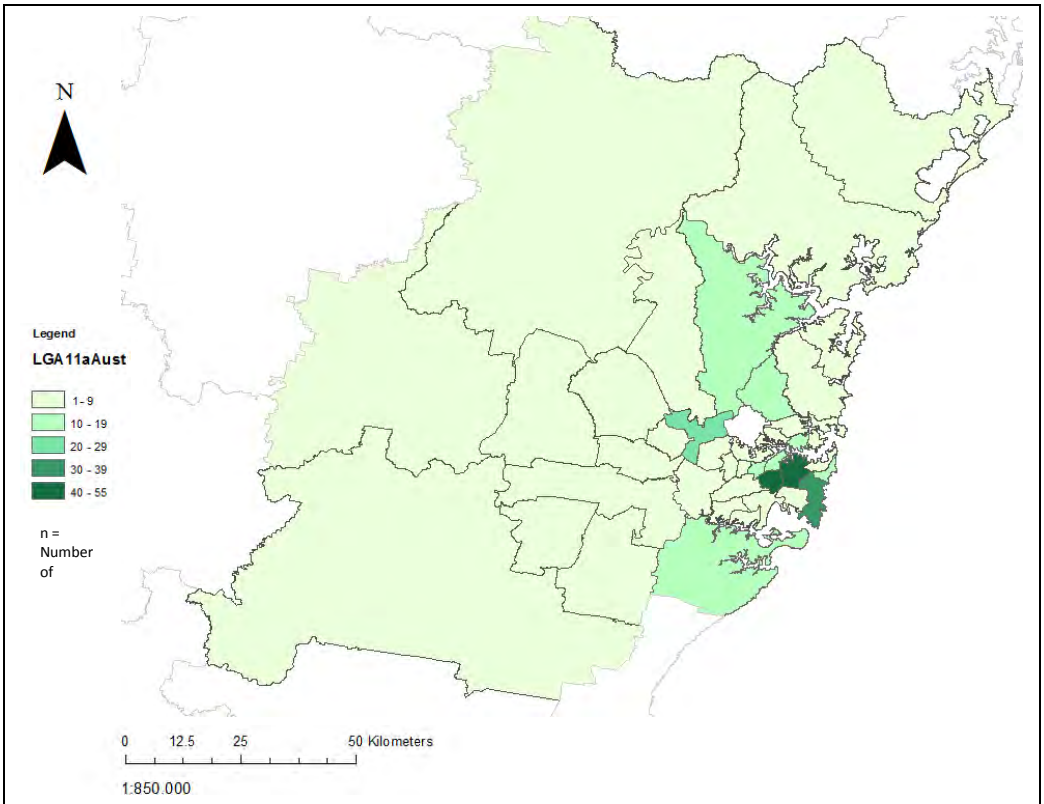



Figure 12: Location of respondents within the Sydney region (N.McNamara, 2013)

Table 3: Tally of respondents' location by LGAs within the Sydney region

| Inner LGAs | Number | Inner LGAs | Number | Outer LGAs | Number |
|---|---|---|---|---|---|
| Ashfield | 11 | Sydney | 49 | Pittwater | 1 |
| Botany Bay | 3 | Waverley | 10 | Ryde | 6 |
| Burwood | 0 | Willoughby | 9 | Sutherland | 10 |
| Canada Bay | 8 | Woollarah | 6 | The Hills Shire | 8 |
| Canterbury | 3 | **Outer LGAs** | **Number** | Warringah | 5 |
| Hunters Hill | 3 | Auburn | 2 | **Surrounding LGAs** | **Number** |
| Hurstville | 7 | Bankstown | 7 | Blue Mountains | 3 |
| Kogarah | 0 | Blacktown | 3 | Gosford | 2 |
| Lane Cove | 2 | Camden | 3 | Hawkesbury | 0 |
| Leichhardt | 15 | Campbelltown | 5 | Wollondilly | 0 |
| Manly | 5 | Fairfield | 1 | Wyong | 1 |
| Marrickville | 55 | Holroyd | 1 | **Ex-Sydney LGAs** | **Number** |
| Mosman | 1 | Hornsby | 15 | Wingecarribbee | 1 |
| North Sydney | 15 | Ku-ring-hai | 10 | Wagga-Wagga | 1 |
| Randwick | 35 | Liverpool | 6 | Wollongong | 1 |
| Rockdale | 2 | Parramatta | 20 | | |
| Strathfield | 0 | Penrith | 1 | | |

All respondents were 18 years of age and older. The eldest male respondent was 74, whereas the eldest female respondent was 63 years of age. There were proportionally more male than female respondents aged 40 years and over whereas a greater proportion of female respondents were aged between 18 and 49 (see Figure 13 below). There were very few females aged between 60 and 69, and no female respondents were over the age of 70. These figures mirror ABS data that indicates that more males participate in sport and physical recreation over the age of 60 than females (ABS, 2012f).

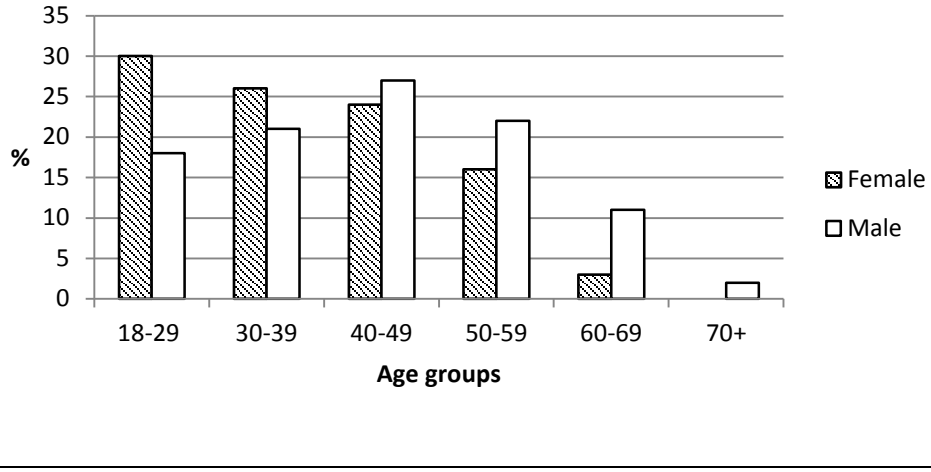



Figure 13: Age of web-survey respondents by gender

## 4.3 Doing cycling:

This section explores the everyday practices and habits of web-based survey respondents, expands upon the cycling snapshot of Sydney, and broadens definitions of urban cycling.

### *Practices and cycling habits – Frequency*

Each respondent had access to least one bicycle and the majority (98% of all respondents) rode at least once or twice a month. Proportionally more male respondents reported that they were riding more frequently than female respondents. Conversely, a greater proportion of female respondents reported

riding less frequently than male respondents (Figure 14). These findings support research by Rissel et al (2010b) and the Australian Bicycling Council (ABC, 2011) which maintains that adult women cycle less frequently than men in Australia overall.

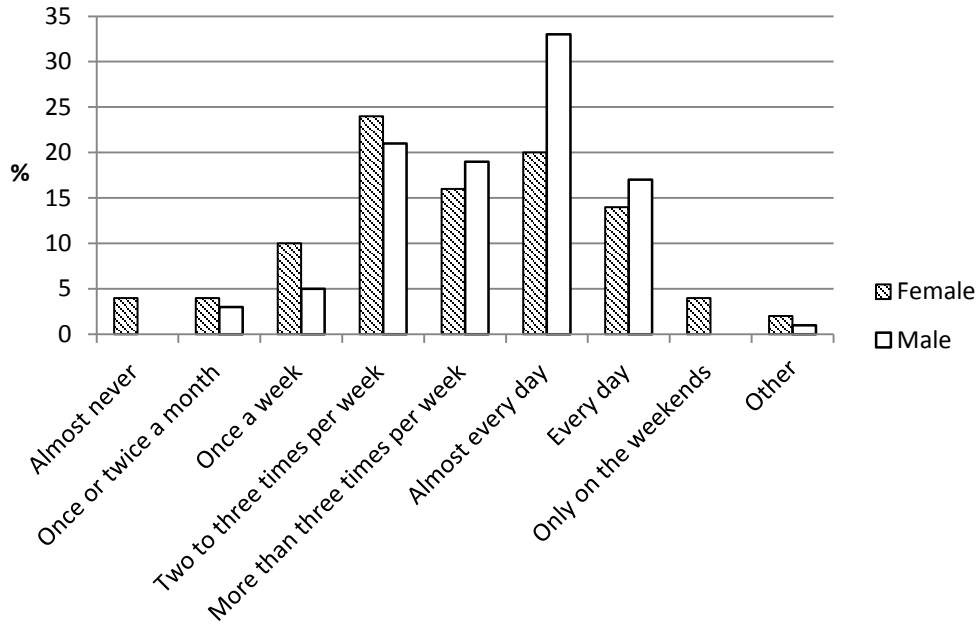



Figure 14: Frequency of respondents' bicycle ride/s by gender

***Practices and cycling habits – Cycling activities***

Cycles were used by respondents for a wide range of activities and purposes; including for recreation, fitness or health, shopping, everyday transport (utility riding), commuting (utility riding), as a social or family activity, racing with a club, and training.

Respondents were asked which cycling activities they had ever been involved in out of the following: Recreational, Social group, Fitness training, Commuting, Fundraising rides, Bicycle NSW events, Organised club racing, or Other (with comments). The majority of both male and female respondents (91%) had been involved in recreational cycling activities. Of all respondents, 80% had commuted, 61% had been involved in a social group cycle, and 57% had been involved in fitness training. Significantly less respondents had been involved in

fundraising rides (46%), BNSW events (45%) and organised club racing (24%). Other events or activities respondents reported that they had been involved in included: cycling messenger world championships (one respondent), mountain bicycle events (two respondents), bicycle polo (three respondents), cycling advocacy events such as Critical Mass (seven respondents), and tourism or touring (24 respondents). This question, by asking respondents which cycling-related activities they had ever been involved in, measured two dimensions of social cohesion (participation and inclusion) as well as expanding understandings of what cycling means in contemporary cities. Jenson's (1998) three other dimensions of social cohesion (belonging, legitimacy and recognition) were measured in the survey and in the group discussions. These are explored further in this Chapter in sections 4.5 and 4.6, with a particular focus on legitimacy and belonging.

**In sum,** cycling encompasses a range of different activities, although recreational and commuter cycling were the most popular amongst respondents. Knowledge about cyclists' differing levels of involvement in specific cycling activities or events can help inform government and community behaviour change programs and target particular groups of cyclists, such as those who take part in organised BNSW rides.

***Practices and cycling habits – Trip purposes***

A distinction was made between *activities* respondents had ever been involved in and the *purposes* of cycling trips in the web-based survey in order to ascertain whether respondents were doing multiple kinds of cycling at the time of the survey. Respondents often reported using their bicycle or bicycles for multiple purposes. These included but were not limited to: everyday transport (utility), shopping (utility), recreation, health and fitness, and social purposes. Multiple forms of cycling at times involve different route choices, different clothing choices, and require different end-of-trip facilities needs.

The different forms of cycling performed by female respondents (summarised in ored further in this chapter.

Table 4 over the page) and the 'multiple ways (female respondents) … used bicycles defies the [narrow] categorisation of cycle journeys widely used in the

transport and health literature' (Bonham & Wilson, 2012: 204). The numerous purposes female and male respondents indicated, together with respondents' comments that identified bicycle polo, touring, competition, family exercise, work, cargo journeys, and even rehabilitation (F#260) as cycling trip purposes, gives an insight into the complex uses of the cycle in urban Sydney. These findings highlight the need to explore multiple cycling journeys, the ways in which cyclists perform cycling and their social interactions surrounding cycling. Social interactions are explored further in this chapter.

**Table 4: Multiple kinds of cycling - Localities and (purpose/s of) cycling of female respondents**

| Location | Total* | Utility: transport, commuting, school drop off/pick up | Utility: shopping | Recreation: social group, family activity | Health and fitness | Sport: club riding, bicycle polo, racing |
|---|---|---|---|---|---|---|
| **Inner Metropolitan Sydney** | 100 | 75 | 59 | 80 | 76 | 5 |
| **Outer Metropolitan Sydney** | 33 | 14 | 10 | 30 | 26 | 1 |
| **Sydney Surrounds** | 2 | 0 | 1 | 2 | 1 | 0 |
| **Outside GSCCSA** | 0 | n/a | n/a | n/a | n/a | n/a |
| **Total** | 135 | 89 | 70 | 112 | 103 | 6 |

* Number of female respondents

To further illustrate the complexity of cycling journeys, 25% of female respondents and 24% of male respondents reported that they used their cycles for five or more purposes, and close to half used their cycles for three to four different purposes (53% of female and 49% of male respondents). Those male and female respondents who used their cycles for a single purpose were in the minority: 4% of female and 6% of male respondents.

The proportion of both male and female respondents who used their cycles for recreational purposes were almost even, with 83% of female respondents and 82% of male respondents reporting that they use their bicycle for recreation. This is not surprising, given that cycling was amongst the ABS' top 10 activities in terms of participation rates in the 2011-12 *Participation in Sport and Physical Recreation*

survey (ABS, 2012f). Of persons aged 15 years and over 5.4% of women and 9.8% men participated in cycling for sport or recreation (ibid). Similarly, Austroads' report on the results of the 2011 *National Cycling Participation Survey* found that 'the most often cited purpose for cycling travel … was recreation [in NSW at 67%]' (Austroads, 2011: 33). Additionally, utility riding (including shopping and commuting) and social riding were popular trip purposes, with some respondents commenting that they used their bicycle(s) for the 'kids school run' (F#164) or to 'drop my daughter at day care' (M#57) as part of a daily commuting trip or as the sole purpose of a trip (see Figure 15). More female than male respondents reported using their bicycle(s) 52% of female and 39% of male respondents used their bicycles for shopping, and 53% of female and 56% of male respondents used their bicycles for social purposes.

**In sum**, the multiple activities that cycling is used for by women in the web-based survey suggests that, regardless of the unequal gender participation rates in Australia, women, like men, are cycling for a wide range of purposes and reasons. Indeed, cyclists often cycle for multiple purposes and multiple reasons at different times. These multiple cycling purposes expand our understanding of what cycling means and can become in urban Australia.

Figure 15: An example of the different uses of the bike: a cargo bicycle in Redfern (N.McNamara, 2012)

***Practices and cycling habits – Commuting and the use of end-of-trip facilities***

Commuting was explored after trip purposes through a distinct set of questions in the web-based survey. Bicycle commuting, along with cycling for sport and physical recreation, has received more attention in transport and health literature, as commuter participation rates can be more easily measured through bicycle counts during the morning and evening peaks and through the ABS' journey to work Census data (Bonham & Wilson, 2012). The commuter questions in this study were focused on infrastructure use and social cohesion, exploring the individuals' experiences of cycling in Sydney. Respondents were asked if they had ever ridden their bike (commuted) to and/or from their place of work or study, the frequency of their commute, the enablers and disablers of commuting and their social interactions surrounding the commute.

A large proportion of respondents (81% of female respondents and 94% of male respondents) had or do commute. Of those who commuted, males were commuting slightly more frequently than females, as 46% of female commuters

were commuting by bicycle in excess of two times per week in comparison to 49% of male commuters. Australian data indicates that, similar to cycling statistics overall, males commute by bicycle more frequently than females (Pucher et al, 2011). Of those who responded to the commuting questions, the availability of end-of-trip facilities did influence respondents' decision to commute, with 67% of males and 57% of females reporting this as a contributing factor. Facilities such as showers, lockers, and bicycle parking (see Figure 16 over the page) were appreciated as it 'makes it [commuting] more convenient' (M#262). Although these were not necessary for all respondents, as 19% of females and 18% of males reported that they did not use any end-of-trip facilities in their commuting or non-commuting rides. For some cyclists who commuted the end-of-trip facilities were 'appreciated but [were] rarely a deciding factor' (F#29), and some respondents commented that they would 'usually find a sign pole to lock … up to' (M#317) or would 'lock my bike anywhere' (F#129) (see Figure 17). Colleagues and friends that also commuted were of relatively little importance in encouraging respondents to use their bicycle for their commute, as between 7% and 12% of male and female respondents reported this as an influencing factor.

Those who were positively influenced by end-of-trip facilities commonly 'need[ed] somewhere to change into office gear and shower' (F#149) 'as you get sweaty due to [the] hilly topography [in Sydney]' (M#137) and need a 'good safe place to leave … [your] bike' (M#285). Indeed, more than half of all respondents reported using end-of trip facilities for commuting and/or in their every day cycling. Both female and male respondents reported using bicycle parking in their cycling (including commuter and non-commuter cycling), with 62% of females and 59% of males. Bicycle lockers were a much less popular end-of-trip facility, as 13% of males and 13% of females reported using bicycle lockers. However, a greater proportion of male respondents reported using showers for commuter and also non-commuter cycling (60% of males in comparison to 40% of females).


Figure 16: Bicycle parking at Fox Studios, Moore Park (N.McNamara, 2012)

Amongst the respondents who had or do commute, 'the joy and ease of it' (F#337), or 'having a job not too far away' (M#145), 'safe riding environments [and], a good bike' (F#296) all enabled or encouraged a commute. Additionally, the 'convenience [of cycling] over public transport' (M#261), one's 'conscience' (F#115) and 'motivation for fitness' (M#340) contributed to respondents' decisions to commute. This sense of joy and freedom that cycling brought to the respondents was a continual theme throughout the research, and was a prime motivator for respondents, especially amongst those who rode more frequently. In addition, owning a bicycle was an enabler of activity alone as on respondent comments that: 'I love the freedom of moving through a heavily congested city with ease and speed' (F#347). The respondents' decision to commute to their place of work or study by bike was primarily personal – often connected to personal will power – although cycling infrastructure during one's journey and at the end of one's journey, as well as supportive work places or bosses could positively impact this choice.


Figure 17: Impromptu bicycle parking on Erskineville Road, Erskineville (N.McNamara, 2012)

**In sum**, the provision of basic end-of-trip-facilities, such as bicycle parking racks, represents a physical indicator of cyclists' rights to the city in addition to the bicycle lane or path. They indicate support for cycling from the broader community, from workplaces, educational institutions, local Councils and transport providers such as City Rail. Moreover, they enhance cyclists' experiences of riding in Sydney.

