

All dressed up and nowhere to go? A qualitative research study of the barriers and enablers to cycling in inner Sydney

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Abstract

There is considerable capacity to increase community levels of cycling in Sydney. This qualitative study aimed to explore factors that influence personal decisions to initiate and maintain cycling, or not to cycle, in inner Sydney, and to identify differences according to current cycling behaviour.

Three types of riders were identified and 70 participants (24 males and 46 females) recruited. Of these, 22 were classified as non-riders, 23 were occasional riders and 25 were regular riders. Twelve focus groups were held in inner Sydney during October and November 2005 and explored perceptions of cycling, specific barriers and enablers for recreational and commuter cycling, as well as environmental and socio-cultural influences. Data were audiotaped, transcribed and thematically analysed using the 'template analysis' technique.

Personal factors and the built environment had greater influence for occasional and non-riders, while on-road infrastructure and socio-political issues were more significant for regular riders. Major themes centred on safety concerns due to a lack of cycling infrastructure and low recognition and respect of cyclists' needs by other road and path users. Political will and leadership are required to support programs that legitimise cycling as an essential form of transport that deserves infrastructure, investment and promotion.

Refereed Paper

This paper has been critically reviewed by at least two recognised experts in the field.

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INTRODUCTION

Physical inactivity is the second (after tobacco) most significant cause of ill health in Australia (Mathers, Vost and Stephenson 1999). About 50% of Australian adults are not sufficiently active to achieve a health benefit (AIHW 2006). Regular cycling significantly reduces overall mortality, diabetes, heart disease and hypertension, and is associated with a lower prevalence of obesity (Anderson et al. 2000; Hu et al. 2003; Pereira et al. 1999). The British Medical Association (1994) found that the benefits of cycling outweigh the risk of injury by a factor of 20 to one. Integrating physical activity into people's daily routines is more cost effective and more likely to be sustained than structured exercise programs (Hillsdon et al. 1995; Sevick et al. 2000).

There is considerable capacity to increase cycling in the community. Only 1% of Sydney's population cycles each day, compared with 2% in Melbourne and 3% and 4% in Canberra and Perth respectively (Australian Bicycle Council 2004). Inner Sydney is characterised by limited cycleways, extensive but narrow back-street bicycle networks, some hilly terrain and substantial traffic congestion on the main corridors into the city. Most cycle trips are for recreation and social purposes, suggesting that cycling could be better utilised for accessing work, education and shopping (Roads and Traffic Authority 1998).

For people not currently riding a bicycle, barriers and motivators to cycle are likely to be different from those of recreational riders or regular cycle commuters (Rissel and Garrard 2006). Demographic influences on cycling include age, sex, socio-economic status and location. There is a substantial gender imbalance in cycling in Australia. Approximately 80% of people cycling to work and 70% of recreational riders are male (Australian Bicycle Council 2004). Garrard (2003) suggests the lower rate of cycling among women is related to heightened safety concerns.

There is limited published qualitative research into people's thoughts about cycling, or that specifically compares perceptions to rider experience. In the only substantial qualitative study using a rigorous design that we could locate, Greig (2001) investigated barriers and motivators to cycling, focused on infrequent and non-riders, and found that safety issues, inadequate infrastructure and lack of acknowledgement by motorists were significant deterrents to regular cycling. A limitation of these findings is that the views of

people who ride rarely or not at all may be different from those of more experienced riders. For example, Rissel et al. (2002) found that concerns about safety are lower among regular riders, while non-riders consistently overestimate the level of risk involved.

From a survey of regular riders, McManus et al. (2005) identified improved fitness, enjoyment, stress reduction and cost-efficient transport as significant motivators to cycle. Improved cycle path design, availability and proximity have been shown to increase the numbers of cyclists (Merom et al. 2003; Wooldridge 2005). Reducing the speed differential between motorists and cyclists could improve local cycling conditions without a large investment in cycle-specific infrastructure (Mason 2000; King 2005; Sully 2005).

