Australian Cycling Conference

"Everybody's cycling?"

Proceedings of the 5th
Australian Cycling Conference

The Science Exchange
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21-22 January 2013

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Editors

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Preface

The *Australian Cycling Conference 2013* took the theme of *Everybody's Cycling* and was the fifth in a series of annual conferences designed to showcase the latest in cycling research, planning and practice. The conference is held each January in Adelaide to coincide with South Australia's pro cycling event the *Tour Down Under.* The *Australian Cycling Conference 2013* was for the second year running held at the Science Exchange, 21-22 January.

The *Australian Cycling Conference* is of national significance as it is the only forum in Australia to have a core aim of *providing a forum for the presentation of rigorous research to inform cycling policy, programs and projects*. The Conference also actively encourages academics, policy makers, and practitioners from governments and private sectors, as well as community organisations, to exchange knowledge about all forms of cycling.

Cycling spans institutional boundaries drawing experts from governments, communities and private organisations. Once again the *Australian Cycling Conference 2013* papers range across disciplinary boundaries bringing together researchers and professionals from transport, engineering, health, geography, urban planning, tourism and events and sociology, in particular the sociology of gender.

Those attending the conference were welcomed by the Lord Mayor of Adelaide, the Hon. Stephen Yarwood. The Lord Mayor has a vision for Adelaide which has people and places at the centre and which aims to reduce the dominance of motor vehicles. In his welcome he noted the many cycling and other people and place developments in Adelaide. He also expressed his pleasure in having the Adelaide City Council sponsor the Conference keynote speaker Dr Rajendra Ravi, Director of the Institute for Sustainability and Democracy, New Delhi in India.

Dr Rajendra Ravi has a high profile in India. The Conference organisers were aware of the significant work he had undertaken in advocacy campaigns, including leading a case through the Indian court system and eventually winning in the Supreme Court. As a result, rickshaw riders in India now have a Constitutional right to use the roads, whereas in the past they were being removed from increasingly car dominated roads. Dr Ravi's advocacy has been especially successful in relation to supporting Indian women to ride as a form of emancipation and to achieve their right to mobility. A major focus of his conference address was the role of rickshaws and other cycles in providing livelihoods for low income people and so the perspective he presented was a very different one to the focus on cycles and mobility common to Australian cycling advocacy and research. Dr Ravi's presentation was wonderfully illustrated with many photographs of the huge diversity of cycles in India.

The Australian Cycling Conference had major input in 2012 from a senior Nigerian delegation, and in 2013 from Dr Ravi. These contributions have stimulated thinking in Australia and broadened our understandings of agendas of cycling worldwide.

Two papers included in this collection directly provided commentary on the theme *Everybody's Cycling*. Papers authored by Ian Radbone and Gemma Kernich provide overviews of national and state data surveys, and provide a nuanced perspective of cycling activity across Australia. Not everybody is cycling, but then again, more people are cycling more often.

The editors of this collection have included both refereed and non-refereed papers. However, as an initiative first introduced at the 2012 conference, non-refereed papers were submitted for Organising Committee review. The review process was instituted as a means of developing and enhancing the quality of all Conference papers. The Organising Committee sought written papers from all authors as a means of creating a durable record of the knowledge and experience contained in those papers that can be used and further developed by researchers, practitioners and policy makers into the future. This objective was substantially achieved. The review papers were perused by appropriately qualified members of the Organising Committee and comments for strengthening the papers were passed on to authors.

Refereed papers were subject to an independent double blind refereeing process. Refereed papers were reviewed by experts in their fields, and in most cases there was both an Australian and an international reviewer. It is our hope that the peer reviewed papers will go on to publication in peer

reviewed academic journals or other relevant publications, further lifting the profile of cycling and walking in cities. We only request that prior publication in the *Australian Cycling Conference 2013* Proceedings be acknowledged. Also please let us know by email of successful publication.

Reviewing and refereeing papers is a time consuming, unpaid, skilled and entirely necessary professional activity which is largely invisible. We appreciate the work of the experts who participated in our refereeing process.

The *Australian Cycling Conference* Organising Committee is grateful to those paper author/presenters for preparing papers ahead of the conference and, when requested, for reworking their papers by responding to reviewers' suggestions. It is our view that the quality of the papers and the presentations has been improved through the additional labour contributed by authors. Stronger argument with more persuasive evidence seen in the papers will assist moving cycling towards including 'every-body'. We are deeply grateful to all the authors listed in these proceedings.

Prizes

Another initiative begun at the *2012 Conference* was the establishment of prizes for the best paper in each of three categories: practitioner, student and academic. We expect the prizes will provide an incentive for further improving the quality of papers. Congratulations to our excellent prize winners. In 2013 they were:

- Academic prize - Kath Bicknell, *Everybody's writing.*
- Student prize - Nicole K McNamara, *Urban bike space: claiming and infrastructure use in Sydney.*
- Practitioner prize - Caitlin Brookes, *Shared paths: perceived and actual conflicts.*

Reference group

While the Organising Committee takes responsibility for its decisions, we have benefited by having an eminent group of people with whom we communicate as our Reference Group. The Reference Group makes the conference more representative of, and responsive to, developments in cycling across Australia. We are deeply appreciative that the reference group responds to our requests for advice and information.

Fiona Campbell NSW
Manager, City of Sydney cycling strategy

Russell Greig WA
Manager, Bikewest, Department of Transport, Western Australia

Dr Marilyn Johnson Vic
Researcher, Behavioural Science Safety Team, Monash University Accident Research Centre and Research and Policy Manager, Amy Gillett Foundation, Victoria

Jim Krynen WA
Cycling Integration Manager, Public Transport Authority, Western Australia

Professor Chris Rissel NSW
Professor of Public Health, School of Public Health, University of Sydney

Peter Watts SA
Manager, Office for Cycling and Walking, Department for Transport, Environment and Infrastructure, South Australia

Sponsors

This year's *Australian Cycling Conference 2013* is also indebted to our generous sponsors. The editors, on behalf of the organising committee would like to thank the following organisations and companies for their support.

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Conference vision

The vision of the Australian Cycling Conference is
...to ensure the Australian Cycling Conference is a quality, affordable and inclusive conference with a positive national reputation. The Australian Cycling Conference will promote thinking about good ideas for cycling. It will provide a forum for the presentation of rigorous research to inform cycling policy, programs and projects. Our Conference will strongly contribute to an energetic and positive network among Australia's cycling communities who engage with cycling issues, nationally and internationally.

Thanks to all presenters and delegates who helped the Australian Cycling Conference in 2013 achieve this vision. Furthermore, thank you to all who contributed to understandings about the issues associated with Everybody's Cycling.

Peter Lumb, Katie Gillfillan and Jennifer Bonham
for the Australian Cycling Conference Organising Committee

Australian Cycling Conference Organising Committee

Peter Lumb, President and reference group liaison and assistant in paper review process

Fay Patterson, Secretary

Jeremy Miller, Treasurer and media spokesperson

Dr Jennifer Bonham, Paper review process and program development

Graham Bradshaw (Victoria), Web site and registrations

Katie Gilfillan, Conference manager and international delegations

Anna McDonald, City of Adelaide liaison

Matthew Mayes, Evaluation, venue liaison and committee meeting chairperson

Ben Russ, Sponsorships

Author and presenter biographies

By speaker, in alphabetical order

Dr Kath BICKNELL
Dept of Performance Studies, The University of Sydney
Kath Bicknell's research interests evolved from using case studies from mountain bike racing to explore the relations between thinking, doing and performance. Her PhD thesis, *Embodying Biking: Sport as live(d) events*, was completed in the Department of Performance Studies at the University of Sydney. She was awarded a Faculty Teaching Fellowship there in 2011. In addition to her academic work, Kath has written articles for Australia's leading mountain bike magazines and websites. She currently works as a features writer, product reviewer and columnist for *Flow Mountain Bike*, which unites both print and digital approaches to understanding, documenting and growing the sport. Kath enjoys racing her mountain bike in Australia and overseas with the Subaru-Marathonmtb.com race ream.

Dr Jennifer BONHAM
Discipline of Geography, Environment and Population, The University of Adelaide
Jennifer is a senior lecturer and co-convenor of the Master of Planning programs in the School of Social Sciences, University f Adelaide. She has a background in human geography specializing in urbanization and cultural practises of travel. Her research draws on post-structuralist and feminist theoretical frameworks as it explores the complex relationship between bodies, spaces, practices, and meanings of travel. Her current research examines the gendering of cycling. Jennifer's work is informed by a concern for equitable and ecologically sustainable cities. Jennifer is an ongoing member of the organising committee for the Australian Cycling Conference series and is program manager and *Conference Proceedings* editor for the 2013 conference. She is also a member of the editorial board of the international journal *Transfers*, an interdisciplinary journal of mobility studies.

Peter BOURKE
General Manager, Cycling Promotion Fund
Peter Bourke has had a continuing role in the development of community partnerships and programs across a variety of sectors, only moving into the field of cycling relatively recently. With a recreation and sports marketing background, Peter has worked on partnerships for the YMCA across Australia and has also developed funding models for Indigenous programs in Victoria: later he managed a sports development agency. In more recent years, he has worked in a local government role leading teams that required local, state and federal agreements in the areas of environment, youth, refugee settlement, community safety, Indigenous and regional development. As a result he has developed skills in negotiating partnerships and how to assess the value of them when they work. Peter has brought this knowledge to the bicycle industry, aiming to gain wider support for all levels of riding – for health and for transport, not just recreation and sport.

Caitlin BROOKES
Project coordinator, StreetShare Strategy, City of Sydney
Caitlin Brookes is the project coordinator managing the delivery of the StreetShare Strategy initiatives in the cycling project team at the City of Sydney. StreetShare is a cycling behavioural change strategy including a suite of programs aimed at addressing the social barriers to making Sydney a cycling-friendly city. Numerous cycling behaviour change programs have been undertaken in Sydney, and focus on increasing cycling and improving the relationship between bike riders and other road users, specifically motorists and pedestrians. Caitlin is currently completing her Masters in Planning and holds a bachelor degree in Social Science (Criminology). She has a background in designing, planning and delivering behaviour change, community engagement and social research projects, including program delivery and evaluation. Caitlin enjoys cycling to work and for leisure and as an avid traveller she is keen to explore many more cities by bike.

Gayle BUCKBY[1], Fay PATTERSON
[1]InfraPlan transport and infrastructure planning, Adelaide
Gayle has over 25 years of experience in traffic and transport planning, working in the areas of both consulting and local government. Her core area of work is sustainable transport and active living, and she has been planning and designing for cycling since 1992. Projects have ranged from Council-wide Strategic Bicycle Plans to small scale detailed design of infrastructure. She has a broad understanding of movement related Australian Standards and Guidelines (worked with Kym Dorrestyn in the development of Austroads Part 14: Cycling in 1995), and has a working and experiential knowledge of international best practice in cycling infrastructure.

Scott DICKASON

Director, Power Ped Pty Ltd and Electric Vehicles Pty Ltd

Scott Dickson is a Director of Power Ped P/L and Electric Vehicles P/L based in Melbourne Victoria. He has a Diploma in Sales and Marketing and has developed a diverse professional career across a variety of brand, marketing and product related roles. In 2003, after a very successful 13 year career at Levi Strauss and Co (Levi's Jeans) where he acquired international experience in brand marketing, sourcing and product development, Scott decided it was time for a change of career and took his experience into a field he was really passionate about, cycling (however with a twist or a bit of assistance if you like). This was a big move from corporate job security to a start up business with a product that was almost unheard of in the Australian cycling industry, Electric Bicycles. Scott founded the Power-Ped Brand of electric bicycles and has since also become Director of Electric Vehicles P/L that is presently providing sales, service and parts support to a fleet of over 1400 Power-Ped electric mail delivery bicycles for the Australian Postal Corporation (Australia Post). The fleet is the largest of its kind in the southern hemisphere and rivals some of the biggest commercial Light Electric Vehicle fleets worldwide. Scott has also been actively involved in and contributed to the recent regulatory change to the laws surrounding electric bicycles in Australia, the new 250 watt standard. Scott is passionate about expanding the sales and usage of electric bicycles in Australia. He has a vision for the Electric Bicycle to incrementally increase the use of bicycles for both commuting and recreation.

Rod HOOK

Chief Executive, Dept of Planning, Transport and Infrastructure, South Australia

Rod Hook is one of South Australia's most highly respected senior public servants with an unrivalled reputation for delivering major projects and programs that is recognised at the highest levels of both State and Federal Government. Rod is currently the Chief Executive of the Department of Planning, Transport and Infrastructure, responsible for South Australia's transport system and services (including public transport), building management, land services, recreation and sport as well as infrastructure planning. These responsibilities include the delivery of major infrastructure projects for the State consistent with priorities set out in South Australia's Strategic Plan including the unprecedented $2.6 billion investment to rebuild Adelaide's public transport network and the $535 million upgrade of the iconic Adelaide Oval. Rod is also South Australia's Commissioner of Highways, and the State's Coordinator-General for the Nation Building Economic Stimulus Plan. Rod is widely known for his role in delivering a range of major infrastructure projects that have changed the way people live, work and do business in Adelaide. These include the Port River Expressway bridges, the Glenelg tramline extensions to Victoria Square and the Adelaide Entertainment Centre, the Bakewell and Gallipoli underpasses and most recently South Australia's State Aquatic Centre. Rod graduated from the University of Adelaide with Honours in Civil Engineering.

Margaret HOWARD

Manager Community Programs, Dept of Planning, Transport and Infrastructure, South Australia
Program Director, Velo-city Adelaide 2014

Margaret's role, as Manager of an area of transport that encourages safer, greener and more active travel by engaging with organisations and communities, makes good use of a diverse background including education, counselling and 13 years as a consultant. She has worked on State Government cycling and physical activities strategies, designed and managed numerous community consultation processes, particularly in relation to Coast Park, and now oversees DPTI's Cycle Instead program. Marg has recently taken on the job of Program Director for Velo-City Adelaide – the European Cyclists' Federation conference being held for the second time in the southern hemisphere.

Dr Marilyn JOHNSON[1], Nicolette DAVEY[2]

[1]Amy Gillett Foundation and Monash University Accident Research Centre, Monash University
[2]Active Transport Officer, Baw Baw Shire Council

Marilyn is an academic and practitioner and her main research focus is cyclist safety. In her doctoral research she aimed to improve the safety for on-road cyclists by investigating how cyclists and drivers interact on the road. In her first post-doctoral year, Marilyn was a Research Fellow at the Monash University Accident Research Centre, where she was the lead investigator of cyclist safety studies in metropolitan Melbourne, Australian Capital Territory, Baw Baw Shire in regional Victoria. Marilyn now divides her time between Monash University and the Amy Gillett Foundation. At Monash, Marilyn is a Research Fellow at the Institute of Transport Studies. Her current research focus is on electric bikes. At the Amy Gillett Foundation, Marilyn is the Research and Policy Manager, where she provides advice to ensure all the AGF activities are based in critically evaluated scientific research evidence. Prior to commencing her PhD, Marilyn held senior positions at the Department of Justice (Victoria) and the Victorian State Parliament Road Safety Committee. She is also a member of the Monash University Human Research Ethics Committee.

Nicolette is an active transport officer with Baw Baw Shire Council, a rural municipality in eastern Victoria. The role involves focusing on projects designed to encourage walking and cycling for both transport and recreation. In the context of cycling, Nicolette's work includes coordinating an active travel leadership program with a local primary school; developing cycling action plans for Council to improve infrastructure; and more generally promoting bike riding as a legitimate form of transport. Some of this work has included experimentation with bike

art graffiti and developing come-and-try bike days. Nicolette is also a burgeoning academic, having recently completed a thesis about the social impacts of climate change policy and she is hoping to pursue PhD studies in 2013.

Gemma KERNICH

Department of Planning, Transport and Infrastructure, South Australia

Gemma Kernich is a civil engineer and has worked at DPTI for 15 years, and has almost 10 years experience in the cycling and walking field. She is currently the Acting Manager in the Cycling and Walking section of DPTI and is responsible for infrastructure planning and overseeing significant cycling programs such as the Greenways project. Outside of work, Gemma is a keen competitive cyclist occasionally still racing at a national level, and is involved in the sports administration in cycling at club, state and national level.

Bim LANGE

Director, Works and Engineering, Barossa Council, South Australia

Bim has worked in Local Government for more than 38 years and during this period he has gained a wide and varied understanding of all the aspects of local government, its roles and responsibilities to the community. For the past 16 years Bim has been the Director – Works and Engineering for the previous District Council of Barossa and following amalgamation for The Barossa Council. During this period Council has taken an active role in asset management, life cycle costs and has developed strategic infrastructure plans which give clear direction as to sound management of its assets. Bim has also represented Council and local government on numerous committees.

Peter LUMB

Centre for Development Studies, Flinders University

Peter has been a commuting cyclist since 1975. He is a former President of the Bicycle Institute of South Australia. He was on the conference planning committee for Adelaide's first major cycling conference, VelOZity, in 1999. Peter has been a Ministerial appointment to a number of cycling related government advisory committees. He is a former academic in the School of Social Work and Social Policy, UniSA, where he was Program Director for Rehabilitation Counselling and taught courses on sociology of work and disability. Peter chairs the Board of a disability support organisation. He currently is a consultant and works with the Gender Consortium, Centre for Development Studies at Flinders University where he is an adjunct working on AusAid projects.

Nicole K McNAMARA

City Futures Research Centre, University of New South Wales

Nicole has a Bachelor of Arts with Honours in Human Geography from the University of Sydney. She is currently completing a Master of Philosophy in Planning at the University of New South Wales, and works for the City Futures Research Centre also at the University of New South Wales.

Alan PARKER, OAM

Alan was awarded an OAM (Medal of the Order of Australia General Division), for service to the community, particularly through the Bicycle Institute of Victoria, of which he was a founding Member. Alan was president for 2 years and a research officer for 12 years. He is author of many articles in the cycling press and letters to the general press mostly based on submissions to government. Alan was the Vice-President of the Bicycle Federation of Australia for several years; where he wrote several submissions. Alan was involved in planning work, with the Geelong Bike Plan and other bike plans in Melbourne, Newcastle and Perth. He was a member of the Victorian State Government Bicycle Planning Committee and for many years wrote position papers on the need for research. Alan was also Acting President of the Town and Country Planning Association, for two years; later the Vice-President, a committee member and member for many years. He wrote submissions and conference papers.

Fay PATTERSON

Hub Traffic and Transport, Adelaide

Fay Patterson is one of Adelaide's most innovative pedestrian and bicycle planners and a principal of Hub Traffic and Transport. A strategic and innovative thinker in transport planning and traffic engineering, Fay has specialised in walking and cycling from the start of her career. In addition to more traditional skills in traffic engineering, she deploys an appreciation of strategic policy and planning, urban form and function, economic rationalism, statistical analysis and comparative history to tailor solutions to the local situation. Most recently, she has organised a bike art festival, co-authored a history of taxis in South Australia and was highly commended by the AITPM for traffic engineering design innovation.

Dr Ian RADBONE

Hub Traffic and Transport, Adelaide

Ian Radbone is a principal of Hub Traffic and Transport, a transport consultancy that specialises in cycle planning. A life-long cyclist, Ian came to bicycle policy and planning 10 years ago, after many years as an academic and government policy adviser. In those 10 years he has been involved in numerous cycling planning exercises in South Australian and New South Wales. In recent years he was a transport planner at the Adelaide City Council, where he prepared and oversaw the implementation of the city's Bicycle Action Plans.

Dr Rajendra RAVI

Director, Institute for Democracy and Sustainability, G-24 Vijay Nagar, New Delhi-110009

Dr Ravi is an urban social planner and researcher who has more than three decades of experience working with marginal groups in various parts of India. He has carried out studies on different aspects of cycle rickshaws, cycles and pedestrians. Since 1998 his research has focused on cycle rickshaws and cycles in India and he has been involved in a number of projects, campaigns and advocacy in this regard. He was the Campaign Coordinator of an initiative on life, livelihood and equal road rights of rickshaw pullers. He is National Convener of the National Alliance of People's Movement, which is the national network of various people's movements. He is very active in several international people's forums and networks. He is the author of several books, research papers and articles and has been honoured by Hindi Academy, Government of NCT Delhi for the book *Rickshaw Ek Mahagatha*. Many documentary films have also been made based on his work. Currently he is Convener of the Equal Road Rights campaign and Director of the Institute for Democracy and Sustainability. Dr Ravi's visit has been made possible by the generosity of Adelaide City Council.

Professor Chris RISSEL

School of Public Health, The University of Sydney

Director of the NSW Office of Preventive Health

Chris Rissel is a Professor of Public Health with the School of Public Health, University of Sydney, and also Director of the NSW Office of Preventive Health which focuses on childhood obesity prevention. He has a strong record of published research in the area of active travel and cycling, and is one of the authors of the national report *'Cycling: Getting Australia Moving*'. He recently completed a three-year grant to promote increased use of cyclepaths in south-west Sydney – 'Cycling Connecting Communities'. He is an Investigator with the Safer Cycling Study, and he is now working on evaluating new cycling infrastructure in the City of Sydney with an ARC Linkage grant.

Louise SHAW

School of Public Health and Community Medicine, University of NSW

Louise Shaw is in her second year of a PhD with the Safer Cycling Study in the School of Public Health and Community Medicine at the University of New South Wales (UNSW). Her particular interest within the study is in the application of the Safe Systems Approach in the promotion of safe cycling, with a focus on understanding cyclist behaviour in crashes and road rule infringement. She trained as a physiotherapist in Edinburgh and worked as a physiotherapist both in the UK and Australia. Louise completed a Masters in Public Health at UNSW with her research investigating injury prevention in junior, community cricket players. As a keen tri-athlete, she has both professional and personal interests in cycling safety.

Rachel SMITH[1]**, John SCHIMMEL**[2]

[1]*AECOM*

[2]*New York University*

Rachel is a Principal Transport Planner with AECOM in Brisbane and is one of Australia's leading cycling, walking and sustainable transport specialists. Rachel has spent the last 13 years working in planning, strategy development and travel behaviour change in the private and public sectors in the UK and Australia. She was a UK Government Advisor on three national transport panels for six years. Rachel is the Founder of 'Cycling Super Highways' a vision for 7m wide cycleways completely separated from parked and moving cars; creator of "We Heart Cycling" a social media campaign and co-founder of Lazy Sunday Cycle a social media initiative to encourage anyone to ride a bicycle for fun. Rachel is part of the BMW Guggenheim Lab a world-first urban think tank and creator of Dynamic Connections a world-first crowd-solving bike map. Rachel is on the Curatorial Panel of the Queensland Government's art+place, a guest lecturer at the University of Queensland, columnist at Cycle Brisbane and blogger at ThisBitgCity. Rachel won the 2003 CIHT BP International Road Safety Award, a 2004 International Walk to School Week Award, the 2008 AITPM Janet Brash Memorial Scholarship and was short-listed as a 2012 TED Global Fellow.

Clare WASTENEYS

Queen's University, Canada

This winter, Clare is living and biking in the mountains on the north coast of the Dominican Republic. In between rides, she volunteers as an organic gardener and writer for a development foundation and works on her PhD thesis at Queen's University in Canada. In April, she will return to Ontario, where she is building an off-the-grid log house on an island. Her research explores the factors that can hinder or enable teenagers in North American

cities to adopt cycling for transportation. More broadly, she is interested in how people can change habits to adopt more sustainable behaviours and lifestyles. Academically, she holds degrees in economic development, rural planning and teaching. Her professional life has been too eclectic to capture in one sentence.

Richard WESTON[1], **Eke EIJGELAAR**[2]
[1]*Institute of Transport and Tourism, University of Central Lancashire, UK*
[2]*Ctre for Sustainable Tourism & Transport, NHTV Breda University of Applied Sciences, Netherlands*

Richard worked for over 10 years in the motor industry before entering higher education. In 2000 he graduated from Staffordshire University with a first degree in Economics, and in 2007 completed a PhD in housing at Nottingham Trent University. Richard joined Lancashire Business School in 2004 and is a member of the Institute of Transport & Tourism. He lectures at both undergraduate and post-graduate levels and undertakes research into the economic impact of transport and tourism interventions for a wide variety of external bodies including several international projects.

Eke studied tropical forestry and nature management at Larenstein University of Applied Sciences in Velp (Netherlands), where he wrote a thesis on the socio-economic impacts of a World Heritage Area designation in New Zealand. In 2007 he obtained his Master in sustainable tourism management at Eberswalde University of Applied Sciences (Germany) with a thesis on voluntary carbon offset schemes and tourism emissions. In between and after his studies Eke has been active as a tour guide, translator and tourism consultant. Eke has been working for the CSTT as a researcher since October 2008, before also taking up lecturer activities at NHTV for the BSc Tourism in 2010.

Stephen YARWOOD
Lord Mayor of Adelaide

A town planner with nearly 20 years' experience in state and local government, Stephen has dedicated his professional life to developing cities. Stephen's vision for Adelaide is a modern, vibrant and sustainable place to do business, live and enjoy life. He believes an economy based on innovation, education, arts and culture will make Adelaide prosperous. One of Stephen's primary goals is to encourage strong working relationships between all levels of government, as well as business and the general community. Stephen was elected an Adelaide City Councillor in October 2007 and was Deputy Lord Mayor in 2009. He is a member of the Adelaide Development Assessment Panel, Capital City Committee, Adelaide Parklands Authority, Rundle Mall Management Authority and the Council of Capital City Lord Mayors. He is also the Presiding Member of the Local Government Association committee, overseeing the State/Local Government Climate Change Sector Agreement. Stephen has also served on the Adelaide Central Market Committee, Adelaide High School Governing Council and the board of the Adelaide Convention Bureau. Stephen has an MBA, as well as post-graduate qualifications in Regional and Urban Planning and Environmental Studies. He worked as a researcher in state parliament before joining the City of Playford as Principal Planner for six years. Stephen has lectured in planning and management in several countries, as well as studying future cities in Tsukuba, Japan's technology city. Stephen drives an electric car and enjoys bike riding, food, music and world travel. He lives in the heart of the CBD with his wife Emily, daughter Megan and son Oliver.