### 4.4 Cycling Actions:

This section explores the actions of web-based survey respondents and their interactions with cycling infrastructure, other road users (including cyclists, motorists and pedestrians) as well as the broader public. Cycling actions, for the purposes of this thesis are defined in terms of cyclists making use of infrastructure – it is the act of cycling in the city. Creating space/s for cycling (i.e. space claiming and legitimising cycling) through infrastructure use, and infrastructure preferences are explored further in this Chapter in section 4.5. Actions are explored below with regards to cycling infrastructure respondents have used. Respondents were asked

numerous infrastructure specific questions regarding their route choices, path use, and recognition of various forms of cycling infrastructure, to ascertain whether they were utilising the wide range of cycling infrastructure options available in Sydney and their reasons for doing so or not.

***Cycling actions – Separated cycling infrastructure and dedicated cycling infrastructure***

As previously outlined in Chapters 1 and 2, the COS has constructed 10 kilometres of greenway (dedicated separated cycleways) in the city, completed 60 kilometres of shared paths, and is implementing a share the path program to create more cycling-friendly spaces in the city. As a response to these improvements in cycling infrastructure, respondents were asked about their experiences of engaging with these forms of physical and social cycling infrastructure, including off-road shared cycleways in the region. Of all respondents, 77% had experienced riding along part or all of the 10 kilometres of greenway or other traffic separated cycleways such as the Cooks River cycleway or the M7 cycleway (see Figure 18, Figure 19 and Figure 20 for maps of these cycleways). The majority (81%) of all respondents who had used a separated cycleway or greenway used these options for approximately less than or equal to 30% of their trip/s. A small number of respondents (less than 5%) who used greenways or separated cycleways would spend in excess of 80% of their trip/s on the greenways or separated cycleways. Whilst popular cycling options for respondents, the greenways and separated cycleways were rarely used for 100% of an individual's cycling trip/s. Given that dedicated separated infrastructure makes up a small share of Sydney's total cycling infrastructure this is of little surprise.

It is imperative to note that 96% of all respondents agreed with the statement that separated cycleways are a good means of travel for inexperienced or new riders. This form of infrastructure was generally commented upon in a positive manner. For example, separated cycling infrastructure offers: a 'relaxing rid[e]… without having to watch out for cars' (F#43), 'a feeling of safety and security – giving more confidence to my riding' (F#245), is 'a pleasant way to ride with others' (F#16), and provides a 'space for cyclists where you feel like you have a right to be there' (M#117). Moreover, when respondents were describing what they most liked about

cycling in Sydney, the increases in traffic-separated cycling infrastructure and the shared paths were frequently referred. Typical examples of such statements included; 'I love the off road paths - cycleways, shared paths. I love the convenience of going when I want and not worrying about parking' (F#25) and amongst the 'weather, separated cycleways, varied topography, [and] backstreet routes' (M#270).

**In sum**, web-based survey respondents had experience of cycling along traffic-separated cycling infrastructure however as the cycling network in Sydney is yet to be completed, the opportunity to use dedicated cycling infrastructure for one's entire journey is not always available. The greenways and separated cycleways, for the majority of respondents, represent both a legitimising and normalising influence on the broader public. As, through the creation of dedicated spaces for cycling and shared pedestrian-bike spaces, cycling as a practice is made more visible and thus is normalised in the urban region. However, as is explored further in this chapter, as relatively new forms of infrastructure in an already established city, the dedicated cycleways and new shared pedestrian-bike spaces also present problems for some cyclists.

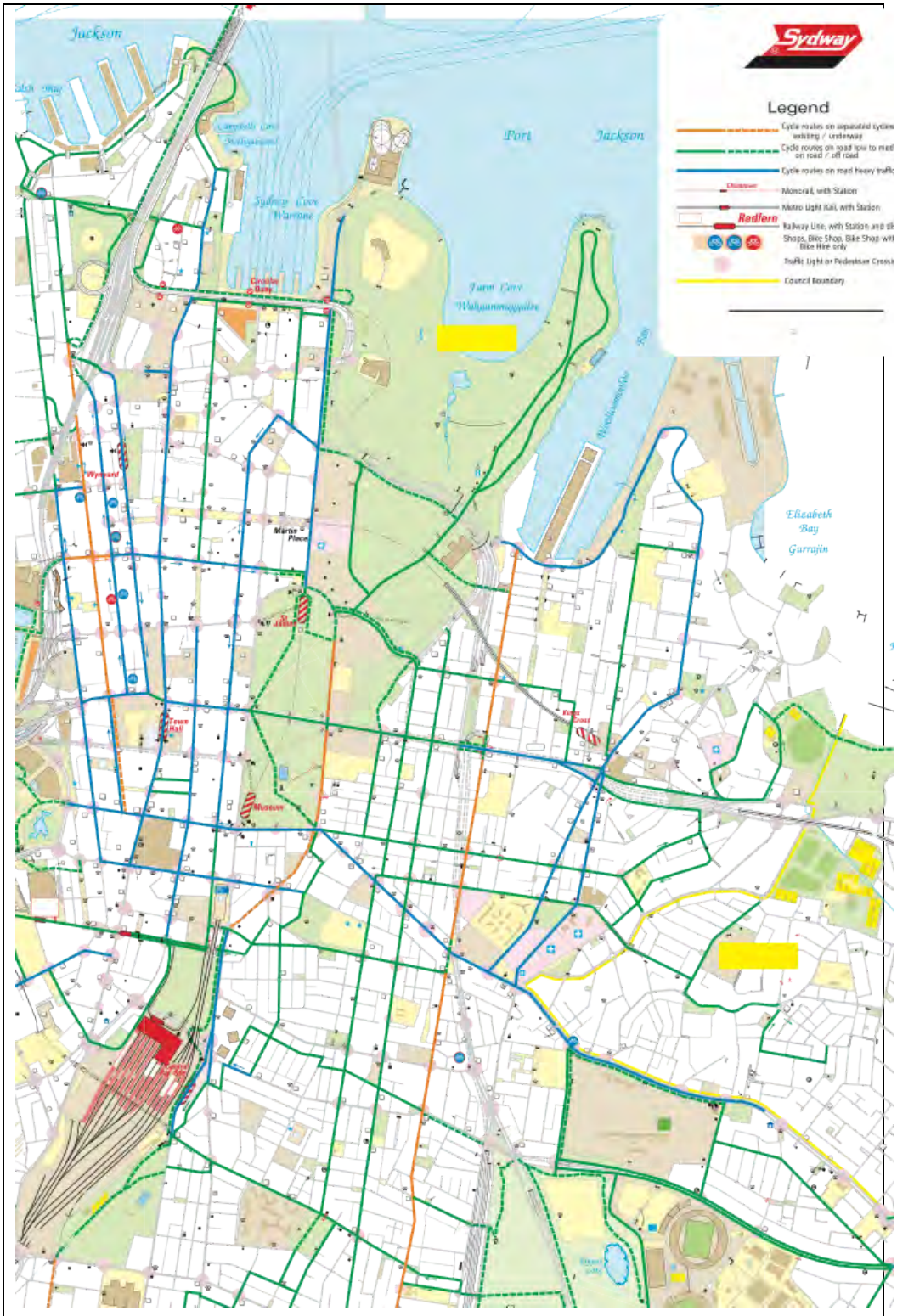



**Figure 18: Part of the COS' Sydney City Bike Map depicting the different cycle routes in the city – Orange denotes traffic-separated cycleways.**
**Source:** http://sydneycycleways.net/wp-content/uploads/2011/03/SydneyCityBikeMap-Feb2013.pdf


**Figure 19: Cooks River shared path (cycleway and pedestrian) map**
**Source: (part of) City of Canterbury, 2012, *Canterbury City Cycleway Plan,* accessed December 2012 <www.canterbury.nsw.gov.au/www/html/83-cycle-way-to-botany-bay-and-cycleway-plan.asp>**

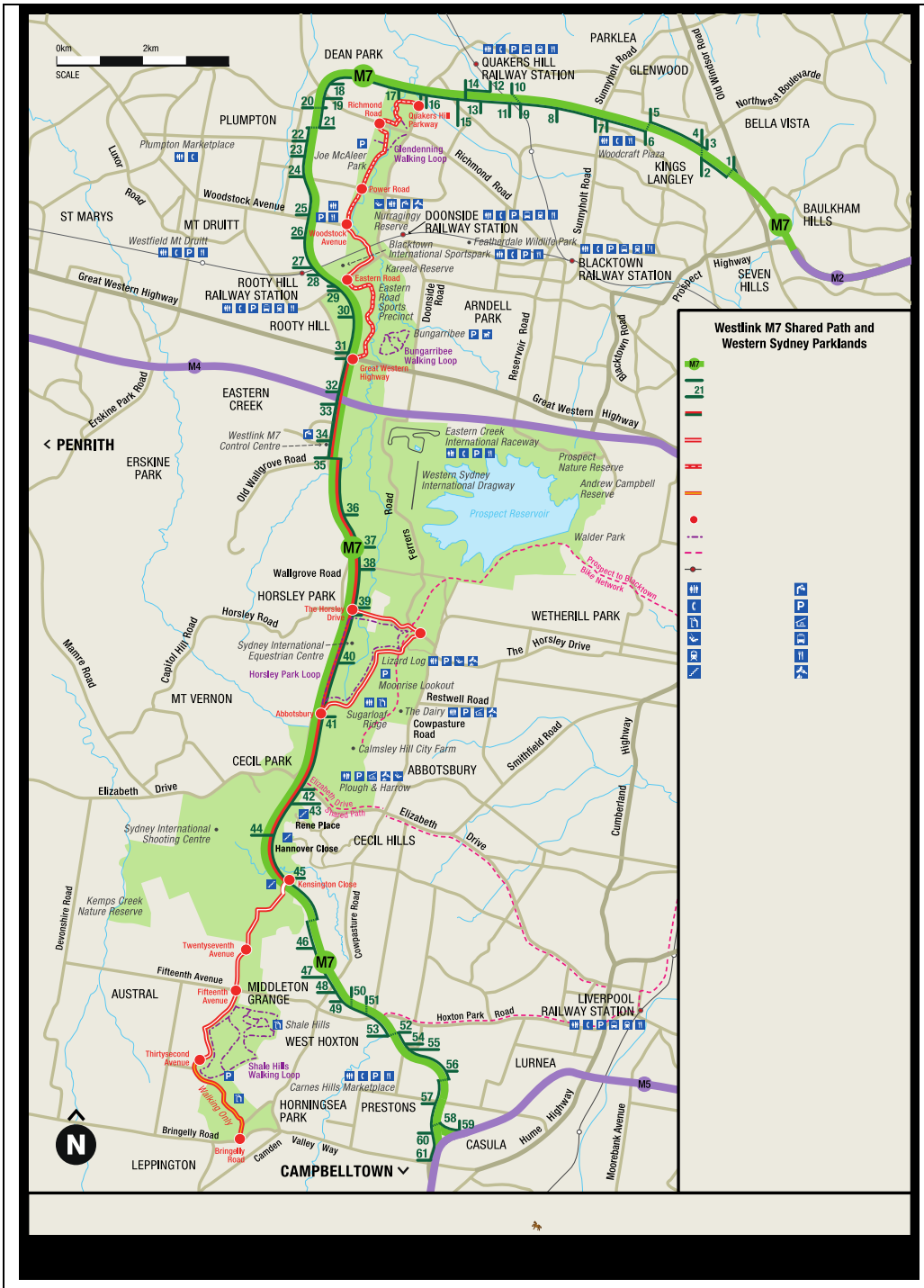



**Figure 20: West link M7 shared path (cycleway and pedestrian) map**
**Source: Westlink M7, 2008, *Shared Path Brochure*, accessed December 2012 <http://www.westlinkm7.com.au/maps.php>**

***Cycling actions – Route choices***

The range of cycling infrastructure in Sydney is vast. For reference, a summary of the typical infrastructure types referred to in this thesis can be found in Appendix 6. When selecting or planning routes, cyclists may consider the available infrastructure, traffic, topography, local knowledge, comfort, personal safety, the weather, or any other number of factors (Heinen et al, 2009; Garrard et al, 2008).

The majority of both female (83%) and male (77%) respondents from the web-based survey when selecting their route/s reported that they would utilise the range of available path options (e.g. use a mixture of everything available: marked cycle paths, separated cycleways, shared pedestrian-cyclists paths, shared bike-car lanes, and streets without cycling signage or markings). In contrast, proportionally less respondents would choose only streets or paths that have bicycle symbols or signs (7% of female respondents and 1% of male respondents). Similarly smaller proportions of male and female respondents would choose the quickest route possible (irrespective of the level of vehicular traffic or [lack of] cycling signs), with 17% of males and 9% of female respondents preferring these options.

These response rates, when examined in conjunction with results from the follow up question regarding which *types* of cycling infrastructure respondents usually used (see Figure 21 over the page), indicate that in urban Sydney cyclists make use of the road, shared pedestrian-cycle network, and traffic-separated cycleway networks most often, and more ambiguous spaces such as footpaths and laneways are used less. These findings are significant given that they do not indicate a clear preference amongst the female respondents to choose routes which provide the greatest amount of separation between the self and vehicular traffic. Indeed, proportionally more male than female respondents reported that they would usually choose routes which included traffic-separated cycleways, with 72% of male respondents in comparison to 58% of female respondents. A greater proportion of male than female respondents would also usually use shared bike-car lanes and shared pedestrian-bike paths. Although more male respondents than female respondents would also use roads that were devoid of bicycle symbols or signs, the majority of both respondents often utilised these routes, thus challenging research which suggests female cyclists prefer separated cycling infrastructure

(Environmentrics 2006 & 2007; Garrard et al, 2008). These figures also indicate that access to traffic-separated or shared pedestrian-bike paths is not possible for every respondent.

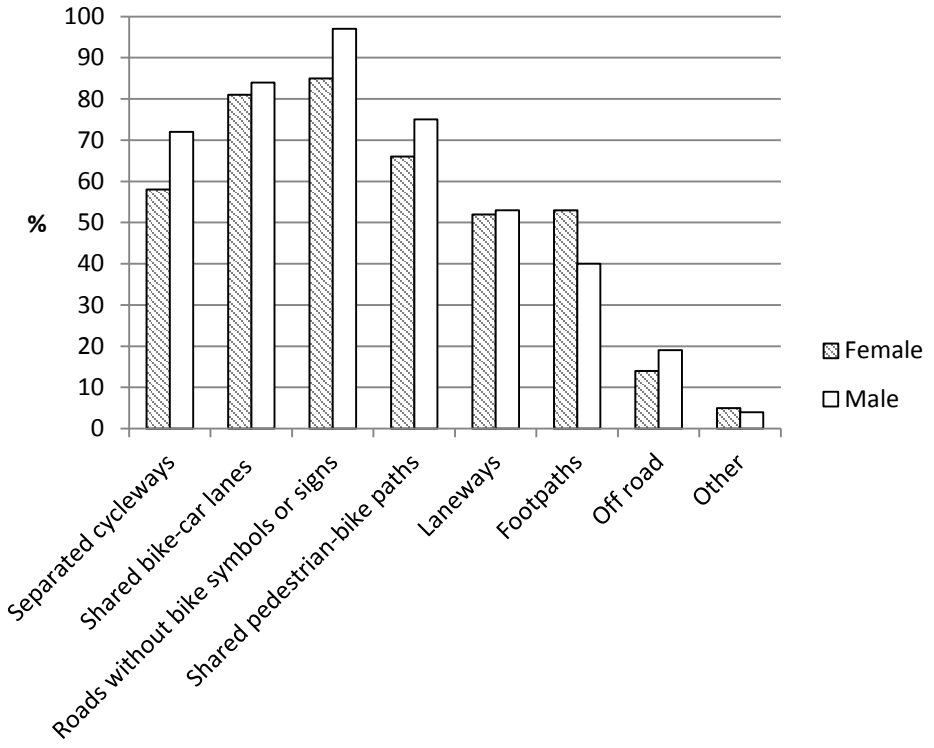



**Figure 21: Usual type/s of cycling infrastructure male and female respondents use**

Typical comments made by respondents in the web-based survey with regards to their route choices highlight the importance of feeling safe whilst on a ride, being able to ride to one's destination quickly without taking too much of a detour, and having route options available that have lower levels of vehicular traffic, these are collated in Table 5 over the page. Whilst these comments are indicative of cyclists' attitudes regarding safety, when examined alongside the infrastructure commonly used by respondents (see Figure 21 above) they pose a challenge to the culture of safety and separation espoused in cycling discourse in countries with lower-rates of female cyclists like Australia (Day, 1999; Bowling et al, 1999; Burgess, 1998; Valentine, 1989).

Table 5: Typical reasons respondents chose routes

| Focus | Comment |
|---|---|
| **Safety** | 'I only use the road when there is no other option to get to my destinations' (F#216) |
| **Low traffic volumes** | 'I look for the quietest roads and back streets that take me on a fairly direct route' (F#6) |
| **Low traffic volumes** | I 'choose streets with less traffic as higher priority than distance (will cycle further to cycle on quieter streets)' (F#310) |
| **Safety** | 'Choose the safest path' (F#349) |
| **Speed** | 'Only ride on the road, don't like shared paths' (F#99) |
| **Speed Low traffic volumes** | 'I choose the quickest route which also involves the least motor traffic' (M#15) |
| **Safety Speed** | 'Generally quickest, safe route' (M#26) |
| **Speed** | 'Follow signs the first time then find short cuts' (M#145) |
| **Low traffic volumes** | 'Generally choose back roads with low traffic and main roads with breakdown lanes' (M#171) |
| **Speed Low traffic volumes** | 'Cycling myself I chose the fastest route. Cycling with my girlfriend I try to take routes with cycle paths or quieter streets' (M#279) |

**In sum**, where cyclists ride on the road, cycling symbols or signs are not always equated with a lack of use by cyclists. Moreover perceived risk, safety, one's position in the door-zone, and speed were often of more importance for respondents than the type of infrastructure alone, as 'sometimes … [cyclists would] feel that the streets marked with bicycle signs [were] … not always the best' (M#243). When selecting routes, therefore respondents would take into consideration many other factors apart from the type of infrastructure available. This finding supports recent work by Bonham and Wilson (2011 & 2012) which argues that they way women cyclists use cycling infrastructure has been gendered and this should be redressed, as women cyclists do not always use space differently to men as Greed (2005) espoused was generally the case.