Although previous studies have identified the main reasons why people do not cycle, there is considerable scope to better understand the barriers and enablers of cycling, particularly the perceptions of riders with varying levels of experience. The aim of this study was to identify and elaborate factors that positively and negatively influence personal decisions to initiate and maintain cycling, or not cycle, in inner Sydney.

METHODS

Research participants

To categorise research participants for the purposes of this study, we identified three rider types across both sexes. Respondents having ridden a bicycle only once or twice in the past 2 years, or not at all were classified as 'non-riders', those having ridden more than four times in the past 2 years were classified as 'occasional riders' and those who currently rode at least two or three times a month were classified as 'regular riders'.

As this was a qualitative study, we only required a small number of participants to explore the topic in depth and it was appropriate to purposively sample and assign participants to groups, based on the characteristics of interest. We aimed to recruit adults who lived or worked in inner Sydney through workplaces, advertisements in local media and during Bicycle Week events. Respondents rang a central telephone number, were screened for sex and riding status, then offered the most convenient date and time to attend a focus group that matched their characteristics. All participants were offered a \$25 gift

voucher. The study was co-funded by Sydney South West Area Health Service, Marrickville and Leichhardt Councils.

A series of 12 focus groups were held in the inner Sydney suburbs of Camperdown, Leichhardt and Marrickville during October and November 2005, with a total of 70 participants (24 males and 46 females). Of these, 22 were classified as non-riders, 23 were occasional riders and 25 were regular riders (Table 1). Focus groups were held during lunchtimes, evenings and on Saturdays. The groups comprised between three and 11 participants and each discussion lasted approximately an hour. Although we attempted to recruit a balance of men and women within each rider classification, the non-riders and occasional riders were predominantly female, while most of the regular riders were male. Male non-riders were under represented, with no group exclusively reflecting these

characteristics. Ethics approval for the study was obtained from the Sydney South West Area Health Service Ethics Committee. Participants completed a consent form prior to their participation.

Data collection

Each focus group had a facilitator and co-facilitator, who had received prior training from one of the authors. Each discussion was guided by a semi-structured interview schedule, previously pilot tested with a group comprised of all rider types. We asked questions about perceptions of cycling, specific barriers and enablers for recreational and commuter cycling, and environmental and socio-cultural influences on cycling. A number of *a priori* themes of interest were selected by the research team to guide the focus of the questions used in the discussions (Table 2).

Table 1
Description of groups and number of participants

| Group | Rider type | Sex | Age range (years) | Number of participants |
|-------|------------|--------|-------------------|------------------------|
| 1 | Non | Female | 18–49 | 5 |
| 2 | Occasional | Female | 30–49 | 4 |
| 3 | Regular | Male | 30–59 | 6 |
| 4 | Non | Female | 18–59 | 6 |
| 5 | Regular | Female | 40–60+ | 3 |
| 6 | Occasional | Male | 30–59 | 4 |
| 7 | Non | Female | 18–59 | 11 |
| 8 | Regular | Male | 30–49 | 3 |
| 9 | Occasional | Female | 30–59 | 8 |
| 10 | Occasional | Female | 18–60+ | 7 |
| 11 | Regular | Mixed | 40–59 | 6 |
| 12 | Regular | Male | 30–60+ | 7 |
| | | | | Total 70 |

Table 2
A priori themes used in question and initial template development

| Influences | A priori themes of interest |
|------------------------|---|
| Personal factors | Demographic variables Personal motivation/initiation Personal maintenance |
| Socio-cultural factors | Social, cultural and economic variables |
| Environmental factors | Natural environment/Built environment |

Data analysis and interpretation

All focus groups were audiotaped and transcribed. The transcripts were analysed using 'template analysis' (King 1998). This method involves the development of a coding template or framework, comprised of codes representing themes identified in the data through multiple readings of the text. Coding is the process of allocating a label to a section of text on the basis of its content. Codes are organised hierarchically, with broad themes represented by the highest level codes, progressing to more narrowly focused themes at lower level coding. The qualitative analysis package NVIVO7 (QSR International) was used to code, organise and retrieve segments of text and record memos, as themes emerged.