Everybody's cycling in Australia? Data overview

Ian Radbone
Hub Traffic and Transport, ian.radbone@hubtt.com.au

Abstract

This is a background paper for the conference, providing an overview of current levels of cycling in Australia and trends over the past forty years. Principal sources of data are household travel surveys, including the journey to work data collected in the census, and counts of cyclists at specific locations over time.

The data indicate that cycling is still a very much a minority activity, at least if defined as occurring once a week or more, and for transport purposes. Only 1.2% of Australians reported cycling to work at the 2011 census.

About half of all cycling is done by children up to the age of 15. Men are twice as likely to cycle women. However the respective dominance of children and men is lessening. Cycling levels are strongest in the inner suburbs of the larger cities, as well in Canberra, and Darwin.

The steep decline in children's cycling that occurred in the 1980s and 1990s appears to have been arrested in the past ten years. At the same time adult cycling appears to be increasing strongly, by about 10% per year. Much of this increase is composed of women taking up cycling.

1 Introduction

The presentation is designed to provide a brief overview of cycling in Australia, covering:

- cycling's share of overall travel,
- age and gender of cyclists,
- the purpose of cycling trips and
- levels of cycling by location.

We will also look at trends in cycling over the past forty years or so, pointing out the often overlooked decline in children's cycling over this period.

This is not meant to be the definitive picture of cycling in Australia. In particular, the debate over helmet legislation has involved more detailed arguments about specific trends. (Gilham and Rissell, 2012; Olivier et al, 2012; Davies 2012). It does however attempt to tease out specific components of the overall trends in cycling.

2 Sources of data

The Australian sources of data on cycling can be divided into two categories.

The first category covers surveys of people, asking them about their travel or specifically cycling habits. Surveys have the advantage of being able to cover all trips, although normally relying on stratified samples of the population to produce conclusions. However they are reliant on the memory of the respondent, who may have to answer not only for him or herself, but also for those of the household. For this reason such surveys often restrict the time period being surveyed to the previous week or even day. This, in itself. introduces sampling bias, for the time period is not likely to be typical of the year as a whole. More recently, reliance on memory has been avoided by some surveys by using GPS devices to track trips. This however has been limited by cost, the need to interpret the data and privacy issue.

The most widely used survey is the census, which is undertaken every five years. This does not have a population sample bias, as it covers all households, which are legally obliged to respond. However it does suffer from a time period bias, as it is undertaken in August. This is particularly significant for cycling as it is the winter, when cycling drops by about 30% below average in the southern states, and the likelihood of rain increases for any one day, further reducing cyclist numbers. The impact is much less further north, where conditions are drier and warmer. Indeed this is the popular time for cycling in Darwin, as conditions are mild and dry and the humidity is low.

In future years the National Cycling Participation Survey (Heart Foundation and Cycling Promotion Fund, 2011) is likely to become a more important source of information about levels of cycling in Australia. The 2011 survey drew on a stratified sample 6,824 households/ 17,425 individuals across Australia, apart from Sydney, which has just been subject to a survey with the same methodology. (SKM and NSWBTS, 2012) The telephone survey was

undertaken in March and April (popular months for cycling in the southern states). While focusing on cycling in the past week, respondents were also asked about cycling in previous month and year.

The second category of data covers counts of cyclists at particular locations. Manual traffic counts often include cyclists, but these are often unreliable, particularly at busy locations. In recent years governments have been installing permanent counters located and calibrated specifically to count cyclists. These gather data 24 hours a day, 365 days a year, as long as there are no technical problems. They are very good for indicating trends, the impact of weather and events. (Kernich and Radbone, 2012)

However permanent counters only count cyclists at specific locations. While these locations are normally where there are a lot of cyclists, they miss cycling being undertaken on back streets. They are sparse or non-existent in outer suburbs. Children's cycling in particular is not likely to be captured.

There are other sources of data, such as bike sales and involvement in events such as Ride to Work. However these are not used here, as they are not considered reliable indicators of actual cycling.

3 Current levels of cycling

The first point to note is that in answer to the conference theme, *Everybody's Cycling?* most people are not. **Table 1** indicates the percentages household members who cycled in the seven days before their household was surveyed as part of the Cycling Participation Survey.

Table 1: Cycling in Australia by age and gender

	Population proportion who rode in past 7 days		
Age group	Male	Female	All
0 – 9	51.3% (47.2% – 55.3%)	46.9% (42.8% - 51.0%)	49.1% (46.0% - 52.3%)
10 – 17	42.2% (38.5% – 45.8%)	24.6% (21.3% – 28.2%)	33.6% (31.0% - 36.3%)
18 – 39	17.1% (15.2% – 19.2%)	9.7% (8.1% – 11.4%)	13.4% (12.1% - 14.9%)
40+	12.3% (11.3% – 13.4%)	5.0% (4.4% – 4.7%)	8.5% (7.9% - 9.3%)

Source: Austroads National Cycling Participation Survey 2011, Table 4.1

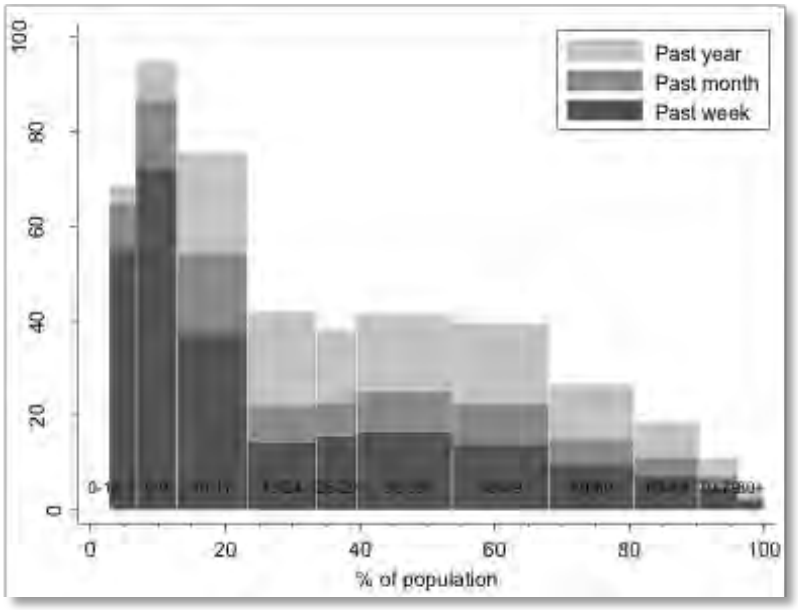
Note that Table 1 accounts for cycling undertaken in the previous week for households surveyed in the months of March and April, 2011. Only 18% of those surveyed said that they cycled in the previous week, which is assumed in this paper to define regular cyclists. (Note almost 40% said they rode a bike in the past year.) 44% of households reported not having a bike in working order.

The key points are:

- Half the children aged between two and nine cycled, with girls just as likely to cycle as boys. But much of this cycling might have been just in the back yard. (Those aged less than two were not counted in the survey.)
- The decline in cycling starts in the teenage years, especially for girls.
- Of the adults, only about 10% rode in previous week, and males were about as twice as likely to cycle as females.
- 11% of these who cycled in the previous week reported cycled ten times or more. That is, if this response is distributed evenly across the age groups, only about 1% of adult Australians cycle on a daily basis.

The age group breakdown is further illustrated by Figure 1, also taken from the National Cycling Participation Survey.

Figure 1: Cycling by age group over past week, month and year



Source: Austroads National Cycling Participation Survey 2011, Figure 4.3

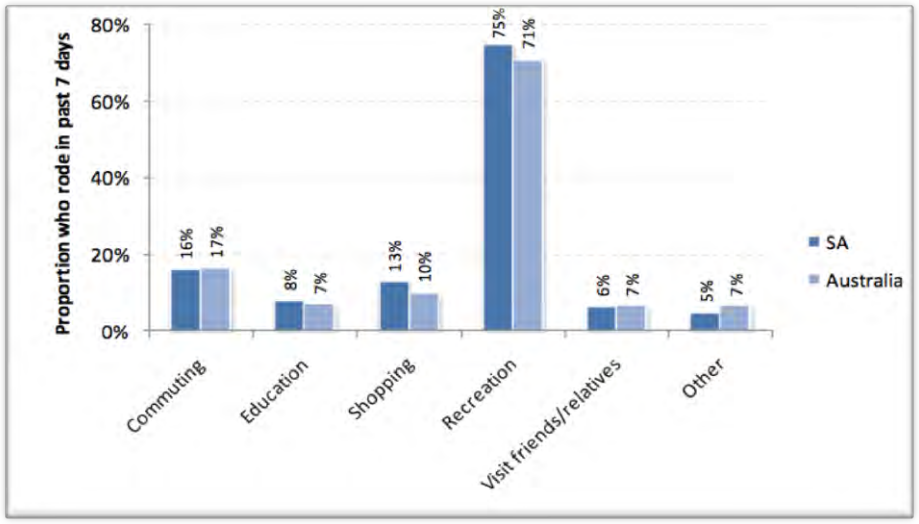
The low levels of cycling reported for the 18-24 year olds interesting, given the apparent high visibility of such cyclists in inner cities. The lesson here is that we should not assume cycling activity in Australia as a whole by what we see on inner city streets.

3.1 Cycling by purpose

Figure 2 indicates that of the cycling that is undertaken, most is for fun and/or exercise only. This figure is for South Australia and Australia as a whole. The report provides separate figures for each state or territory. The differences between states are minor.

Elsewhere in the survey report it is revealed that 35% of those who rode in the previous week said that did for transport purposes (that is, to get from A to B). The figure was nearly half in Canberra and the Northern Territory. This suggests that about 4% of adult Australians rode for transport purposes in previous week.

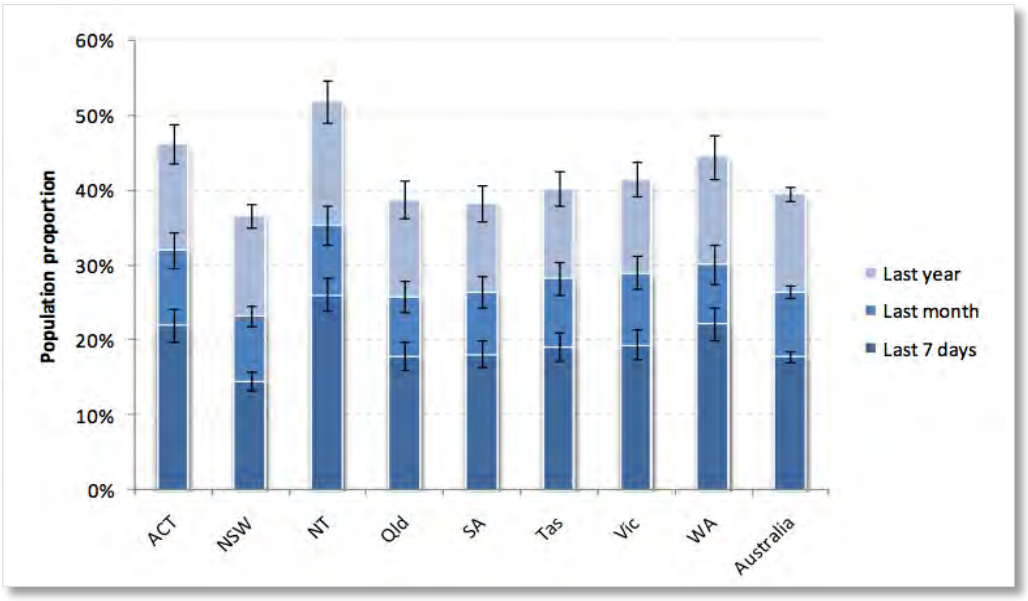
Figure 2: Cycling by purpose



Source: Austroads National Cycling Participation Survey 2011, Figure 4.10

Figure 3 reveals that there is not much difference in the overall levels of cycling across Australia.

Figure 3: Cycling by state and territory



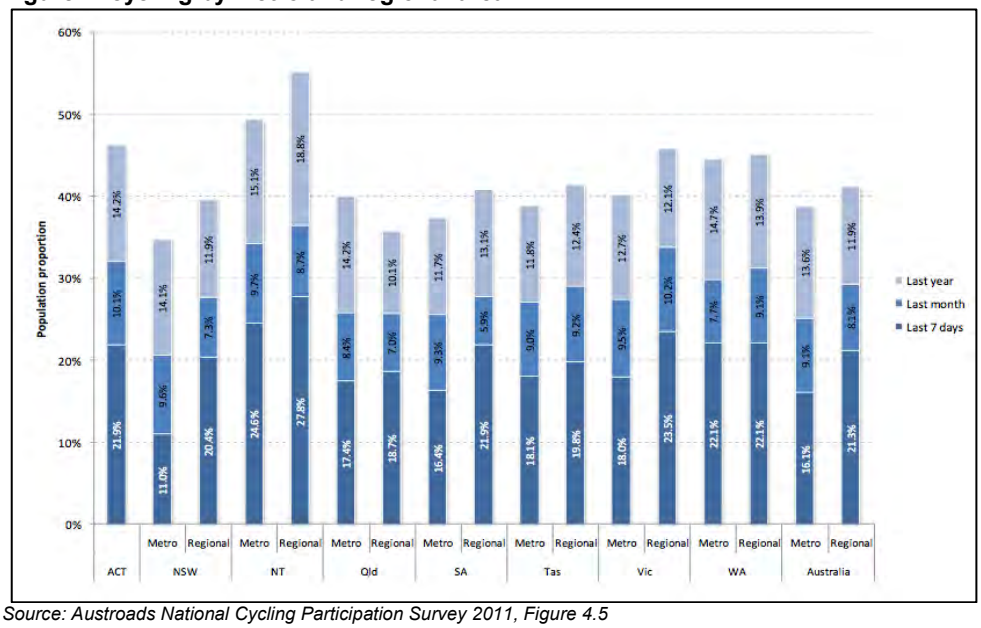
Source: Austroads National Cycling Participation Survey 2011, Figure 4.1

The two territories stand out. High quality cycling infrastructure is often used to explain the high levels of cycling in Canberra, but another explanation may lie in the nature of the population. The high levels of cycling in the NT have not been explained. Once again there are high quality off-road paths, at least in the Darwin area, but the answer may also lie in the nature of the population, and possibly the low levels of traffic experienced in the Northern Territory. Western Australian governments have also devoted a lot of resources to off-road paths that seem to appeal to the recreational cyclists that predominate in Australia.

But the more important observation is that the states are all very similar, with variations almost all lying within the bars indicating 95% confidence in the results.

Figure **4** breaks down the locational distinctions further by distinguishing between metropolitan and non-metropolitan areas. Note that the small sample sizes means that these results are not as reliable as figures for the state as a whole. Nevertheless, it is interesting to note that the level of non-metropolitan cycling is higher than in the cities in all states except Queensland. This also supports the idea suggested earlier, that cycling is more likely to happen when traffic levels are low.

Figure 4: cycling by metro and regional area



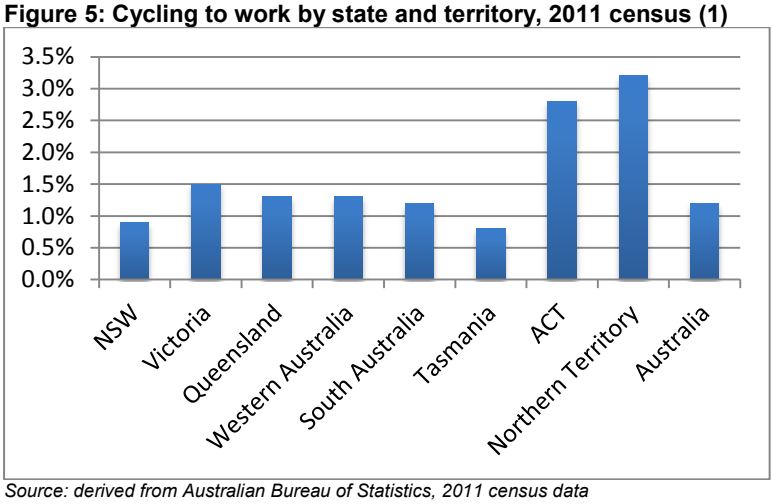
Source: Austroads National Cycling Participation Survey 2011, Figure 4.5

3.2 Cycling to work

Figures 5 and 6 both present cycling's percentage of the journey to work as recorded in the 2011 census. Figure 5 has the usual format, with the Y scale limited to slightly above that of the highest reading. However to indicate just how small cycling's share of the journey to work still is, Figure 6 presents the same data, but with the Y scale scaled to 100%.

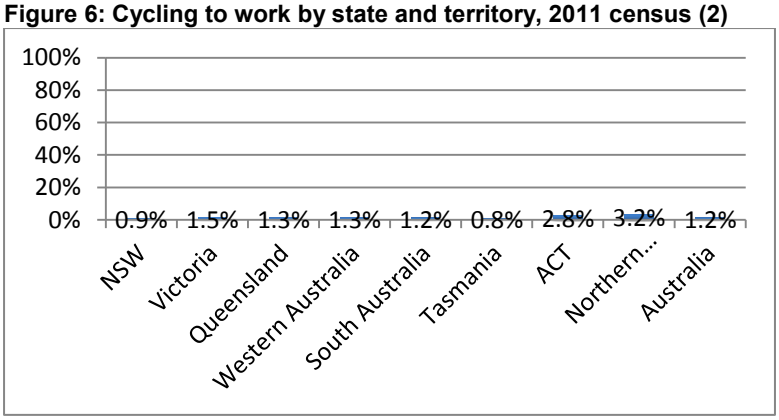
Figure 6 indicates that there is very little variation between the states and territories: in all cases cycling's share of the journey to work is very minor. However Figure 5 points out that cycling's share is about twice as high in the ACT and Northern Territory as it is in the highest of the states – Victoria; and that Victoria's share itself is approaching twice as high as that of the two lowest states – New South Wales and Tasmania.

Figure 5: Cycling to work by state and territory, 2011 census (1)



Source: derived from Australian Bureau of Statistics, 2011 census data

Figure 6: Cycling to work by state and territory, 2011 census (2)



Source: derived from Australian Bureau of Statistics, 2011 census data

As noted earlier, while census data captures practically all journeys to work, it can be a misleading indicator of general levels of cycling because it records only one day's cycling, and that day is in winter, when in the southern states at least cycle commuting is about 30% less than the average for the year as a whole. Moreover, South Australia's level was particularly low as the state (including Adelaide) experienced frequent showers during the day.

Because it records virtually every trip, the census can be used to determine cycling's share of the journey to work in quite small areas. Figure 7 presents the percentage of commuters who cycled to work from among those who live in or near to the city centre.

To be reasonably consistent, we have used as boundaries the Commonwealth Electoral Districts for the city centre in each case. That is, in each case the measure is of the 80,000 people or so who live closest to the city centre. (The actual numbers range from 97,000 in Sydney to 73,000 in Adelaide.)

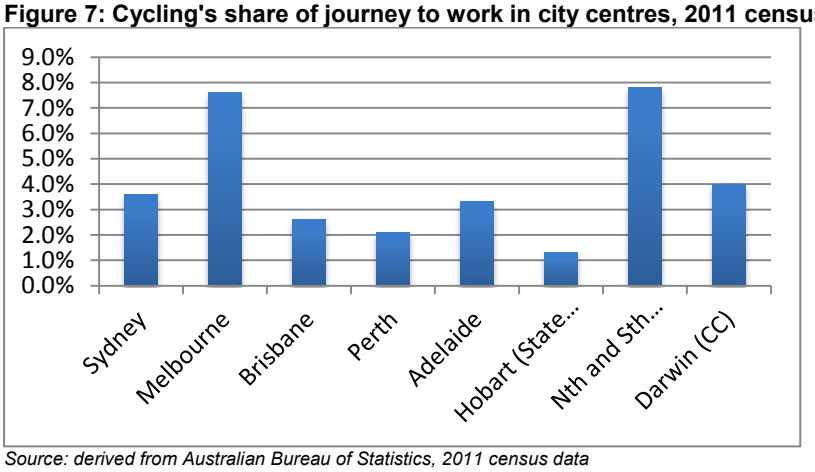
There are three exceptions.

First, Tasmania uses state electoral boundaries for the federal election, and there is no federal electorate that neatly encompasses Hobart's city centre. Here we have use the Australian Bureau of Statistics "state locality" of Hobart, numbering some 78,000 residents.

Second, the Commonwealth Electoral District of Canberra covers the southern part of the ACT, not the centre. Here we have used the two statistical areas level 3 of North Canberra and South Canberra, which together cover the 40,000 people who live closest to Lake Burley Griffin.

Third, there are only 120,000 residents in Greater Darwin, an area extending about 50km from the city centre. So a boundary encompassing 80,000 residents would cover many who lived well away from the city centre. Here we have used the boundaries of the Darwin City Council, which serves 39,000 residents.

Figure 7: Cycling's share of journey to work in city centres, 2011 census



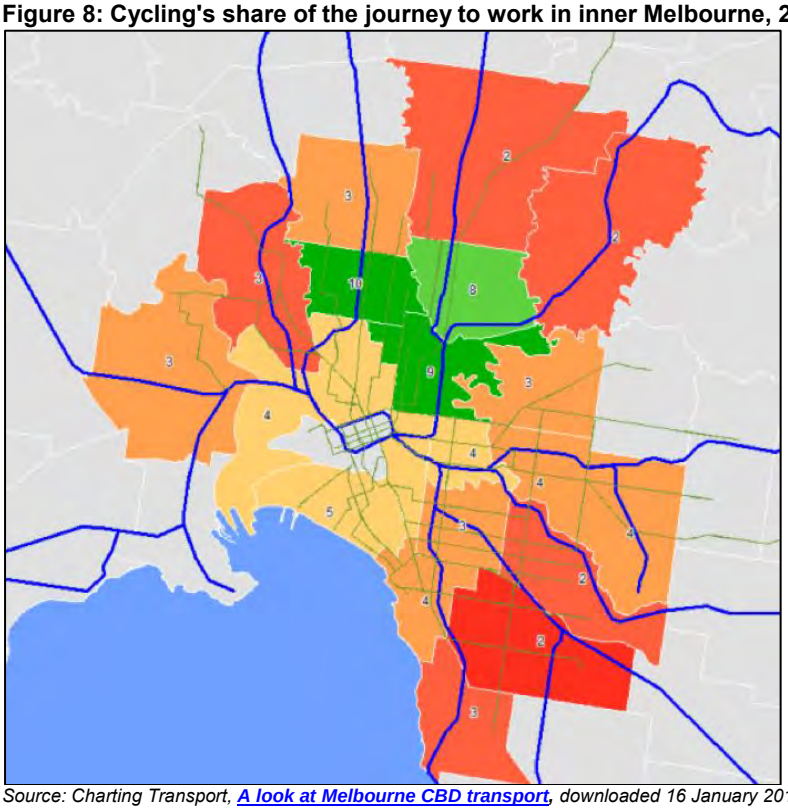
Source: derived from Australian Bureau of Statistics, 2011 census data

Cycling is still pretty minor, but the shares are at least twice that for the respective state/ territory as a whole in Sydney, Melbourne, Brisbane, Adelaide and Canberra.

In central Melbourne's cycling share is five times that of Victoria's. See Figure 8 for a breakdown of this. Note that the 8-10% achieved in Yarra, Brunswick and Northcote are winter figures. In the popular cycling months of February, March, April and November the share is possibly twice as high.

It is also interesting to note that the higher the level of cycling, the higher the proportion of female cyclists. For example 10% of the City of Yarra's residents rode to work on census day, and 39% of the cyclists were female. This compares with 23% for Australia as a whole. To a large extent the higher absolute numbers of cyclists in the inner suburbs is made up of women.

Figure 8: Cycling's share of the journey to work in inner Melbourne, 2011 census



*Source: Charting Transport, **A look at Melbourne CBD transport**, downloaded 16 January 2013*

4 Cycling trends

So far we have attempted to provide a snapshot of cycling in Australia, mainly as it was in 2011. What are the trends? Is cycling increasing or declining? Anecdotal evidence is undoubtedly that cycling is increasing, but that assumes a time period of only the past decade or so. What of the longer term?

In fact Gilham & Rissell (2012) claim cycling rates have declined. Their evidence has been criticised Olivier et al, (2012) who argue that the apparent declining rate from 1986 to 2011 was due to the older population at the later date, and that if the age demographics were constant we would have seen an 8% increase in the cycling rate. Alan Davies (2012) adds that the increase is likely to be higher still, because the way Gilham and Russell tried to reconcile a 1986 survey (which covered one day) with the 2011 survey (which covered seven days) gave a misleadingly low result for 2011.

An important factor here is that the breakdown of the population by age. As we have seen, children are far more likely to cycle than adults. If the proportion of the population who are children declines, then the overall rate of cycling will decline even if the respective popularity of cycling is constant for both children and adults. And we may see more cycling by adults on city streets, but does this replace the cycling that used to be done by children to the corner shop to buy sweets?