### *Cycling actions – Enablers and disablers of cycling*

In order to better understand respondents' route choices, web-based survey respondents were also asked to identify factors that would encourage them to cycle as well as factors that would stop them from cycling. The results of these questions are shown in Figure 22 and Figure 23 over the page. Predictably the majority of respondents (84% of females and 89% of males) were encouraged to cycle due to fitness and health, and approximately half were encouraged by

concerns about the environment (50% of females and 44% of males) and as a means to avoid traffic congestion (45% of females and 54% of males). These three responses are consistent with Australian Government understandings of liveable and sustainable cities. The gender difference for the traffic congestion response is suggestive of theories of self-preservation and risk aversion regarding females, as is the influence of traffic as a factor which would stop female respondents from cycling (41% of female respondents compared to 29% of male respondents – see Figure 23 over the page).

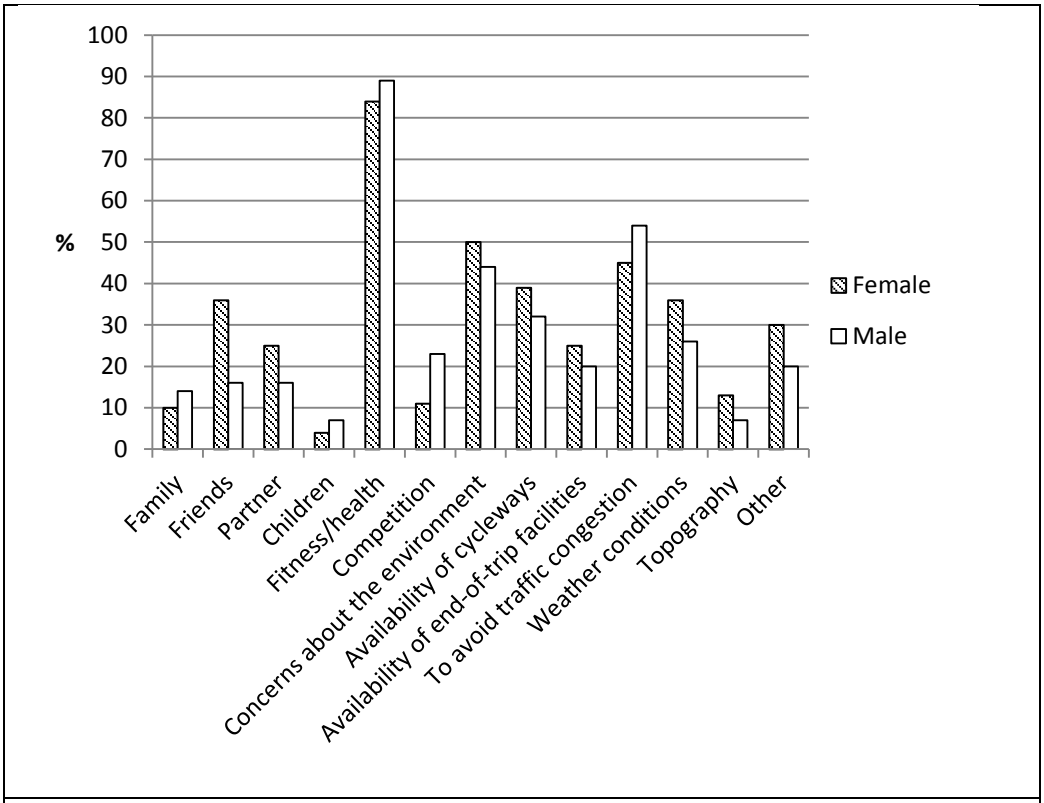



**Figure 22: Factors that would encourage respondents to cycle**

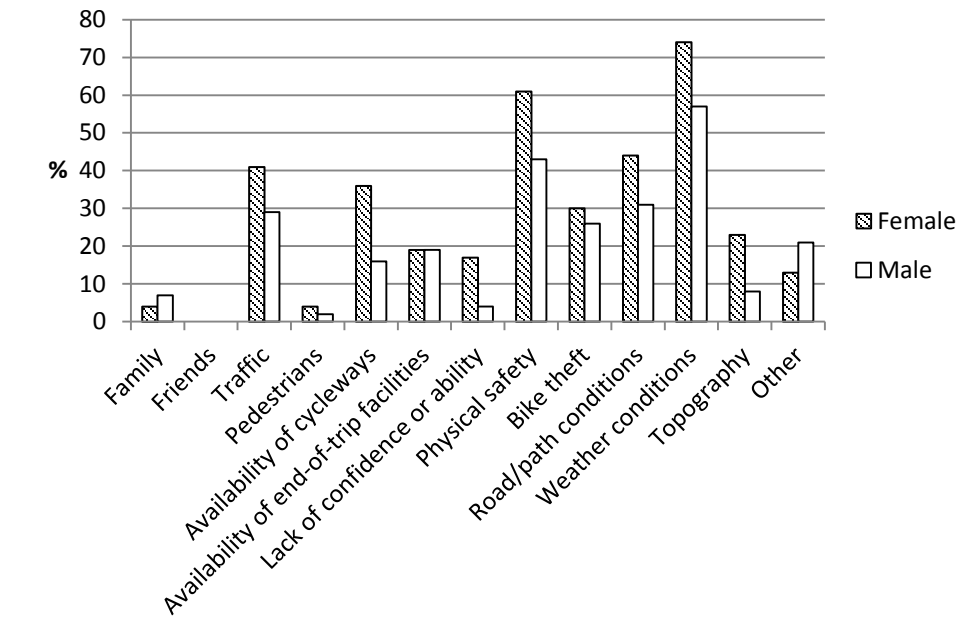



**Figure 23: Factors that would discourage or stop respondents from cycling**

The availability of cycleways influenced the web-survey respondents' decision to cycle or not. As 39% female respondents and 32% of male respondents reported that the availability of cycleways would encourage them to (Figure 22). In comparison, when asked what would stop respondents from cycling, significantly more female respondents (36%) than male respondents (16%) reported that the availability of cycleways would be an influencing factor (Figure 23). When considering that respondents do in fact choose a range of cycling infrastructure when selecting their routes and utilise the gamut of physical cycling infrastructure available in Sydney, for the majority of respondents (64% of females and 84% of males), the availability of cycleways *would not* discourage cycling. However, for female respondents, the availability of physical cycling infrastructure – cycleways: including greenways, traffic-separated infrastructure, and shared pedestrian-cycle paths – could stop or discourage a ride. This result indicates a need for greater connectivity across cycle networks.

**In sum**, the factors which influence cyclists' decision to ride not only highlight the need to improve connections between cycle routes across Sydney, the influencing factors also point to the importance of social networks for encouraging cycling, particularly for women.

***Cycling actions – Infrastructure recognition***

Web-based survey respondents were shown six images from the Nelessen-style VPS image data base and asked which of those they recognised. This question was designed to gauge the usefulness of Nelessen's (1994: 85) concept of the 'public viewshed' and help design the final Nelessen-style VPS used in this research. Overall there was a high-level of recognition by both genders for the first four images (A-E), and a moderate-level of recognition for the last two images (F and G). The results are collated in Figure 24 and Figure 25: Different cycling infrastructure respondents recognised below. There was very little or no difference between the proportion of male and female respondents that recognised each image.


**Figure 24: Images of cycling infrastructure used in the web-based survey (N.McNamara, 2012)**

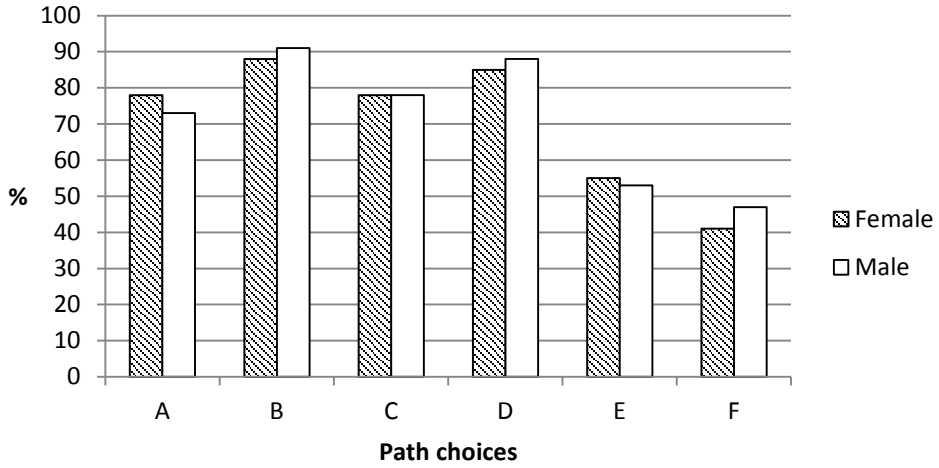



Figure 25: Different cycling infrastructure respondents recognised

High infrastructure-image recognition implies that whilst respondents may not necessarily have first-hand experience of cycling where those images were taken, they were familiar with the type of infrastructure depicted and thus with the cycling-public viewshed.

**In sum,** the use of the visual image to measure recognition of cycling infrastructure displays very little variation in terms of gender. Irrespective of cyclists' preferences for different types of infrastructure over others, male and female cyclists' experience of the public viewshed is exceedingly similar. This finding helps to redress the notion that men and women experience space differently.

***Cycling actions – Interactions:***

The act of urban cycling takes place in (traditional) public spaces (Warner, 2002; Mitchell, 2003; Iveson, 2007), whereby one will inevitably cross paths with others, be they cyclists, pedestrians, or motor vehicle drivers, and simultaneously interact with the available cycling infrastructure. These interactions – between cyclists and 'the other' (pedestrians, drivers, broader public), between cyclists (others within the cycling community), between genders, and interactions with the infrastructure – are explored in this section using the results of the web-based survey, however they are explored in greater detail further on in this chapter in section 4.6.

**- Positive interactions**

For the majority of respondents their experiences of cycling in Sydney and interacting with other cyclists and the infrastructure were positive. 'Smiling at fellow cyclists [and] small interactions with riders/pedestrians' (F#45) were common examples of positive cycling experiences and incidental interactions which fostered a sense of community or belonging for respondents. For one respondent, there is 'a sense of collectedness' (M#58) amongst cyclists. Indeed this was particularly strong amongst respondents who took part in larger social group or club rides where their interactions with other cyclists were resoundingly positive and could involve a 'friendly … wave or chat' (M#11), 'cyclists … nodding … [or] chatting or stopping to help' (F#203), and were generally seen as a positive aspect of cycling: 'I love … the little conversations you have with strangers - other riders, drivers, people on the street – makes me feel as though I am part of a community' (F#25). Respondents were also asked if, when and why they made stops as part of a normal cycling journey. Of those respondents who made stops along the way (51% of respondents overall, 58% of females and 48% of male respondents), they did so to chat, run errands, shop, drop children off at day care, have a coffee, have something to eat, use the bathroom, 'offer directions to someone looking lost' (F#164), 'check a map' (F#333), 'sometimes stop on or after hills' (M#33), or stop to 'look at something interesting or beautiful like a sunset!' (F#77) – all of these interactions, with one's environment contribute to how one experiences the city by bike.

**- Negative interactions**

Social interactions that take place in public spaces are interesting to examine in order to begin to measure social cohesion with regards to recognition and legitimacy. Whilst the overwhelming majority of web-survey respondents had highly positive narratives to tell of their own experiences of cycling in Sydney and interacting with the infrastructure or other cyclists, 'not all of the interaction … [was] pleasant' (F#77). Most negative experiences consistently involved interactions with other road users, including pedestrians and drivers. Respondents and group discussion participants alike described experiences ranging from unpleasant drivers 'shouting abuse' (F#192) or motor vehicles 'forcing you out of lanes … [and] tailgating' (M#331) to disagreements with infrastructure where 'I nearly came a

cropper the other day going down Victoria Road in Marrickville … [in a] ditch across the road that maintenance had presumably dug' (K)**.** However the most common complaints amongst respondents and participants were to do with Sydney's traffic and drivers: 'Sydney Drivers are some of the worst in the world' (M#7).

**In sum**, the interactions that take place between cyclists and the other (other road users, cyclists, pedestrians etc.) help us to understand how cyclists' actions and behaviour can help to normalise cycling as an everyday part of the city, and also highlight areas where social cohesion can be improved in Sydney.

### 4.5 Creating space/s for cycling – space claiming and legitimising cycling:

> *The more infrastructure that we have, the … easier it will become to get our kids to ride…* (M)

There are numerous different methods through which cyclists claim, re-claim, make and re-make space in Sydney that have been explored throughout the research process. The provision of cycling infrastructure typifies a top-down re-making of space and, as will be explored below, it has the potential to both legitimise and marginalise cyclists and cycling. The COS' provision of traffic-separated cycleways, such as greenways, represent a re-claiming of space – transforming spaces previously dedicated to vehicular traffic and parking into spaces which give precedence to cyclists. Similarly, the COS' introduction of shared-paths typifies Iveson's (2007) re-making of public space as it appropriates existing spaces to new uses – combining cycling and pedestrian spaces (see Figure 26 over the page).

Space claiming is also achieved through *actions* or *performance* – by physically cycling and being in public spaces and utilising the available physical infrastructure, claimed through *behaviour* – what cyclists do whilst on the bicycle: abide by laws or break laws, claim the lane, or cycle aggressively, claimed through *appearance* – clothing, equipment, or helmet use, and is claimed or re-claimed through *communities* – the building of and participating in them.

Figure 26: Examples of shared paths and path markings in Redfern [L] & Newtown [R] (N.McNamara, 2012)

***Space claiming through top-down infrastructure provision and separation/segregation from vehicular traffic***

When debating what cyclists thought about cycling infrastructure that provides segregation or a physical barrier, such as a concrete separator, from vehicular traffic (see Figure 27 over the page for examples), participants in the all-female discussion group were in agreement that separated cycle paths were a positive aspect of cycling in the city, especially when paths were free from obstructions and did 'not hav[e]… cars parked in them'(P) or 'people standing around them'(C). Similarly, participants in the male discussion group agreed that depending on the type of cycling one was doing 'you might like a bit of separation from cars, nice wide cycleways, and priority at traffic lights' (K). The top-down provision of separated cycling infrastructure, such as the greenways, can offer this. The overarching benefits of greenways for male discussion group participants were related to a reduction in stress and a sense of relaxation, with observations such as: 'I don't have to think cars approaching from the back' (O). Separation and segregation, indeed 'any time that cyclists are given precedence over other forms of transport it [can] really add… to the comfort and sense of convenience' (A) whilst cycling. As previously discussed in this chapter, an overwhelming majority of web-based survey respondents answered *yes* when asked if they thought the separated

cycleways were a good means of travel for new or inexperienced cyclists (95% of all male respondents and 96% of all female respondents). These findings reinforce the positive role that top-down infrastructure provision has to play for cyclists in order to help them claim space for cycling by providing segregation from vehicular traffic and legitimising cycling as an alternative mode of travel.


College St, Sydney


Wilson St, Newtown


Bourke St, Surry Hills

**Figure 27: Separated dedicated cycleways in Sydney**

Of all respondents, a large majority (77%) had experience riding on the 10 kilometres of completed separated cycleways or along some of the 60 kilometres of off-road shared paths such as the Cooks River cycleway, along the Glebe foreshore, or along the M7 cycleway. The most commonly stated advantages to these forms of traffic-separated cycleways were feelings of safety, comfort and relaxation. Indeed, as the greenways 'have no cars to harass my space' (M#5). Furthermore, the traffic-separated infrastructure (i.e. greenways) inspired feelings of 'legitimacy … relief [and] less pressure' (F#248) for some cyclists. These themes were echoed in the discussion groups by both male and female participants who stated:

> *I just want to be separated from cars so [that] I don't have to think about it… I can be looking around and enjoying my ride as opposed to worrying … so the separated laneways are … a blessing.* (O)

> *When they built the bike paths in town I went the whole way [to work from Bondi to St Leonards]… all that infrastructure has been amazing for riding*. (M)

These encouraging comments seem to support the COS's preference for traffic-separated cycle routes, and supports the observational work of Garrard et al (2008) in Melbourne that women ideally do prefer a feeling of separation. However, this preference was not limited to one particular gender. Both male and female participants in the Nelessen-style VPS-discussion groups chose images that gave this feeling of separation and stated that there were benefits to separation from vehicular traffic. These preferences are illustrated in slides 12 and 18 (below) from the Nelessen-style VPS depicting a path choice between traffic-separated lanes on the right of each slide and a footpath (Figure 28) or on-road route (Figure 29). In each example preference was given to the right hand images (100% for slide 12 and 90% for slide 18).

Figure 28: Nelessen-style VPS slide 12

Figure 29: Nelessen-style VPS slide 18

Both female and male Nelessen-style VPS-discussion group participants chose images that they thought represented routes which offered the most, or a greater amount of, separation and sense of safety (*that whole … a meter matters…*T), as well as images which had the least obstacles (i.e. tree roots or pedestrians). Both sets of participants also chose images which were attractive (*I love jacarandas!* F – see Figure 30 and Figure 31), well-lit, well-drained (*some decent drainage on some of the cycleways would be good too* H), and where the quality of the road or path surface was of a higher standard.


21

| Chosen: 12 Ave: 4.33 | Chosen: 6 Ave: 4.16 |
|---|---|

**Figure 30: Slide 21 from the Nelessen-style VPS - Vegetation choice**


23

| Chosen: 4 Ave: 4.5 | Chosen: 14 Ave: 4.3 |
|---|---|

**Figure 31: Slide 23 from the Nelessen-style VPS - Vegetation choice**

Of course these are all *ideal* urban bicycle spaces and overall there were more positive (*Wouldn't mind riding here = 3 / Would like to ride here = 5*) responses to images than negative. Within the Nelessen-style VPS 42 out of a total of 50 images (or 84%) received scores of greater than 3 and equal to 5. This illustrates the significantly positive Likert scale responses. Images with greater levels of vegetation were also given higher ratings than images with less vegetation.

For the Nelessen-style VPS-discussion group participants overall, the sense of enjoyment which cycling engendered overshadowed fears of safety for the male discussion group participants and indeed for some female discussion group participants, through statements such as: 'I really enjoy it, it makes me see the city more easily [and] you feel great, you feel like you're flying' (O), 'It's like a high' (A), 'it's a great way to start the day' (T) and 'it's a great way to finish the day too' (M). These sentiments were echoed throughout the research where negative comments tended to be balanced by positive comments, such as; 'I don't like the risks of riding on roads without any shoulder' (M#229) but cycling 'opens up the city and makes it much more accessible' (M#114) and it is the 'best feeling when cycling is when you have the whole road to yourself, no pressure, no worries, just you and the breeze'. (F#214)

***Space claiming through rule-breaking and reinforcing cycle-awareness***

For the majority of cyclists who took part in the discussion groups and the web-based survey, having the 'space on the road to ride comfortably' (M#86) and 'respect and cycle-awareness from other road users' (F#169) were both necessary to ensure a more pleasant and comfortable cycling experience. Cyclists also recognised that creating space for cycling could also be dependent on their actions: 'I think we have to obey the road rules to get motorists' respect so that they do treat us appropriately' (S) and 'I think everyone on the road should try to act courteously to all other road users, and I believe that 99% of us do - it's the 1% that are the problem.' (F#292) There was some argument amongst the female discussion group participants over running red lights, as one participant owned up to riding 'on the footpath if it's not safe, regularly, and sometimes I ride red lights if I think it's safe…. I take a calculated risk' (M), whilst another participant recounted seeing

cyclists ride through red lights in heavy traffic 'which is so dangerous on that main road' (S).