RESULTS

In comparing the influences on cycling between types of riders, four general themes emerged from the data. We identified these as personal factors, the built environment, socio-cultural context and policy. These themes were similar to those identified *a priori* (Table 2). The natural environment was not a focus of the talk of these riders, and policy emerged as an independent theme. Personal factors and the built environment had greater influence for occasional and non-riders, while the socio-cultural context and policy were more significant for regular riders. There were also some interesting contrasts in the way influences were perceived as either barriers or enablers, depending on rider status and sex.

Personal factors

Personal factors refer to enjoyment, perceptions of safety, individual skill level, health and fitness status and self-efficacy. Riding bicycles prompted very positive childhood memories for all participants, and cycling was seen as an opportunity to re-embrace youthfulness, freedom, fun and excitement.

Sometimes when I am going down a hill, I think I could be ten years old, that's a great feeling. (Regular rider, female)

Both occasional and regular riders also described benefits that came from a greater connection to the urban and social environment while riding. They described how riding bicycles fostered interpersonal interaction and created a type of cycling camaraderie.

In a car you are in such an 'alien box', but with a bike you really see! (Occasional rider, female)

A dominant theme arising from discussion among occasional and non-riders was the perception there was nowhere to go to ride safely. Fear was a significant deterrent to initiating or maintaining regular cycling. Some described a history and enjoyment of riding in other cities, whereas riding in Sydney was viewed as too risky. Cycling's dangerous image prevented many non-riders from contemplating riding. In contrast some said they felt safer riding on designated cycleways and in cycling-focused recreational areas. Female riders were also deterred by commuting in limited daylight.

The lack of infrastructures for bikes is a barrier. That's a fear, being injured if I got on a bike. (Non-rider, female)

There were differences in the way regular, occasional and non-riders talked about personal safety, and requirements to allay fears and concerns. Lack of confidence and poor riding skills were specific barriers for many non-riders. Geared bikes were an additional barrier, due to their unfamiliarity and apparent complicated nature.

When I was a kid bikes didn't have gears ... I would have to learn all over again. (Non-rider, female)

Those keen to initiate riding felt hindered by the scarcity of accessible places or believed their equipment was inadequate to improve their proficiency. Some were further deterred by the initial investment required to purchase a bicycle and accessories, in case they later decided that cycling was not for them.

Occasional riders were predominantly engaged in recreational riding, but wished to develop more confidence to enable their progression to commuting. Some occasional riders were further hindered by inadequate knowledge of safe, practical routes.

Even if you live a short distance from your work, you don't feel safe enough to be able to build up those skills. (Occasional rider, female)

A lack of bicycle maintenance skills was a specific barrier for this group, as minor repairs left unattended

could result in less frequent riding and eventual deterioration of their bikes.

I have ridden in the past with brakes that didn't really work properly because I didn't know how to fix them. (Occasional rider, female)

There was consensus that there was greater safety in numbers, particularly when riding at the novice level. Notably, female occasional riders expressed feeling safer when riding with others, and support models such as Bicycle User Groups, 'bike buses' and 'buddy' systems were identified as potential enablers, especially for new commuters. Some women also identified that participation in community cycling events was empowering, allowing them to develop greater confidence in a more 'controlled environment'.

It's only been through joining a bike group that I found safe ways to cycle. (Regular rider, female)

Regular riders were less fearful than other groups, and discussed their ability to ride more confidently and assertively. They could feel more in control of their own safety by responding to cues in the unpredictable traffic environment. Their strategies included remaining alert, wearing visible clothing and signalling their intentions to other road users. They also had superior knowledge of alternative riding routes. Some male riders challenged the perception that riding in Sydney is unsafe.