What has happened over the past 30 years or so is:

(1) children as a proportion of the population has declined

(2) the popularity of cycling among children has declined

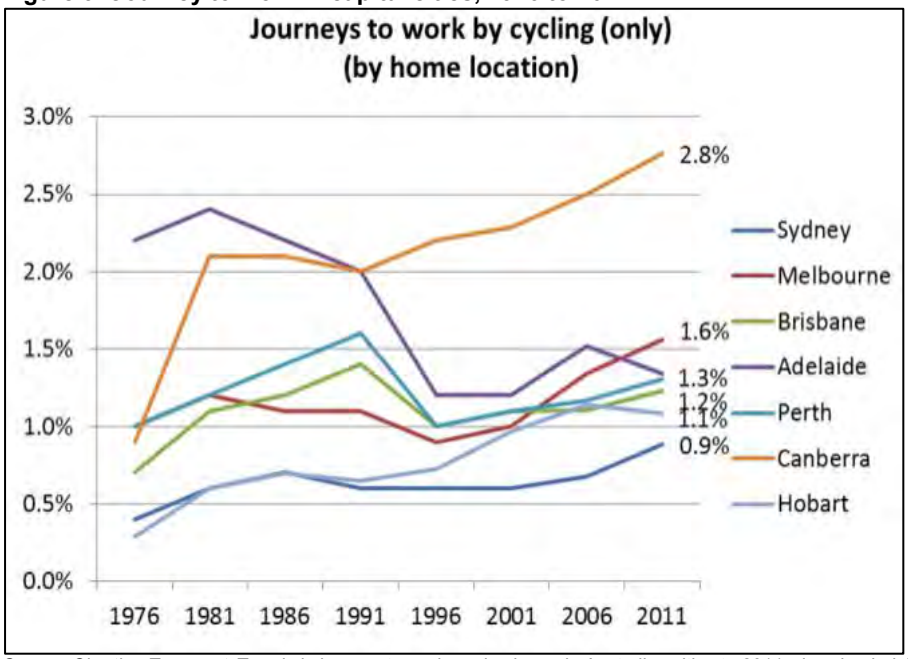
(3) the popularity of cycling among adults has increased, especially in the past 10 years, but not enough to offset the effects of (1) and (2).

We will firstly outline adult cycling over time before turning to children's cycling.

4.1 Adult cycling trends

On the 1976 census day 1.1% of Australians cycled to work. (ABS 1981) In 2011 the figure was 1.2%. Figure 9 breaks down the trend by capital city and year of census. Trends vary between cities, but broadly speaking, the larger cities saw an increase in the decade between 1976 and 1986, a decline (quite sharp in several cases) in the next decade, and a recovery after 1996.

Figure 9: Journey to work in capital cities, 1976 to 2011

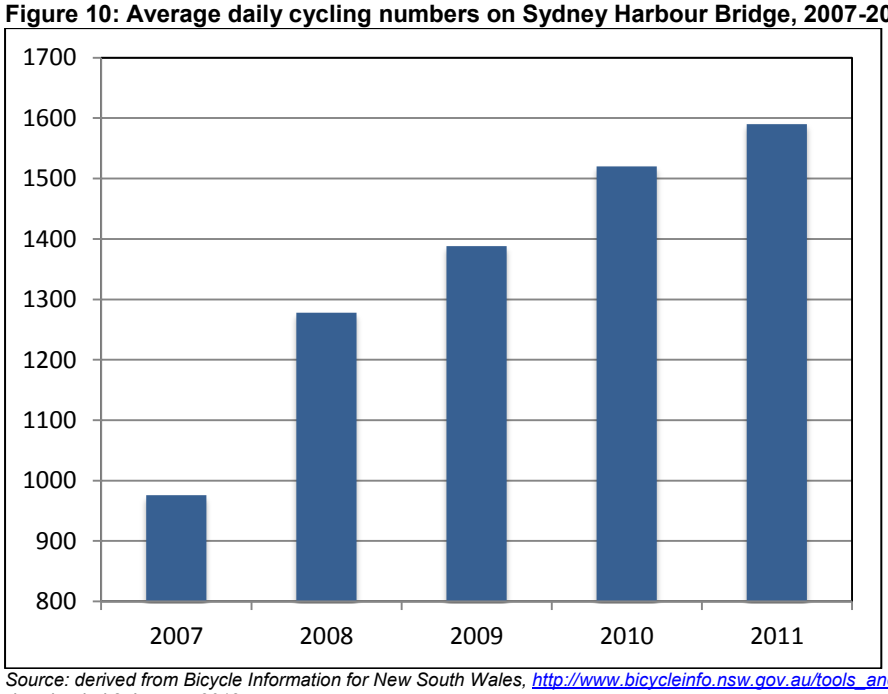


Source: Charting Transport, Trends in journey to work mode shares in Australian cities to 2011*, downloaded 16 January 2013*

Dramatic changes can be seen for Canberra (up) and Adelaide (down). While the longer term trend is clear, we should note that weather might well be influential in any one year, and that figures for the southern cities are likely to be lower than they would be for the year as a whole.

The increase in adult cycling over the past few years is revealed most clearly in the data produced by the automatic counters that are being installed by state governments. **Figure 10** is an example: the average daily number of cyclists crossing Sydney Harbour Bridge from 2007 and 2011.

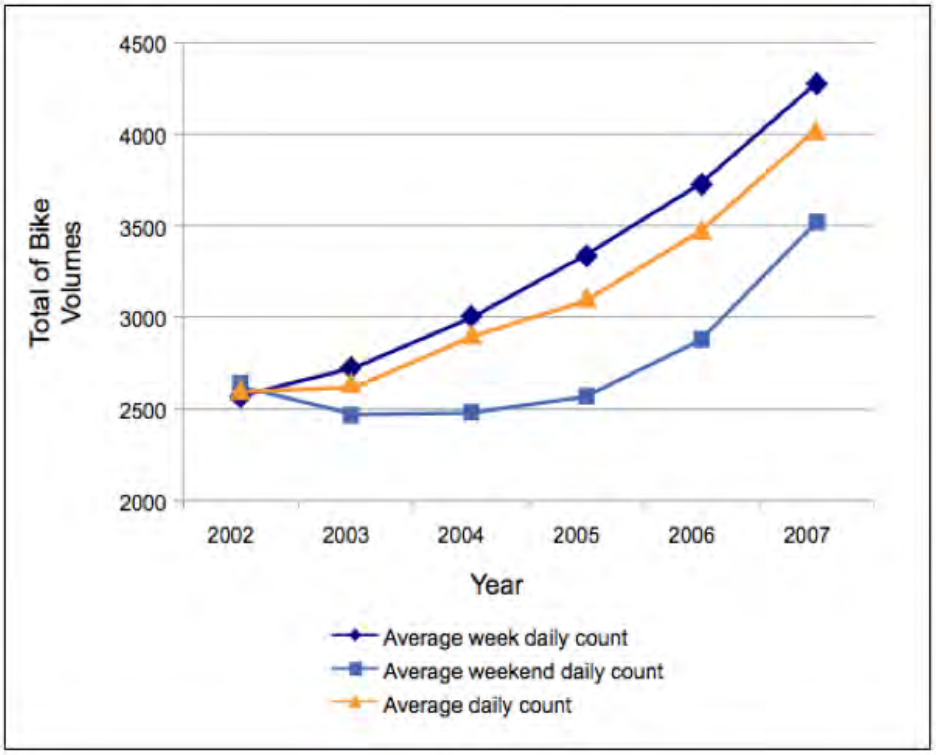
Figure 10: Average daily cycling numbers on Sydney Harbour Bridge, 2007-2011



Source: derived from Bicycle Information for New South Wales, http://www.bicycleinfo.nsw.gov.au/tools_and_resources/cycle_count_data.html, downloaded 8 January 2013

The average annual increase on the Sydney Harbour Bridge is 15%. This appears to be a continuation of the trend established at least five years earlier. The average daily count for recorded by all of Sydney's counters increased by 57% in the five years from 2002, with a higher weekday increase than weekend. (See **Figure 11**.)

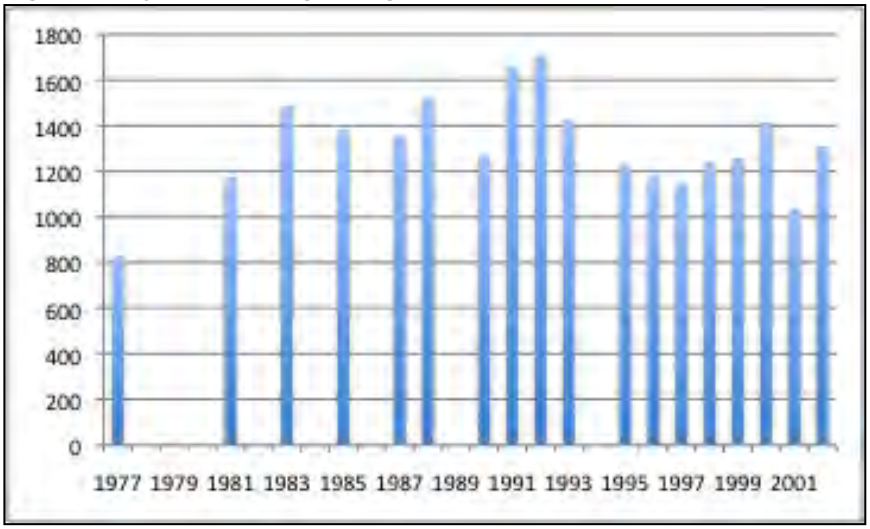
Figure 11: total average daily bike counts recorded by Sydney's automatic bike counters, 2002-2007



Source: NSW Roads and Traffic Authority (2008) Cycling in Sydney Bicycle ownership and use April 2008

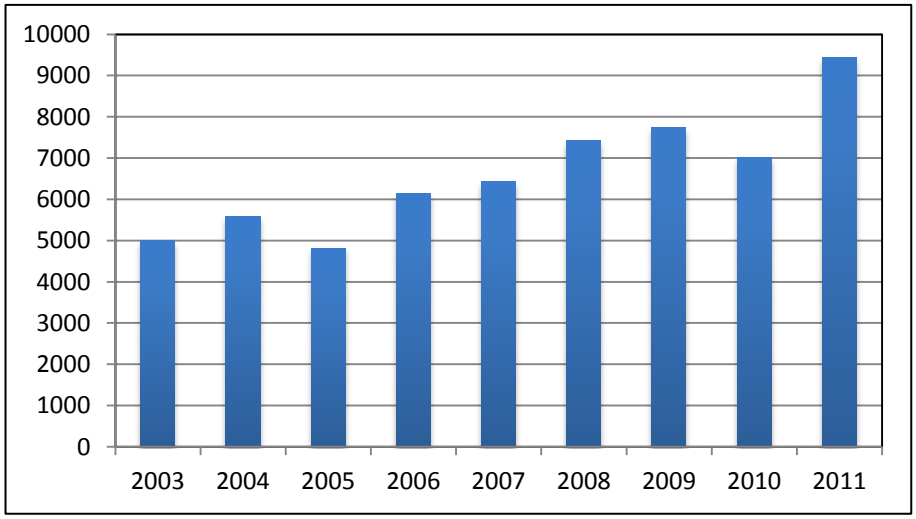
Adelaide City Council and the South Australian government have together been counting the number of cyclists travelling through the Parklands that circle the CBD since 1985. The manual "cordon count" is undertaken every October; the month when cycling is closest to the annual average. The attempt has been to count every cyclist entering the CBD through the parklands for all of this period. However the actual location of counters has changed over this time and the count has changed from a count of cyclists travelling into the city (possibly from 7am to 10am) to cyclists travelling both directions over 12 hours. Figures 12 and 13 cover the two methodologies.

Figure 12: Cyclists passing through Park Lands to Adelaide CBD 1977-2001



Source: SA Department of Road Transport. Note the hours of the count are not known: possibly 7am to 10am. 2001 was recorded during wet weather.

Figure 13: Cyclists to and from the Adelaide CBD through the Parklands, 12 hours (7am - 7pm), 2003-2011



Source: Adelaide City Council

This long time period reveals a flatter version of the history recorded in Adelaide's journey to work data (**Figure 9**): generally flat from 1985 to 2001, apart from a decline in the first half of the 1990s, followed by an increase from 2001. (The average annual increase of about 10% recorded over the past decade is supported by "screenline" counts undertaken by the Adelaide City Council at various city intersections in 2009, 2010 and 2012.)

The cordon counts and screenline counts distinguish male and female cyclists and once again we see a significant increase in the proportion of females riding. 10 years ago, about 13% of cyclists riding through the Parklands were women. Now the proportion now is about 25%. Once again, however, we are talking about adult cyclists only: typically commuters and tertiary students in the inner city.

Sydney has automatic counters distributed across the metropolitan area.
Figure is a map of these counters, with average daily cycling counts added. While designed to show the sparseness of cyclist away from the city centre, we should of course note that the closer to the city centre, the higher the density of activities, including jobs, and the size of the count will depend on whether it was located to

count the maximum number of cyclists in the locality. The northwest counts in the 300s are along the M7 Westlink shared path. The pattern of less cycling the further from the city centre is supported by Sydney's Household Travel Survey, which found more bike ownership in outer suburbs, but fewer bike trips. (RTA, 2008)

Figure 14: Automatic counters in Sydney metropolitan area, with 2011 average daily counts

Source: Bicycle Information for New South Wales, http://www.bicycleinfo.nsw.gov.au/tools_and_resources/cycle_count_data.html, downloaded 8 January 2013

4.2 Children's cycling trends

Even away from the city centre, the counters will mainly pick up adult cycling. More statistically important have been the trends in children's cycling. Here the data are harder to come by. Children's cycling is far more scattered, local, away from major corridors.

Also, the actual quantum of children's cycling over the longer term is difficult to establish as there is little statistical evidence of children's cycling 30 or so years ago. A study using the NSW household travel surveys in 1971 and 2003 argues that cycling was negligible (1-2% of children's trips) in both years. (Van der Ploeg et al. 2008) Remember that the household travel surveys rely on sample households, and the survey responses are provided by an adult on behalf of the household. The 1971 figure may have been true, but is hard to reconcile with the evidence of two photos of the same (admittedly South Australian) high school, one taken about 1972 and the other taken in 2009. (See Figures 13 and 14.)

Figure 15: Bike parking Norwood High School, early 1970s

Source: photo held by Norwood Morialta High School

Figure 16: Bike parking, Norwood Morialta High School 2009

Source: author's collection. Note that the photo was taken during public examinations, when Year 12 students may not have been attending.

An unpublished study undertaken by the author of the Metropolitan Adelaide Household Travel Survey found that the total number of bicycle trips by children aged up to 15 declined by 64% between 1986 and 1999, when cycling just started to recover from its lowest level. This is very important to the overall rate given that cycling rates are dominated by children. More than half of all cycling trips were done by children 15 and under in 1986; half of that in 1999. A large decline in children's cycling will swamp a small increase by adults. In fact the overall decline in cycling between 1986 and 1999 was 54%, despite the increase in population. The dominant factor was the decline in children's cycling.

Figures from the Australian Capital Territory suggest that 13% of attendees cycled to schools (including tertiary institutions) in 1970, and 7.5% in 1997. (cited, Garrad, 2011) (One possibility — not necessary advocated — is that the travel patterns of tertiary students pulled the 1970 figure down and the 1997 figure up.)

The 2012 Active Travel to School Survey, which surveyed 1005 parents across Australia, found that 11% of children cycled to school. (Heart Foundation/ Cycling Promotion Fund, 2012) The survey provides plenty of evidence that children's cycling is limited by the safety fears of parents. Nevertheless, these figures suggest that the decline in children's cycling to school has been arrested.

5 Summary and concluding observations

No, not everybody is cycling. Cycling is still a minority activity. Perhaps the most telling statistic is the 1.2% of Australians cycling to work reported in the 2011 census. Child cycling rates have declined since the 1970s. Adult cycling appears to have been more constant over the longer term and has increased over the past ten years, while children's cycling appears to have recently stabilised. The increase in cycling that has occurred in the past ten years may have restored adult cycling to the sorts of levels achieved in the 1970s, but it hasn't been sufficient to overcome the overall decline that occurred in the 10-15 years before 2000.

On a more positive note, while rates of cycling may look tiny compared with major cycling cities such as Amsterdam and Copenhagen, the Australian rates are fairly typical of that in OECD countries, including many European cities. The most typical proportion of trips by bike recorded in the excellent European Platform on Mobility Management database is less than 5%, even in Europe.

Also, the rates of increase that have been experienced in the inner city areas over the past decade, if continued over the next thirty years, would provide cities such as Adelaide and Melbourne with similar cycling mode shares as currently experienced in Amsterdam and Copenhagen. While this is very much speculative, it is often noted that these examples of best practice have built their reputation gradually over thirty years.

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Moving people 2030: a transport plan for a productive and active Australia

(Contact the author for copies of the full paper.)

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Abstract

Where does bicycle riding align itself to achieve the greatest outcomes?

On October 29 2012 at Parliament House Canberra, the *Moving people 2030* policy document developed by the Moving People Taskforce was launched by the Federal Minister for Transport.

Vision: by 2030 Australia's transport system will be the foundation on which we build a prosperous, sustainable, liveable and healthy nation.

The aims for moving people in Australia by 2030 are:

- A world class integrated and multi-modal system that will safely and efficiently move Australians and our goods.
- To ensure Australians retain a high quality of life and continually improve the liveability of our cities and regions through delivery of:
  - world class public transport systems
  - integrated and connected walking and bicycling networks (active transport)
  - freight networks.
- All Australians have access to transport and mobility alternatives to the car.

The policy document will have cycling, walking and public transport as cornerstones of an integrated transport system to move people and goods across Australia.

The Taskforce comprises:

- Australian Local Government Association
- Australian Logistics Council
- Australasian Railways Association
- Bus Industry Confederation
- Cycling Promotion Fund
- International Union of Public Transport
- National Heart Foundation
- Planning institute of Australia

Through the formation of strong and integrated partnerships, what can the Cycling community achieve?

Cycle tourism policy and practice in Europe

(Contact the corresponding author for copies of the full paper.)

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Abstract

A recent study of cycle tourism in Europe and the development of the EuroVelo network concluded that whilst it is still a small part of the market there is potential for significant growth on a European level. Further, the report concluded that cycle tourism could contribute to a more sustainable tourism sector, particularly in rural areas that have not traditionally benefitted from mainstream tourism, and that there was a role for the European Union in its development.

This paper looks at cycling policy and practice in Europe. In a comparison of the opinions of cycling experts and the developing policies of the European Union towards cycling it seeks to understand whether strategic policies can have some impact on the ground. As part of the aforementioned study for the European Parliament, a survey of 'experts' from 30 countries across Europe was undertaken in 2009 and repeated in 2012. The responses were explored to see to what extent there is agreement about the need for, and the appropriate scale of, any intervention in countries with very different cycling cultures.

This is then compared with the emerging policies at European level and some current national policies to assess the convergence, or otherwise, of policy, practice and demand. The paper reveals some interesting insights into the support for cycle tourism development in Europe and differences in opinion as to how this is best achieved.

Safer in the country? An investigation of the safety issues related to cycling in regional Victoria

(This paper has been peer reviewed.)

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Abstract

Understanding issues impacting cyclists in regional areas is a significant gap in cyclist safety research in Australia. To date, the primary research focus has been on issues affecting cyclists in metropolitan areas. This study investigated safety issues related to cycling in one regional area of Victoria, Baw Baw Shire. An online survey was conducted of adult residents from the area (n=283) who were classified as drivers (53.3%) or cyclists (46.6%). The main safety issues identified were: poor road surface; driver behaviour; lack of bicycle facilities/lack of space on the road; speed, and; trucks. The priority of these issues varied depending on the respondents' road user status. Of particular concern, less than a third of respondents (32.1%) believed that other drivers in Baw Baw Shire considered cyclists to be legitimate road users. Some safety concerns identified did overlap with metropolitan issues, however, others were rural specific and require location-specific countermeasures. This paper also includes details of translation of the study findings by the Baw Baw Shire Council including the action taken and the planned changes in the Baw Baw Shire area to improve safety for cyclists.

Keywords: cyclist safety, rural Victoria, Baw Baw Shire, cyclists as legitimate road users

1. Introduction

Over recent years, there has been a substantial increase in the number of people cycling in Australia[ref 1]. Numerous individual and community benefits are gained by cycling including improved physical fitness, reduced traffic congestion, reduced vehicle exhaust pollution and reductions in the overall societal burden on health resources[ref 2-5]. However, to date, much of the research has focused on metropolitan cyclists, with little attention given to the issues impacting rural and regional cyclists and drivers[ref 6-11].

There are several challenges for local authorities in reducing cyclist crashes in rural areas. The geographic size of a regional local government area is a major factor, particularly as crashes rarely occur in clusters where a targeted countermeasure may reduce risk[ref 12]. High speed limits in rural areas, increased use of highways by cyclists, poor road surface, passing traffic and heavy trucks have all been identified as factors impact cyclist safety and crash risk in rural areas[ref 12-14]. Cyclists in rural areas have been reported to have an increased risk of injury and hospitalisation compared to their metropolitan counterparts[ref 15-16].

Driver attitude is also an important contributing factor as negative driver attitudes towards cyclists have been associated with poorer knowledge of the road rules and lower tolerance of cyclists on the roads[ref 17-21]. Positive attitudes towards cyclists are most frequently associated with drivers who also cycle[ref 22].

1.1 Bab Baw Shire

The focus on cyclist safety in the Baw Baw Shire area was instigated from within the Baw Baw Shire Council by staff in the community development department (N Davey). Through a Transport Accident Commission (TAC) community grant, the Council commissioned the Monash University Accident Research Centre (MUARC) (M Johnson) to undertake a research study to identify the cyclist safety related issues that impacted both cyclists and drivers in the Baw Baw Shire area (Bike It Baw Baw[ref 23]).

The Baw Baw Shire is a rural farming community approximately 100km east of Melbourne. The Shire area is 4,028 square kilometres and has a population of 44,042 (2011). Figure 1 is a map of Victoria with the Baw Baw Shire Council area circled.

[1] Certified in accordance with section 55D of the Local Government Act 1989 by Helen Anstis, Chief Executive Officer, Civic Place, Warragul.

Figure 1: Map of Victoria (Baw Baw Shire Council area is circled)

Source for map: http://www.regional.gov.au/local/publications/pdf/vic_lga_0809.pdf, 11 April 2012

Two key policies underpin the Baw Baw Shire Council's approach to road safety *Baw Baw Shire Council Integrated Transport Plan 2011* [ref 25] and *Gippsland's Road Safety Strategy 2011-2014* [ref 26]. Cyclists are prominent in the *Baw Baw Shire Council Integrated Transport Plan 2011*. The policy clearly identifies the need for practical, applied action including maintenance of roads, maintenance of bike lanes, increased bicycle paths and bike parking. Collaboration with key community groups is highlighted in the policy. This policy illustrates that, at a Council level, increased cycling participation is recognised and the need to create a safe cycling environment is acknowledged.

In contrast, cyclists are almost absent from the regional policy, *Gippsland's Road Safety Strategy 2011-2014*. Despite a range of action plans that list region wide road safety priorities, actions and targets, none of the proposed approaches include any direct action to improve the safety for cyclists.

1.2 Bike it Bab Baw

In this study, the theoretical framework used was the Safe System approach. This framework underpins the approach to road safety adopted in Australia and New Zealand and is comprised of four key pillars: safer road users, safer roads and roadsides, safer speed and safer vehicles [ref 23]. The aim of this study was to identify the cycling-related safety concerns of cyclists and drivers when travelling in the Baw Baw Shire area.

Recommendations were used to by the Baw Baw Shire Council to inform priorities, actions and programs to improve cyclist safety in the Baw Baw Shire area.

2. Methods

2.1 Online survey

An online survey was conducted with residents who cycled or drove in the Baw Baw Shire area. A previous national survey on cyclist safety was used as basis for the Baw Baw Shire survey [ref 27]. To ensure the survey included the issues important to local stakeholders and local residents, an external project reference group (reference group) was formed and a series of focus groups with local residents were planned.

The reference group included representatives from Victoria Police, Warragul Cycling Club, a local bicycle retailer (Chilli Cycles), GippsTafe, West Gippsland Health Care Group, Gippsland Bike Ed, VicRoads, Gippsland Road Safety Network, Community College Gippsland. A first draft of the survey was discussed at a meeting with some members of the reference group. The reference group identified additional topics to be incorporated in a second draft of the survey.

The planned next stage was a series of focus groups with cyclists and drivers from the Baw Baw Shire area to identify any additional issues for inclusion in the survey. Despite extensive recruitment efforts using local advertising, media and from the Council as well as offering a range of times of day and days of the week, only three people responded directly, insufficient to conduct a focus group. The main barriers to local residents' participation in the focus group are not currently known. A greater understanding of the barriers to focus groups is needed prior to attempting a future series of focus groups with this community on this topic.

The second draft of the survey developed and included input from the reference group meeting. This was forwarded to the entire reference group and the people who had expressed interest in the focus group. All comments received were reviewed and incorporated as appropriate.

The online survey was 60 questions including: demographics, driving experience, riding experiences in the Baw Baw Shire area, knowledge of road rules related to cyclists, cyclist collision involvement, reason why people don't ride, attitudes about sharing the road with cyclists while driving and changes needed to make cycling safer in the Baw Baw Shire area. The final survey was available online, using SurveyMonkey, from January to February 2012.

2.2 Participants

The survey participant inclusion criteria were: aged 18 years or older; lived and travelled in the Baw Baw Shire area. Participation was voluntary and no incentive was offered. Informed consent was implied in the submission of the survey and study protocols were approved by the Monash University Human Research Ethics Committee.