Participants in the discussion groups were in agreement that sometimes in certain situations it was necessary to 'claim that space [on the road] as yours' (H), in order to reinforce their presence on the road and say: 'I'm traffic and you have to see me like you see a car' (T). Web-based survey comments that recalled situations when respondents had felt intimidated whilst cycling and also whilst describing what helped them to feel safe when cycling repeatedly made mention of taking and owning the lane in traffic and when going through roundabouts to ensure visibility and thus personal safety. As previously discussed in this chapter, 84% of female survey respondents and 95% of male survey respondents typically used routes which included roads without bicycle symbols or signs. This form of space claiming, through physically riding on the road, reinforces comments that were made throughout the research processes regarding the need for space and respect from all road users. Claiming space for cycling then is not only about claiming the physical spaces ('I'm not riding in the door zone' H) of the city with bicycle symbols and markings, it is also imperative to be visible.

***Space claiming through maintaining visibility***

> A *constant on-my-toes awareness, assuming nothing … lights at night, riding with others (whether friends or just a bunch of people who happen to be cycling the same way at the same time)…* (F#16)

Visibility was raised throughout the research and was often linked to behaviour and clothing, including hi-viz clothing. Cycling specific clothing (i.e. knicks, jersey, gloves – see Figure 32) was mostly worn for reasons of comfort and practicality on a commute or a longer recreational ride or ride for health and well being or training. 61% of female respondents and 83% of male respondents overall reported that they do wear specific cycling clothing. Yet it is necessary to note that 'specific cycling clothing' meant different clothing options for different cyclists. The term was widely used in the classic sense for lycra knicks, jerseys, and hi-viz clothing (see Figure 33 for examples of such clothing), yet it was also used to refer to sports clothing such as yoga pants, running t-shirts, and shorts. Numerous respondents

commented on the usefulness of the 'full kit' (S) 'to increase my visibility' (#16), and therefore one's presence on the road as another vehicle. Lycra was often associated with a particular image of a cyclist as being experienced or professional. Of the 91% of survey respondents who expected the same or a similar level of respect from other road users (93% of male and 88% of female respondents), proportionally less women than men responded that they consider themselves to be another vehicle when riding on the road.

The female discussion group argued that visibility and claiming space could be as simple as riding with someone else, who could act as a 'good sweep as well… to encourage' (H) people to cycle as there are alternatives to riding on the road being 'really brave or insane' (D). This protective behaviour was also common amongst web-survey respondents when describing what helped them to feel safe when cycling (see Appendix 2 for a full list of web-based survey questions). Ensuring visibility through clothing, one's position on the road or path, lighting, and the use of protective clothing or gear were all important for respondents to help them feel safe, however 'riding with another person' (F#1), 'riding with other cyclists' (M#44) and 'riding in a group' (M#195) were incredibly important. Significantly 98% of all web-based survey respondents described what helped them to feel safe, and of those, 27% of male respondents and 37% of female respondents made mention of the safety benefits of group riding, along with having your own confidence on the bike and the aforementioned means of maintaining visibility.

**In sum**, cyclists' claims to space can be interpreted as claims to rights to the city and to the physical and social spaces of the cycling city. Indeed, the very need of cyclists to claim space for cycling on Sydney's road network by *taking the lane* or *claiming the lane* highlights the broader changes that need to occur in order to educate both cyclists and motorists about sharing the road. Moreover, it is clear that different individuals require different types of physical cycling infrastructure and also systems or networks of support in order to build confidence and claim space for cycling.

Figure 32: Cycling specific clothing examples – jerseys and knicks (N.McNamara, 2012)

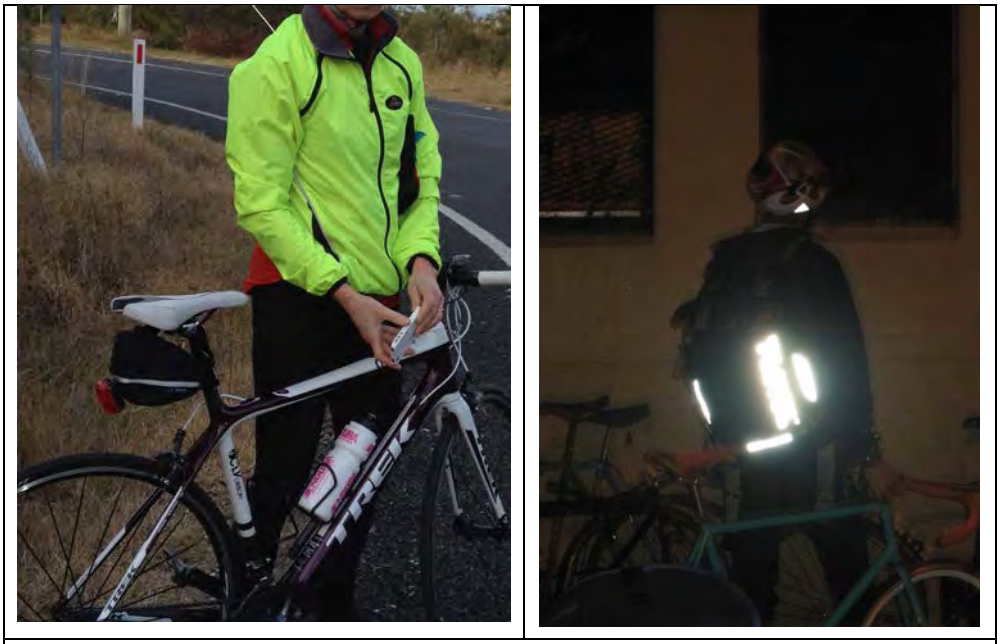


Figure 33: Cycling specific clothing examples – hi-viz cycling jacket and reflective backpack (N.McNamara, 2012)

### 4.6 "Us and them" – normalising cycling in the city:

> *I get treated differently depending on what I'm wearing… If I just put on a bright red duffel coat and … I'm wearing these [boots and jeans] it's a completely different attitude* (H)

Conflict and animosity between road users (cyclists versus cars, taxis, buses etc.) was a common theme throughout this research, as was the sense that as a practice cycling ought not to be 'unusual' (M) in the city. The idea that separated cycleways somehow sent a message to other road users that 'cyclists do not belong on the road or the footpath' (#350) and could potentially 'damage… our reputation with drivers if we ride on the road when there is a cycleway nearby' (#126) was raised in the survey and discussion groups, although the lack of connectivity was of greater concern as 'they're not everywhere' (#203). Narratives of a perceived negative impact of separated cycling infrastructure did not outweigh positive ones, yet there was recognition that 'people who choose not to use the cycleways [have been] harassed for riding in traffic … [and] the driver assumption … that "we've built you this thing, now be grateful - and get off our roads"' (#16) is indicative of a wider culture of automobility. From the research it became clear that different forms of infrastructure offer different levels of separation and therefore attract different kinds of riders. For example for some participants and respondents '[riding in traffic] does give you a sort of adrenalin rush … which is part of the appeal'(I), whereas other cyclists 'really like it when most of [my] … riding is done on quiet streets (the back of Newtown and Dulwich Hill) or somewhere where there is a clear bike path/separate cycle way.' (C) These remarks about route preferences recall Winters et al's (2011: 9) discussion of cyclists as 'a heterogeneous population'.

Terms such as 'aggressive', 'pushy', and 'intimidating drivers' were used repeatedly when discussing negative experiences of cycling in the city for discussion group participants as well as web-based survey respondents. Survey respondents, when describing what they disliked about cycling in Sydney, frequently made mention of 'impatient traffic' (F#1), the 'lack of patience and sense of entitlement of … road users' (F#25), 'the aggression from motorists' (M#75) and 'motor vehicle ignorance of cyclists and their rights' (M#305). It was acknowledged the female discussion group session that 'there's a huge culture, on both sides, of aggression'

(P), widely repeated that 'Sydney's very aggressive' (T), and as a result it was easy for one female discussion group participant to 'get really defensive' (C) when cycling in traffic. Stories of intimidating cycling experiences frequently mentioned abuse '*Get your fat ass of the f*n road* which is just one example… but that's all they can see' (T), and 'feeling like a gutter rat … [with] no rights … [or] not regarded as a legitimate road user' (#208). Cyclists 'get there faster, fitter, and in "their" lanes' (M#15). The need to shift broader attitudes towards cycling was also a cause for concern throughout the research, and even dismay for one female discussion group participant who stated: 'It's really aggressive and I don't know how you change that culture' (P).

The language of the other (us/them/they) was often used to refer to vehicular traffic as well as non-cyclists within the community. The bicycle and even the helmet were seen by some respondents as something that 'de-humanises us' (T) from a driver's perspective. So that 'instead of seeing a person [drivers] see a cyclist' (J) and 'it doesn't matter whether they're out there commuting or in lycra but they're all "an obstruction"' (R). One web-based survey respondent described how she 'used to feel intimidated by the men in bunch ride groups [as the] … cycling kit can be intimidating… but the more I rode, the more I realised that people mostly wear it [lycra kit] for very practical; reasons … [and now] wearing lycra doesn't mean you're an athlete, it just means you went to a shop and bought some lycra.' (F#71)

This image of a lycra-clad cyclist (Daley & Rissel, 2011) caused debate amongst the discussion group participants. There was consensus that the 'stigma of riding in lycra' (P) could be dispelled through riding in everyday clothes (see Figure 34), being gracious in shared path situations, smiling and waving at traffic lights, and obeying the road rules. One participant's strategy for minimising feelings of marginalisation at traffic lights was to 'stop and turn around and try to make eye contact with that person that's behind me, so that they know there's a *woman* there for one, and a person' (T). Female group discussion participants when riding in shared path situations employed similar strategies, and web-based survey respondents also echoed these strategies. The female discussion group argued that normalising cycling particularly in new shared-infrastructure circumstances was 'about how you communicate, and thanking … [the pedestrian/s] after they get out

of the way.' (J) Indeed, the female discussion group saw shared spaces as the perfect place to 'be ambassadors for our cause' (H) and 'call out or say good morning … [because] I want everyone to have a nice experience with us' (T). 'If you're nice (on a shared path) they might think, oh, bicycling looks fun!' (C)

Community acceptance of, and normalising, cycling for the female discussion group was important: 'they [work colleagues] see me and another woman cycle every day and … it is normal. By not making a fuss out of it and just doing it, or saying, "Where do you live? Why don't you cycle?"' (J) We (women) could encourage others to take up cycling.

**In sum,** the divide between cyclists and motorists is difficult to overcome, as are the stereotypes of different road users. The culture of automobility within Sydney will require patience to change, however the provision of top-down cycling infrastructure does go some way to legitimising cyclists within the inner city. A broad cultural shift is required to normalise cycling.

**Figure 34: Everyday clothing can be worn as a mechanism to normalise cycling (N.McNamara, 2011-12)**

## 4.7 (Non)belonging – identity, gender and difference within the cycling community:

A gender perspective of the city recognises that the 'responsibilities and experiences of women are … [often] different from those of most men, resulting in their using space differently' (Greed, 2005: 247). Following Greed's logic, women would approach cycling and use urban bicycle spaces differently to most men. However, Bonham and Wilson (2011 & 2012) argue that the broader gendering of space implies that these differences are often exaggerated. Sections of the web-based survey and Neslessen-style VPS discussion groups addressed this literature gap, exploring what male and female cyclists do, their opinions and infrastructure use and preferences, in order to understand whether or not females use space as differently as Greed indicates. Jenson's five indicators of social cohesion were used to help understand the web-based survey and Nelessen-style VPS discussion group results in terms of gender and difference within the cycling community of Sydney, with a focus on identity, belonging and legitimacy.

### *Identity and belonging*

Questions of identity and belonging were raised in the web-survey and in the group discussions and 42% of web-survey respondents left a comment explaining their understanding of 'identity'. More male survey respondents answered *yes* to feeling a sense of identity as a cyclist (see Figure 35 below), often commenting that they felt this was due to their habit or practice of 'rid[ing] everyday' (F#173) with a bunch or individually, and was attributed to the impression that they 'I look[ed] like one' (M#277). Although proportionally less female respondents identified as a cyclist, identity was still important for female respondents, with one respondent stating that 'cycling gives me a sense of freedom and confidence that I wish to hold onto and claim as part of my identity' (F#52). Overall, 84% of male respondents and 62% of female respondents identified as a cyclist (Figure 35), and for some this identify was described quite intensely as being '…in my blood' (M#103).

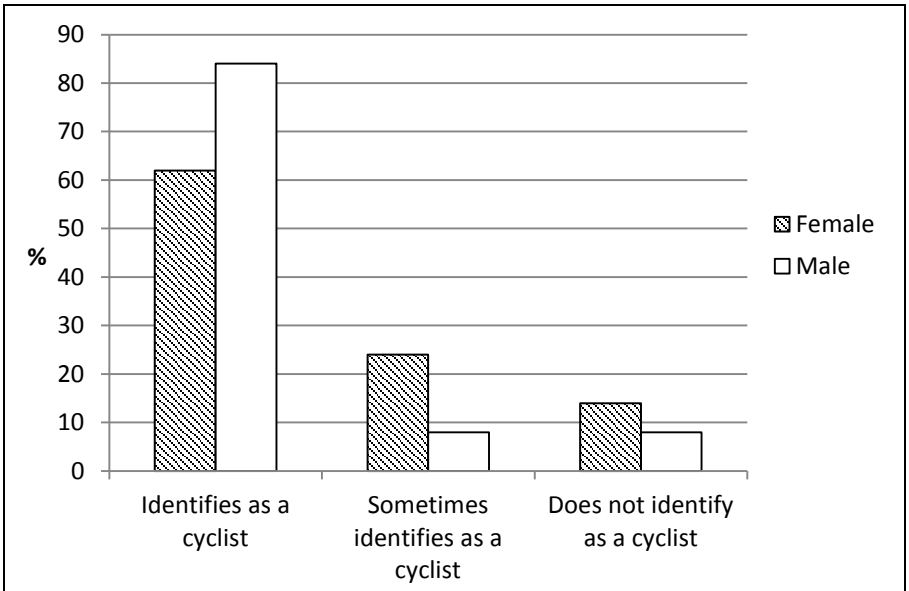



**Figure 35: Respondents who reported that they identify as a cyclist by gender**

A cycling identity (Aldred, 2010) was often linked to clothing and was a contentious issue for respondents and amongst discussion group participants. Lycra was frequently associated with speed and professionalism, through statements such as: 'I'm not a pro, I don't wear lycra [and] I think that's part of it' (F#24), and the 'MAMIL [stereotype] = middle aged men in lycra' (M#118) was brought up repeatedly in comments by survey respondents as well as during the discussion groups (see Figure 36 over the page). For club riders (32% of male respondents had taken part in organised club racing) clothing and identity went hand in hand as the jersey 'is my club shirt [and its] great to identify who is part of the group' (#103). Respondents who did not to identify as a cyclist in the survey commented instead that 'I'm not a cyclist. I ride a bicycle for transport and joy' (F#25) and 'I am a person who rides a bicycle' (M#317), however, I'd like to eventually think we'll be in a position where I can identify simply as 'a person who happens to ride a bike'' (F#16). Clothing and identity were linked throughout the research process, as one respondent stated that by not wearing stereotypical cycling clothing they aimed 'to be identified as a casual rider so [that] people [would] know to slow down around me' (F#140).

Figure 36: Stereotypical lycra-clad cyclist

For web-survey respondents there was a distinction between *identity* and *belonging* or *community*, as overall slightly more respondents felt a sense of community or belonging when they rode (58% of male and 53% of female respondents), whereas 29% of male and 35% of the female respondents *sometimes* felt this (see Figure 35). An equal proportion of male and female respondents did not feel a sense of belonging or community when they rode (12% of each group). Web-survey respondents were also asked if they belonged to a particular cycling organisation or group, and to identify which organisation or group this was. 76% of male survey respondents and 52% of female respondents reported that they had belonged or do belong to a cycling related group or organisation, and responses included social, recreational, racing and maintenance groups, as well as bike user groups (BUGs) and online forums and cycling or triathlon organisations. These high-levels of membership in cycling-related groups or organisations (physical or on-line) reinforce the existence of social cohesion within the cycling community in terms of belonging and participation (Jenson, 1998).

Discussion group conversations surrounding gender were especially positive as each group joked about the other: 'there's nothing sexier than a woman on a bike' (A). The male discussion group challenged some comments made in the survey which cast male cyclists as 'macho competitive' (I) and 'rushed and rude' (F#230). The male discussion group participants were in agreement that they had noticed increasing numbers of both male and female riders in Sydney, with one participant observing that 'when I come up to the city here the ratio of number of women riding is enormous compared to down my way' (Q). Similarly, the female discussion group was in agreement about seeing more and more people ride. One female participant 'really like[d] the chivalry of cycling … as a female cyclist … if you have a flat tyre or an issue, then eight men will stop ... and it's really nice' (T), although it was recognised that 'they can be a bit competitive' (M). Negative stories of bad behaviour (i.e. running red lights) in the female group were countered by stories of camaraderie amongst cyclists: 'It's the same with the group of girls [in the city] on Sundays, when you came across a group of blokes … they were really lovely, saying "morning ladies!"' (G)

Other indicators of social cohesion in the web-survey looked at belonging to cycling-related groups or organisations, participating in cycling-related activities and cycling socially to measure belonging and identity amongst cyclists in Sydney. As previously discussed in this chapter the majority of respondents reported that they had been involved in or were involved in a range of cycling-related groups and organisations, indicating strong levels of participation and feelings of belonging with a cycling community or even the broader community. These figures indicate strong participation within the cycling community amongst survey respondents, and were supported by comments in the survey such as:

> *It's an excellent way to engage with the city, it can be really pretty [and] you can meet some nice people. I feel there is a growing culture of cycling from commuting to club stuff. It can be great to feel like you're part of that community.* (F#50) AND
>
> *It's like being 10 years old again and you are riding around with your friends on your bike … whether you do it at 6 o'clock in the morning down to La*

*Perouse, or you make friends on Oxford St as you commute its really nice, just like being a kid. (T)*

**In sum**, the cycling community within Sydney, whilst not a unified community (different cycling groups exist for different forms of cycling such as racing clubs, local BUGS, or community maintenance groups), provides opportunities for cyclists to build cycling confidence, build their social networks, and interact in public space in a social manner. In short, these foster a sense of belonging and inclusion in accordance with Jenson's (1998) conception of social cohesion

## 4.8 Conclusion:

Conflicts are inherent within cities. Historically conflicts have centered on struggles for social justice, and political and social rights (Iveson 2007; Isin 2000). In an urban cycling Sydney context, conflicts are often between road users, within the cycling community, and between male and female bicycle riders. In addition to identifying some of these quarrels, the research findings tell a very positive story – one of a growing community of people who ride bicycles. The cycling community in Sydney is a vast and varied group of people, rather than a hegemonic 'lycra clad mob' (F#26). This sample of Sydney's cycling community is not necessarily cohesive, and although it is not a traditionally geographically bounded community in the LGA or neighbourhood-sense the research suggests many positive findings.