As long as you show a certain confidence and indicate to drivers what your intentions are, most drivers give you right of way. (Regular rider, male)

Health and fitness benefits motivated current riders, who discussed how riding improved their physical, emotional and social wellbeing. Mental health benefits included relaxation and stress relief, particularly on commute trips.

It is my little bit of time alone. (Regular rider, male)

For some occasional and non-riders though, a lower level of fitness was a barrier and they felt alienated by the 'fit group' culture of regular riders. The hilly nature of inner Sydney was an additional deterrent, especially if they were not confident with geared bikes and hill climbing techniques. Some participants

perceived that fitness was a necessary pre-condition for cycling, rather than viewing riding as a viable pathway to achieving it.

I bought a bike quite a few years ago but I wasn't fit enough at the time and ended up getting rid of it... (Occasional rider, female)

For some regular riders, a riding philosophy reflected their broader commitment to a healthy environment. Others talked more pragmatically about the bicycle as an economical, convenient and efficient form of transport with fitness benefits. Functional purposes such as getting around with freedom, independence and ease were strong motivators, especially for males. Regular riders discussed the time saving benefits of cycling transport and described the intrinsic satisfaction of completing a journey by bicycle faster than by car.

Riding past all the cars queued up in traffic, I get a very positive feeling. (Regular rider, male)

In contrast, occasional and non-riders perceived cycling as a slower, less convenient transport mode. Non-riders were more likely to identify distance as a potential barrier, as there was a perception that cycling to their everyday destinations would take too long. All groups agreed that riding for transport demanded a certain level of personal organisation and, in some cases, family routines needed to be adapted. This was a significant barrier for many occasional and non-riders, especially females, who generally assumed greater responsibility for organising and transporting other family members and viewed bicycle commuting as less practical. However, regular riders challenged the perception that it was too inconvenient to commute or shop by bicycle and many had established effective systems that had become habitual.

We do our shopping differently. I have panniers front and back and I am surprised by how much I can fit in. (Regular rider, male)

The built environment

The built environment refers to road and cycling infrastructure, engineering measures and cycling amenities such as end of trip facilities. Participants in all rider groups felt that Sydney lacked a connected system of designated off-road cycleways and on-road routes, and that negotiating a path through the present,

haphazard network was difficult for all but the most experienced riders. It was a common view that much of the existing cycling infrastructure in inner Sydney was tokenistic and did little to instil confidence or encourage a broader section of the community to ride.

What is the use of having a bike lane that is full of parked cars? (Occasional rider, female)
Shared paths are almost always too narrow to share. (Regular rider, male)

There were some interesting differences in the way regular, occasional and non-riders talked about the cycling environment. Non-riders asserted that limitations of the built environment were a significant barrier to them initiating riding, while occasional riders specifically identified that poor infrastructure deterred them from making the transition from recreational to commuter riding.

You just can't have an unbroken journey on a bike on a cycle track...all of a sudden it just ends. (Occasional rider, female)

Though most regular riders viewed cycling infrastructure as an issue, they still elected to ride within the existing inner Sydney network of narrow back streets and limited cycleways. Others chose to ride in the traffic, especially if it was the most direct route to their destination. Current riders also identified that a lack of end of trip facilities (showers, lockers, irons, secure bicycle storage/racks) in workplaces, at train stations and public facilities was a barrier to using bicycles for transport. All riders agreed that improved cycling infrastructure would be a significant enabler, and many believed it was the necessary foundation for increasing community participation in cycling.

There were mixed opinions about the ideal cycling environment, despite consensus that different conditions were needed for commuter and recreational riding. Non-riders who were keen to commence cycling overwhelmingly indicated a preference for designated, off-road cycleways in their local area, with good signage that clearly separated riders from both cars and pedestrians. Many occasional riders also wanted more off-road cycleways, though some felt they would be confident to use on-road cycle lanes if they were wide enough and separated from both the traffic stream and parked cars.