A convenience sample was used with participants recruited using a broad recruitment strategy. As many cyclists do not belong to a cycling club or organisation [ref 28], various recruitment methods were used including online, through the use of several websites (Monash University webpage and intranet, Baw Baw Shire Council website, Amy Gillett Foundation webpage and social network page). The survey was also publicised via local media and a snowball recruitment strategy was used through the reference group and participants from previous cycling studies at MUARC. This sampling approach was used to maximum the number of survey respondents, however, the non-representative sampling does limit the generalisability of the survey results to the broader cycling population.

2.3 Data analysis

Road user status was determined by the participants' cycling frequency. High cycling frequency (daily, weekly, monthly) was classified as cyclists and low cycling frequency (a few times a year, once a year, less than once a year) and do not cycle were classified as drivers.

All participants' demographic characteristics are included in a summary table with descriptive data for: gender, age, relationship status, employment status, education and household income. Chi square tests were conducted to determine any statistically significant differences between cyclists and drivers.

In this paper, a subset of questions were analysed to determine 1) the main cycling-related safety concerns of cyclists and drivers in the Baw Baw Shire area; 2) the perception of cyclists as legitimate road users by the respondents and other drivers in the Baw Baw Shire area, and; 3) recommendations made by participants to improve cyclist safety.

Participants were asked to list three cycling-related safety concerns when cycling and when driving. Each of these questions was unprompted and open-ended. All responses when cycling were coded as: road surface including potholes, unsealed shoulders; driver behaviour/attitude, including impatience, aggression; lack of cycling facilities including lack of space for cyclists, poorly maintained facilities; trucks; sharing the road with other vehicles; speed including speeding vehicles, high speed limits, speed differential; vehicles overtaking including insufficient space, and; other. All responses in the 'other' categories were reported by fewer than three people, less than 1% of the total responses. All responses when driving were coded as: able to overtake safely; narrow roads, no shoulder; low visibility, can't see cyclist; poor road surfaces; cyclist behaviour – unpredictable, erratic; bunch riders taking up whole road; driver behaviour, uneducated, impatient etc; blind corners, poor sight distance, and; cyclist behaviour – illegal, arrogant.

The perceptions of cyclists as legitimate road users were generated from two closed questions (response categories: yes/no/I don't know). Participants own belief about cyclists' legitimacy and their perceived legitimacy of cyclists by other drivers: *Do you think most drivers in the Baw Baw Shire area consider cyclists to be legitimate road users?*

All statistical analyses were conducted using SPSS Version 18. Statistical significance was set at $p<0.05$.

3. Results

Completed survey responses were received from 283 adult residents of the Baw Baw Shire. A slight majority of respondents were identified as drivers (53.3%) including 13.2% who did not ride a bicycle at all. Slightly fewer than half the respondents were classified as cyclists (46.6%).

3.1 Demographics

Demographic characteristics by road user type are in Table 1. The two groups were similar across the demographic variables, the only statistically significant different characteristics were: gender and education. More males responded as cyclists and more females responded as drivers ($\chi^2_{(1)}$ =19.856, p<0.0001). More cyclist respondents had a university degree than drivers, who were more likely to have completed secondary school or a technical degree ($\chi^2_{(4)}$ =9.572, p=0.048).

The age range for respondents was 19 to 84 years and the average age was 47.5 years. Cyclists were slightly younger (19-64 years, average: 46 years) than drivers (21-84 years, average: 49 years). The age differences were not statistically significant.

Table 1: Summary of demographic characteristics by road user type

	Cyclist n=132		Driver n=151		Total n=283	
	n	%	n	%	n	%
Gender*						
female	42	31.8	88	58.3	130	45.9
male	90	68.2	63	41.7	153	54.1
Age						
18-29 years	10	7.6	12	7.9	22	7.8
30-49 years	60	45.5	72	47.7	132	46.6
50+ years	62	47.0	67	44.4	129	45.6
Relationship status						
single	20	15.3	24	16.0	44	15.7
married/long term relationship	110	84.0	125	83.3	235	83.6
other	1	0.8	1	0.7	2	0.7
Employment status						
working full time	78	59.1	87	58.0	165	58.5
working part time	32	24.2	33	22.0	65	23.0
full time student	4	3.0	1	0.7	5	1.8
not working (inc volunteer)	7	5.3	10	6.6	17	6.0
retired	11	8.3	19	12.7	30	10.6
Education*						
partial secondary	3	2.3	12	8.3	15	5.4
secondary	25	18.9	31	21.5	56	20.3
technical school or TAFE	28	21.2	40	27.8	68	24.6
university degree	59	44.7	45	31.3	104	37.7
higher degree (Masters or PhD)	17	12.9	16	11.1	33	12.0
Household income						
less than $20,000	2	1.6	5	3.8	7	2.7
$20,000 - $39,999	11	8.7	20	15.4	31	12.1
$40,000 - $74,999	26	20.6	31	23.8	57	22.3
$75,000 - $99,999	27	21.4	28	21.5	55	21.5
$100,000 - $149,999	34	27.0	32	24.6	66	25.8
over $150,000	26	20.6	14	10.8	40	15.6

* Statistically significant difference between respondent groups, p<0.05. Data from this table is reproduced from Johnson and Le (2012)

3.2 Driving and cycling behaviour

All the drivers held a full and current driver's licence. The majority of cyclists held a driver's licence (98.5%), 2 cyclists voluntarily do not to drive. The majority of participants drove between 101-500km per week (cyclists: 67.7%; drivers: 67.8%) and were the main driver in their household (cyclists: 72.3%; drivers: 71.9%). There were no statistically significant differences in any of the variables related to driving behaviour.

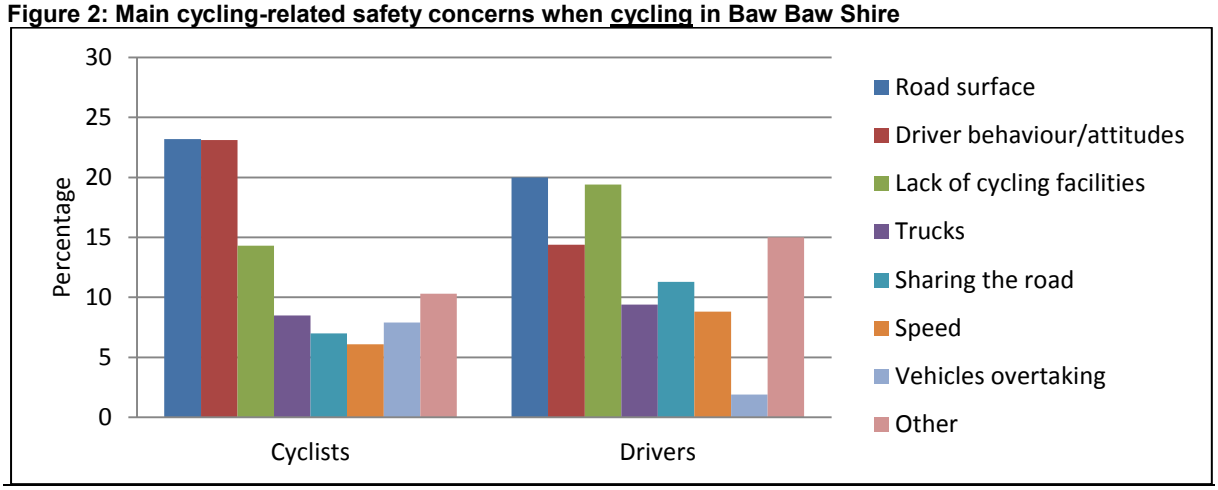
All cyclists and most drivers (71.5%) owned a bicycle. Bike type varied between cyclists and drivers. The majority of cyclists rode: road bikes (57.7%), mountain bikes (18.5%) and hybrid bikes (16.9%). The majority of drivers rode: mountain bikes (39.8%), road bikes (21.5%) and ladies (comfort) bikes (16.1%). The differences in cyclists and drivers bicycle types were statistically significantly different ($\chi^2_{(6)}$=44.734, p<0.001).

Trip purpose when riding also varied between the two groups. Cyclists' trip purpose varied across recreation (44.2%), training (22.7%), fitness/health/exercise (14.5%) and commuting (12.2%). When drivers rode, the main purpose was recreation (81.6%) with the remainder of drivers listing various trip purposes (training: 6.6%; fitness/health/exercise: 5.3%; commuting: 5.3%; fun: 1.3%).

3.3 Main cycling-related safety concerns - when cycling

The top three safety concerns for cyclist and drivers when cycling were poor road surface (21.9%), driver behaviour/ attitude (20.2%) and lack of cycling facilities (16.0%). Figure 2 shows the responses by road user type.

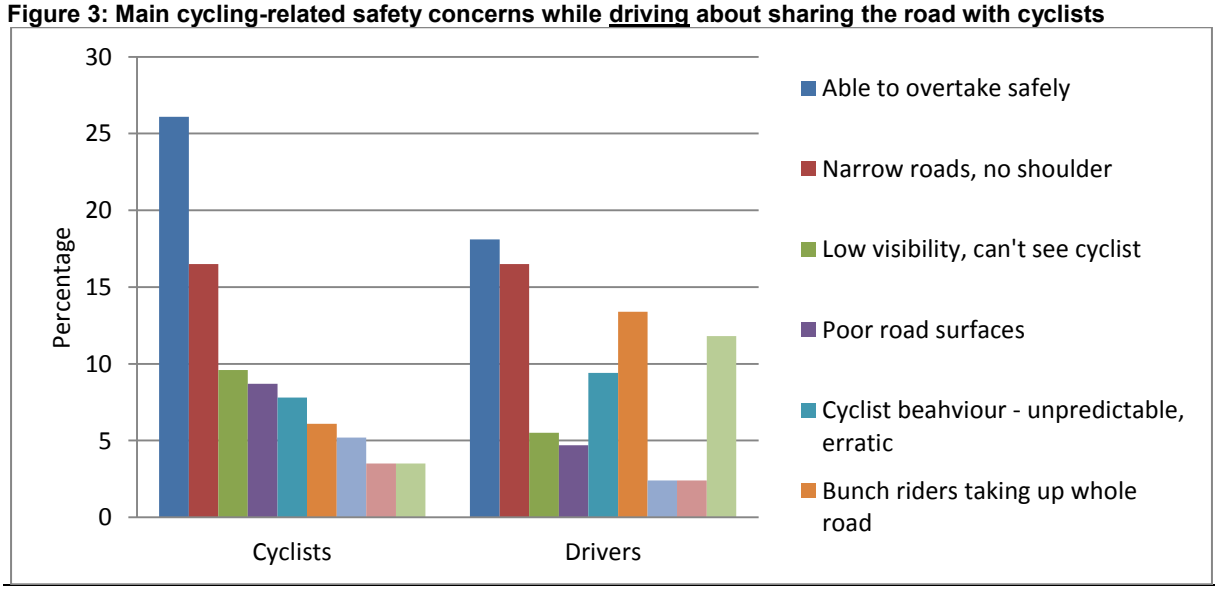
Figure 2: Main cycling-related safety concerns when cycling in Baw Baw Shire



3.4 Main cycling-related safety concerns - when driving

The majority of cycling-related safety concerns when driving for both cyclists (90.4%) and drivers (84.3%) related to nine issues, however, there were considerable differences in the proportions between the two groups (see Figure 3). Being able to overtake cyclists safely when driving concerned the largest proportion of cyclists (26.1%) and drivers (18.1%) with narrow roads and roads with no shoulders being the second concern (cyclists: 16.5%; drivers 16.5%). Beyond these two factors, there were considerable difference between the two groups with more cyclists being concerned about low visibility or being unable to see the cyclist (9.6%) and poor road surface (8.7%) compared to drivers who identified bunch riders taking up the whole road (13.4%) and cyclists' behaviour including illegal and arrogant behaviour (11.8%).

Figure 3: Main cycling-related safety concerns while driving about sharing the road with cyclists



3.5 Cyclists as legitimate road users

The majority of all respondents agreed that cyclists were legitimate road users, with slightly more cyclists in agreement (98.4%) than drivers (83.3%). A small proportion of participants did not consider cyclists to be legitimate road users (cyclists: 1.5%; drivers: 13.8%) and 4 drivers (2.7%) did not know. The difference in responses between cyclists and drivers was statistically significant ($\chi^2_{(2)}$ =18.318, p<0.001) (see Figure 4).

Less than a third of participants (cyclists: 36.1%; drivers: 28.4%) agreed that other drivers considered cyclists to be legitimate road users. The differences between cyclists and drivers were statistically significant ($\chi^2_{(2)}$=10.417, p0.005) (see Figure 5).

Figure 4: Cyclists are legitimate road users

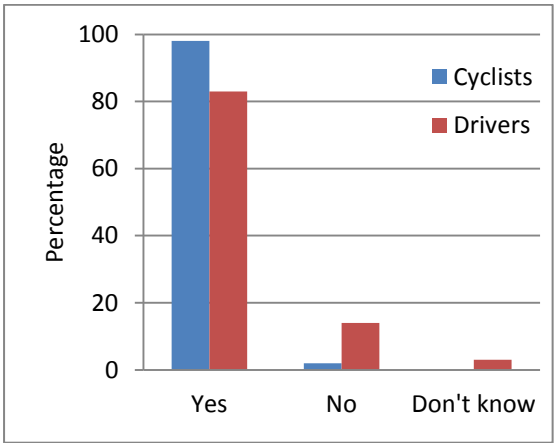
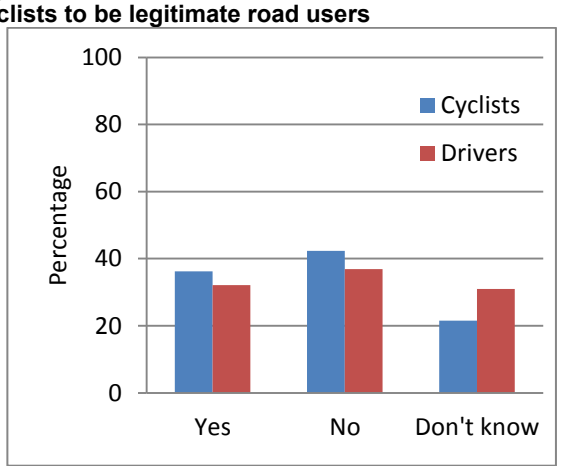


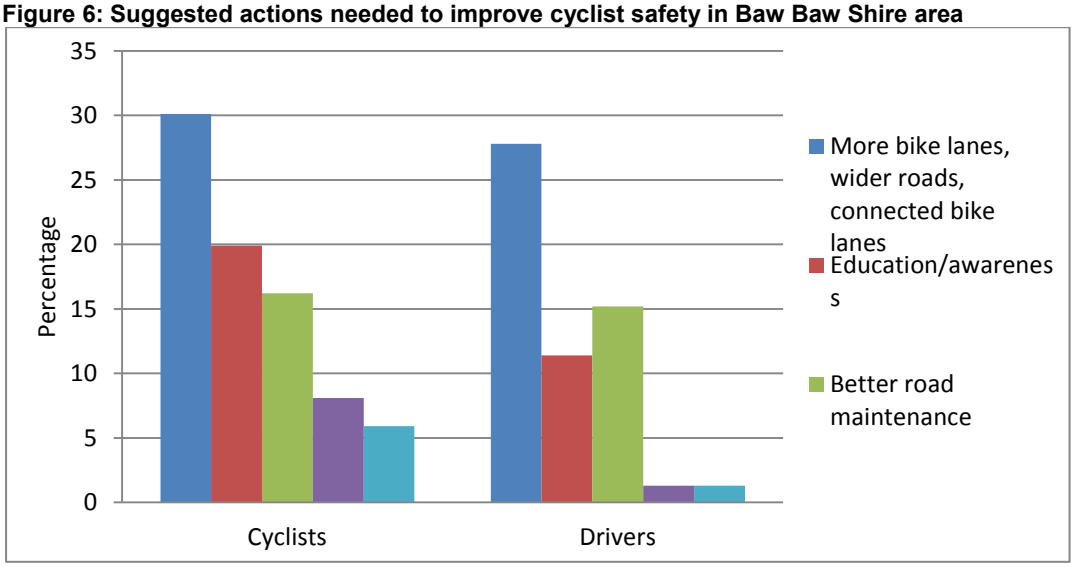
Figure 5: Other drivers in Baw Baw consider cyclists to be legitimate road users



3.6 Suggested action to improve cyclist safety

Participants made suggestions about the types of actions needed to improve safety for cyclists, the main actions listed are displayed in Figure 6. Both groups agreed that the road itself was a major focus and identified the need for more bike facilities/more bike lanes (cyclists: 30.1%; drivers: 27.8%). There was variation between cyclists and driver in the priority of the other main factors. More cyclists considered increased education and awareness to be important (19.9%; driver: 11.4%) with both groups listing the need for better road maintenance at similar proportions (cyclists: 16.2%; drivers: 15.2%). Other actions included increased driver education (cyclists: 8.1%; drivers 1.3%) and increased cyclist-related signage (cyclists: 5.9%; drivers: 1.3%).

Figure 6: Suggested actions needed to improve cyclist safety in Baw Baw Shire area



4 Discussion

In this survey, most participants in the Baw Baw Shire area were drivers. Despite similar driving travel patterns and experiences, there were significant differences among between cyclists and drivers when it came to cyclist safety. Responses from the participants were analysed using the theoretical model of the Safe System approach, each of the four pillars: safer road users, safer roads and roadsides, safer vehicles and safer speeds [ref 23]. However, specific components of the Safe System were identified by a greater proportion of respondents than others, in particular the safer roads and roadsides and safer speeds. Presented below are the main concerns identified by the respondents, ordered with the issues identified by the greatest proportion. The major cyclist safety issues, recommendations and the action taken/to be taken by the Baw Baw Shire Council are discussed below.

4.1 Poor road surface

Roads and road-related issues were the most reported issue. Poor road condition including potholes, broken bitumen, poorly maintained road sections and lack of a sealed road shoulder were repeatedly mentioned. The presence of a sealed edge, or sealed road shoulder, that increases the width of the road allows cyclists to travel with less interaction with motor vehicles and has been identified as an important feature of the road in relation to cyclist safety in rural areas[ref 13]. For cyclists, poor road surface directly affected their riding, creating a crash hazard that required them to swerve around damaged road sections. The swerving by cyclists directly contributed to drivers' perception that cyclists are unpredictable[ref 21].

Participants' most common recommendation to address the issue of poor road surface was greater investment in regular road maintenance and priority on routes with high cyclist volumes may have the greatest impact on cyclist safety. Participants suggested a contact point at the Baw Baw Shire Council for all cyclists and drivers to report issues related to safety on the roads and roadsides. This feedback mechanism could inform Council's planning and maintenance schedule. Such a contact point may already exists, however this was not known by the participants.

Recommendations: greater investment in regular road maintenance; a central contact point at Council for road related issues; education campaign to inform residents of how to notify Council.

4.2 Lack of cycling facilities

Cyclist and drivers are more comfortable sharing the road when there are cycling-related line markings on the road[ref 21] and this was also the case with cyclists and drivers in Baw Baw. A range of safety concerns were identified about cycling-related facilities, or the lack thereof, in the Baw Baw Shire area including: the lack of bike lane markings; unconnected bike lane markings; bike lane markings that stopped in the middle of the road with no intuitive continuation, and; lack of any type of bike line markings along popular cyclist routes.

Drivers (infrequent or non-cyclists) reported that an increased number of bike lanes would encourage them to ride more as they felt currently that there was 'no space' for them on the road. Some participants believed that a bike lane legitimised their position on the road and gave them more confidence compared to when they cycled on road without bike lanes. On-road bike lane markings, particularly facilities that connect destination in townships, would improve cyclists' feelings of safety, may encourage some cyclists to ride more often and may encourage infrequent/non-riders to ride.

Recommendations: review of current cycling facilities; increased connectivity of bike facilities throughout the Baw Baw Shire.

4.3 Speed

Speed is a major factor in road safety and the relationship between lower speed limits and improved road user safety is well established[ref 29-30]. Given the extent of roads in the Baw Baw Shire area with high speed limits, often 100km/h, it is not surprising that speed and the speed differential between roads users, was a major safety concern for cyclists and drivers. The high speed limits are further complicated by narrow, windy roads, which reduce sight lines and reaction times for cyclists and drivers. High speed limits are a clear point of difference that impacts cyclist safety in regional and rural areas compared to metropolitan areas.

One option may be to encourage cyclists to avoid travelling on high speed zone routes when there is likely to be high traffic volumes, however, this may not a viable option particularly when there is no alternative route. Cyclists and drivers will share roads with high speed limits and options need to be available to ensure the safety of all road users.

Participants recommended a review of the speed limits across the Baw Baw Shire area; the high speed limit was questioned particularly on some of the narrower, windy roads. Another option suggested was to consider a maximum passing speed for drivers when they overtake cyclists regardless of the posted speed limit.

Recommendation: review of the speed limits in Baw Baw Shire

4.4 Signage

Cycling-related signage has been widely used across Victoria to denote bike lanes and to remind drivers that cyclists are likely to be in the space both in urban and outer urban areas (see Figure 7).

Figure 7: Roadside sign indicating cycling training circuit

(Photo: Karin Jones, reprinted with permission)

Greater use of signage in the Baw Baw Shire along popular cycling routes, particularly training routes with high volumes of cyclists, was recommended. Roadside signs provide a constant reminder to all road users that cyclists may in the area. It is also a tangible reminder that the local authorities acknowledge the legitimacy of cyclists and their right to ride on the road.

Recommendation: installation of signage to remind drivers of cyclists in the area.

4.5 Education

Throughout the study it was apparent that there is misinformation in the Baw Baw Shire regarding cyclists and drivers rights and responsibilities when sharing the roads. Participants who were cyclists themselves were much more aware of road rules and guidelines than drivers who infrequently/did not ride a bike. Some participants did not consider cyclists to be legitimate road users and comments included: *'roads are for cars'* and *'cyclists should stay on the off-road bike path'*. Broad education messages are needed to inform residents about cyclists and drivers rights and responsibilities.

While most participants considered cyclists to be legitimate road users, when asked about other drivers, it was clear that there is a perception that many drivers in Baw Baw do not consider cyclists to be legitimate.

Recommendation: an education campaign on cycling-related road rules including the legitimacy of cyclist as road users.

4.6 Bunch riders

Bunch riders is a term used to describe cyclists who ride in groups together on the road. The groups are often arranged in a formal peloton style with riders two abreast in long queues of riders that can extend from four or more riders to a group of 30 or more riders[ref 28, 31]. Participants in Baw Baw repeatedly commented on the behaviours of bunch riders. The most frequent response was that bunch riders did not ride in a close formation that allowed drivers to overtake them and that they 'swarmed the road'. It is essential that bunch riders in the Baw Baw Shire area comply with the road rules, and follow the Code of Conduct for Training Cyclists and ride in a safe and legal formation: two abreast unless overtaking.

For bunch riders who belong to an official cycling club or organisation, following the Code of Conduct can be encouraged through the club and when on training rides by more senior riders. However, it can be difficult to communicate with informal groups who do not belong to an official club or cycling group[ref 28].

Recommendations: promotion of the Code of Conduct through cycling clubs; increased enforcement of road rules, in particular riding more than two abreast and riding across vehicular lanes.

4.7 Trucks

Trucks were repeatedly mentioned in the survey and considered a serious safety concern for many cyclists. Many of the roads in the Baw Baw Shire area are narrow, with unsealed road shoulders and high speed limits, often 100km/h. On the smaller roads, it is difficult to accommodate large trucks and cyclists without some compromise.

The participants' focus was on behavioural changes on the part of the road users when they encounter each other to ensure cyclist safety. Suggestions included that all drivers, particularly truck drivers should slow down, wait for a wide space with no other vehicular traffic and overtake providing a minimum of 1m clearance distance. However, drivers suggested that cyclists ride single file to allow vehicles to pass.

Currently throughout the shire area, there seems to be little knowledge of when each group will be on the road and encounters seem to be random, frustrating and uncomfortable for all road users. However, from the responses, it appears that there are major commercial routes throughout the Baw Baw Shire that are used for quarry trucks and dairy trucks. Similarly, there are preferred routes ridden by groups of riders, reference was made to large groups riding in the Cloverlea area on the weekends.

Recommendations: Cooperation between the commercial organisations who manage the trucks and the cycling groups in the Baw Baw Shire area could establish the main times that each group will be on the roads and work together to identify the best times for each group to minimise the encounters on the road.

5 Action taken/planned by Council

This study provided the Baw Baw Shire Council with quantified local data about the cycling-safety related concerns of residents in the area. Recommendations are being considered by multiple stakeholders including Council, cycling clubs, Police and VicRoads. Key gaps and challenges were identified including the need for increased knowledge about popular cycling routes and on-road facilities. Action taken and planned by Council will address a number of cycling-related safety issues and are discussed below.

5.1 Roads - quality and maintenance

Participants identified that there was a need to prioritise road maintenance along specific routes, and while this finding has prompted internal discussions at the Baw Baw Shire Council, there is currently no provision for specific route or vehicle type prioritisation within the road assessment process. Road maintenance in regional areas is challenging due to the combination of large geographical areas and restrictive budgets[ref 12]. The road assessment process to determine the priority of road works is based on the size and depth of potholes and road hierarchy (ie whether it is a local or arterial road etc). Significant rainfall and flooding in the Baw Baw Shire has further contributed to the deterioration of road quality and the current Council road maintenance programs are endeavouring to improve the road quality.