There are very few differences and an apparent lack of a battle between the sexes with regards to physical cycling infrastructure use and preferences. Both gender groups held similar desires for safety and separation from vehicular traffic and/or pedestrians. Moreover both gender groups showed an awareness that cyclists were often marginalised in Sydney, and some had experienced first hand this marginalisation. Certainly attitudes towards urban cycling and claiming space differed between men and women, and although these differences were minor (i.e. risk-taking versus slightly more cautious and competitive verses relaxed or social riding), they are imperative for encouraging greater female participation.

Most stereotypical images of cyclists throughout the research referred to images of the MAMIL or lycra-clad weekend warrior, which tended to be exclusionary towards women. This non-cyclist's perception of cycling (Daley & Rissel, 2011) was replicated in the cycling community albeit to a lesser extent. Traffic-separated cycling infrastructure was widely seen as positive for increasing cycling participation rates by encouraging others to cycle, and providing a retreat from the more hostile streets and unfavourable door-zones. However cycling infrastructure can have a negative influence. Physical cycling infrastructure can reinforce the notion that cyclists do not belong on the roads, thus increasing the need for cyclists to claim spaces for cycling. However this is negated by new transformations of public space into shared pedestrian-cycle spaces that physically force citizens to co-exist.

# Chapter 5: Conclusion – what the view from the bicycle-saddle, theory, qualitative and visual methods can offer

## 5.1 Introduction:

This thesis has outlined the theoretical and practical contexts for examining gender and cycling in Sydney, proposed a methodology for research and presented the research findings and discussions. The thesis has detailed Sydney's complex cycling community, has given insights into cyclists' participation, habits, actions, interactions, and personal cycling experiences of the city. This chapter examines these results, which are focused on the view from the bicycle saddle, with regards to the model of top-down infrastructure provision in Sydney and explains what the results mean for discussions of cycling, gender, social cohesion, and citizenship, and offers conclusions based on the findings from the multiple research methods used. This chapter then provides recommendations for governments, government agencies, and non-government organisations, community groups based on the findings from the research. Finally, this chapter highlights areas for further research, identifies limitations to the research, and concludes with a postscript to bring the thesis full circle.

This thesis has argued that: *Women's rights to the physical and social spaces of the cycling city need to be legitimised in order to increase women's cycling participation rates in Sydney.* Four sub-questions helped to address the thesis statement and connect the research methods to the theory, these were:

1. How is space re-made and claimed by cyclists?
2. How is citizenship re-negotiated by cyclists?
3. Do these claims and re-negotiations differ for female cyclists? AND
4. What is the role of infrastructure in space claiming?

## 5.2 Making meaning from the research findings, literature and methods

The top-down provision of physical cycling infrastructure in Sydney is reshaping the city, transforming public spaces, altering traffic flows and re-making pedestrian spaces. Council's overarching intentions through these provisions of infrastructure are to create a cycling-friendly city, redress Sydney's culture of automobility, and positively contribute to the sustainability and livability of the city well into the future.

Part of the discourse surrounding this infrastructure provision is the need to increase female cycling participation rates. Females are demonstrably under represented in cycling in terms of the numbers of women who participate in cycling across Australia, and it is commonly accepted that females prefer to use dedicated traffic-separated cycleways in the urban region. Therefore it follows that a build it and they will come model of top-down cycling infrastructure provision will encourage more females to cycle, thus increasing cycling participation rates overall. Indeed, as has been evidenced through the COS' monitoring of cyclists along their traffic-separated greenways in the City, cycling participation along these routes is increasing. Within cycling literature it is acknowledged that many different kinds of cyclists exist, beyond those who, due to self-preservation, safety concerns, or fear (Valentine & Bell, 1995; Day, 1999; Burgess, 1998). The thesis makes in-roads into areas of gender and transport research on the local scale, by examining cycling from a gender perspective – moving beyond the traditional binaries of gender embedded in the city to explore cycling as an activity which can potentially re-shape these binaries. Re-shaping these binaries (i.e. nature/culture, public/private, production/reproduction) is important for planners and local governments in the move towards more sustainable and socially cohesive cities. Indeed, discussion of cycling and gender need to be expanded beyond the realms of traffic-separated infrastructure and safety and fear, to include notions of social cohesion, citizenship and the right to the city.

The research findings are significant for women who currently cycle, and those women who are considering cycling, as they underline broader personal and social issues surrounding cycling, as well as identifying sources of encouragement,

and strategies for increasing female cycling participation rates that can be implemented at a range of local levels, not only at the LGA level by Council.

***Public space and the right to the city***

The act of cycling and physically being in space 'representing one's group … to a larger public' (Mitchell, 2003: 35) reinforces to the cyclists' right to the city, and the right to public space. This is crucial for Sydney as the city retrofits for cycling and the traditionally car-centric public spaces of the city are re-made in the long run into cycling-friendly spaces. Isin (2000: 5) argues for a contemporary understanding of citizenship 'as a social process through which individuals and social groups engage in claiming, expanding or losing rights … [where] the emphasis is … on norms, practices, meanings and identities.' The thesis started from the premise that the provision of physical cycling infrastructure is reshaping the form of the city and represents a challenge to the dominant culture of automobility in Sydney (Sheller & Urry, 2000). Urban cycling infrastructure is re-making public space (Iveson, 2007), and this raises many questions for cycling, gender, and social cohesion, in addition to how we conceptualise public space and understand citizenship in contemporary cities.

Governments are trying to address issues of cohesion which occur in these new forms of public spaces through behaviour change programs, such as the COS' Share the Path Program (COS, 2012c) and the NSW State government's Share the Road messages (TNSW, 2010). However shifting Sydney's culture of automobility is not a straightforward task, nor is changing the habits of individuals to watch for cyclists. Throughout the research process, comments made by the web-based survey respondents and the discussion group participants repeatedly touched upon the notions of public space, citizenship, social cohesion and social norms – through the claiming of space, expansion of rights, and feelings of community, legitimacy and belonging. Cycling for many is still considered to be a marginal mode of travel and represents a challenge to the dominant ideologies underpinning the City.

Cycling takes up public space, disrupts it yet also improves it. By providing spaces for cycling through increasing infrastructure (paint, cycleways, signage, cycle networks, priority traffic crossing, bicycle parking racks and rings), governments can

help to normalise cycling by making it more visible and a part of everyday topographical public spaces. This thesis contributes to discussions of public space, as cycling and cycling infrastructure broadens traditional notions of public space. Research highlights the conventional notion that not all public spaces are for the whole public. Indeed, the traffic-separated dedicated cycleway can in fact be an exclusionary form of public space as pedestrians are (ideally) banished from the greenway and cyclists whose needs are not met by the greenway are excluded and return to the road.

***Physical Cycling Infrastructure***

This thesis reinforces the notion that the provision of physical cycling infrastructure should meet the needs of the whole cycling community. Research findings reaffirm that Sydney is a diverse community, as different cyclists require and use different types of infrastructure. If we consider that public spaces serve different publics, then it follows that cycling infrastructure does indeed serve different cycling publics: off-road shared pedestrian-bike paths have the potential to serve the novice or cautious cycling community, and facilitate family and tourism cycling in Sydney, whereas the cycle lanes on busy roads serve cyclists with greater confidence, ability and experience, or the stereotypical lycra-clad cycling public. Whilst it is essential to acknowledge that different forms of infrastructure are utilised by different types of cyclists, the use of a Nelessen-style VPS and web-based survey found that the physical infrastructure story is much the same for female and male cyclists in Sydney with regards to use and preference.

Traffic-separated cycling infrastructure was popular amongst cyclists from both the web-based survey and Nelessen-style VPS-discussion groups, with a large majority of web-survey respondents (77%) having experienced riding along these forms of infrastructure. Conversation amongst participants in the female discussion group conformed to existing research which suggests that females prefer separation from vehicular traffic, as the COS' greenways were pronounced as an attractive form of infrastructure. Similarly, male participants were in favour of traffic-separated infrastructure such as greenways as they provided an attractive and stress-free safe haven from Sydney's busy streets. These forms of infrastructure were also seen as useful for encouraging people to take up cycling, and provide an

environment in which to build confidence and ability whilst providing a perception of safety.

This lack of a distinct gender difference with regards to preferences for traffic-separated cycling infrastructure was also evident in the Nelessen-style VPS and negates research by Garrard et al (2008) which suggests that female cyclists prefer separated cycleways. Importantly, both males and females chose images which depicted separation from vehicular traffic and also from pedestrian traffic. Although there were some minor differences in infrastructure preference between male and female participants in the Nelessen-style VPS, theses were related to the level of lights and respondents having no preference for either image. The Nelessen-style VPS revealed a preference amongst participating cyclists for *ideal* forms of infrastructure which provide a sense of space on the road and on the path. In all circumstances images which depicted an attractive cycling environment with minimal obstacles, few cars close to the door zone, few pedestrians around, but other cyclists using the infrastructure were preferred by both genders and were rated highly.

Furthermore, when examining which types of physical cycling infrastructure male and female cyclists normally used, there was no clear preference amongst women to use separated infrastructure. In contrast, proportionally more male cyclists than female cyclists would normally use separated cycleways (72% in comparison to 58%) and shared pedestrian-bike paths (75% compared to 66%), whereas more women would normally use the footpath compared to men (53% to 40%). Indeed, the majority of both male and female cyclists who responded to the web-survey reported that, when selecting their routes, they would use a *range* of physical cycling infrastructure (83% of male respondents and 77% of female respondents): including separated cycleways, shared paths, roads without bicycle symbols or signs, and roads with bicycle symbols or signs. All of these results suggest that there are very few differences between male and female cyclists' infrastructure use and preferences. There is no one clear infrastructure solution for the urban region. The mixture of physical cycling infrastructure responses that have been established as part of the process of retrofitting the city for cycling are appropriate, in so far as they appeal to the multitude of different cyclists in Sydney.

Further to this, males and females made use of end-of-trip facilities (such as bicycle parking, bicycle lockers and showers) in much the same way as each other in commuter and non-commuter cycling.

Irrespective of the external and internal images or stereotypes of cyclists and the connotations that these have for linking cyclists to different infrastructure modes, this thesis has found that overall both male and female cyclists (commuter, lycra-clad, recreational, utility cyclists etc.) use the range of available infrastructure in a similar way. Moreover, both male and female cyclists display a preference for traffic-separated cycleways, such as greenways and shared-paths, as well as infrastructure options which offer milder levels of separation, such as a cycle lane on a street where traffic volumes are not overwhelming. This is an incredibly positive finding as it provides support for the implementation of a range of cycling infrastructure, demonstrating that there is no one option to provide space for cycling in cities.

The study found that physical signs of cycling such as bicycle symbols and signs or on-road lane markings, and share-the-path symbols and signs, can increase the sense of visibility for cyclists, and thus legitimacy. Infrastructure represents a claim to space and a claim to the right of cyclists to the city.

***Social Cohesion: Participation***

The ratio of male to female respondents for the web-survey broadly reflects national trends in cycling participation rates. It is thus not surprising to conclude that more males cycle than females in inner-metropolitan Sydney, and that males also cycle more frequently than females. However, it is surprising to note that the number of females who participated in the Nelessen-style VPS-discussion group outnumbered the participants for the male group. Nine males participated in the Nelessen-style VPS-discussion group, whereas 11 females took part. These participation rates stress the importance for governments of legitimising female rights to the physical and social spaces of the cycling city to encourage greater female cycling participation.

Gender differences were less apparent amongst commuter cyclists. The number of males and females in Sydney who had or do commute is large, with 80% of female respondents and 94% of male respondents having commuted. The large numbers of commuter-cyclist respondents support the COS' increases in bicycle traffic during the morning and afternoon commuter peaks in Sydney from 2010 to 2012 (COS, 2013b).

***Social Cohesion: Identity, belonging and legitimacy***

'Australia is among the most cohesive and harmonious societies on earth, based on stable institutions, high living standards, economic expansion and isolation from zones of conflict' (Jupp, 2007: 9), yet discussion about social cohesion is becoming increasingly popular for urban governance. As cycling is transforming Sydney in such a pronounced way, it follows that discussions of social cohesion with regards to cyclists and the broader public will become necessary if cycling participation targets are to be met. This thesis has used Jenson's (1998) five dimensions of social cohesion: belonging, inclusion, participation, recognition and legitimacy, to help understand the experience of cyclists in Sydney, discuss gender and space claiming for cycling, and identify areas where cohesion is lacking. This thesis has focused on belonging, participation and legitimacy. It can be argued that cycling recognition and inclusion have already been achieved to a certain degree through the cycling strategies and plans currently in place across Australia, and cyclists inclusion as road users in a legal sense. Broader social acceptance of cycling, identified as processes of normalisation in this thesis, will happen slowly in Sydney given the ingrained culture of automobility.

As social cohesion is seen as a process rather than an end product, Sydney's growing cycling community is indicative of further progress in the process. Cyclists repeatedly linked cycling to social networks, group of friends and family, and often linked their own cycling activities to a broader cycling community – united by the act of cycling. As Jenson's first dimension of social cohesion, it is fitting then that ideas about belonging and feelings of belonging were prevalent throughout the research. Cyclists who took part in the web-based survey and discussion groups belonged to cycling-related groups or organisations, including on-line groups such as

forums or email newsletters. The majority identified with a particular aspect of cycling, and claimed that cycling gave them a sense of belonging and identity.

Cyclists in Sydney, as citizens, are governed by the same set of road rules which apply to vehicular traffic. However there exits a raft of underlying social norms that cyclists navigate through their daily cycling practices. Self-confessed rule breakers often cited reasons of personal safety for running red lights or riding along the footpath. Similarly, those cyclists who do not wear helmets were unconvinced of the added safety benefits. Although these are policed in Sydney, some cyclists still transgress the law and choose to leave their helmet at home. This small number of cyclists who did break rules represented a rift amongst cyclists.

***Gender and difference within cycling***

There were surprisingly few differences between male and female cyclists. The overarching story is a highly positive one where gender is concerned. The relationship between gender and differences between cycling practices and actions is tenuous, rather differences in cycling are dependent upon the individual cyclist, the type of cycling one does, and one's level of confidence and experience. Both groups held similar desires for safety and separation from vehicular traffic and/or pedestrians yet would cycle on any form of infrastructure, as the enjoyment of cycling tended to overshadow negative experiences. Both groups also showed an awareness that cyclists were often marginalised in Sydney, and individual cyclists had their own strategies to cope with any feelings of marginalisation such as making eye contact with other road users, smiling and waving, or cycling with others. The lack of an overall gender story in this thesis was a surprising result. However it is an entirely positive finding, as it supports recent research into women cycling over the life-course which argues that female cyclists (Bonham & Wilson 2012: 4) 'disrupt prevailing norms' and thus challenges discourse that has marginalised female cyclists.

The prevailing norms Bonham and Wilson refer to can be interpreted at the lycra-clad, white male, or elite cyclist (Daley & Rissel, 2011; Steinbach et al, 2011) which is still a dominant image of cycling in Australia and was echoed amongst research participants and respondents. Research into female cyclists in particular

can begin in break down these stereotypes as women, much like men, 'are not "fixed" in their cycling' (Bonham & Wilson, 2012: 196), utilising cycling for numerous different purposes and experiencing the gamut of cycling infrastructure. This thesis' investigations into the infrastructure use and preferences of female and male cyclists in Sydney reinforces that women's rights to the physical and social spaces of the cycling city need to be legitimised in order to increase cycling rates amongst women in Sydney, as infrastructure was not used, viewed or preferred remarkably differently by any one gender group. Indeed, the rights to space are similar for male and female cyclists – as the claims to space are claims for normalising and legitimising cycling in Sydney.

## 5.3 Recommendations:

Active transport and physical activity policies and strategies at all three tiers of government are imperative to creating cycling-friendly environments, shifting the behaviour of Australians to motivate more people to cycle, limit conflicts between all road users, and promote more inclusive and cohesive communities. This thesis provides further insight into cyclists' needs, highlighting that more can be done to not only encourage cycling in Sydney, but in urban and regional Australia.

### *Recommendations for government and government agencies*

#### Small-scale infrastructure design measures

- This thesis has argued that cyclists need *space* for cycling – this argument can be taken quite literally to mean that Australian guidelines for road design should be reviewed to consider increasing the on-road space required for cycling. As Councils upgrade their local roads and renew lane markings, I suggest that the current Austroads guidelines (referred to in Chapter 2 of this thesis) could be used to decrease traffic speeds on local roads to under 60 kilometres per hour, and simultaneously decrease the width of the car lane to between 2.5 and 2.8 meters wide as the City of Yarra Council in Victoria has done, thereby increasing the size of the cycle lane to a minimum width of 1.5 meters (McDonald, 2012). Whilst this measure cannot be implemented on all roads in the Sydney region, it is a relatively

inexpensive road treatment that all local councils should take into consideration for future road works, especially in areas where the existing traffic-speeds are low. This will provide more space for cyclists without obviously decreasing the space required for cars – representing an effective compromise.

- Taking and owning the lane in traffic and when going through roundabouts to ensure visibility and thus personal safety were amongst the space claiming strategies used by cyclists in Sydney explored in this thesis. Roundabouts can prove challenging for new or inexperienced cyclists and present an accident risk (Cumming, 2012). The more experienced cyclists amongst the respondents described how they would position themselves in the middle of the lane much like a car when negotiating a roundabout to ensure that they would be seen by all roundabout traffic and can travel through safely. Roundabout design should take into consideration the safety of cyclists when entering and exiting a roundabout. Bicycle symbols or sharrows which move the cyclists away from the left hand side of the car lane and into the middle of the lane leading up to a roundabout and as one moves through the roundabout could easily be included into lane marking upgrades on local roads. This treatment presents an alternative to Austroads' (2009) guidelines which suggest using a circular lane marked by green paint.