Both occasional and regular riders talked about cycling as more than a recreational pursuit and wanted the infrastructure to support functional purposes, such as getting to places, for example work. Consequently, many believed that off-road cycleways alone were not the panacea. Regular commuters believed these types of cycleways were limited because they do not allow a direct route to destinations and may be poorly maintained.

I would rather change the culture where we were more accepted on the roads because that is invariably the shortest and fastest route. (Regular rider, male)

Some regular riders, mostly males, were also concerned that separate infrastructure created lower acceptance of riders as legitimate road users, which was counterproductive to mainstream community recognition of cycling. These participants also felt greater acceptance on the existing roads and back streets enabled access to a more extensive network than was ever likely to be feasible with separate infrastructure.

The roads in the inner city are simply not wide enough to have a dedicated bike path, a lane for car parking and a lane for car travel. (Regular rider, male)

Regular riders, particularly males, talked in more technical terms about engineering measures they thought were needed to improve the road environment for cycling. Some expressed frustration at the failure of local councils (local government) to apply specific design rules in new works that would improve rider safety. They also believed the fragmented development of infrastructure within local government boundaries resulted in poor route connectivity. Better signage and improved intersection treatments, including priority turning lanes were viewed by riders as important.

The kerb blisters, the raised thresholds, make life very difficult for cyclists. (Regular rider, male)

Socio-cultural context

The socio-cultural context refers to social values and attitudes, transport culture and norms, and the broader economic and political factors that influence these. Ownership of space on the existing footpaths, cycleways and roads was a dominant theme in rider

talk. Participants noted that most of the viable places to ride in inner Sydney were shared environments, which created tensions as cyclists, motorists and pedestrians struggled to harmoniously occupy narrow and limited infrastructure. There was consensus among all groups that the 'shared' concept does not work well. As a result, riders questioned where they belong.

Car drivers see us as too slow and pedestrians see us as dangerous and too fast, so we can't win. (Regular rider, male)

Many occasional and regular riders perceived the average Sydney driver as impatient and intolerant, though some thought drivers were more likely to respect cyclists' safety and rights if bicycles were more frequently encountered on the roads. Riders described altercations where motorists took out frustrations on them, often triggered by the motorist's view that their journey was delayed by the rider. Riders felt there was a skewed driver perception that a cyclist held up traffic, rather than seeing them as a legitimate part of the traffic stream.

I am told incessantly to 'get off the road'. (Regular rider, male)
I think the weird thing about motorists getting annoyed with you, it's like 'should I get in a car and sit in front of you?' (Regular rider, male)

Both current and non-riders agreed that car dependency was unsustainable. But they felt that Sydney's prevailing car culture discouraged a broader section of the community from viewing riding as a realistic transport alternative. A number discussed how this culture was reinforced through social norms that encouraged gaining a driver's licence as a rite of passage.

Getting your licence is such a badge of adulthood ... it is implicit in our culture and unchallenged. (Non-rider, female)

Non-riders did not generally consider trading their car for a bicycle as a realistic option, and some noted that being a parent made living without a car unviable. Occasional riders talked more reluctantly about needing a car and some wanted to replace car travel with a combination of bicycle and public transport, if the physical and political environment better supported this. In contrast, regular riders who had committed to cycle commuting espoused the numerous

health and financial benefits they enjoyed, but some expressed frustration at the negative perceptions of others.

I am sick to death of being (treated as) a second class citizen because I don't drive a vehicle that kills and pollutes. (Regular rider, male)

Policy

Policy refers to the rules and procedures that determine or influence transport-related decisions and actions. Riders discussed the impact of vehicle speeds on the riding environment, and the average speed differential between bicycles and motor vehicles was a safety concern, even for regular riders. Many participants supported the introduction of lower speed limits, restricted motor vehicle access and other traffic-calming measures to make the local environment more amenable to cycling.