The study identified safety concerns about the suitability of local roads for cyclists. The Council recognise that there is a key challenge to identify and map routes with high volumes of cyclists along rural roads.

5.2 Roads – cycling infrastructure

Participants identified the lack of cycling facilities as a safety concern, particularly at high risk locations were the on-road bike lane ended suddenly and without a safe alternative route. Currently Council does not have a map or register of roads with existing on-road bike lanes. The Baw Baw Shire Council plans to map the existing on-road bike lanes and determine if they meet current standards. This process will inform Council about how the existing on-road bike lane routes are connected and the interconnection with other off-road paths. This process will also inform Council of the gaps in the network.

Concurrently, the report has also given additional weight to existing projects. Although cycling infrastructure in Baw Baw Shire Council was considered poor by respondents, separately there is also the need to promote what does exist. Particularly bike racks in towns at key locations such as libraries and cafes. To promote these facilities and boost the legitimacy of bike riding, a local artist was commissioned to develop stencils which could be spray painted under bike racks (Figure 8). Stencils will be spray painted by members of the Youth Council and a community strengthening officer in September. This has also be inspired by recent 'guerrilla knitting' of bike racks around the Shire (Figure 9).

Figure 8: Stencils to be sprayed under bike racks in Baw Baw Shire area

Figure 9: 'Guerilla knitting' on bike racks in the Baw Baw Shire area

5.3 Education

Six print advertisements (figure 10) were developed by Baw Baw Shire Council and addressed key study findings including: visibility of cyclists; courteous and safe behaviour by cyclist and drivers; road rule knowledge, and; speed of trucks. Advertisements have been printed in the local newspaper (Warragul Gazette) which has the highest newspaper readership in the area. The advertisements and study findings have also been added to the Council's Facebook page. Further advertisements are planned for a local online magazine, the *Warragul Citizen*, to target a different audience before summer.

Figure 10: Print and social media advertisements by Baw Baw Shire Council

Brochures were also created for distribution at cycling events (eg Ride to Work Day, Great Victorian Bike Ride and the Baw Baw Challenge), other community events (eg family fun days, pram walks), local libraries and bike shops. Discussions with VicRoads have commenced to distribute to new license holders or potentially through L2P driver programs, nothing is yet confirmed. 20,000 brochures have been printed with photos provided from local cycling groups to create both a local feel and connection with the people who frequently cycle in the area (Figure 11). Two types of promotional stickers are under-development – one focuses on cyclist visibility and the second focuses on providing an image of family bike riding (Figure 12). The perception that other drivers in the Baw Baw Shire area do not perceive cyclists as legitimate road users is of particular concern. It is anticipated that these educational material will contribute to redressing this attitude.

Figure 11: Cycling brochures supporting safe behaviour by Baw Baw Shire Council

Figure 12: Promotional stickers being developed by Baw Baw Shire Council

5.4 Signage

Signage was identified by participants as an important action to increase the legitimacy of cyclists on the road and to increase driver awareness of the 'presence' of cyclists on the road. As a result, Council purchased signage to be erected along main cyclist training and racing routes.

The purchased signs are yet to be installed. The delay is due to internal Council procedural concerns about how these routes would be identified. Currently there are no guidelines or internal processes to identify cyclist training and racing routes, yet this is now considered a necessity before installing signs. It may be that the optimum locations for installing the signs will be determined following route mapping process which Council is committed to undertake as discussed in 4.3.

In addition, two signs were made to be placed alongside the main road entrance to Warragul, Baw Baw Shire's largest township, and a highly visible area for incoming traffic. The signs again addressed the visibility of cyclists and safe sharing of local roads (Figure 13).

Figure 13: Roadside signs in Baw Baw Shire Council area

5.5 Cyclist behaviour – bunch riding

Bunch riding was identified as a key concern for drivers, with participants referring to cyclists 'swarming the road'. To directly address bunch riding issues, a member of the reference group plans to meet with the main cycling club in the area (Warragul Cycling Club) to discuss the study findings and advocate safe and legal road user behaviour. Council staff also plans to meet with other cycling clubs and informal recreational cycling groups to discuss safe riding practices.

Further, a recommendation in the study was to distribute the Code of Conduct for Training Cyclists. Council staff obtained the latest electronic version of the Code from Cycling Victoria and a thousand copies have been professional printed for distribution to local clubs and others which apply to conduct cycling events in the Shire. Council staff currently view dissemination of information about safe cycling behaviour as both the responsibility of Council and cycling clubs.

5.6 Other stakeholders

The study has been used to inform the work of other agencies. The Department of Transport requested a response from Council in the development of the Victorian Cycling Strategy of which the study report was used to bolster requests for reviewing of speed limits, cycling infrastructure and inclusion of social and attitudinal aspects

related to bike riding. In addition, Council officers intend to seek support from local Police and VicRoads in addressing the countermeasures listed in the report.

5.7 Driver behaviour

Council is unsure of how to specifically target driver behaviour. Initial suggestions have included presenting the study findings to the Gippsland Road Safety Network to discuss how to integrate the study findings and recommendations into current road safety activities.

5.8 Enforcement

Local police have indicated an interest in the results of the study. Council is also intending to meet directly with local police to present the findings with a similar view to hear their thoughts on possible educational or enforcement avenues.

5.9 Community response

Community response to the study and advertising material by Council has been varied. Rural town networks responded favourably to the study with many concerned about cycling infrastructure in small towns to accommodate safe intra-town cycling. Some feedback from cycling club members have included reservations about the need for a study feeling money would be better spent on infrastructure, whilst others felt the research gave them credible information to support advocacy for infrastructure. Social media was trialled for the first time but with only minimal 'likes' and 'shares' as Council's Facebook page has a limited audience.

6 Conclusion

This study identified the key safety concerns for cyclists and drivers in the Baw Baw Shire area and provided the Baw Baw Shire Council and local stakeholders with information about the comprehensive approach needed to improve safety. The three primary concerns identified in this study were: 1) poor road surfaces including potholes, unsealed shoulders, 2) driver behaviour, attitude, impatience, aggression, and 3) lack of cycling facilities; and these should be considered priority areas.

Participants identified an extensive list of issues concerning cyclists and drivers who share the roads in Baw Baw Shire area. Some of the issues are similar to concerns raised in other parts of Victoria and Australia, such as adequate overtaking distance, driver behaviour and lack of connected bike paths. For those types of concerns, the Baw Baw Shire can look to other local government areas or jurisdictions to gain insights into how to manage the issue.

However, there were other concerns raised that were particular to the Baw Baw Shire, including the disrepair of the road surface, lack of road shoulders and the large number of high speed roads. For these Baw Baw specific, and perhaps regional/rural specific concerns, the approach taken will need to be more considered and solutions may need to be specific to the Baw Baw Shire.

The Baw Baw Shire Council has already acted on recommendations from this study and further action is planned to continue to understand the existing facilities and improve cyclist safety in the Baw Baw Shire area.

7 Acknowledgements

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Countries with bicycle friendly road networks are safer for all users

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Abstract

About 1.3 million people die each year as a result of road traffic crashes worldwide. Nearly half of them are "vulnerable road users": pedestrians, cyclists and motorcyclists. Furthermore, the world's fleet of passenger cars peaked at 1 billion in 2010 and car drivers killed most of the 1.3 million people. The World Health Organisation (WHO) believes that road safety generally and bicycle safety in particular need to given priority in all countries .

This paper focuses on national road death rates per 100,000 population and the number of bicyclists' deaths in 32 countries in east and western Europe, the Pacific region, Japan and China. Trends from 1970 to 2010 are charted which suggest that bicycling has become much safer in Japan, Switzerland, Germany, the Netherlands and Scandinavia because of their innovative bicycle planning and intermodal bicycle/public transport planning practices.

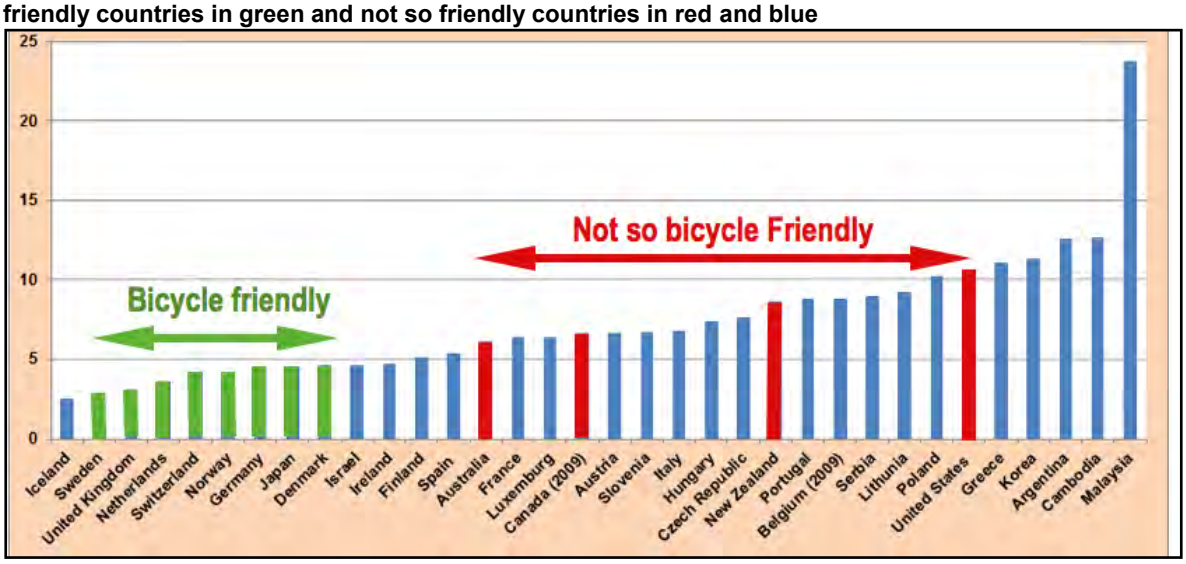
Australian cyclists deaths, which are charted by state and gender, have declined since 1980.

This paper argues that due to unsustainable vehicle ownership and population trends on expanding road systems in developing countries child cyclists, are at risk. Therefore the resolution of the June 2012 Velo-city global conference (that included Australian representatives) that called for the UN to enshrine "Rights to Cycle" for Children should be endorsed by this conference.

1 The role of WHO in reducing bicycle and pedestrian road deaths

Since 2000 the World Health Organisation (WHO), the Organisation for Economic Cooperation and Development (OECD) and European cycling organisations have done their collective homework about road safety generally and for greater bicycle and pedestrian safety. European countries are focusing on ways to reduce the carnage on the world's roads.

Figure 1: Deaths per 100,000 population in 34 countries showing the relative position of the bicycle friendly countries in green and not so friendly countries in red and blue



Source: WHO regional data for Europe 2009

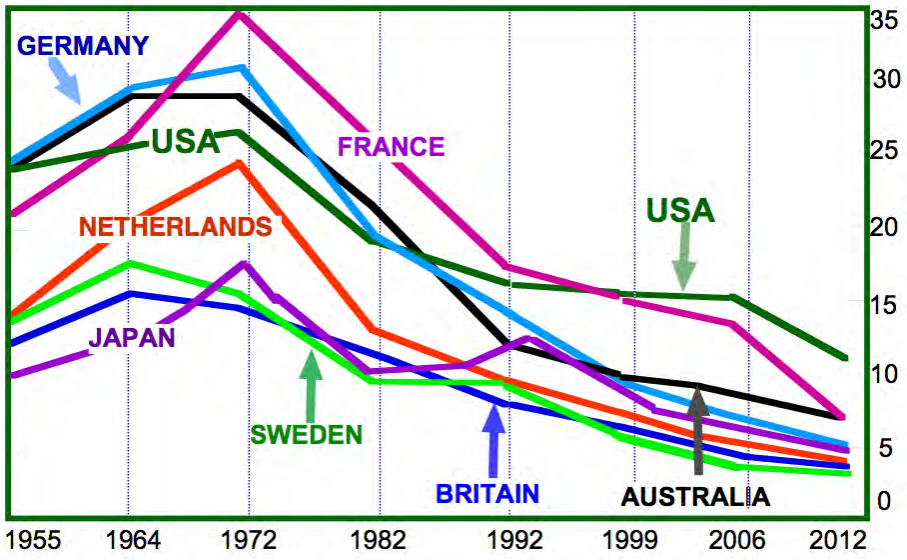
The road safety role of the WHO is to persuade the rapidly developing countries to manage their road systems in such a way as to constrain the growth in deaths and injuries to achieve similar levels of safety to those countries with good safety records (shown in green on figure 1). According to the WHO about 1.3 million people die each year worldwide as a result of road traffic crashes mostly in the poorest and developing countries which have little chance of reducing their road deaths below 23 per 100,000 population (see far right of figure 1). Europe's current road deaths are one fortieth of the current world road deaths (WHO fact sheet No 358 2011).

2 More passenger cars threaten our mobility and health

This paper refers to motor vehicles but its focus is on the **passenger car,** which causes most of the world's road traffic deaths, and vulnerable cyclists and pedestrians. The **passenger car** has at least four wheels and is used for the transport of passengers, with no more than eight passenger seats in addition to the driver's seat. **Passenger cars** make up approximately 74% of the world's total motor vehicle fleet. The remaining 26% are light commercial vehicles, heavy trucks, road trains, buses, coaches and minibuses. **Passenger cars** today come with different drive units: internal combustion, 4WD, electric and hybrid (IC & electric) (Worldometers 2012).

In 2012 over 60 million **passenger car**s were produced for the first time in a single year , that is 20 million more than in 2000. Road safety is getting worse in many poor countries because of the growth of both the human and motor vehicle populations (WHO fact sheet No 358 2011). Add that to the lack of resources and of trained planners to deal with their often unstable or uncontrolled level of level of economic growth.

Figure 2: Road death rates per 100,000 population in 5 EU countries, the US, Japan and Australia from 1955 to 2012

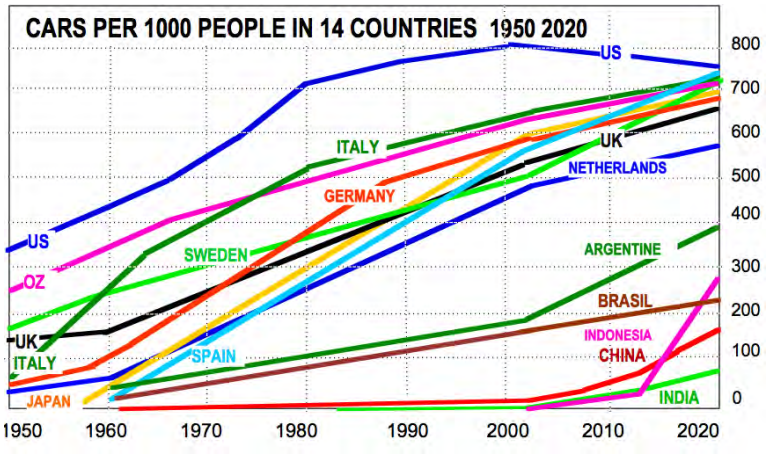


Source: IRTAD (2009 & 2011) 1955-1970 UN Annual Reports of road deaths

Figure 2 shows those European countries and Japan with good road safety records and a not so good record in the USA. The WHO hoped to avoid the mistakes made in the reconstruction of Europe in the 1950s and 1960s. After World War 2, as Europe's car industries expanded, this resulted in 1972 in a peaking of road deaths in the EU countries (shown on figures 2, 4, 5 and 6). After 1972 the growth in car passenger travel was increased but was constrained by traffic management and road law enforcement measures. The greater use of public transport, walking and cycling was encouraged in ways that achieved this outcome; in interestingly different ways from after 1972 to the present time.

The WHO mission is to use these different ways of reducing the road death rates in Europe to counter the rapid increase in road death rates in the rest of the world and cope with the world total of 60 million new cars produced in 2011. The number of passenger cars produced in China was 14.5 million, Japan 7.2 million, Germany 5.8 million, South Korea 4.2 million, USA 3 million, India 3 million, Brazil 2.5 million and France 1.9 million. Five developing countries also produced between 600,000 and 500,000 passenger cars: Turkey, Argentine, Indonesia. Thailand, and Malaysia (Worldometers 2012).

Figure 3. Passenger cars per 1000 population in 14 countries



Car production has generated higher levels of car ownership per 1000 population in Argentine and Brazil in the last decade (see figure 3 above). There are other important car producers starting with South Korea, 4.2 million, and France, 1.9 million, and 10 other producers making more than 500,000 cars (Worldometers 2012).

3 Population growth threatens our mobility and health

Worldwide the implications for the future of every day cycling are not good because the demand for motor vehicle traffic is dependent on the growth of population. Only in the high income countries of the EU can we see a resolution of this conflict through reduced population growth and the creation of bicycle friendly road networks. Of the developing countries, only in China do we see a similar commitment to constraining population growth while supporting bicycle use, public transport, high speed trains and the development of electric vehicles (shown on figure 4). We also see the sacrifice made by Chinese families in accepting the necessity of the one child policy.

The ten countries which will contribute *most* to world population growth over the next 30 years are India, China, Pakistan, Nigeria, Ethiopia, Indonesia, the United States of America, Bangladesh, the Democratic Republic of the Congo and Iran - in that order! These countries will create demand for all kinds of road vehicles; and the road death rates will go up due to an explosion in their human population and passenger car fleets (Worldometers 2012).

China's population is now 1.3 billion and still growing. By the year 2025 the population will have increased to 1.4 billion; with no further population growth it will then decline by 2035, unless their one child per married couple policy is abandoned. India's population is now 1.2 billion and will join China as the world's two most populous nations by 2025, with a total population of 2.8 billion in 2025 (US Census Bureau 2010).

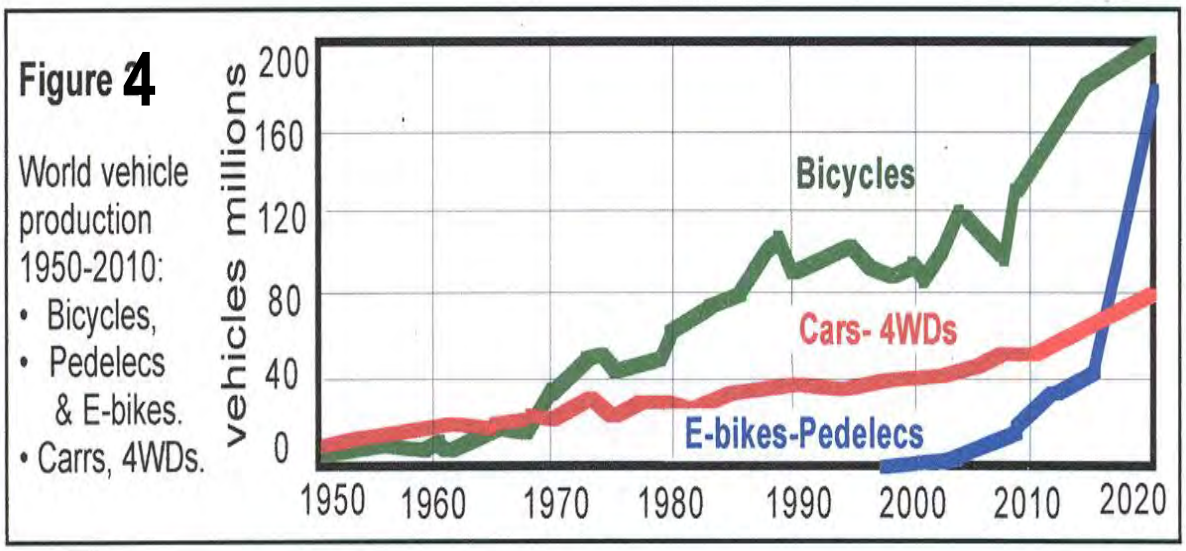
By 2025 India's population will increase by 120 million; Indonesia will grow to 273 million, Bangladesh will grow by 193 million, Pakistan by 130 million and Nigeria by 127 million. The population of the USA will increase to 350 million in 2025. The population of the European Union in 2025 will be around 372 million and reducing.

4 Transport technology needs to be adapted to conserve energy

To see the production of passenger cars in perspective in the developing world a clear picture of the major sustainable alternatives on urban and rural roads is required. Oil and gas supplies for transport have already peaked and will be very costly by 2020, according to many reliable sources.

China's 100 million electric bikes and 450 million bicycles are already constraining the growth of transport CO2 emissions, oil imports and pollution in their cities. The world fleet of bicycles and electric bicycles is growing faster than the predicted doubling of the passenger motor vehicles, as is shown on figure 4.

Figure 4: Production of passenger vehicles 1950 to 2020. Bicycles, electric bikes and pedelecs (passenger cars with different drive units)



Source: China bicycle year book in English and Chinese Tokyo (2008). Jamerson, F. and Benjamin, E. Electric bikes worldwide reports 2011 & 2012 update, www.ebwr.com

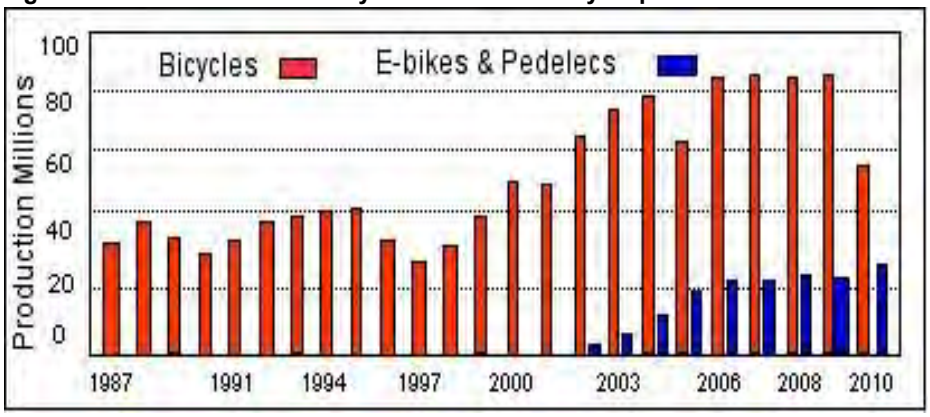
Figure 4 shows one sustainable option - electric bikes - which is well within the transport technology now available. China produced 84.5 million bicycles in 2011 including 51 million units for export and 3.6 million e-bikes, 600,00 of which were exported.

500 million people live in the under-developed areas of China (China Population Census 2010). The 230 million elderly populations who live in China's cities and rural areas need more bicycles, electric bikes and scooters to improve their mobility.

Chinese cities will be mass producing quality electric cars, motor cycles, and other electric vehicles (Weinert, Jonathan et al 2008).

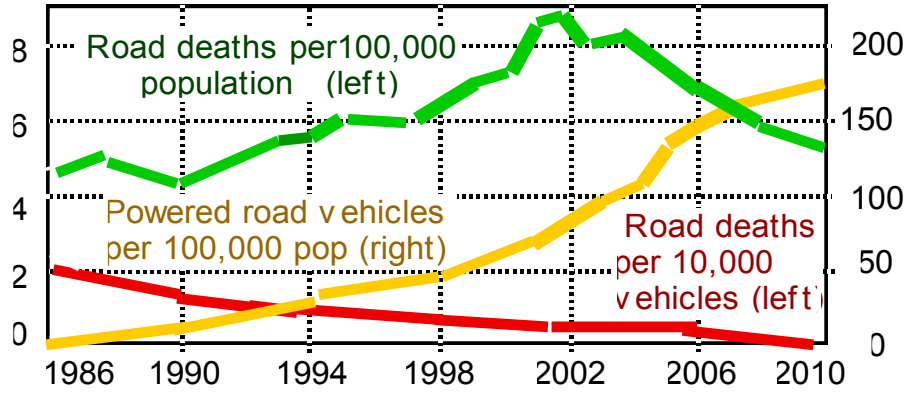
China has both the capacity and the need to become a global leader in sustainable development and innovation in environmental technology. Only 2.5% of all batteries used in the past were lithium based, but China is gradually increasing and is aiming for 30%. In unified efforts between the Chinese government and industry cycling will be promoted for further economic development and to improve the urban environment.

Figure 5: Growth of China's bicycle and electric bicycle production 1987 to 2010



China has succeeded in bringing down its road death rate per 100,0000 population from a high level of 8.8 in 2002 to 4.7 in 2010; a very good performance in eight years given the number of powered road vehicles owned during that time. However police reporting of accidents is still relaxed in China, according to several reports (Cycle Press 2011).

Figure 6: Road deaths in China are still high but current road death rate trends down trends are good given the rapid growth in car ownership



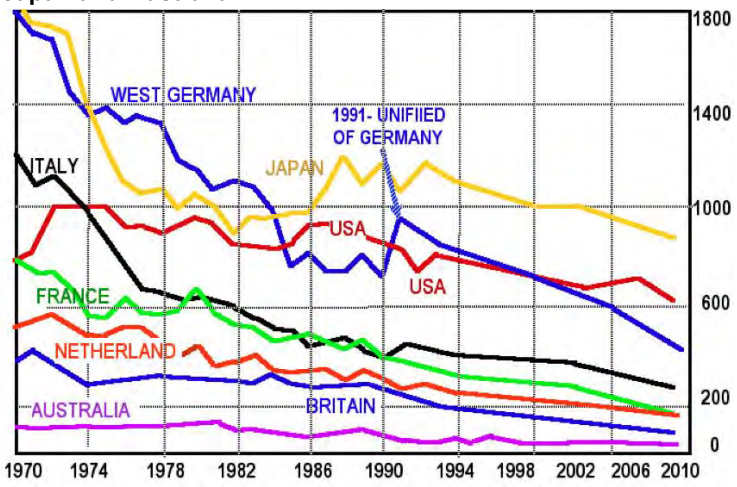
Source: Alan Parker (2011).