- Road treatments that give cyclists priority do need to be coordinated across LGAs. These should be accompanied by small-scale educational messages through Council websites, Council social media pages, and print advertising in places such as local newspapers, community centres, and council offices. Advertising messages should be educational in nature, informing the broader community of new cycling signs and lanes to reinforce the correct way to use the new treatments.

- Research findings suggest that cyclists experience frustration whilst riding cross-regionally, and a major concern for inner-metropolitan Sydney riders was the lack of connectivity between marked cycleways. The COS should consider additional simple road treatments on minor roads and quiet backstreets that do not form part of the COS' Cycleways Network in order to connect cyclists up to the network. Web-survey respondents commonly rode on streets which did not have bicycle symbols, lanes or signs – these are important indicators to other road users of the cyclists' right to be on the road, rather than in the gutter or the greenway.

**Discussion group suggestions for infrastructure**

- Giving cyclists priority at traffic lights was suggested by both male and female discussion group participants: *At traffic lights you do want that security, not to be bowled over, so there's some food for thought for infrastructure – having "bike go" lights, similar to "bus go" lights at intersections.* (S)

Although local Councils do have bicycle specific traffic lights at key intersections along separated cycleways, such as the COS' Bourke Street greenway, and at intersections along Leichhardt Council's shared pedestrian-bike path adjacent to Victoria Road in Rozelle, "bike go" lights could be considered at regular intersections which do not have traffic-separated cycleways and instead have marked on-road bicycle lanes to give cyclists a 'head start at lights' (S).

**Small-scale education measures**

- The COS produces cycling maps and guides which are available throughout the LGA and online. These could be more widely distributed, for example through libraries, and at railway stations in increase the visibility of the cycle network.

- Community groups and Bike User Groups (BUGS) should be more visible in cyclist education. Top-down infrastructure provision also requires bottom-up or grass-roots support – simple measures to encourage collaboration and communication between BUGS, cycling clubs, community groups and social cycling groups should be encouraged to foster a greater sense of community, share skills and knowledge, and also bridge divisions between various cyclists.

- Behaviour change programs are incredibly localised in order to best target infrastructure users, such as the COS' Share the Path Program (COS, 2012c). Whilst they are effective in so far as communicating a share the path or road message with local communities and local users, they do not necessarily reach the broader community. On-site behaviour change programs could be expanded to parks and share paths in other LGAs.

**Large-scale educational measures**

- Research findings which highlight animosity between cyclists and car drivers commonly recall language such as 'aggressive', 'pushy', and 'intimidating drivers'. These negative experiences of cycling in the city indicate that there is a great need for a coordinated education program in the State that is integrated across Local Government Areas. Current programs and campaigns are effective *within* local areas, however they need to reflect that cycling, like driving, crosses LGA boundaries.

- Driver-awareness education campaigns should cross all tiers of government. There is great potential for the Local Governments Association to coordinate driver and pedestrian-awareness advertising campaigns on public transport (i.e on buses and bus shelters) in order for campaign messages to cross LGA boundaries, as well as through local newspapers, community magazines, local radio and the usual media outlets. The NSW RMS' Driver Knowledge Test does include a cycling component, as does the Hazard Perception Test. However, these do not target current full licensed drivers – awareness campaigns can, yet they need to be consistent and coordinated at all levels across the State: State government agencies, Councils, community groups, schools, etc.

- The NSW State government and Councils could coordinate and increase out-door driver-awareness campaigns in the inner-metropolitan region, in order to compliment the NSW State government's targeted campaigns in outer-metropolitan areas including Liverpool and Wollongong (TNSW, 2012), to capture more drivers.

- Rider-awareness education is extremely important given how fast Sydney's urban environment is changing. Linking cycling confidence courses with educational institutions as part of curriculums in high schools and primary schools across the Sydney region would enhance awareness of cycling and ability from an early age. This could be linked to introducing students to the Inner Sydney Bicycle Network and the NSW State government's Metro Sydney Bike Network – raising awareness of the networks.

**Discussion group suggestions for education**

- Amongst the female discussion group the very graphic helmet safety campaigns of the late 1990s – early 2000s were cited as the predominate reason for wearing a helmet. Renewed national efforts to target helmet use through such campaigns could introduce younger generations to the same message.

- There was a strong consensus amongst the female discussion group that cycling needs to be normalised through shifting the culture of automobility so that cycling becomes 'normal, not needing lycra and a complete kit.' (H) The COS' video/film messages from ordinary people who cycle 'talking about how cycling has changed their lives or helped them keep active in old age are great… but I found the best encouragement has been from my friends, even when I was a kid. Get them young!' (C)

***Recommendations for governments – Infrastructure up-keep and maintenance***

**Small-scale infrastructure maintenance measures**

- Finding from the Nelessen-style VPS suggest that cyclists have a preference for cycling infrastructure which is free from obstacles – this includes debris from surrounding trees and rubbish such as broken glass, as well as parked cars, pedestrians and stray animals (explored further in this chapter). The following comment is representative of the solutions web-survey respondents and discussion group participants offered for local governments: 'note that councils need to increase sweeping regime for hard shoulders & bike track' (F#248). Increasing council sweeping regimes along separated cycling infrastructure and along on-road infrastructure, such as the bicycle lanes can improve the quality of cyclists' journeys, and also minimise unnecessary tyre punctures.

- As a follow up measure, increased or better policing of these spaces could enhance the cyclists experience and minimise obstacles.

**Discussion group suggestions for infrastructure maintenance**

- In addition to cycle lanes being policed (by police on mountain bikes naturally), the discussion groups offered suggestions regarding flexibility in the NSW road rules regarding cyclists riding along footpaths. Given that 53% of female respondents and 40% of male respondents would normally use the footpath in their riding, if for example the traffic was too fast, there needs to be a 'more flexible [government/RMS or police response] in terms of people riding on the pathways (footpaths) … to encourage people to start … [and] not [feel] forced onto the roads …' (J) Cycling re-shapes out understanding of citizenship and reinforces the necessity for cycling to be both legitimised and normalised in communities across Australia.

***Recommendations for the private sector and everyday citizens***

**Small-scale measures for workplaces**

- Talk to your employees! For individuals who commuted in Sydney whilst end of trip facilities such a shower and secure place to park one's bicycle added to the convenience and comfort of commuting. Employers in Sydney are providing bicycle facilities, however more can be done to improve comfort, ease, and convenience for cyclists and indeed active travel overall at workplaces.

- Take part in Ride to Work Day and join a COS Cycling the City Confidence Course with a group of colleagues.

**Discussion group suggestions – for cyclists and non-cyclists**

- 'It's all about positive reinforcement and even if you don't cycle to work … I've found that a lot of my friends want to start cycling now because I say, oh yeah I went for a bike ride on the weekend along the cooks river and it was really nice, you know, I got out of the house for a couple of hours and because they know me they know that you don't necessarily have to wear special gear or need a fancy bike, you … need a helmet and then you get on the bike and you ride, that's all it is… so you don't need to be a huge part of the culture it can just be something that you do for fun…' (C)

- Cycle with a buddy: ‘I would come with you and show you the safe ways to go.’ (P)

- There are alternative strategies to normalise cycling: ‘Instead of fighting other people I try to flip it, so that they are the crazy person and not me. ’ (J)

- Friendly advice for cyclists looking lost/ people new to cycling in Sydney: ‘Encouraging people to go on routes that are pleasant… [by saying] “you know what you could go straight down Oxford Street, but actually if you go through the back streets of Paddington its slightly more hilly but it’s really green and pleasant…” and you don’t really notice the hills.’ (M)

### 5.4 5Lessons learnt for other cities retrofitting for cycling:

The key themes of space claiming and re-negotiations of citizenship explored in the thesis have informed recommendations that will help to increase cycling participation, particularly in the urban region. Lessons learnt from this research can also be applied to other cities in countries with similarly lower rates of cycling that are retrofitting to encourage greater participation

- There is not one infrastructure solution: Multiple forms of physical cycling infrastructure and road treatments will attract a wide range of cyclists. These also need to be connected to avoid alienating potential riders and encourage use by all cyclists. Cycling populations are incredibly diverse - Inclusive cycling environments should encompass off-road, on-road, and shared spaces for cycling. Both female and male cyclists prefer spaces for cycling that are attractive, well-lit, provide adequate space for cycling, and are free from obstacles.

- Cycling groups and organisations, and incidental interactions whilst cycling can foster a sense of community and belonging for cyclists > infrastructure measures can influence this through placing cyclists together with pedestrians in a shared-path situation, although adequate signage and behaviour messages are necessary.

## 5.5 Space for further research:

The gender perspective of cycling presented in this thesis presents tantalising opportunities for further research. Cycling and gender issues in urban environments are well worth investigating in greater detail. Possible spaces and opportunities for research into gender, cycling and infrastructure in Sydney highlighted by this thesis include:

i. The lived-experience of cyclists whose cycling activities cross perceived cycling typologies and challenge accepted tropes of what constitutes a cyclist in Sydney could be explored in greater detail. This could be achieved by documenting the stop-start Life Cycle (Bonham & Wilson, 2011 & 2012) of female and male cyclists in Sydney.

ii. Closer analysis of the effects of shared cycling infrastructure on social cohesion within Sydney, or within a bounded study site that crosses LGA boundaries would enable analysis of the City of Sydney's share the path programs and awareness campaigns.

iii. A longitudinal study of how lessons learnt in the City of Sydney and Bike Wise-run Cycling the City Confidence courses impact the cycling habits and experience of participants involved.

iv. Further Nelessen-style VPS' followed up with the use of video cameras attached to cyclists' helmets – the potential of the visual image is vast. Video could perhaps be used to capture how cyclists interact with physical cycling infrastructure – tracking routes, interactions with other road users, and be used to measure the physical space that cyclists *need* to ride safely and comfortably.

v. Further qualitative research is needed into the different strategies cyclists use whilst riding to inform cycling education classes – including; harm minimisation, wayfinding, negotiating intersections and coping with inclement weather.

vi. A survey of taxi and bus drivers' interactions with cyclists, to provide an alternative view of the clashes between vehicular traffic and cyclists.

## 5.6 Research limitations:

Although the focus of this thesis was initially extremely broad, with the web-based survey attempting to capture as much information about respondents and their cycling as was possible, the thesis could have benefitted from greater focus in this early data gathering stage. The web-based survey could have been divided into a group of smaller surveys that would each take two to five minutes to complete, thus minimizing any potential survey drop out rate and increasing the number of survey respondents. This would provide a larger snapshot of cycling in Sydney whilst also improving the significance of the statistics obtained.

The questions used in the web-based survey could be divided into demographic questions, practical cycling questions (questions about cyclists' current cycling habits and practices – frequency, trip purpose etc.), behaviour questions, questions about how cyclists feel about their current cycling habits and practices (cyclists' experiences of cycling in the study area, their problems, fears and their positive and negative experiences), infrastructure questions (questions about infrastructure use specific to the study area, interactions with the physical cycling infrastructure and also social infrastructure, and infrastructure preference questions – possibly modelled on the Nelessen-style VPS but carried out online), questions about networks (involvement in , questions regarding cyclists' involvement in cycling-related groups and organisations – and also how they feel about this involvement), and questions about social interactions in public spaces (including identity, belonging, inclusion, clothing, encouraging others to cycle, safe cycling practices, and conflicts). Whilst there are numerous means of breaking down the survey into smaller, shorter surveys, questions could have been included to explore in greater detail personal cycling histories (i.e. when individuals started to cycle, when they gave up, came back to cycling, etc.) and the external influences on this stop-start pattern.

Conclusions drawn from this research could also benefit from further validation by studying a larger sample of cyclists in the Nelessen-style VPS and in-depth discussion group sessions. Broadening the study to incorporate more cyclists from a wider range of LGAs within the Sydney region in Nelessen-style VPS-discussion groups would be beneficial in order to examine the cycling infrastructure

preferences of a broader cross-section of cyclists who may not be exposed to the same kinds of physical cycling infrastructure as residents in the inner-metropolitan region. Although conducting more discussion group sessions was beyond the scope of this thesis, the study would have benefitted from a larger pool of cycling narratives and discussions about the lived-experience of cycling. Indeed the key themes (Creating space/s for cycling – space claiming and legitimising cycling, "Us and them" – normalising cycling in the city, (Non)belonging – identity, gender and difference within the cycling community) that were drawn out of the discussion group sessions could have been explored in greater detail with two to four extra discussion groups to add depth.

The Nelessen-style VPS could be enhanced by creating an on-line version of the survey in order to reach a broader cycling audience. A much larger sample size to draw from for the Nelessen-style VPS would enable further testing of the usefulness of the method for Local Governments in the design, construction, and maintenance of physical cycling infrastructure. Images used in the Nelessen-style VPS could be specific to a bounded area, such as an LGA or Electoral area in order to test how specific, bounded communities feel about alternative and/or cycling infrastructure.

### 5.7 Postscript:

This thesis started by reflecting on my childhood memories of cycling in a semi-rural area on Sydney's peri-urban fringe, and my transition from city-fringe to inner-urban cyclist as life, work, study and my growing love of the bicycle took me to Sydney's inner-western suburbs. Over the course of the thesis I continued to cycle in the city, often cruising to the park on weekends with friends (Figure 37). However towards the end of thesis I moved back to the peri-urban fringe and took my beautiful city bicycle with me. Whilst back home I embarked upon numerous rides into the previously unfamiliar realm of early Saturday morning lycra-clad 50 kilometre-plus cycle trips. These morning rides were with a group of women who were unafraid to cycle up Mount Razorback on a winding road which reputably has a gradient that averages between 5.8% and 16%, attracts predominately male lycra-

clad cyclists, and is *still* a mighty struggle for me to climb. The ride was always punctured by a coffee stop where the disparate groups of early morning riders sit together as friends – 'blokes and girls' as my Dad said once – before cycling off in different directions. Since moving back into the inner-west I have come to miss the feeling of utter pleasure when I'd reach the top of Mount Razorback and look towards Sydney. On these rides I learnt more about cycling etiquette, how to call out 'car back!', and how to dismount properly whilst wearing cleats so that I wouldn't stab myself in the calf with the chain ring. Last week I hopped back on my city bike and rode for the first time in two months. I rode in a skirt, I wobbled when I indicated a right hand turn and I jumped off and wheeled my bike through a set of traffic lights. I *loved* every second of it and cannot wait to make new friends by cycling in the city.

**Figure 37: A cheery weekend cycle to Centennial Park in Sydney (N.McNamara, 2012)**

## Appendices

### Appendix 1:

Sample images and notes from fieldwork (stage 1 of the research)

| Image | Location & Infrastructure type | Comments |
|---|---|---|
|  | Buckland Street, Alexandria<br><br>Greenway – contra-flow (single lane)<br><br>Surface treatment: good quality | Early afternoon<br><br>Autumn<br><br>Potential obstacles = debris from overhead deciduous trees and also cars in the reverse angled parking<br><br>Cars potentially coming out of side street |
|  | Lenthall St, Randwick<br><br>On-road: cycle lane in car parking zone<br><br>Round about approach<br><br>Surface treatment: Road/brick-path both good quality | Mid day weekday<br><br>Summer<br><br>Cyclists directed by bicycle symbols on street to move through round-about on the left hand side of the road<br><br>Concrete barrier provides space for cyclist at entrance to round about |

| Image | Location & Infrastructure type | Comments |
|---|---|---|
|  | Parkham St, Surry Hills<br><br>On-road: shared bike/car lane<br><br>Surface treatment: good quality<br><br>On-road symbols starting to fade | Late summer<br><br>Early Saturday morning after a light shower<br><br>Narrow side-street with pedestrians and parked cars either side<br><br>Cyclists are positioned in the middle of the road |
|  | Corner of Boronia and Marriott Sts, Redfern<br><br>On-road: shared bike-car single lane<br><br>One-way street with traffic calming swales<br><br>Surface treatment: good quality | Summer<br><br>Saturday afternoon<br><br>Light traffic<br><br>Road widens ahead<br><br>Street trees and WSUD traffic calming devices slow down traffic on the back streets |

| Image | Location & Infrastructure type | Comments |
|---|---|---|
|  | Cope St, Waterloo/Redfern<br><br>Round about approach at Phillip St<br><br>On-road, downhill<br><br>No cycling symbols or signs along the street | Autumn<br><br>Early evening<br><br>Wide street however image is taken from the door-zone |
|  | Bourke St, Surry Hills<br><br>Greenway<br><br>Surface treatment: good quality | Mid-Summer<br><br>Early afternoon Weekend<br><br>Some debris from street trees on path<br>Shade<br>Dual lane = need to be wary of cars when riding in the opposite direction |