You would want to restrict traffic speed to say 40 km/h and even enforce it some way with speed humps. (Occasional rider, male)

There was general support for policy measures that would enable a better integration of cycling with public transport. Most participants felt that the State Transit Authority's policy to charge an additional fare to take bikes on trains during peak hours was discriminatory. The inaccessibility of trains and train platforms was considered a further disincentive. Regular riders discussed, in greater detail, other social and economic policies they felt encouraged car use over bicycle transport. Examples cited included the routine promotion of car parking options at community events and public facilities, tax incentives for car use, and the assumed provision of car parking in building developments.

... it is an assumption that you would be driving to whatever is being advertised ... if you are on a bike you find your own way. (Regular rider, male)

Male regular riders were most fervent about political solutions and believed forced cultural change was necessary via legislation that 'stopped appeasing motorists'.

I think facilities are really key ... major, main road routes to take the space off cars. (Regular rider, male)

Participants expressed concern that if children did not grow up with bikes, including a history of riding to school, riding culture could be lost. The alternative view was that training children and creating a school and family riding culture was an opportunity to influence the nature of travel in the future. There was consensus among all rider groups however, that safer riding conditions and better infrastructure were necessary *before* widespread cultural change was likely to evolve.

*If there were more facilities you would be surprised how many more people would show up.
(Occasional rider, female)*

DISCUSSION AND CONCLUSIONS

The main focus of this study was to determine if barriers and enablers for cycling differed according to rider experience. The study contributes to the evidence by identifying enablers that would assist in engaging non-riders to commence cycling as well as supporting current riders to progress to regular cycle transport. The major themes identified from the research interviews centred on personal factors and the built environment, including safety concerns due to a lack of cycling infrastructure and poor acceptance by other road and path users. Perceived danger was a significant barrier for occasional and non-riders (mostly females), who had lower levels of skill and confidence than regular riders. Tension in shared environments between riders, motorists and pedestrians was particularly evident, typically triggered by the differences in travel speeds between various modes.

From this study it is evident that an improved cycling environment has great potential to increase the level of cycling in inner Sydney. All rider groups agreed that cycling is a healthy, enjoyable recreational and fitness activity and an economical, efficient and sustainable form of transport. Female riders were especially attracted to cycling as a low-impact form of physical activity. Our results indicated however, that different types of riders have different infrastructure requirements. Novice riders want off-road cycleways, where they can ride with a greater sense of safety, at a slower pace and with other family members. Occasional riders want a combination of on- and off-road facilities with greater route connectivity, so they can make the transition to cycling for transport without being forced into an unpredictable traffic environment.

Regular cycle commuters want more direct cycle routes, greater ownership of road space and acceptance by other road users. Both occasional and regular riders want options for integrating cycle transport with other public transport modes and advocate for better consideration of cyclists needs in planning, funding and policy development.

A strength of this study was the typology used to classify riders and distinguish the specific influences salient for each group, which helped us to identify barriers and enablers. We employed a rigorous methodology to recruit sufficient numbers to the focus groups and record and transcribe participants' views. A limitation of the study was the inability to elicit the views of male non-riders. The occasional and non-riders who agreed to participate in the focus groups were predominantly female, while most of the regular riders were male. However, the gender profile of the rider groups generally reflects the breakdown of the rider population. Further research is needed to investigate the views of male non-riders and extend an understanding of the factors that motivate and enable females to become regular riders and cycle commuters.

Based on these results, a number of recommendations and conclusions are proposed that may increase the number of bicycle trips and encourage a greater proportion of people to cycle. To support novice riders to develop confidence and skills, dedicated, off-road cycle paths are required. They should be wide, well lit and clearly signposted. Non-riders in this study expressed interest in options that would allow cycling to be trialled without a significant financial investment. Community bicycle loan schemes or bicycle pools would assist new riders to commence cycling and develop basic proficiency before committing to a bicycle purchase. Support for local Bicycle User Groups (who organise social and community rides and participate in advocacy) is a practical way to help novice riders develop greater confidence and riding ability. Rider support systems are especially important to encourage female riders, who feel more empowered riding with others who can help develop their riding and bicycle maintenance skills and improve their knowledge of safe routes.