5 Bicycle friendly road networks are safer for all road users

In the last decade the most important change that has taken in Europe is that several bicycle-friendly countries have made their road systems much safer for children, bicyclists and pedestrians, particularly the elderly. Consistent accident monitoring throughout Europe has enabled national road deaths to be compared per 100,000 populations from 1970 to 2010. Bicycling has become much safer in Japan, Switzerland, Germany, The Netherlands and Scandinavia because of their innovative bicycle planning and intermodal bicycle/public transport planning practices.

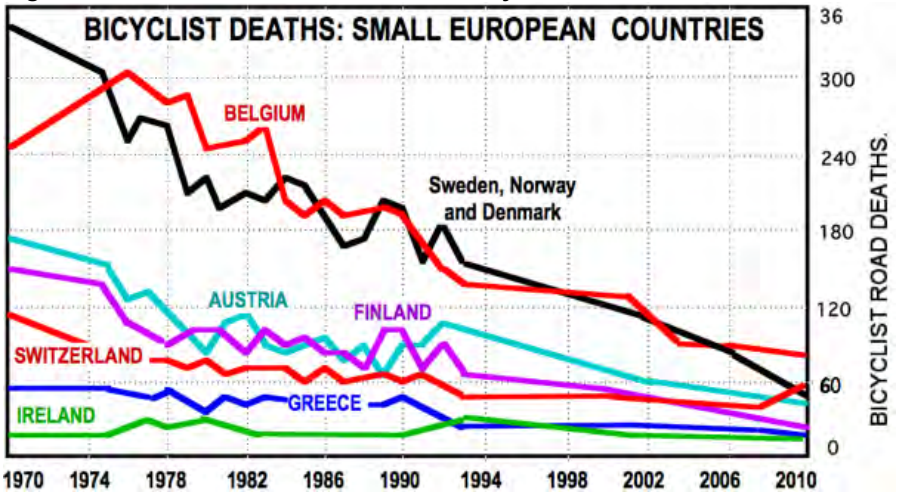
Figure 7 shows that in Europe, Japan, Australia and the USA the number of bicyclist deaths dropped from 1955 to 1970 although they had increased following World War 2 due to the priority given to post war reconstruction of damaged infrastructure in the 1950s and 1960s. However Sweden, from 1964, reduced its death rate and that was noticed by the powers that be who wanted a united Europe to put an end to war, once and for all. The road death rates of the small European countries and Scandinavia (shown on figure 8) confirm that the early Swedish leadership was important throughout Europe. Indeed this provides a model from which Australia and New Zealand could learn.

Figure 7: The decrease in the number of bicyclist road deaths 1955 to 2012 in 5 EU countries, the USA, Japan and Australia



Source: IRTAD reports (2010 & 2011), Parker (1996).

Figure 8: The decrease in the number of bicyclist road deaths 1970 to 2012 in small European countries.



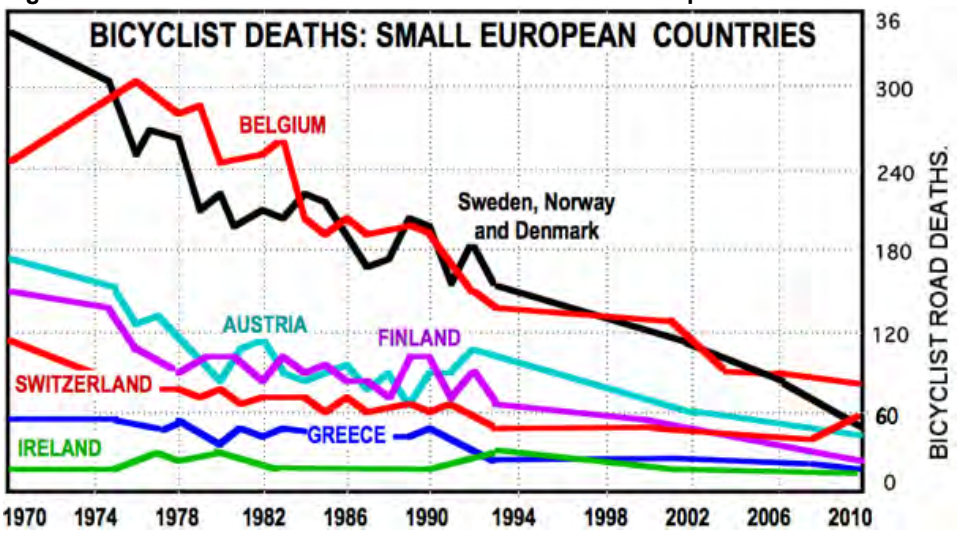
Source: IRTAD reports 2010 & 2011, Parker (1996).

Since 1970 there has been a large increase in their populations and car ownership, but the total road deaths rates per 100,000 people have declined except for Ireland.

As a general rule those countries that have provided the best bicycle infrastructure and have high levels of bicycle use have the lowest overall death rate per million population for all road users. The small European countries provide a model for large states or regions within a country.

The road safety record of the former communist countries is nothing to be proud of; at least half of their road deaths could have been avoided given that they heavily relied on public transport and that car ownership was very low, as shown table 3. The former East European death rates ranged from 12.5 to 17 deaths per 100,000 populations, but by 2009 had dropped to between 7.5 and 12 with around half the number of cars per 1000 population in 2010 (Dargay et al 2007).

Figure 9: Decline of road death rates in former Eastern European countries and Australia



Source: IRTAD reports (2010 & 2011), Parker (1996).

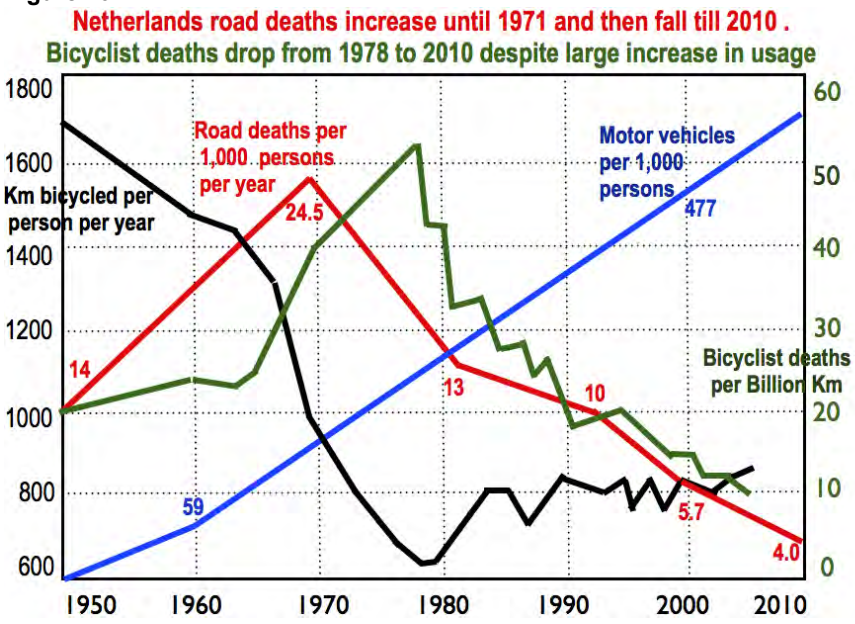
The deaths of all road users during 1970-2010 show that Australia compares well with five of the former Soviet republics. Until the unification of East and West Germany in 1990 the German data did not include East Germany but the downward trend since is good news for cyclists. In 2009 car ownership was 660 per 1000 in Australia and 565 in Germany. This ownership is higher than in Hungary with 300, Poland 355, and the Czech Republic with 400; and much higher than Romania with 170, and Serbia 180. Even with the high ownership of cars, the number of cyclist deaths dropped by around 70% between 2001 and 2009.

Only in Romania was there an increase in deaths of 10%. The safety of cyclists increased in all these countries and pedestrian deaths went down Even in Romania safety measures were introduced in 2010 that reduced bicycle fatalities in 2011**.** These countries are all investing in footpaths and traffic calming programs as result of WHO initiatives.

6 Netherlands road networks are safer for all road users

In Australia and New Zealand no robust national data are collected regularly for "all walking" and "all cycling trips" which makes it difficult to measure how safe cycling is per distance travelled and the death rate per billion km. The only time this was measured in Australia was in 1985 (INSTAT 1989) when the Netherlands was 5.6 times safer for walking and 2.2 times safer for bicycling.

Figure 10



Source: Netherlands Ministry of Transport (2007), IRTAD 2011.

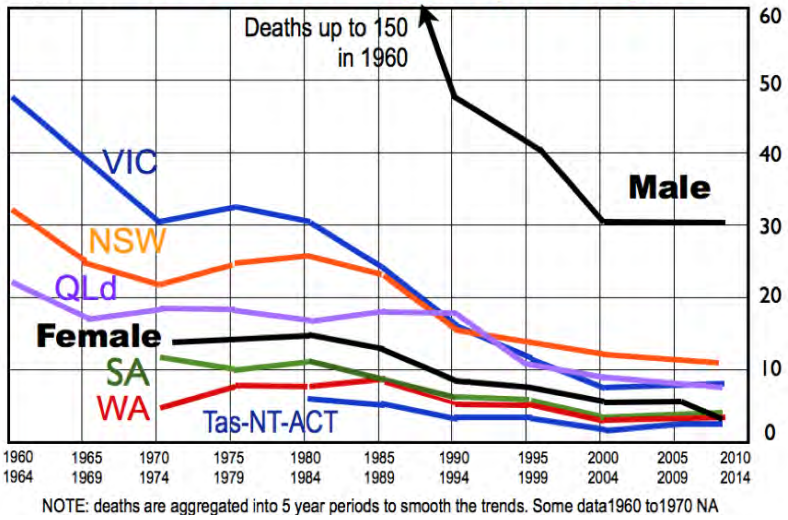
Figure 10 shows the large reduction in death rate per billion km of bicyclists from 1978 to 2010 and the large increase in bicycle km travelled from 1978 to 2008. The decrease in cycling from 1950 to 1980 is driven by increased motor vehicle use (blue) which increases from 1950 to 2010. But total road deaths per 1000, persons (red) rapidly increases from 14 in 1950 to 24.5 in 1970 then drops down to only 4 in 2010. Cycling is forecast to rise much further even if the EU economy fails.

Jan Gerard, who is perhaps Australia's leading bicycle planning consultant, sums up the merits of learning from world best practice in the Netherlands as follows:

> *"The Netherlands recognised several decades ago that for the multiple short-to-medium distance trips that characterise daily living, the most efficient vehicle is the bicycle. This is also feasible for Australia, where about 50% of household trips in urban areas are less than 5km. Despite already having excellent cycling infrastructure, the Netherlands continues to invest about $25 per head per annum in cycling infrastructure.*
>
> *Annual investment in cycling infrastructure varies across Australia's states, territories and local government areas, but rarely exceeds $10 a head. The Victorian Government's decision to no longer fund bicycle infrastructure may well mean that Victoria now takes the wooden spoon for state-funded cycling investment".* Gerrard, Jan (2012)

Most of Australia's population lives in urban areas; in total the urban areas are not so different from the urban rural areas of the Netherlands. It is pretty clear that in the Australian capital and provincial cities about $20 per head per annum is what could be described as the Australian bicycle movement's demand from all local, state and federal governments. It will be difficult to work out an equitable distribution by the three tiers of government but the time has come to ask for what is needed: $20 per head per annum per urban area and a 13 % cycling mode target.

Figure 11: Deaths of Australian bicyclists by state and gender



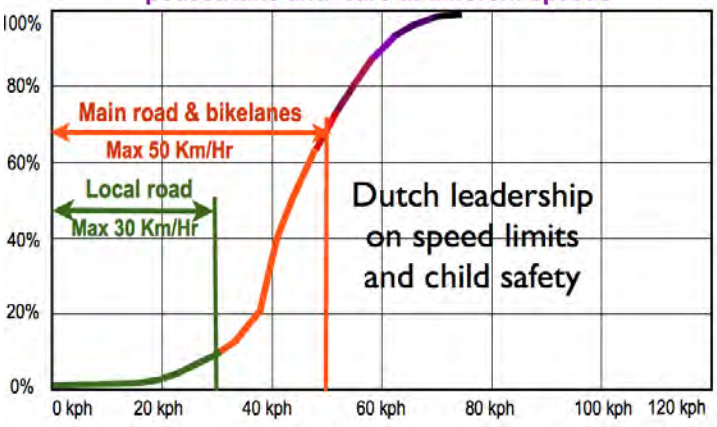
NOTE: deaths are aggregated into 5 year periods to smooth the trends. Some data1960 to1970 NA

My experience of this problem comes from my own enlightenment when 20 years ago I did a study tour of bicycle facilities in 10 Dutch cities after which I produced long articles in the cycling and planning press in Australia. After my study tour I was advocating to road engineers and urban planners that they travel and study to learn from world best practice in the Netherlands, Denmark and Sweden.

6 Conclusion

This paper concludes that due to unsustainable vehicle ownership and population trends in the developing world, many of the world's child cyclists are at risk on their rapidly expanding road systems. Therefore the June 2012 Velo-city global conference call for the UN to enshrine the "Rights to Cycle" for Children should be endorsed by this conference. The simplest way to promote this idea is to recognise that speed limits are an important in the growing world cities. And that is where speed kills as shown in figure 12 below.

12: Risk of fatality for collisions involving bicyclists, pedestrians and cars at different speeds



This paper examines the problems facing cyclists on the roads in Australia by considering world best road safety practice in the 30 countries in Europe, in China, the USA and Japan. It describes the work of the WHO in coordinating world road safety programs and particular its strategy for reducing deaths on the world's roads and for the better integration of public health and transport objectives.

This paper proposes an increased level of funding, based on world best practice in Europe, to enable Australian governments to fund bicycle infrastructure. This will enhance the mobility and health of the young, the elderly and the partially disabled. (Parker, A A,1993.)

For those concerned with fossil fuel shortages need to know that China is a major Australian trading partner and can mass produce bicycles and electric bicycles to EU regulations and safety standards, and is reducing its air pollution and road death rate for all road users per 100,000 populations.

For most other developing countries, in 2020 solar charged electric bikes will potentially be just as important as the various kinds of hybrid car in reducing carbon dioxide emissions and for reducing the growing dependence on imported crude oil that will probably increase to US$150 plus per barrel in a year or so (Parker 2006 and 2007). Australia also needs both these hybrid vehicles and lots of them as quickly as possible.

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Ride a bike to prevent falls: 2 pilot studies

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Introduction

Physical activities that increase leg strength and balance are recognised as falls prevention strategies, and cycling may be an important strategy for maintaining mobility and preventing falls in older adults.

Aim

There are two components of this research. Part 1 tests whether age-related declines in balance are moderated by cycling. Part 2 tests whether regular cycling can increase leg strength and improve balance.

Methods

Part 1: a cross-sectional survey of 43 adults aged 40-75 was conducted. Physical measures taken were **leg strength** using an electronic force gauge, **balance** using the Choice Step Reaction Time (CSRT) test (decision and response time), and timed single **leg standing**.

Part 2: 18 older adults aged 50-75 were recruited into a pilot 12 week cycling program, cycling at least two hours a week. Pre and post measures (similar to Part 1) were taken.

Results

Part 1: After adjusting for age, sex and physical activity, participants who had cycled in the last month performed significantly better on measures of decision time (B=-0.07, p=0.008) and response time (B=-0.15, p=0.05). There was a 47 second difference in standing balance between cyclists and non-cyclists, but this was not statistically significant.

Part 2: For older adults cycling two hours a week over 12 weeks, there were significant improvements in balance (decision and response time) and timed one leg stand.

Qualitative feedback from interviews with participants will also be presented.

Conclusion

Cycling by healthy older adults appears to improve risk factors for falls. Cycling should be encouraged during adulthood and continued into older ages.

Cyclists and road rules: what influences the decisions they make?

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Introduction

Previous research has shown drivers often have negative perceptions of cyclists which appear to be due, in part, to a perception that cyclists frequently bend the road rules. Investigating cyclists' self reported attitudes and behaviour with a focus on adherence to the road rules and laws for cyclists, the reasons behind their decisions and what impacts on these, has the potential to improve cycling safety by promoting mutual understanding between all users of the transport system.

Methods

The quantitative and qualitative analysis of cyclists' responses to a series of questions. These questions were from the 4th survey week of the "Safer Cycling Study", a large cohort study of NSW cyclists. Questions were a mixture of Likert responses and open-ended questions related to cyclists' attitudes and behaviour in order to find out how often cyclists are breaking the rules; how easy it is to follow the rules and what factors contribute to cyclists violating the road rules.

Results

Qualitative and quantitative analysis suggests perceptions of personal safety often influences a cyclist's decision break the road rules. Cyclists perceive a number of different factors contribute to them breaking the road rules such as poor existing infrastructure, behaviour of other road/ path users and speed of motorised traffic.

Conclusions

Understanding cyclists' behavioural decisions may provide a basis for developing policy and practice interventions to promote safer road use behaviour in relation to cycling and to promote cycling.

Shared paths: perceived and actual conflicts

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Introduction

The City of Sydney, like many Australasian cities, faces a number of physical and social challenges in creating a more cycling-friendly City. In 2007 the City began tackling the physical issues through its cycling strategy, the Cycle Strategy and Action Plan 2007-17. Connecting Our City (2012) is the City of Sydney's new 25-year Integrated Transport and Land Use Strategy, and was formally adopted by Council at its meeting on Monday 12 November, 2012. This report has set a target of 10% of local trips in the city to be made by bike by 2030. The City is now constructing a safe and convenient bicycle network, made up of different types of bike paths including 55 kilometres of separated cycleways. 10km of the separated cycleways within the planned network are already built and more than 50 kilometres of shared paths are already in place.

Separated cycleways, providing there is road space to accommodate them, are the safest and preferred cycleway option because they separate motorists, pedestrians and bike riders. Our research shows that separated cycleways are needed to get people riding. Shared paths are required where traffic levels and speeds on the road are such that they increase the risk for inexperienced riders and where it is not possible to construct a separated cycleway. Shared paths also improve connectivity of the network as they often provide a necessary link between separated cycleways, bike lanes and other bike paths.

Thousands more Sydneysiders are riding than ever before. To complement the infrastructure investment and an increase in new riders the City recognises the need to work hard to educate all road users on the need to co-exist safely. The Share the Path safety awareness program is spreading the word about behaviour by every means possible at pop up events at shared path locations, through social media and advertising. Ongoing research into the effectiveness of this program and its role in changing behaviour has been documented through the Shared Paths in the City report and other recently commissioned research. The findings from the research suggests the need for improved signage and a heightened sense of awareness of shared paths within the community and the desired behaviours required of all users of shared paths. Findings from research and community feedback will inform the future delivery of the Share the Path and other StreetShare programs.

1 Shared paths

1.1 How are shared paths defined in NSW and when does the City use them?

Shared paths have been used extensively for many years in Australia and other countries.

"Shared paths and cycle use of footpaths is the most common mode of providing cycle facilities in Australia." (Austroads 2006)

A shared path is an area open to the public that is designated for, or has as one of its main uses, used by both the riders of bicycles and pedestrians. Includes a length of path for use by both bicycles and pedestrians beginning at a shared path sign or shared path road marking and ending at the nearest of the following:

a) an end shared path sign or end shared path marking,
b) a no bicycles sign or no bicycles road marking,
c) a bicycle path sign or bicycle path marking,
d) a road (except a road related area),
e) the end of the path.

(Rule 242 NSW Road Rules 2008)

The provision of bicycle infrastructure in the city is constrained by the existing road network and densely built environment of the City Centre and fringe suburbs. The level of provision for different route types depends on local conditions, issues, constraints, and road practices. Separated cycleways are the first choice in providing a low-risk environment for bike riders.

Shared paths are used where traffic levels and speeds on the road are such that they increase the risk for inexperienced riders and where it is not possible to construct a separated cycleway. This is referred to as *High difficulty roads* in the City's *Cycle Strategy and Action Plan 2007-11* (City of Sydney, 2007).

As of October 2012, thousands more Sydneysiders are riding bikes. Independent counts show an 89 per cent increase in bike trips over the past two and a half years. Bi-annual cycle counts are conducted at 100

intersections across the City of Sydney LGA. They show an increase of 93 per cent in the morning peak period (6am-9am) and 85 per cent in the afternoon peak period (4pm-7pm) during the period March 2010 to October 2012 (counts were independently undertaken by a private count company).

With the number of bike riders increasing, the City's priority is to educate bike riders, motorists and pedestrians about sharing Sydney's streets. This will be the City's main focus in the future. It is often necessary to use shared paths where they provide a necessary link between separated cycleways, bike lanes and other bike paths to maintain an effective cycle network around the city (see glossary of terms on cycling infrastructure). Shared paths are important because they provide an option where there is insufficient space to build a separated bicycle path; they also allow families and other slower bike riders to access local shops and facilities safely.

Shared paths are also appropriate for some urban renewal areas where open spaces are planned having considered bike use and walking. Parks and open spaces attract recreational cycling with low riding speeds. The paths in all City managed parks are shared paths. Local Government rules previously prohibiting bike riding in parks has been amended.

These paths will support safe cycling along some of our busiest streets – streets where it is not possible to provide an on-road bicycle facility. Some experienced riders are capable and confident to ride within the traffic flow. These riders often prefer to ride on road.

It should be noted that the road rules for NSW allow children under 12 to ride on any footpath unless specifically prohibited. A no bicycles sign will indicate that riding on this footpath is prohibited. In NSW, bicycle riders aged 12 years or older must not ride on a footpath unless:

1. The rider is an adult accompanying and supervising a child who is under 12 years old.
2. The rider is aged 12-17 years, and is cycling under the supervision of an adult accompanying a child under 12 years old.

Note: A bike rider must not ride a bicycle on any part of the Sydney Harbour Bridge other than the cycleway (Bicycle Info website, 2012).

Similar to NSW, in South Australia you may only ride your bicycle on the footpath if you are under 12 years of age (Government of South Australia, 2012). However, unlike NSW you may ride on the footpath when crossing over the path to enter or leave the road and if you are carrying and complying with a certificate issued by your doctor (Government of South Australia, 2012).

In Queensland and the Northern Territory bike riders are legally allowed to use any footpath – not just those designated as shared paths unless there are specified exemptions to riding on the footpath (i.e. a path marked by a no bicycles sign (Queensland Government, 2012).

1.2 Where are Sydney's shared paths?

The City of Sydney is committed to rolling out more bike paths and developing a 200 kilometre bike network, made up of separated cycleways, on-road bike paths and shared paths. The routes are based on connection and destination – getting people to and from work, university, school, the shops, and recreational areas.

There are currently more than 50 kilometres of shared paths in the Local Government Area, many of which have existed for more than a decade, such as the shared path that runs along Anzac Parade. The City will be adding an extra 10 kilometres of shared paths to the existing shared path network over the next few years.

1.3 Shared path identification to improve awareness

In NSW shared paths are identified by Roads and Maritime Services (RMS) approved signs that are specific to these paths (see below).

Roads and Maritime Services regulatory shared path signage

There is a legal requirement to identify any path designated as a shared path. The statutory signage must be placed where a shared path starts and finishes. There is no requirement to apply any other marking. Council is responsible for the design, construction, signposting and education campaign for shared paths, in accordance with the NSW Government's technical guidelines. The City generally exceeds safety standards and conducts extensive safety audits before introducing a shared path, and reviews paths after they are installed.

In 2009 the City commissioned the design of additional advisory markings that could be applied to shared paths. This was seen as necessary to address issues relating to the conflict between bike riders and pedestrians. The perception being that such conflicts are a frequent occurrence and are of a significant risk.

A range of treatments were considered. The current blue markings were adopted (see example of the blue line signage below). They are similar to those used in Europe. In September 2010 a report commissioned to determine the current use of the blue markings along Redfern Street concluded that the surface designs has had a positive impact on raising awareness. Also the results showed that there has been an increased perception of safety on the path (City of Sydney, 2010).

1.4 The safety record of shared paths

There are a number of reports that conclude that in real terms safety is not compromised by mixing bike riders and pedestrians on the same path. A report for the *UK Countryside Agency* also suggested that, *"the way in which people remember events predisposes them to perceiving encounters with others as being more frequent than they actually are."* (Austroads, 2006, p8).

Crash data for 2005-10 for the City of Sydney indicated that five crashes involving pedestrians and bike riders occurred on a footpath. None of these crashes occurred on existing shared paths. The last recorded crash happened on 5 December 2007. There is under-reporting of incidents but to what degree is unknown. All collisions that occur on road-related areas and result in injuries to pedestrians or bike riders that are reported to the police are included in the Roads and Maritime Services (RMS) CrashLink crash database (RMS, 2010). CrashLink data received from the Centre for Road Safety does indicate that more crashes involving motor vehicles and pedestrians on footpaths are reported to the police than crashes involving bicycles and pedestrians on footpaths.

Crash data for New South Wales shows a decline in this type of crash from 2006-10 despite an increase in the use of shared paths by many councils and the Roads and Maritime Services. A total of 42 crashes were recorded.

Table 1: Crashes involving a pedal cyclist and a pedestrian in the first impact where a manoeuvre of 'moving along the footpath' or 'pedestrian on footpath or elsewhere off carriageway' was recorded, 2006-10, New South Wales

	Reporting year				
Degree of crash	2006	2007	2008	2009	2010
Injury	14	14	7	4	3

Prepared by Centre for Road Safety – February 2012

There are anecdotal reports of other crashes and 'near-misses'. Many crash reports are not substantiated and near-misses are very subjective to personal judgment. As was reported in the Austroads report: 'while pedestrian-bike collisions are rare, the perception of conflict on shared paths is significantly greater than the actual number of conflicts' (Austroads, 2006 for the RMS, August 2009).