**Appendix 2:**

a) Web-based survey questions

| SURVEY QUESTIONS<br>Part 1<br>1. What is your age? |
|---|
| 2. Are you? Male, Female, Other |
| 3. What is your post code? |
| 4. What was your age when you learnt to ride a bike? |
| 5. Are you aware of any gender-specific cycling groups or organisations? If so, please specify: |
| 6. Do you belong to any cycling-related groups or organisations? If so, please specify: |
| 7. What cycling activities have you ever been involved in? (Please select all that apply) |
| 8. Do you prefer to cycle: |
| 9. How often do you cycle? (Please select one) |
| 10. Who or what encourages you to cycle? (Please select all that apply) |
| Part 2<br>1. Do you feel a sense of community or belonging when you cycle? |
| 2. Do you feel like you identify as a cyclist? |
| 3. Are you aware of any stereotypes (i.e. related to cyclists or to gender) when you cycle? |
| 4. a) Have you ever felt intimidated when cycling? |
| 4. b) What are the situations that this occurs? |
| 5. What do you like about cycling in Sydney? |
| 6. What don't you like about cycling in Sydney? |
| Part 3<br>1. Please indicate the purposes you use your bike for: (Please select all that apply) |
| 2. a) Have you ever ridden your bike (commuted) to and from your work or place of study? |
| 2. b) How often do you commute by bike? (Please select one) |
| 2. c) Please estimate (in kilometres) the distance you commute (one way): |
| 2. d) Please estimate (in minutes) the time your commute takes (one way): |
| 2. e) What enables you to commute? |
| 3. Does the availability of end-of-trip facilities impact your decision to commute? |
| 4. Please select the end of trip facilities you use in your cycling: |
| 5. How long would you normally cycle for on a single journey that is not to commute? (estimate in minutes) |
| 6. Is there a season/s in which you would cycle more? Why? |
| 7. Do you ever cycle and use public transport in the same journey? |
| 8. What public transport option/s do you cycle to or from? (please select all that apply) |
| 9. How often do you use your bike to get to or from public transport? |
| 10. Do you lock your bike up or take it with you? Why? |
| Part 4<br>1. The City of Sydney Council has constructed 10 kilometres of dedicated cycleways separated from road traffic (e.g. Bourke St cycleway and College St cycleway) in recent years.<br>a) Have you ridden on any of the separated cycleways (or other separated cycleways)? |
| 1. b) Approximately what percentage of your trips are on separated cycleways? |
| 1. c) What advantages (if any) have you experienced to the cycleways? |
| 1. d) What disadvantages (if any) have you experienced to the cycleways? |
| 2. Do you think separated cycleways are a good means of travel for inexperienced or new riders? |
| 3. When cycling on the road, do you: a) Consider yourself to be another vehicle? |

| |
|---|
| 3. b) expect the same or a similar level of respect from other road users? |
| 4. What does ‘safe cycling’ mean to you? |
| 5. What helps you to feel safe when cycling? (i.e. your lights, riding with another person, hi-viz vest...) |
| Part 5 |
| 1. Where do you feel most comfortable riding? (think of specific streets, suburbs, places or circumstances) |
| 2. Across Sydney, bicycling signs are often the responsibility of differing levels of government. Please indicate which signs you recognise from the images below |
| 3. a) When cycling, are you aware of any signs (signposts or road markings) that direct cyclists onto certain routes or paths? |
| 3. a) If yes, please give details of streets or suburbs where this occurs: |
| 3. b) Do you make use of these signs? |
| 3. c) Do you find that these signs: |
| 4. Do you recognise any of the path types depicted below? Please indicate which ones. |
| 5. When selecting your cycling route/s do you: |
| 6. Do the routes you take usually include any of the following types of bicycle infrastructure? (Please select all that apply) |
| 7. Does the level of vehicular traffic influence the route/s you take? |
| 8. Do you usually make stops along the way (other than at lights, intersections, or crossings)? If so, what are these stops for? |
| Part 6 |
| 1. a) Do you wear specific cycling clothes? |
| 2. If yes, please give reasons as to why: |
| 3. If you do not wear specific cycling clothing, what do you choose to wear and why? |
| 4. Do you feel that the type of clothing you wear when you ride gives a certain message to other road users? |
| 5. a) Do you wear a helmet? (Please select one) |
| 5. b) What influences this decision? |

b) Images for Part 5 Q2 (colour images used in on-line survey)

1


2

3


4


5

6

7

8


9


10

11

12


13

c) Images for Part 5 Q4 (colour images used in on-line survey)

A

B

C

D

E

F

**Appendix 3:**

Female web-based survey respondents:

| **Female Respondents** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **#** | **Age** | **#** | **Age** | **#** | **Age** | **#** | **Age** |
| 1 | 25 | 99 | 52 | 216 | 42 | 311 | 24 |
| 2 | 25 | 101 | 18 | 219 | 51 | 312 | 38 |
| 3 | 30 | 104 | 33 | 220 | 43 | 314 | 48 |
| 6 | 39 | 115 | 47 | 222 | 31 | 315 | 25 |
| 8 | 31 | 120 | 46 | 230 | 40 | 318 | 25 |
| 9 | 28 | 129 | 31 | 233 | 42 | 322 | 34 |
| 14 | 31 | 135 | 32 | 236 | 26 | 323 | 49 |
| 16 | 36 | 139 | 21 | 237 | 37 | 326 | 35 |
| 20 | 21 | 140 | 25 | 238 | 32 | 327 | 24 |
| 21 | 40 | 142 | 40 | 241 | 38 | 328 | 50 |
| 22 | 45 | 143 | 53 | 242 | 56 | 329 | 48 |
| 23 | 35 | 148 | 35 | 245 | 56 | 332 | 49 |
| 24 | 23 | 156 | 61 | 246 | 45 | 333 | 48 |
| 25 | 43 | 164 | 44 | 247 | 53 | 334 | 28 |
| 26 | 25 | 165 | 61 | 248 | 63 | 335 | 42 |
| 27 | 38 | 169 | 48 | 249 | 39 | 337 | 40 |
| 29 | 31 | 172 | 25 | 253 | 45 | 338 | 35 |
| 33 | 49 | 173 | 54 | 257 | 47 | 339 | 33 |
| 34 | 48 | 177 | 38 | 260 | 50 | 347 | 28 |
| 36 | 34 | 180 | 29 | 263 | 40 | 349 | 47 |
| 39 | 31 | 184 | 48 | 264 | 28 | 350 | 31 |
| 43 | 55 | 185 | 24 | 269 | 26 | | |
| 45 | 24 | 188 | 56 | 273 | 32 | | |
| 48 | 35 | 192 | 53 | 274 | 52 | | |
| 50 | 27 | 193 | 62 | 281 | 56 | | |
| 52 | 25 | 196 | 27 | 291 | 33 | | |
| 55 | 30 | 198 | 55 | 292 | 43 | | |
| 56 | 29 | 199 | 31 | 293 | 39 | | |
| 59 | 55 | 201 | 28 | 296 | 49 | | |
| 66 | 54 | 202 | 21 | 297 | 32 | | |
| 70 | 32 | 203 | 47 | 298 | 54 | | |
| 71 | 28 | 204 | 21 | 299 | 55 | | |
| 72 | 24 | 206 | 58 | 300 | 55 | | |
| 76 | 23 | 209 | 27 | 304 | 21 | | |
| 77 | 45 | 211 | 28 | 306 | 46 | | |
| 82 | 18 | 212 | 33 | 307 | 25 | | |
| 85 | 20 | 214 | 23 | 309 | 22 | | |
| 87 | 44 | 215 | 56 | 310 | 27 | | |

Male web-based survey respondents:

| **Male Respondents** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **#** | **Age** | **#** | **Age** | **#** | **Age** | **#** | **Age** | **#** | **Age** | **#** | **Age** |
| 4 | 34 | 69 | 29 | 119 | 49 | 168 | 43 | 235 | 40 | 295 | 65 |
| 5 | 44 | 73 | 28 | 121 | 40 | 170 | 52 | 239 | 25 | 301 | 51 |
| 7 | 35 | 74 | 36 | 122 | 24 | 171 | 60 | 240 | 74 | 302 | 61 |
| 10 | 22 | 75 | 25 | 123 | 45 | 174 | 41 | 243 | 30 | 303 | 26 |
| 11 | 18 | 78 | 38 | 124 | 54 | 175 | 42 | 244 | 39 | 305 | 45 |
| 12 | 58 | 79 | 54 | 125 | 50 | 176 | 30 | 250 | 22 | 308 | 30 |
| 13 | 49 | 80 | 34 | 126 | 53 | 178 | 46 | 251 | 38 | 313 | 25 |
| 15 | 58 | 81 | 25 | 127 | 32 | 179 | 43 | 252 | 36 | 316 | 33 |
| 17 | 19 | 83 | 22 | 128 | 54 | 181 | 58 | 254 | 60 | 317 | 63 |
| 18 | 22 | 84 | 47 | 130 | 35 | 182 | 70 | 255 | 52 | 319 | 24 |
| 19 | 65 | 86 | 65 | 131 | 29 | 183 | 37 | 256 | 48 | 320 | 38 |
| 28 | 31 | 88 | 41 | 132 | 39 | 186 | 67 | 258 | 25 | 321 | 42 |
| 30 | 40 | 89 | 35 | 133 | 37 | 187 | 25 | 259 | 39 | 324 | 35 |
| 31 | 26 | 90 | 69 | 134 | 42 | 189 | 44 | 261 | 69 | 325 | 53 |
| 32 | 48 | 91 | 61 | 136 | 74 | 190 | 58 | 262 | 43 | 330 | 28 |
| 35 | 54 | 92 | 58 | 137 | 34 | 191 | 60 | 265 | 58 | 331 | 40 |
| 37 | 26 | 93 | 26 | 138 | 45 | 194 | 53 | 266 | 41 | 336 | 28 |
| 38 | 55 | 94 | 63 | 141 | 46 | 195 | 63 | 267 | 46 | 340 | 26 |
| 40 | 50 | 95 | 48 | 144 | 64 | 197 | 45 | 268 | 37 | 341 | 36 |
| 41 | 50 | 96 | 42 | 145 | 51 | 200 | 26 | 270 | 43 | 342 | 45 |
| 42 | 49 | 97 | 46 | 146 | 44 | 205 | 62 | 271 | 35 | 343 | 31 |
| 44 | 29 | 98 | 66 | 147 | 38 | 207 | 45 | 272 | 56 | 344 | 37 |
| 46 | 37 | 100 | 61 | 149 | 50 | 208 | 42 | 275 | 36 | 345 | 65 |
| 47 | 47 | 102 | 32 | 150 | 39 | 210 | 59 | 276 | 38 | 346 | 23 |
| 49 | 24 | 103 | 32 | 151 | 59 | 213 | 42 | 277 | 53 | 348 | 54 |
| 51 | 52 | 105 | 50 | 152 | 41 | 217 | 56 | 278 | 42 | 351 | 23 |
| 53 | 41 | 106 | 49 | 153 | 54 | 218 | 24 | 279 | 28 | 352 | 27 |
| 54 | 42 | 107 | 45 | 154 | 35 | 221 | 63 | 280 | 39 | 353 | 25 |
| 57 | 30 | 108 | 56 | 155 | 42 | 223 | 32 | 282 | 43 | 354 | 56 |
| 58 | 51 | 109 | 49 | 157 | 44 | 224 | 50 | 283 | 26 | 355 | 26 |
| 60 | 38 | 110 | 40 | 158 | 57 | 225 | 63 | 284 | 45 | | |
| 61 | 36 | 111 | 48 | 159 | 20 | 226 | 25 | 285 | 44 | | |
| 62 | 44 | 112 | 64 | 160 | 44 | 227 | 48 | 286 | 53 | | |
| 63 | 52 | 113 | 45 | 161 | 74 | 228 | 34 | 287 | 60 | | |
| 64 | 23 | 114 | 39 | 162 | 58 | 229 | 51 | 288 | 69 | | |
| 65 | 31 | 116 | 51 | 163 | 54 | 231 | 49 | 289 | 25 | | |
| 67 | 57 | 117 | 41 | 166 | 23 | 232 | 34 | 290 | 56 | | |
| 68 | 34 | 118 | 52 | 167 | 57 | 234 | 50 | 294 | 59 | | |

**Appendix 4:**

Sample advertising flyer/spoke card and recruitment poster



Figure 38: Spoke card and flyers (N.McNamara 2012)


Figure 39: Advertising poster (N.McNamara, 2012)

**Appendix 5:**

Wordpress site: screenshots

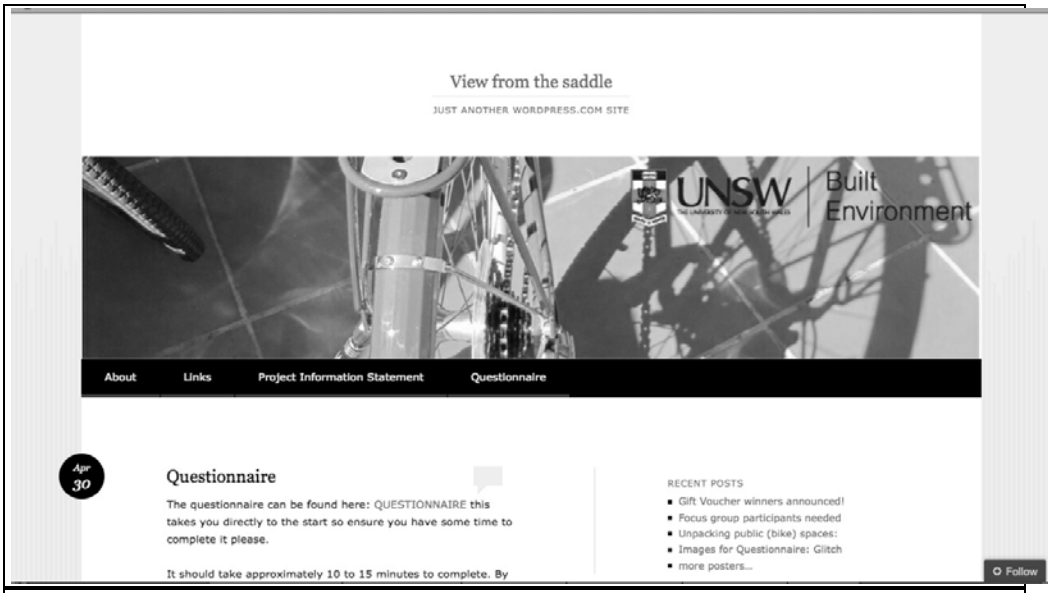



Figure 40: Link to web-based survey on wordpress site (N.McNamara, 2012)

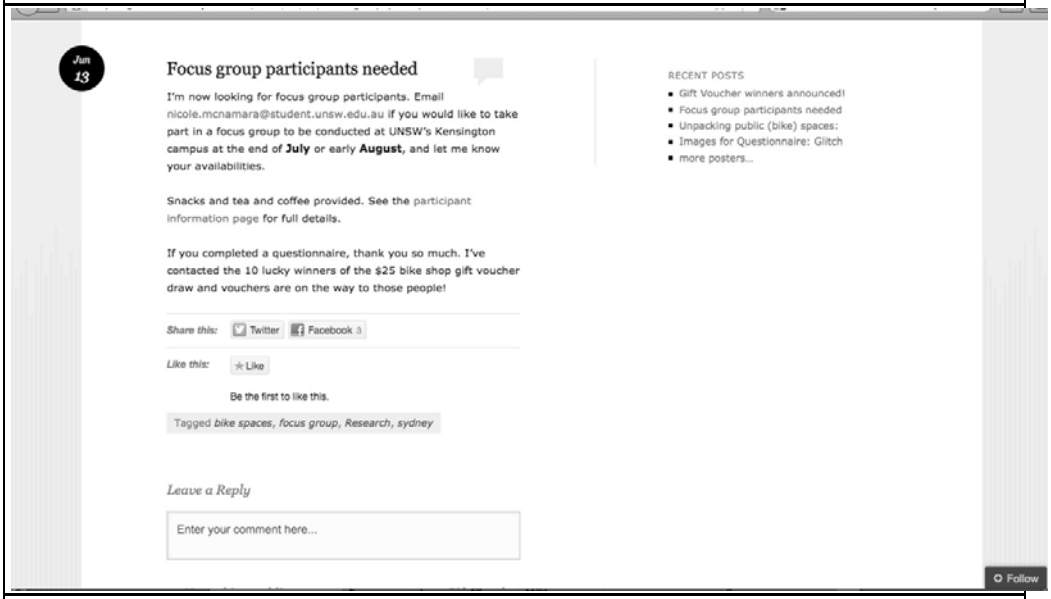



Figure 41: Recruitment post on wordpress site for discussion groups (N.McNamara, 2012)

**Appendix 6:**

Combined VPS-discussion group participant profiles (July 27th & August 10th, 2012)

| Participant | Gender | Age | Post Code | Frequent cyclist | Occasional cyclist |
|---|---|---|---|---|---|
| A | M | 23 | 2031 | X | |
| B | M | 23 | 2031 | X | |
| C | F | 26 | 2203 | | X |
| D | F | 26 | 2049 | | X |
| E | F | 27 | 2203 | | X |
| F | M | 27 | 2036 | X | |
| G | F | 28 | 2034 | | X |
| H | F | 28 | 2031 | X | |
| I | M | 30 | 2034 | X | |
| J | F | 30 | 2011 | X | |
| K | M | 36 | 2090 | X | |
| L | F | 40> | 2008 | X | |
| M | F | 43 | 2026 | X | |
| N | M | 45 | 2011 | X | |
| O | M | 48 | 2010 | X | |
| P | F | 49 | 2130 | X | |
| Q | M | 50 | 2234 | X | |
| R | M | 54 | 2032 | X | |
| S | F | 56 | 2560 | X | |
| T | F | ? | ? | X | |

**Appendix 7:**

Nelessen-Style VPS Variables page 1 – Images 1-24

| IMAGE | SIGHT LINES | | VEHICULAR TRAFFIC | | PEDESTRIANS | | SHADE/STREET TREES | | EVIDENCE OF CYCLING SIGNS | | INFRASTRUCTURE | | | ROAD/PATH SURFACE | | OBSTACLES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CLEAR | UN-CLEAR | PRESENT | ABSENT | PRESENT | ABSENT | PRESENT | ABSENT | CLEAR | UN-CLEAR | GREEN WAY | ON-ROAD | FOOT PATH | GOOD | POOR | PRESENT | ABSENT |
| 1 | | X | | X | | X | X | | X | | | X | | | X | | X |
| 2 | | X | | X | | X | X | | X | | X | | | X | | | X |
| 3 | | X | | X | | X | X | | X | | | X | | X | | | X |
| 4 | X | | X | | | X | X | | X | | | X | | X | | | X |
| 5 | X | | X | | X | | X | | X | | X | | | X | | | X |
| 6 | X | | | X | | X | X | | X | | X | | | X | | | X |
| 7 | X | | | X | X | | X | | X | | | | X | X | | | X |
| 8 | X | | | X | | X | X | | X | | | | X | X | | X | |
| 9 | | X | | X | | X | X | | X | | | X | | X | | X | |
| 10 | X | | | X | | X | X | | X | | | X | | X | | X | |
| 11 | X | | | X | | X | X | | | X | | X | | X | | | X |
| 12 | | X | | X | | X | | X | | X | | X | | | X | | X |
| 13 | X | | | X | X | | X | | | X | | X | | X | | X | |
| 14 | X | | | X | | X | X | | X | | X | | | | X | | X |
| 15 | X | | | X | X | | X | | | X | | | X | X | | X | |
| 16 | X | | | X | | X | X | | | X | | | X | X | | | X |
| 17 | | X | | X | X | | | X | | X | | | X | | X | X | |
| 18 | X | | | X | X | | X | | | X | | | X | | X | X | |
| 19 | | X | | X | | X | X | | | X | | X | | | X | X | |
| 20 | | X | | X | X | | X | | | X | | X | | | X | X | |
| 21 | X | | | X | | X | X | | | X | | X | | X | | X | |
| 22 | | X | | X | X | | X | | | X | X | | | X | | X | |
| 23 | X | | | X | X | | | X | | X | | | X | X | | X | |
| 24 | X | | | X | X | | X | | X | | X | | | X | | X | |