Occasional riders indicated that better route connectivity would encourage them to ride to local destinations, such as shops, as well as for social and recreational purposes. Female occasional riders

indicated they are more confident riding on designated cycleways or with other riders, and need practical support with riding skill development, bicycle maintenance and route knowledge. There is also a need for secure bicycle parking (bike lockers/visible racks) located at shopping districts, workplaces and recreational facilities. Better inter-modal transit connections and secure bicycle parking at transport hubs would support recreational riders to make the transition to commuting by bicycle. To promote regular cycle commuting, on-road facilities (without dangerous car door zones) are required to provide fairly direct routes and facilitate travel speeds that make cycling an attractive alternative to other modes. For longer commutes, end of trip facilities (lockers, showers, change rooms, irons) in workplaces are essential.

Some measures would improve the local riding environment for all types of riders. Introducing lower speed limits, traffic restraint and calming measures in residential streets has the potential to make larger areas more cycle and pedestrian friendly (Sully 2005; King 2005). Sully calls these strategies 'invisible infrastructure' and suggests such policies, practices and physical measures encourage a modal shift in favour of cycling without a significant financial investment in cycle-specific infrastructure. Clearly, cycle-specific measures that improve connectivity are complementary and planning for a cycle-friendly environment should happen before urban development or re-development. Integration of bicycle planning with road and pedestrian planning will cost less in the longer term (Shantz 2005).

This study indicates that increased community and driver education is needed to raise awareness of road rules, emphasise the rights of cyclists, and foster a more supportive socio-cultural environment. It is important that cycling is portrayed as a legitimate transport form, not just a recreational activity limited to purpose-built facilities. Further, greater investment in promoting the value of cycling is warranted, with a focus on fitness, health, economic and environmental benefits.

In the current climate of car dependency, concern about global warming, peak oil and rising rates of overweight and obesity, there has never been a more critical time to promote and support cycling. Increased population levels of cycling offer significant public health gains, from improved physical health to broader

environmental benefits, such as cleaner air and reduced traffic congestion. When more people cycle, both the visibility and safety of cycling increase (Jacobsen, 2003; Robinson, 2005). It is evident from this study that the ideal cycling environment supports a variety of journey purposes, including inter-modal options. Political will and leadership are required to support programs that legitimise cycling as an essential form of transport that deserves infrastructure, investment and promotion.

REFERENCES

- ANDERSON, LB, SCHNOHR, P, SCHROLL, M and HEIN, HO (2000). All cause mortality associated with physical activity during leisure time, work, sports and cycling to work, *Archives of Internal Medicine*, 160, 1621–8.
- AUSTRALIAN BICYCLE COUNCIL (2004). *Australian Cycling – Bicycle ownership, use and demographics* (draft), July 2004, www.abc.dotars.gov.au (accessed 10 March 2006).
- (AIHW) AUSTRALIAN INSTITUTE OF HEALTH AND WELFARE (2006). *Australia's Health 2006*, AIHW, Canberra.
- BRITISH MEDICAL ASSOCIATION (1994). *Cycling towards health and safety*, Oxford: Oxford University Press, London.
- GARRARD, J. (2003). Healthy revolutions: promoting cycling among women, *Health Promotion Journal of Australia*, 14(3), 213–15.
- GREIG, R (2001). Cycling promotion in Western Australia, *Health Promotion Journal of Australia*, 12(3), 250–3.
- HILLSDON, M, THROOGOOD, M, ANTISS, T and MORRIS, J (1995). RCTs of physical activity in free living populations: a review, *Journal of Epidemiology and Community Health*, 49, 448–53.
- HU, G, QIAO, Q, SILVENTOINEN, K, ERIKSSON, JG, JOUSILAHTI, P, LINDSTROM, J et al. (2003). Occupational, commuting, and leisure-time physical activity in relation to Type 2 diabetes in middle-aged Finnish men and women, *Diabetologia*, 46, 322–9.
- JACOBSEN, PL (2003). Safety in numbers: more walkers and bicyclists, safer walking and bicycling, *Injury Prevention*, 9(3), 205–9
- KING, N (1998). Template analysis, in C Cassel and G. Symon (eds.), *Qualitative Methods and Analysis in Organisational Research*, pp 118–34, Sage, London.
- KING, R (2005). A cycle trip from Warrington, UK, to Hilden, Germany, to compare cycle facilities. *Proceedings of the Fifteenth Velo-city Cycling Conference*, Dublin, 31 May–3 June 2005.
- McMANUS, A, SMITH, J, McMANUS, J, MACDONALD, E and WILLIAMS, M (2005). Evaluation of an alternative transport initiative in Perth, Western Australia, 2000–04, *Health Promotion Journal of Australia*, 16(3), 184–8.