It is important to recognise that the number of bike riders on shared paths has been rising and will increase; therefore the City has an obligation to attempt to reduce the risk of crashes and to improve safety.

2 The City's Research

2.1 Shared paths in the City of Sydney reports

The City of Sydney has commissioned various reports relating to shared paths. The *Perceptions of Shared paths research report* was commissioned in September 2009 as a baseline and a repeat, *Shared paths in the City of Sydney,* was produced in February 2012. The 2012 report outlines the findings of 400 intercept surveys conducted with pedestrians using shared paths at eight locations in the city and expands upon the findings of the study undertaken in 2009. Interviewees were asked about their awareness of their usage of a shared path, whether they felt safe sharing the path with bicycle riders, and whether they have every experienced an incident with a passing bike rider. Perception of behaviour of both bike riders and pedestrians was recorded.

The 2012 report notes that there is a marked disparity between the percentage of pedestrians who have seen bike riders on the path (92 percent overall) and the percentage of pedestrians who are aware that they are using a shared path (71 percent overall). This leads to the conclusion that a greater concentration of signage is necessary on all shared paths to clearly identify them and to encourage both bike riders and pedestrians to behave appropriately (keep left, use bell, slow down etc).

People surveyed in Hyde Park South had a lower awareness that it was a shared path (42 percent compared with three other locations in the '90s). In terms of reported events, Prince Alfred, Belmore Park and Anzac Parade were the safest locations with 'zero bicycle safety incidents' reported.

We use this information to guide priorities for the Share the Path program and to prioritise where the blue line marking is added first.

The report questioned pedestrians on how often bicycle riders demonstrated certain desirable behaviours on shared paths e.g. bell use. The best locations for bell-ringing and calling out were Prince Alfred Park (37 percent 'always or most of the time') and Glebe Foreshore (34 percent 'always or most of the time'). Other behaviours that were assessed were slowing down and giving way. Note the sample size was approximately 50 surveys per location.

3 The City's response - StreetShare and Share the Path

As well as safe infrastructure, there are other physical and social barriers to encouraging more people to ride. The City commissioned a StreetShare Strategy to research and propose projects to achieve behavioural change in four areas: more people riding more; better relations between people walking and riding on shared paths; better relations between drivers and bicycle riders on roads; and better compliance by bicycle riders (GHD, 2010). The latter three all improve public acceptance of the first – more people riding. The 12 projects recommended in the strategy were informed by a global best practice review of case studies of behaviour change projects.

For the past two years the City's Cycling Team have been co-ordinating a behaviour change and safety awareness program - Share the Path. This project is one of the key projects identified in the StreetShare Strategy and is one of many communication tools utilised to improve the actual and perceived safety of all users of Shared Paths.

The Share the Path program provides information about desired behaviours on Shared paths for all users. A key element of the program is encouraging bike riders to alert pedestrians that they are approaching by ringing their bells early. The key desired outcome of this program is that bell ringing be normalised and that shared path users know they are in a shared path environment, and understand the basic rules of co-existence.

Sydney is riding, with a peak in bike riding in the morning peak particularly over the past two years every effort is being taken by the City to ensure bike riders (particularly new riders) are being educated on the road rules and responsible riding.

Courteous behaviour from all path users is important. On shared paths the following safety tips are encouraged:

- Pedestrians always have right of way;
- If riding, please slow down, ring your bell early and give a wave, smile or say thank you;
- If walking, please move to the left when you hear a bell and control your pets.

The signage below has been placed on shared paths locations after the Share the Path program has been present to act as a prompt or reminder to shared path users of the advisable behaviours to adopt and their previous interaction with the Share the Path program. It also provides clarity and legitimacy for each shared path user group that these types of behaviours are recommended.

3.1 Share the path program design

The Share the Path program was developed through a workshop held with a broad spectrum of representatives from the community (ie walkers, bike riders, over 55 representatives, school parent that rides, local bike user groups, local parklands ranger etc). The purpose of the workshop was to develop a campaign that would achieve the following.

To ensure the users of shared paths:

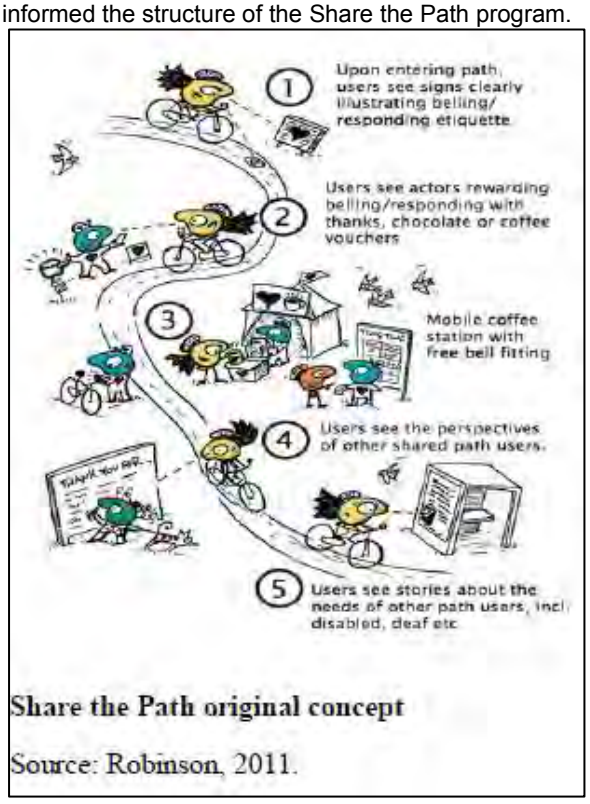
- Know it's a shared path; and
- Know the rules for considerate, safe co-existence

The desired behaviours are:

- Bike riders on shared paths: bell before overtaking; cycle at a safe speed; overtake at a safe distance
- Pedestrians on shared paths: don't block the path; keep left; look both ways before crossing a path.

(Robinson, 2011).

Workshop participants were informed that they should consider activities that are genuinely surprising, unpredictable and whimsical. Sparking conversations between path users is an important outcome; an unexpected delight is the best way to achieve this outcome (Robinson, 2011). A mobile coffee and bell-fitting station was one of the ideas that resulted from this workshop (see the original concept detailed below). It informed the structure of the Share the Path program.



Share the Path original concept

Source: Robinson, 2011.

The Share the Path program commenced in 2011 and still continues to pop-up at shared path locations to date. The program consists of staff being positioned at various shared paths across the city during the commuter peak periods (mornings, evenings and occasional weekends) and engaging directly with both pedestrians and bike riders on expected behaviours. The onsite presence is generally a 1.5-hour session and is complemented by a range of intervention methods to ensure the interactions are buzz-worthy, sociable, participatory, inclusive and fun (StreetShare Strategy, 2009).

The Share the Path program has included various activities such as street performers, coffee cart, street art, quick check-up and tune-up bicycle service with bell fitting and story-telling. Different activities have been trialled to enable City staff to more effectively engage with both pedestrians and bike riders recognising that there are a diverse number of path user groups ie joggers, walkers, dog-walkers, racing riders, commuter bike riders, skateboarders, scooter riders etc.

Two different types of bells have been made available to cater for all types of riders/bicycles, one of which displays the message 'the path is there to share'. The 'path is there to share' sticker on the bell is a prompt to bike riders of their engagement with the Share the Path program and also to ring their bell on shared paths (Doug McKenzie Mohr, 2011).

Bike riders are reminded through the Share the Path program that having a working bell fitted to their bike is a legal requirement under the road rules. All of these activities are supported by City staff that are available to answer any safety or cycling questions, impart key messages and provide route planning advice.

A bicycle instructor and City staff are stationed at shared paths; a bicycle mechanic offering a free quick check up and tune up will also frequently be at sites where there is space available to do so. Staff have safety brochures detailing the road rules pertaining to bicycle riders, pedestrians and motorists, bells and lights in an effort to raise awareness and encourage commitments to ring their bell early on shared paths.

The Share the Path program provides an opportunity for the City to better understand the sensitivities around the infrastructure including accessibility issues and more vulnerable street user's perspectives. The story-telling activity on Share the Path collects such stories of shared paths users so we can ensure the program is reaching and appropriately targeting all audiences. Legislation (NSW Road Rules 2008) gives pedestrians right of way on shared paths. The City is aware that pedestrians, particularly people living with a disability i.e. a hearing impairment and/or reduced mobility will generally feel even less safe if bike riders are riding at speed in close proximity and not alerting them to their presence by politely ringing their bell.

The City recognises that behaviour change takes years ie drink driving is still a problem after 30 years and numerous large scale awareness information campaigns that utilise education and/or advertising to encourage the adoption of sustainable actions (Doug McKenzie Mohr, 2011). Education alone will not influence behaviour; it needs to be complemented with enforcement. We receive few complaints about bike riders; however the City regularly liaises with the NSW Police Force and if a hot spot at an intersection or on a bike path is identified, we will send a team to speak personally to bike riders in the area and remind them of their obligation to obey the law and provide them with advice on how to safely share intersections and paths.

Regulation is most effective when it sets behavioural norms that can be self enforced by users (as in littering behaviour) or becomes a fashionable norm. The incidence of conflict between pedestrians and bike riders can be reduced through considerate behaviour by both parties.

3.2 Site selection

The locations for Share the Path are chosen based on the following criteria:

1. Identified hot spot (in response to community complaints, comments or as the result of a safety audit) requiring intervention to raise awareness
2. Busy commuter bicycle route and high pedestrian traffic
3. Recently new or upgraded shared paths.

The chosen site location often dictates the interventions that can be present and key messaging. Consideration is made for the impact on local businesses and residences and also for the specific configuration of the site i.e. infrastructure design.

3.3 Marketing

The Share the Path program is marketed through the City's website, media releases, twitter, What's On newsletter, Sydney Cycleways webpage, e-newsletter and facebook page. When encountering Share the Path for the first time, riders are encouraged to sign up to the City's Sydney Cycleways facebook page for updates about future Share the Path sessions. The session is also well marketed through word of mouth, and there are often repeat visitors.

3.4 Outputs and outcomes

The Share the Path program is effective in that it can be seen, is cost-effective and is proactive in raising awareness. Many road users aren't familiar with all of the road rules therefore they often base their knowledge on 'common sense' or assumptions. Usually when informed of the road rules, recommendations on desirable behaviours and how to interact more considerately and safely on shared paths the information is welcomed and a change in attitude follows. The feedback from the community, both bike riders and pedestrians is overwhelmingly positive. The bike mechanic and free coffee are important engagement tools, the bike mechanic assists in drawing in those hard to reach bike riders and the coffee for both bike riders and pedestrians. Anecdotally, the Share the Path program has contributed to improving the cohesiveness of Sydney's cycling community. The SydneyCycleways.net brand, has contributed to the establishment of the community, whereby bike riders and potential bike riders feel they can identify with.

In the 2012 calendar year there were over 3,000 bells handed out and/or fitted to bike rider's bicycles, over 25,000 face-to-face interactions with pedestrians/bike riders on shared paths, and over 1,000 bikes have been provided with quick check-ups and/or a tune-up. 125 Share the Path sessions have been conducted throughout 2012, 2.5 sessions per week.

Actual crashes is relatively low (see Crashlink data in table 1.1); however perception about the likelihood of a pedestrian being hit by a bike rider is great. Often there are incidences whereby a pedestrian has stepped in front of bike rider which has led to a collision.

Most people in Sydney will mention the hostile traffic in Sydney as their reason for not riding. The use of the bell by a bike rider can be perceived by a pedestrian as a warning to move out of the path of the bike rider which could stem from the way car horns are used or overused. Therefore bike riders are hesitant to ring their bell on shared paths because of a bad reaction that have been subjected to in the past.

3.5 Key learnings

1. Need to constantly adapt the community education program, its key messages and the activities involved to ensure the community are well informed and the program is buzz-worthy.

2. It's best to complement infrastructure with social programs to inform desirable behaviours. To address the perception in the community that conflicts on shared paths are a regular occurrence appropriate regulatory and behavioural signage in conjunction with education should be prioritised.

3. The actual conflicts between pedestrians and bike riders are relatively low. This is supported by a review of research on this field and supported by the City's observations and research. However, the City cannot assume to know the community sentiment, observations and face-to-face engagement without understanding the perceptions and observing actual interactions between bike riders and pedestrians on shared paths. Safety awareness programs assist in normalising the desirable behaviours, sparking conversations and discussion around behaviour and self-efficacy (show by doing).

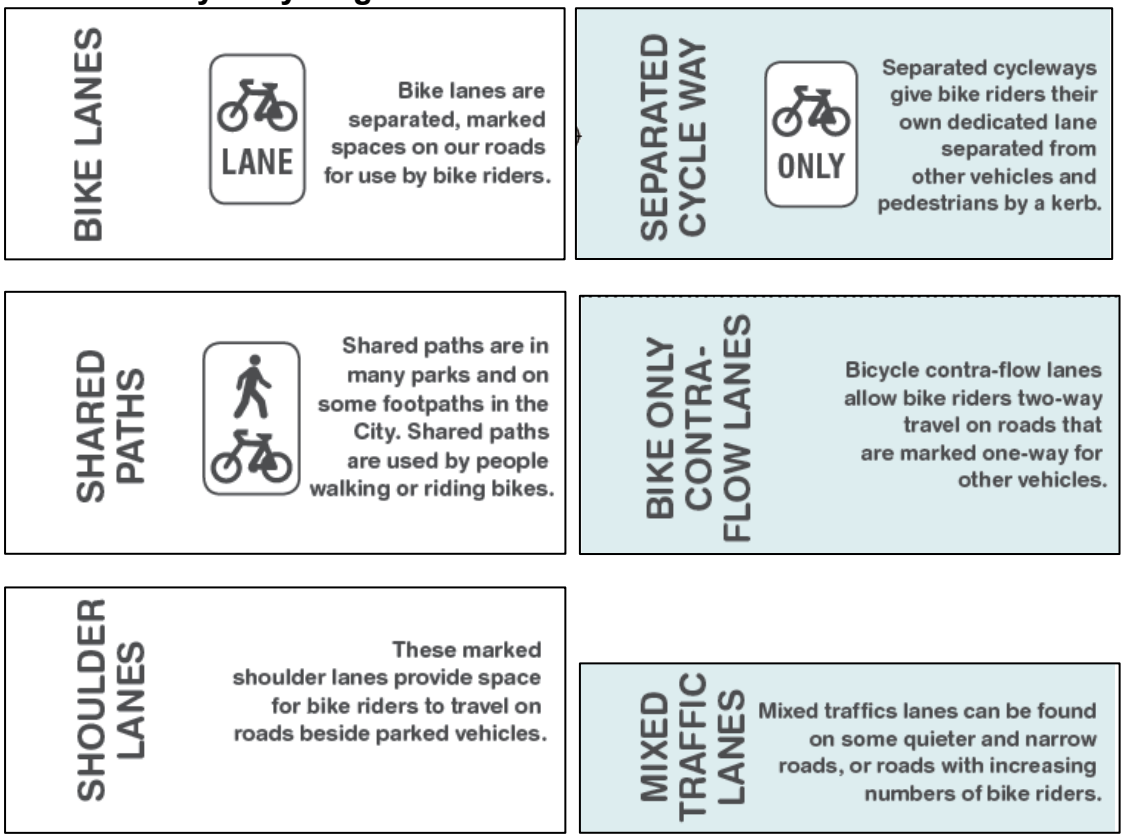
4. Behaviour change programs need to be evidence based and measuring of the progress in reaching behavioural outcomes should be tracked over time.

4 Conclusion

Sydney is riding and is riding more, consequently there are more new riders learning how to get back on a bike and are often looking for social cues from experienced riders about how to navigate Sydney's cycle network and on how to behave.

The City has been running a safety awareness program, Share the Path since 2011. There is a concern from the community that collisions between pedestrians and bike riders on shared paths are a frequent occurrence. The actual reported number of crashes between bike riders and pedestrians is low. The City is working hard to understand the community's concerns to help everyone who uses our streets, whether by car, bike or foot, to share respectfully, and have a safe and enjoyable trip. To ensure that we protect bike riders and pedestrians as they interact on shared pathways, the City is committed to implementing the StreetShare projects through letterbox drops, social media, advertising, newsletters, cycling courses and on site presence.

5 Glossary of cycling infrastructure terms



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Towards the Holy Grail: 'super routes' in Burnside

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Abstract

The recent resurgence of cycling in Australia is encouraging many councils to provide for more cyclists and a greater range of cyclists. Associated with this has been a call for greater separation of cyclists from traffic. However, the separated facilities recently appearing in Sydney and Melbourne have significant costs and impacts on other road users. Few local governments could realistically create their cycling networks with such facilities.

One Council grappling with its infrastructure response to providing for cyclists is the City of Burnside. Burnside is a mainly residential council of metropolitan Adelaide, hosting several main street shopping areas, with a mainly grid street network crossed by arterial roads and reaching to Adelaide's foothills.

In 2008, Burnside commissioned the first review of Burnside's Bicycle Strategy since 1996, based around practical, low-cost outcomes. When considering its adoption, however, a newly elected Council moved:
"That the draft Bicycle Strategy for the City of Burnside be revised to specifically encourage a commuter environment that allows children to ride safely to school."

This was addressed through an approach that aims to:

- Create high quality facilities, following an '8 to 80' philosophy
- Be financially feasible for the Council to implement
- Satisfy local residents by minimising the impact on on-street parking and access, and returning a 'green dividend'
- Suit a range of streets that are too narrow to accommodate bicycle lanes
- Use techniques that do not require approval by the Department of Planning, Transport and Infrastructure (and hence the time/cost/uncertainty that relates to such approval).

The result, built around 'Super Routes' and a modest toolkit of simple techniques, is an encouraging case study for other councils seeking a modest fiscal outlay, political acceptability and technical practicality in achieving a high-quality outcome – a 'Holy Grail' for bicycle planners.

1 Introduction

As Australia heads into the century's second decade, its cities are increasingly facing issues of urban congestion, transport funding costs, community health and the value of local amenity. Cycling has seen something of a renaissance across the nation as politicians, planners, engineers and individuals recognise that as a form of active, environmentally friendly and space efficient transport, cycling offers significant cross-sector benefits.
Overseas, cities with significant modal share for cycling demonstrate that to achieve such results, cycling needs to appeal to the broad range of potential cyclists. In particular, many sectors of the population desire greater safety – or at least a perception of safety – than is provided through bicycle lanes created by line-marking, logos and signage.

This concept has been expressed as '8 to 80', referring to infrastructure that parents would be happy to allow their 8 year old child to use, and which an 80 year old would be equally comfortable using.

The last few years have seen impressive cycling corridors retro-fitted to Melbourne and Sydney's streets. However, these are not without serious questions of cost and political acceptability:

- Melbourne City Council has estimated that for La Trobe Street, the costs of providing bicycle lanes between the kerb and parked cars would be about $2.4 million, compared to $350,000 for painted bicycle lanes[2].
- The backlash from such necessities as removal of parking is evident in Sydney, where in March 2012, Premier Barry O'Farrell announced new laws aimed at diluting Lord Mayor Clover Moore's transport and traffic planning powers. This was attributed to Ms Moore's agenda for cycling[3], characterised as a 'war on motorists'.

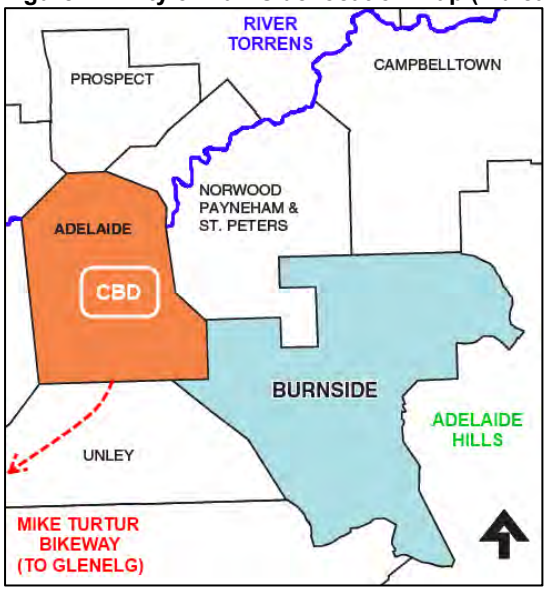
[2] 'Danish a sweet thought for city cyclists', Carey, The Age, 16 April 2012 (www.theage.com.au/victoria/danish-a-sweet-thought-for-city-cyclists-20120415-1x1jf.html accessed 17 April 2012).
[3] 'Premier Barry O'Farrell spikes Lord Mayor Clover Moore's city-of-bikes strategy', Campion, The Daily Telegraph, 7 March 2012 (www.dailytelegraph.com.au/news/sydney-news/premier-barry-ofarrell-spikes-lord-mayor-clover-moores-city-of-bikes-strategy/story-e6freuzi-1226291172647, accessed 5 November 2012)

While the degree to which such impacts should be considered acceptable may be argued, the reality for many councils is a reluctance to engage in what could be a negative and divisive debate. This is certainly true in the City of Burnside, which is also keen to minimise rate increases at the same time that it is being placed under financial pressure.

2 Background

The City of Burnside is one of Adelaide's older local government areas, with a well-established, mainly grid street network crossed by arterial roads under the care and control of the Department of Transport, Planning and Infrastructure (DPTI). Burnside and its relation to Adelaide City Council area are shown in Figure 14 below.

Figure 14: City of Burnside location map (indicative only)



The Adelaide CBD is a key destination. The Adelaide Hills is a key sport/ recreational destination. The River Torrens Linear Path, heading north-east to the Hills and west to south-west to Henley Beach, and the Mike Turtur Bikeway, heading south-west to Glenelg, are key pieces of nearby cycling infrastructure.

The first bicycle strategy to operate in the current City of Burnside was *Cycle Routes in Burnside*. Prepared in 1977, this was based around cycling to schools on the assumption that "…there is and always will be…" a real demand for school-based cycling.

This was followed by the *Regional Area Bike Plan*, prepared for the eastern councils in 1992. The Burnside components of this were reviewed in 1995-96; council amalgamations added Kensington to the local government area in 1997. Most existing bicycle infrastructure in the council area comprise bicycle lanes and advisory treatments along routes that form part of the State government's 'Bike*direct*' network, which started being developed at about this time.

A 2008-09 update of the City of Burnside's 2005 *Vision 2020* strategic plan[4] included as a desired outcome "A safe and well maintained pedestrian and cycle network".

The focus for the new Bicycle Strategy (also developed in 2008-09) was practical, low-cost outcomes. Public consultation on the draft Bicycle Strategy occurred during 2010 – soon followed by Council elections. A new Council called for a feasibility assessment for a Park Lands route in 2011, then passed a resolution that:
"The draft Bicycle Strategy for the City of Burnside be revised to specifically encourage a commuter environment that allows children to ride safely to school."

Our approach to this revision started with three concepts:

- An '8 to 80' philosophy is pursued – i.e. creating an environment suited to cyclists aged from 8 to 80 would provide for school children, commuters and everyone except sports and racing cyclists
- The focus on practical, low-cost outcomes is retained – to enable Burnside to feasibly implement the proposals within budgetary constraints

[4] As at 5 November 2012, the current edition of Vision 2020 is available at www.burnside.sa.gov.au/Council/Annual_Business_Plan_Budget/Vision_2020#.UJdq8FGFiZQ.

- The environment created is regarded positively by local residents – local residents are not necessarily the greatest beneficiaries of the proposal and asking residents to tolerate the impacts not only raises questions of equity but could raise barriers to the project.

Hence our aim was a high-quality, low-cost cycle network embraced by residents and users and retro-fitted into an existing street network.

This case study outlines the approach that achieved what might be considered a 'Holy Grail' for those seeking to significantly improve cycling conditions in existing street networks.

3 The 'Super Route' concept

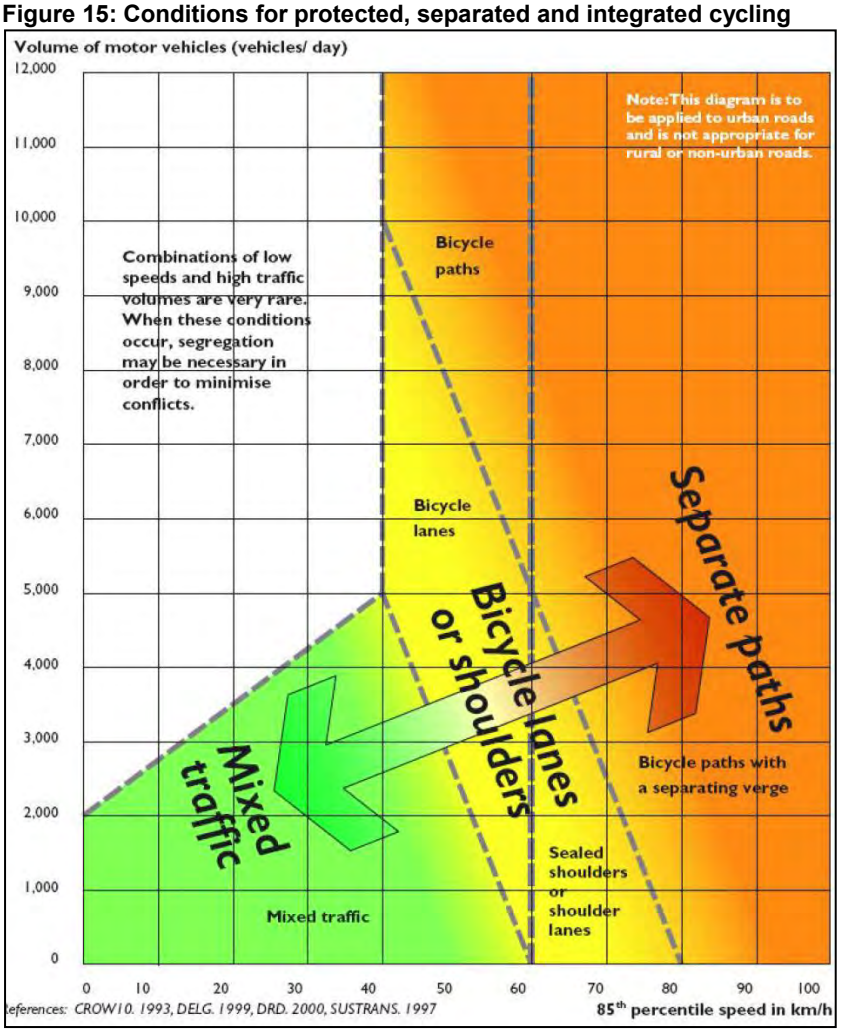
There are three basic approaches to providing cycling routes. Acknowledging inconsistent terminology and that these may overlap in a network or even routes, these are:

- Protection – providing physical separation of cyclists from general traffic e.g. with cyclist-only paths or kerbing
- Separation – removing cyclists from general traffic, but not physically preventing interaction, e.g. bicycle lanes created with paint providing separation of the cyclist and vehicle operating spaces
- Integration – cyclists operate with general traffic.