Nelessen-Style VPS Variables page 2 – images 25-50

| IMAGE | SIGHT LINES | | VEHICULAR TRAFFIC | | PEDESTRIANS | | SHADE/STREET TREES | | EVIDENCE OF CYCLING SIGNS | | INFRASTRUCTURE | | | ROAD/PATH SURFACE | | OBSTACLES /DEBRIT ON PATH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CLEAR | UN-CLEAR | PRESENT | ABSENT | PRESENT | ABSENT | PRESENT | ABSENT | CLEAR | UN-CLEAR | GREEN WAY | ON-ROAD | FOOT PATH | GOOD | POOR | PRESENT | ABSENT |
| 25 | X | | X | | X | | | X | | X | | | X | X | | X | |
| 26 | | X | | X | X | | X | | X | | | | X | X | | X | |
| 27 | X | | X | | | X | X | | X | | | | X | X | | | X |
| 28 | X | | X | | X | | X | | X | | | X | | X | | | X |
| 29 | X | | X | | X | | X | | X | | | | X | X | | | X |
| 30 | X | | X | | | X | X | | X | | | | X | X | | | X |
| 31 | X | | | X | X | | X | | X | | | X | | X | | | X |
| 32 | | X | X | | X | | X | | | | X | | | X | | | X |
| 33 | X | | X | | | X | X | | X | | X | | | X | | | X |
| 34 | X | | | X | X | | X | | X | | X | | | X | | | X |
| 35 | | X | X | | X | | | X | | X | | X | | X | | X | |
| 36 | X | | X | | | | X | | X | | X | | | X | | | X |
| 37 | | X | | X | X | | X | | X | | | | X | X | | X | |
| 38 | | X | X | | | X | | X | X | | | | X | X | | X | |
| 39 | | X | | X | X | | X | | X | | | | X | X | | | X |
| 40 | | X | | X | | X | X | | X | | | | X | X | | X | |
| 41 | X | | X | | | X | X | | X | | | X | | X | | X | |
| 42 | X | | X | | | X | X | | X | | | | X | X | | X | |
| 43 | X | | X | | X | | X | | X | | X | | | X | | X | |
| 44 | X | | X | | | X | X | | X | | | | X | X | | X | |
| 45 | | X | X | | | X | X | | X | | | | X | X | | X | |
| 46 | X | | X | | | X | X | X | | X | | | X | X | | X | |
| 47 | | X | X | | | X | X | | X | | | | X | X | X | X | |
| 48 | | X | X | | | X | X | | X | | | | X | X | | X | |
| 49 | X | | X | | | X | X | | X | | | X | | X | | X | |
| 50 | X | | X | | | X | X | | X | | | X | | X | | X | |

**Appendix 8:**

VPS results combined (M & F discussion groups) – The following 5 tables depict the number of times each image was chosen by VPS-discussion group participants, and the average preference rating for each image (the rating scale was from 1 to 5). All images were taken by the researcher.

Group 1: Space

| | | | |
|---|---|---|---|
|  1 | |  2 | |
| Chosen: 4 Ave: 4 | Chosen: 16 Ave: 3.9 | Chosen: 12 Ave: 3.33 | Chosen: 7 Ave: 2.87 |
|  3 | |  4 | |
| Chosen: 6 Ave: 3.4 | Chosen: 12 Ave: 4.5 | Chosen: 1 Ave: 3.82 | Chosen: 19 Ave: 4.5 |
|  5 | | | |
| Chosen: 3 Ave: 3.66 | Chosen: 15 Ave: 3.78 | | |

Group 2: Road/Path Conditions

6

| Chosen: 13 Ave: 3.07 | Chosen: 7 Ave: 3 |
|---|---|

7

| Chosen: 11 Ave: 3.9 | Chosen: 7 Ave: 3.57 |
|---|---|

8

| Chosen: 1 Ave: 5 | Chosen: 18 Ave: 4.64 |
|---|---|

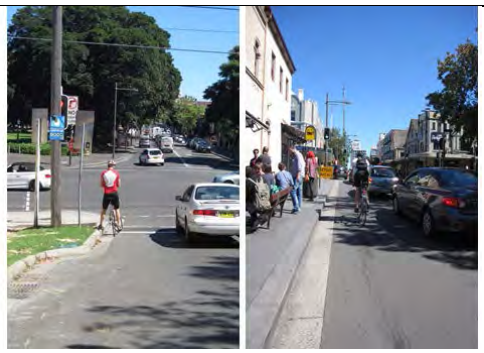
9

| Chosen: 1 Ave: 2 | Chosen: 15 Ave: 3.07 |
|---|---|

10

| Chosen: 2 Ave: 4 | Chosen: 17 Ave: 3.64 |
|---|---|

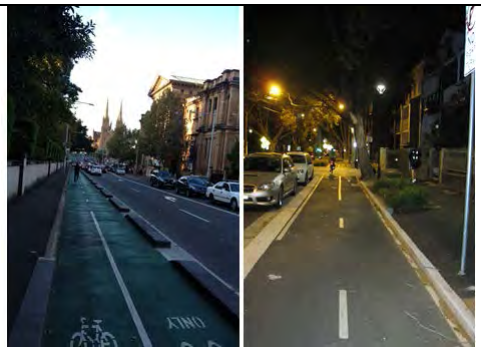
Group 3: Level of activity

<table>
<tr><td colspan="2">  <br>11</td><td colspan="2">  <br>12</td></tr>
<tr><td>Chosen: 15 Ave: 3.13</td><td>Chosen: 5 Ave: 3.6</td><td>0</td><td>Chosen: 20 Ave: 4.75</td></tr>
<tr><td colspan="2">  <br>13</td><td colspan="2">  <br>14</td></tr>
<tr><td>Chosen: 9 Ave: 3.55</td><td>Chosen: 6 Ave: 3.66</td><td>Chosen: 7 Ave: 3.42</td><td>Chosen: 5 Ave: 3.8</td></tr>
<tr><td colspan="2"> 
<br>15</td><td colspan="2"></td></tr>
<tr><td>Chosen: 11 Ave: 3.9</td><td>Chosen: 8 Ave: 4</td><td colspan="2"></td></tr>
</table>

Group 4: Level of light

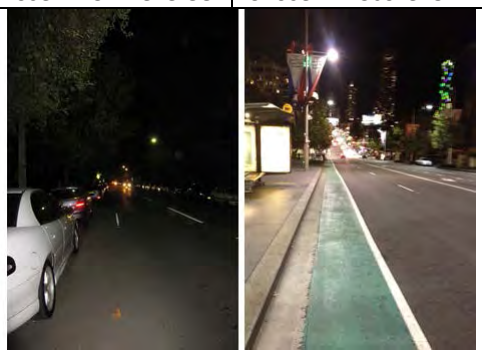
16

| Chosen: 19 Ave: 3.88 | Chosen: 1 Score: 5 |
|---|---|



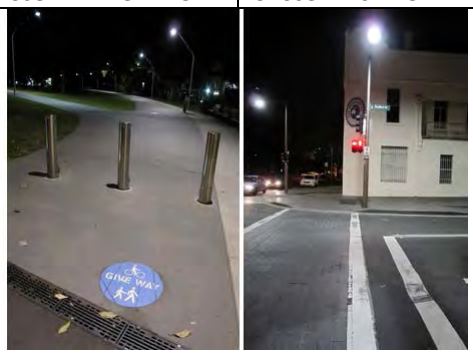
17

| Chosen: 4 Ave: 4.25 | Chosen: 10 Ave: 4.44 |
|---|---|



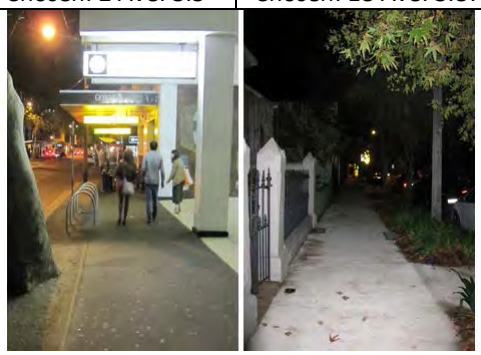
18

| Chosen: 2 Ave: 3.5 | Chosen: 18 Ave: 3.87 |
|---|---|



19

| Chosen: 18 Ave: 4.22 | Chosen: 1 Score: 5 |
|---|---|

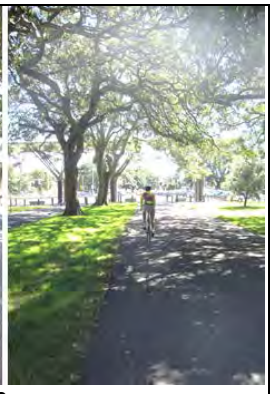


20

| Chosen: 4 Ave: 3.25 | Chosen: 15 Ave: 3 |
|---|---|

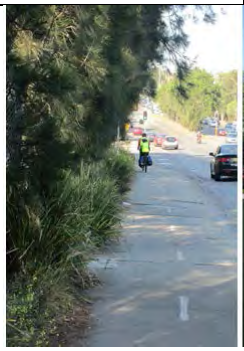
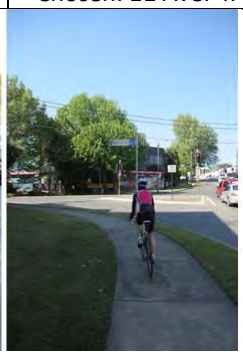
Group 5: Vegetation



| 21 | | 22 | |
|---|---|---|---|
| Chosen: 12 Ave: 4.33 | Chosen: 6 Ave: 4.16 | Chosen: 5 Ave: 4.33 | Chosen: 11 Ave: 4.4 |

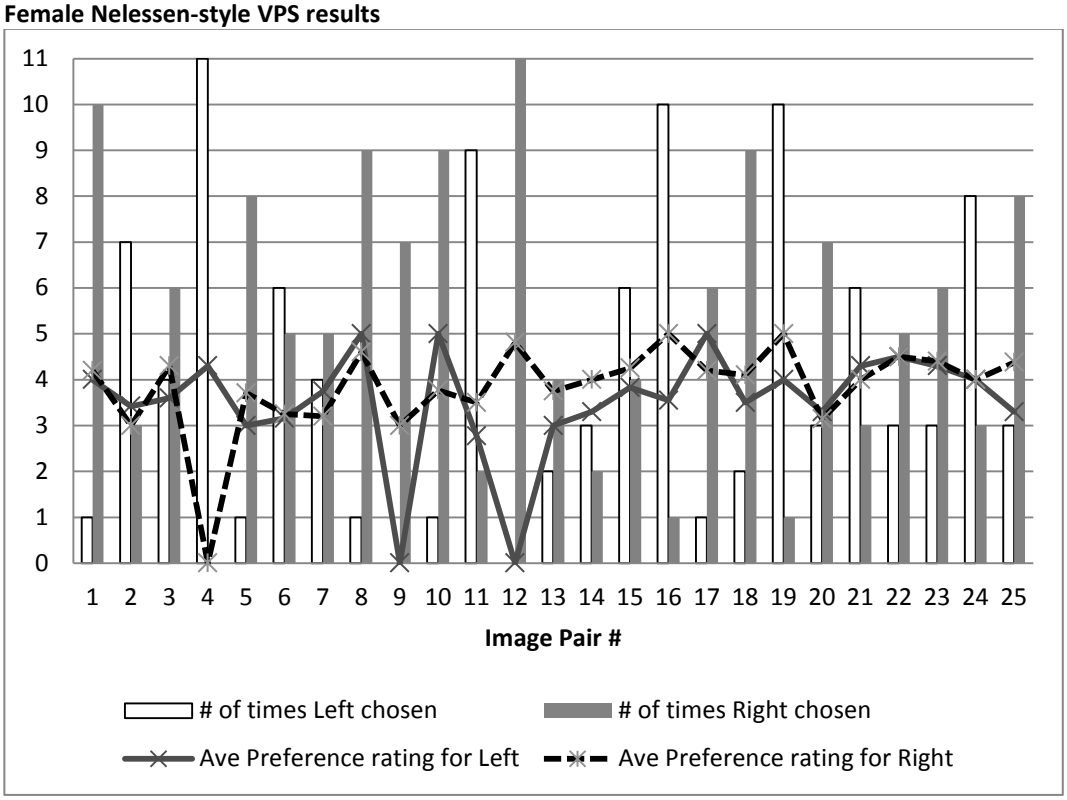


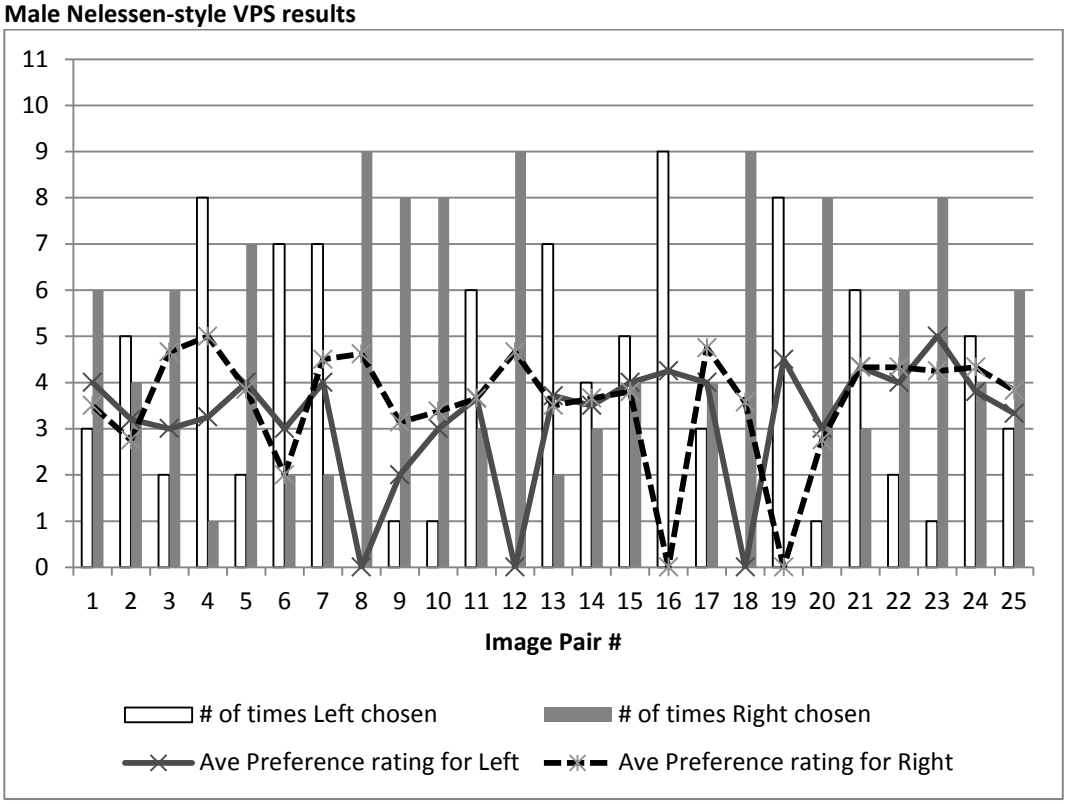
| 23 | | 24 | |
|---|---|---|---|
| Chosen: 4 Ave: 4.5 | Chosen: 14 Ave: 4.3 | Chosen: 13 Ave: 3.9 | Chosen: 7 Ave: 4.2 |


| 25 | |
|---|---|
| Chosen: 6 Ave: 3.33 | Chosen: 14 Ave: 4.14 |

**Female Nelessen-style VPS results**




**Male Nelessen-style VPS results**



**Appendix 9:**

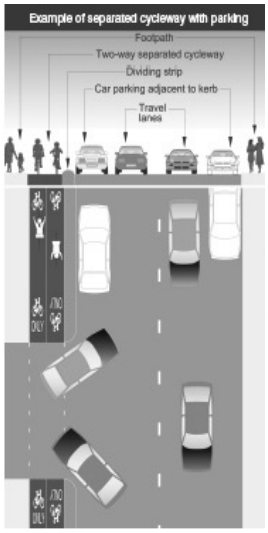
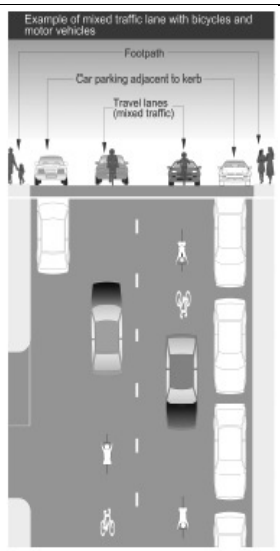
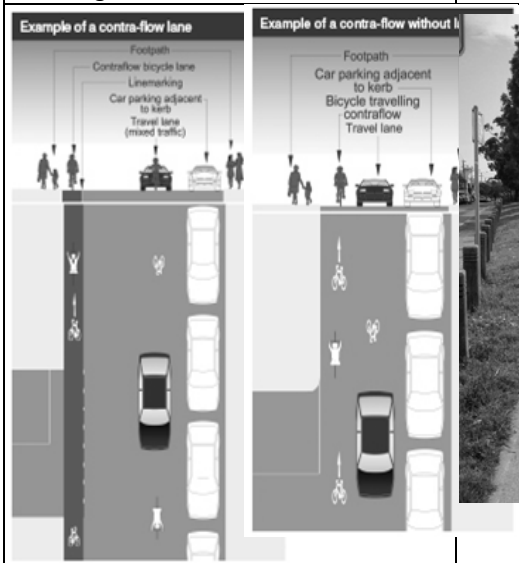
<table>
<tr><td>Separated Cycleways<br>Physically separated from traffic<br>- with/without parking<br>- with separated priority bicycle crossings<br>- with bend out intersections</td><td>Mixed traffic lanes<br>Share the road with all road users<br>with bicycle logos<br>without bicycle logos</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Contra-Flow lanes<br>Travel in opposite direction to vehicular traffic: with/without concrete separator<br>: with/ without lane/line markings</td><td>Shared Paths<br>Pedestrians and cyclists share the path (some urban/suburban footpaths and paths in parks)<br>Marked by: pedestrian and bicycle logos & signs</td></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>

**Figure 42: Cycleway Classifications (All graphics: City of Sydney, Types of Cycleways http://www.cityofsydney.nsw.gov.au/aboutsydney/parkingandtransport/cycling/TypesOfCycleways/default.asp, All photographs: N.McNamara, 2012)**

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