MASON, C (2000). Healthy people, places and transport, *Health Promotion Journal of Australia*, 10(3), 190–6.

MATHERS, C, VOST, T and STEPHENSON, C (1999). *The burden of disease and injury in Australia*, AIHW catalogue No. PHE 17, Australian Institute of Health and Welfare, Canberra.

MEROM, D, BAUMAN, A, VITA, P and CLOSE, G. (2003). An environmental intervention to promote walking and cycling—the impact of a newly constructed rail trail in Western Sydney, *Preventive Medicine*, 26, 235–42.

PEREIRA, MA, FOLSOM, AR, McGOVERN, PG, CARPENTER, M, ARNETT, DK, LIAO, D et al. (1999). Physical activity and incident hypertension in black and white adults: the atherosclerosis risk in communities study, *Preventive Medicine*, 28, 304–12.

QSRINTERNATIONAL (2007). *NVivo 7*, QSR International Pty. Ltd., www.qsrinternational.com.

RISSEL, C, CAMPBELL, F, ASHLEY, B and JACKSON, L (2002). Driver road rule knowledge and attitudes towards cyclists, *Australian Journal of Primary Health*, 8(2), 66–9.

RISSEL, C & GARRARD, J (2006). Cycling for active transport and recreation in Australia: status review and future directions, *World Transport Policy and Practice*, 13(1), 49–63.

ROADS AND TRAFFIC AUTHORITY OF NSW (1998). *Bikeplan 2010: The state of cycling – a review of data and research*, RTA, Sydney.

ROBINSON, DL. (2005). Safety in numbers in Australia: more walkers and bicyclists, safer walking and bicycling, *Health Promotion Journal of Australia*, 16(1), 47–51.

SEVICK, M, DUNN, A, MORROW, M, MARCUS, BH, CHEN, GJ and BLAIR, S (2000). Cost-effectiveness of lifestyle and structured exercise interventions in sedentary adults – results of Project ACTIVE, *American Journal of Preventive Medicine*, 19(1), 1–8.

SHANTZ, T (2005). Cycling Infrastructure: are we getting the best bang for our buck? Changing the language – it's about people, *Au:Proceedings of the Bicycle Federation of Australia National Conference*, Brisbane, 5–8 October 2005.

SULLY, A (2005). Invisible infrastructure, *Proceedings of the Fifteenth Velo-city Cycling Conference*, Dublin, 31 May–3 June 2005.

WOOLDRIDGE, C (2005). Cycling, the re-emerging transport mode. *Proceedings of the 'Transit Oriented Development – Making it Happen' Conference*, Fremantle, 5–8 July 2005, Planning and Transport Research Centre, Perth, WA, www.patrec.org/conferences/todJuly2005/papers/wooldridge.cpdf (accessed June 18, 2006).



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