The original approach to Burnside's Bicycle Strategy focused on separation. This review considered how protection and integration could be used to create '8 to 80' cycling conditions.

Conditions conducive to integration ("mixed traffic"), separation ("bicycle lanes or shoulders") and protection ("separate paths") are indicated by Figure 2.1 of Austroads' *Cycling Aspects of Austroads Guides* (p13). This is presented here as Figure 15.

Figure 15: Conditions for protected, separated and integrated cycling



Clearly, slow speeds and low to moderate traffic volumes are conducive to integration ("mixed traffic"), although this figure doesn't provide any guidance about what is appropriate for different types of cyclists. Protection ("separate paths") is recommended at high traffic speeds and/or volumes, but could be considered at lower volumes and speeds in order to address perceptions of safety relevant to an '8 to 80' philosophy.

There are several well-known design approaches that could provide templates for integration or separated facilities – such as Portland's 'bicycle boulevards', Germany's 'bicycle streets' or Copenhagen's 'bicycle tracks'.

Rather than adopt any one of these per se, the term 'Super Routes' – first used in Adelaide City Council's *Strategic Bicycle Plan 2003* – was adopted, with the specific aim of separating the concept of a high-quality route from the method used to achieve it. Super Routes can be tailored to the local circumstances without raising objections that a particular design doesn't have certain features characteristic of (say) a bicycle boulevard.

Conceptually, then, creating Super Routes is a matter of:

- select the most appropriate route to achieve the required aims (Section 3.1);
- install treatments that facilitate integration by reducing the speed of the road environment (Section 4);
- provide protected facilities when appropriate and delineate the route as a Super Route, i.e. provide treatments that highlight that the route being used is different in nature to other streets (Section 5).

3.1 Route selection

A starting point to achieving any practical, low-cost network is to concentrate on a discrete set of high-quality routes, rather than attempting to provide such routes throughout the council area.

To suit commuters, these should radiate out from the Adelaide City Council area. To suit school children, these should pass close to schools and for young children, use signals when crossing arterial roads. To suit others, these should service key destinations – notably shops and open space – and connect to other routes and adjoining council areas.

While all of this was reasonably true of routes previously identified for Burnside, the quality of those routes was not sufficient to provide an '8 to 80' cycling network. The Super Routes would need to identify routes to enabled a high-quality 'spine' to be created, connecting Bike*direct* and other local access routes, and focused more strongly on the needs of children and other '8 to 80' cyclists.

In pursuing the Super Route concept, two specific issues needed to be addressed early on: treatments at schools and high traffic volumes on potential routes.

3.1.1 Treatments at schools

While usable commuter routes can be identified that pass reasonably closely to schools, the streets immediately around schools tend to have high traffic volumes, buses and on-street parking during peak periods. Integrating child cyclists into these streets is challenging, while providing protected facilities is also difficult – notably preserving safety at driveways and side streets and given high pedestrian numbers.

Further, many barriers to children's cycling are perceptual rather than physical: 'stranger danger', the 'cool' factor, etc. Given that most schools have already participated in the infrastructure-based Safe Route to Schools program in an attempt to address access issues, additional expensive infrastructure is unlikely to be able to change these perceptions.

The Bicycle Strategy took the approach that non-infrastructure techniques such as differential release[5] and prohibiting parking immediately around schools[6] are an integral part of promoting cycling to schools. DPTI's Way to Go program officer confirmed that they would be keen to engage schools within the council area, with the City of Burnside's support.

Hence Super Routes service schools but do not necessarily surround schools or reach to their front gates. Local linkages between schools and nearby Super Routes are provided in some cases, with longer links acceptable for older children.

[5] Under differential release, children are released from school in five minute increments depending on the method of travel to school. Pedestrians and cyclists are released first, followed by public transport users, followed by car passengers. This separates vulnerable children from traffic using time rather than infrastructure but also provides an incentive for children. As advocates for cycling, children are well placed to convince parents of its worth.

[6] This distributes traffic and parking over a larger space, hence reducing the intensity and impact. The application of this approach very much depends on local conditions.

3.1.2 High traffic volumes

Bike*direct* routes have previously been identified for Burnside, as had additional local cycling routes. Actual cyclist usage provides a further indication of route priority and had been collected as part of the 2008-09 work through an on-line survey linked to Google maps (possibly the first use of this type of survey in Australia).

These routes, as reviewed and amended during 2008-09, provide a base for identifying a Super Route network. However, they do not necessarily meet Super Routes requirements.

The Super Routes philosophy is that where traffic volumes are low to moderate (under about 4,000 vehicles a day and with few heavy vehicles), a safe cycling environment conducive to integration can be created by reducing the road speed environment to around 30-40km/h. Bike*direct* routes on local collector streets have traffic volumes that exceed this target range and cannot be reduced without compromising traffic function.

To address this, Super Routes were reviewed for opportunities to bypass such road links, using cut-throughs or on alternative parallel routes. This identified a number of opportunities that often linked well with ongoing routes. Where this was not possible, the feasibility of protected treatments was examined. As a last resort, bicycle lanes were considered. To maximise protection, these should use tactile or extra-wide line marking, or coloured pavement. (Under South Australian law, children would be allowed to cycle on the footpaths in these locations.)

3.2 The Super Route network

Figure 16 shows the final Super Route network, overlaid on the Bike*direct* network. Four Super Routes were identified (shown in red; local links in dashed red).

Figure 16: Super Routes shown with the Bikedirect network[7]

[7] Source: Bike*direct* map 9 as at May 2012, accessed 5 November 2012 via www.transport.sa.gov.au (www.sa.gov.au/upload/franchise/Transport,%20travel%20and%20motoring/Cycling/Bikedirect%20maps/bikemap9.pdf)

- The **North Burnside Commuter Route** is an east-west route that extends the popular Beulah Road Bike*direct* route to service Norwood Morialta High School and Magill Primary School. An additional pedestrian actuated crossing of Magill Road is proposed at Brand Street (at the western end of the route).
- The **Central Burnside Commuter Route** is an east-west route with a branch at the eastern end to provide connection across Greenhill Road via the popular Hazelwood Park, with a local link to Burnside Primary School over Glynburn Road. This branch provides a slightly diagonal route that better suits commuter desire lines. This route effectively substitutes the quieter Alexandra Avenue for Grant Avenue, with better connectivity to signals on Portrush Road but with indirect access to the signals at Grant Avenue/ Fullarton Road.
- The **South Burnside Commuter Route** is a roughly radial route running from the south-west to Adelaide City Council. (In comparison, the Bike*direct* network largely forms a north-south, east-west grid.) It runs extensively off-road from Conyngham Street to the Park Lands, making use of the quiet internal street network of Glenside.
- The **Burnside Connector Route** provides a north-south connector between the other Super Routes, roughly mid-way through the Council area. This generally follows Bike*direct* routes but substitutes quieter streets with easier crossings, while attempting to minimise the impact of detours on cyclists. A service road, car park, road closure access and cut-through are used to achieve the alternative routes, which also bypass two difficult intersections.

4 The design toolkit for integrated cycling

As noted, integration is proposed for streets with traffic volumes under about 4,000 vehicles a day and few heavy vehicles, by creating a road speed environment of around 30-40km/h.

This is achieved through streetscape improvements that encourage adoption of this speed, with traffic calming devices to reinforce this. (Area wide 40km/h precincts could also be used but a low posted speed is not sufficient in itself to create the required speed environment and area wide proposals can be contentious.)

The approach to moderating the speed environment is generally as per Local Area Traffic Management (LATM) guidelines produced by DPTI[8]. However, LATM is an area-wide approach that requires DPTI approval; Super Routes are a route-based approach and any DPTI approval process creates uncertainty, time penalties and cost penalties. Therefore, any devices requiring DPTI approval were avoided.

Three additional guidelines were adopted in addition to the general LATM approach, largely based on European practice:

- Limit clear, straight sightlines along a street to no more than 200m-250m – This aims to moderate the impression that the route is a longer-distance vehicular route instead of serving local traffic only. This guideline can be ignored if vertical deflection to reduce speed (speed bump, plateau) is present.
- Provide a deflected path of travel in preference to straight travel – Particularly for shorter streets, narrower streets or where cars have opportunities to bypass or exit the street. This extends to a perception of deflected travel, e.g. parking moves from one side of the road to the other, giving an impression that the travel lane is not straight.
- Minimise street widths – Not as a large-scale program of street narrowing, but as an important parameter affecting the overall speed environment and acknowledging that the use of simple guidelines (e.g. 2.3m parking + 3.0m travel lane) may be inappropriate. (As evident in the number of existing streets with parking on both sides but a width of, say, 8.5m; or with parking on one side of the street and a width of, say, 6.5m.) Instead, street width should be designed appropriately to the particular street.

Some streetscape treatments are often expensive to install, particularly when used along a length of street at specified spacings; while others will not be supported by the local community due to their impact on parking or the potential that they increase traffic noise as vehicles brake and accelerate.

The proposed approach is therefore to use only a limited set of streetscape treatments that:

- Improve the streetscape and hence provide a positive 'dividend' for local communities, with little other impact on their amenity
- Do not require major reductions in on-street parking
- Are reasonably cost-effective
- Do not require DPTI approval.

This led to the use of five main types of treatments in the design toolkit, plus one used for designating Super Routes. Treatments are spaced about every 50 metres.

[8] That is, as per the *Code of Technical Requirements for the Legal Use of Traffic Control Devices*.

4.1 Street tree plantings

Street trees are generally welcomed by residents and are an effective means of changing the streetscape environment. There are a number of opportunities to use street tree plantings.

- Under the Australian Road Rules, parking is restricted at intersections. This kerb length can be used to accommodate kerb build outs or extensions ('protuberances' in South Australia), without affecting on-street parking.
- Trees can be planted directly into the carriageway, located to minimise the impact on parking and where gaps in the canopy exist. E.g. where sufficient width to park 2.5 cars exists, planting a tree to reduce this to 2 cars does not markedly affect parking. There are also locations where the kerb length is too short for a single car.
- These trees are typically planted into a small kerbed area (examples of these are seen in Glynburn Road, south of Elford Street) with a pavement cut of 1.0m x 1.0m to provide room for growth. They can be planted closer to the kerb if necessary, with a localised change in the kerb-line to create the planting space (this can be seen in the City of Holdfast Bay).
- Trees can be placed in roundabouts to reduce onward sightlines (subject to service locations).
- Trees can be located to create a chicane or change in alignment of the street. This should not direct traffic closer to the throat of minor streets (i.e. away from the centre line in the major street), as this potentially increases the crash risk.

In Burnside, there are existing legacy examples of trees in the centre of the carriageway. New proposals for such plantings are unlikely to be acceptable to DPTI unless accommodated in a (wide) central median. No Super Routes were identified that were wide enough for such a median to be constructed while maintaining traffic access.

4.2 Contrasting pavement treatments

Contrasting pavements are used to enhance the impression that lower speeds are appropriate. Contrasting pavement is proposed:

- at the start/end of a street section as a threshold treatment, highlighting to motorists that they are entering a particular type of street
- where minor streets intersect with the route, highlighting the presence of the minor street and breaking up the continuity of the major street.

The type of contrasting pavement should be chosen for durability, to ensure an enduring effect, and with respect to the streetscape e.g. green coloured pavement used in bicycle lanes in Adelaide is not desirable due to its poor wear and dubious streetscape compatibility.

4.3 Central medians

A central median interrupts a clear, straight sightline by requiring cars to travel further to either side. It also narrows the travel lane, enhancing the perception of a slower speed environment.

Landscaping in a median greens and softens the street, contributing to the 'green dividend', while vegetation that overhangs the median's edges can further reduce the perception of travel lane width. Landscaped medians are therefore desirable, with a preferred minimum width of about 1.0m – which is also sufficient width to start altering sightlines. (Significantly greater width would be required for trees.) A median with a flush kerb is proposed for use with narrow road widths, to reduce the hazard for vehicles that might overrun into the median – especially heavy and turning vehicles.

Due to the impact on turning movements (including accessing driveways), medians have limited application and the final feasibility will also depend on service locations.

4.4 Kerb extensions

The effectiveness of kerb extensions in creating a localised street narrowing makes these a valuable tool even if they cannot support trees.

In Burnside, trees planted at the kerbside that have grown into the carriageway can be formalised with a kerb extension that protects the tree, clarifies conditions for motorists and also creates a localised street narrowing.
Kerb extensions that are too small to support a tree may still be able to support some vegetation and can also assist with narrowing the carriageway width.

4.5 Alternating on-street parking

In some locations, on-street parking is provided only on one side of the street. Changing sections of parking to the other side of the street leads to a deflected travel path – at least when cars are parked.

5 Other design features

5.1 Protected facilities

As noted, there are several limitations to providing protection appropriately and at a reasonable cost. However, there are some locations where protection can and should be applied, notably where traffic volumes exceed 4,000 cars per day. These are:

- wide streets, where the carriageway width is sufficient that some can be reallocated to a protected facility without major loss of on-street parking, and where driveway and side street access can be managed safely
- at pedestrian actuated crossings, where car parking is banned on the approach and departure, leading to unused road space that can be reallocated
- where the footpath/verge is wide enough to support shared use paths – particularly to link to pedestrian/cyclist refuges to cross main roads
- in the form of cut-throughs that run between properties or through street closures.

A protected facility is proposed in Alexandra Avenue despite its low traffic volumes, to highlight the Super Route as an alternative to Grant Avenue (and given available road width).

5.2 Route designation

Signage plays an important part in identifying the route, both to assist with wayfinding and to indicate that particular circumstances exist along a route.

The main form of route designation proposed is the use of “sharrows”, basically large (1.2m wide) bicycle logos with a double arrow head indicating the ongoing path of travel. These are applied on street and road surfaces. Their use is currently being trialled by DPTI.

Guidance in the use of sharrows is provided by American practice (European practice tends to use signage and some logos similar to Australian regulatory practice). The American practice includes indicative spacings and distances from decision points (intersections) that sharrows should be applied.

Where formal bicycle lanes or shared use paths are proposed, regulatory logos are required and sharrows are not proposed in addition to these.

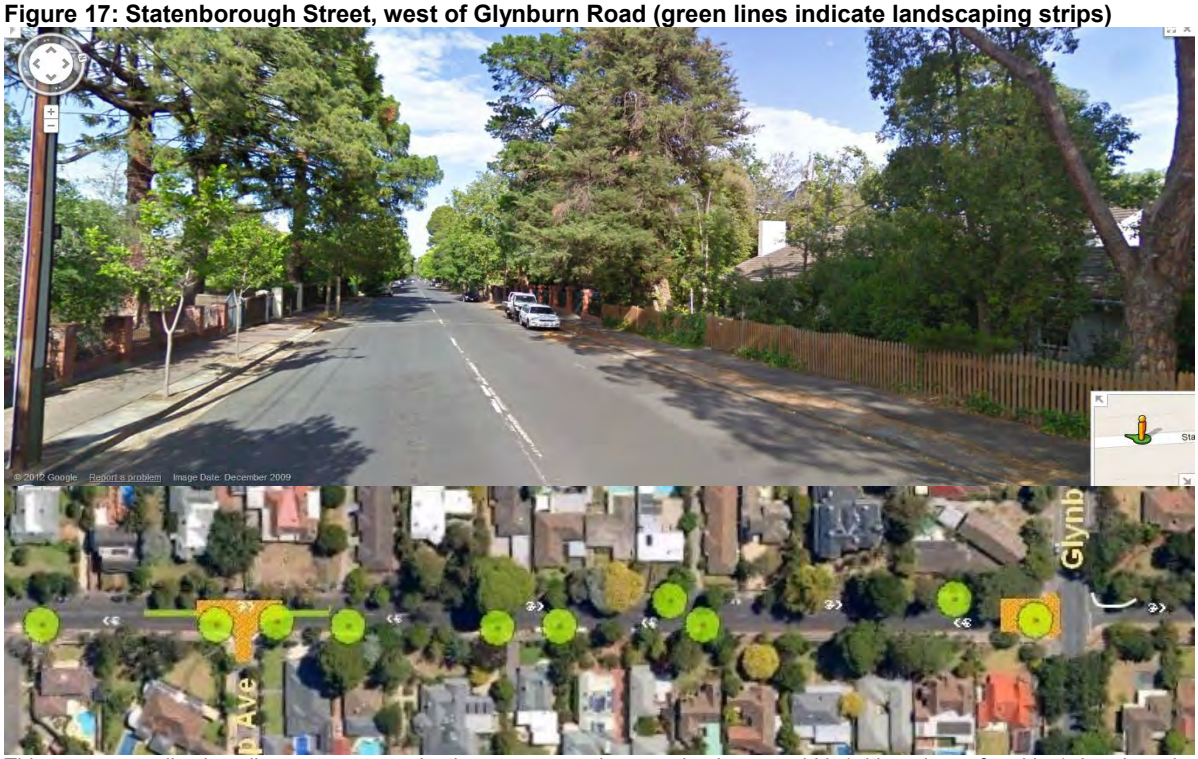
In South Australia, small signs are also used to indicate locations of ongoing routes. Developing a signage strategy has been recommended as part of the Bicycle Strategy, however an interim approach would be to change those signs that point to Super Routes to use a different colour and also a simple designation for the Super Routes e.g. SR1, SR2, SR3, SR4.

6 Applying the toolkit

Indicative ‘strip maps’ of Super Routes street segments illustrate how design concepts could be applied in developing Super Routes. An observation from the indicative design work undertaken is the need to tailor the design to the proposed routes. Two examples follow.

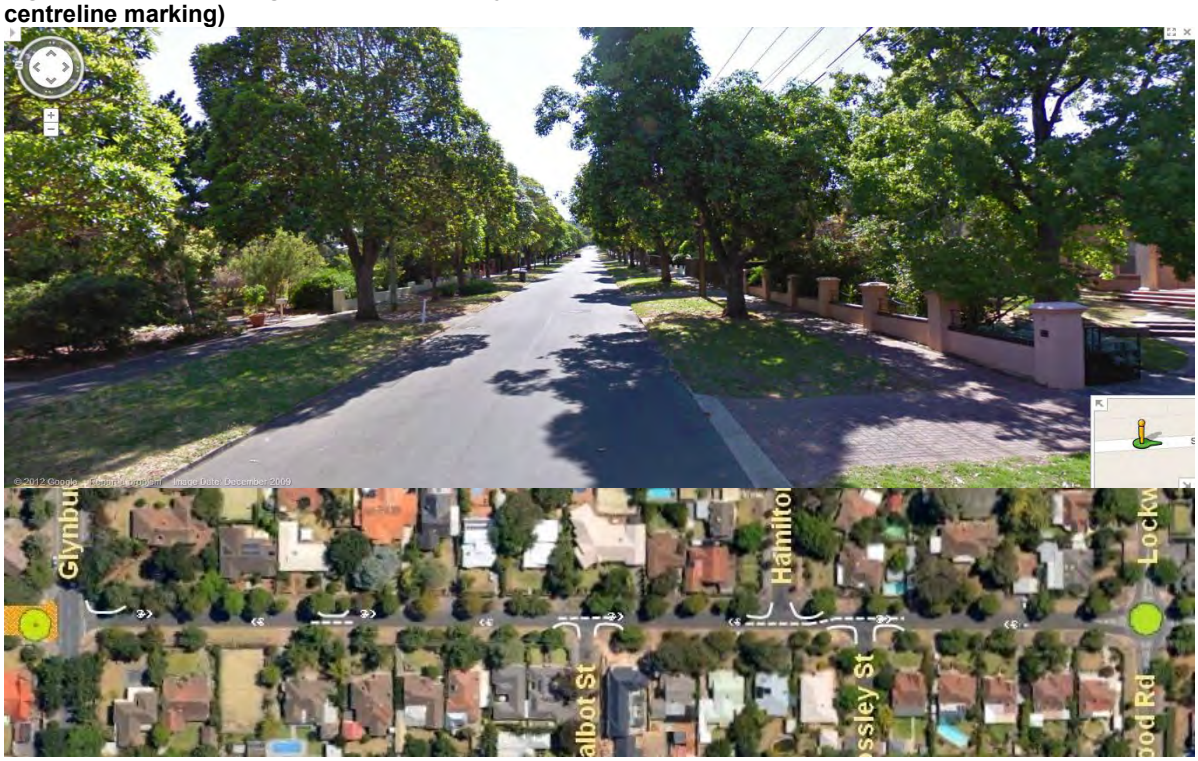
The first illustrates how concepts for Statenborough Street differ east and west of Glynburn Road, reflecting the different street environments and using different elements of the design toolkit to achieve the overall goals.

Figure 17: Statenborough Street, west of Glynburn Road (green lines indicate landscaping strips)



This treatment relies heavily on street tree plantings to narrow the perceived street width (with no loss of parking). Landscaping strips deflect travel, interrupt sightlines and emphasise street narrowing. Contrasting pavement is used as a threshold treatment at either end and to break up the carriageway.

Figure 18: Statenborough Street, east of Glynburn Road (white indicates protuberances and road centreline marking)



This street link features excellent street tree plantings and a narrower carriageway. The sightline is interrupted at a roundabout at Lockwood Road (a treatment used extensively in the North Burnside Commuter Route). Low level kerb extensions are used to deflect travel and are emphasised by the road centreline marking, but the treatment doesn't compromise the overall streetscape.

The second example illustrates the difference between Alexandra Avenue as a Super Route and Grant Avenue as a Bike*direct* route.

Figure 19: Alexandra Avenue (Super Route, top) vs Grant Avenue (Bikedirect route, bottom)

The pink lines shown in Figure 20 indicate a protected treatment proposed to emphasise the Super Route status, rather than reflecting higher traffic volumes. Many/ most houses facing Alexandra Avenue have garages at the rear, hence driveway access is a lesser issue for a protected treatment for Alexandra Avenue than for other streets.

The traffic signals that attract traffic to Grant Avenue also include a bicycle treatment to access Victoria Park, which would need to be used by the Central Burnside Commuter Route via Thomas Place. With removal of five car parking spaces to accommodate bicycle lanes from Fullarton Road to Thomas Place plus a refuge at Thomas Place and also to comply with parking restrictions under the Australian Road Rules, this has one of the highest proposed impacts on residents of any proposed Super Route.

Figure 20: Alexandra Avenue strip map

The overall cost of the Burnside Bicycle Strategy, including some forty bicycle routes with 150km of bicycle lanes and a five-year program of non-infrastructure items, was estimated at about $680,000 (excluding traffic management). Of this, Super Routes comprise about $300,000 and would be eligible for part-funding by the Office of Cycling and Walking's Strategic Bike Fund. Indeed, Council is already designing Super Routes in-house as part of its annual capital works program for kerb replacements. The final designs are not expected to exactly follow strip maps contained in the Bicycle Strategy as the detailed design stage needs to verify locations for new trees, services, etc, and because strip maps were not prepared for all street segments.

Still, because the concept aims to provide a positive return to residents, design toolkit elements are being incorporated into designs with a minimum of fuss and at little appreciable cost. The first Super Route sections are scheduled to be constructed in January 2013, even though the Bicycle Strategy was only formally adopted in October 2012.

7 Conclusion

This paper presents a case study of an alternative approach to providing high-quality bicycle facilities to the high-cost, politically difficult infrastructure that has been seen recently. This case study demonstrates how adopting and applying a philosophy of high-quality routes using an integrated streetscape design approach can change the way that a network is conceptualised and hence delivered.

Did the City of Burnside Bicycle Strategy deliver on its goal of an '8 to 80' network?

Arguably not fully: Council does not have care and control of arterial roads, hence can only lobby DPTI for additional signalised crossings or refuges. The Northern and Central Burnside Commuter Routes are also broken by the City of Norwood Payneham St Peters and are most likely to be effective with a complementary approach in this adjoining council area. Around schools, the Bicycle Strategy is relying on Way to Go to partner with schools to deliver non-infrastructure measures that will provide the greatest effectiveness of the Super Routes proposed.

There are also some links, none greater than 300 metres in length but probably amounting to almost a kilometre in total, that continue to feature bicycle lanes as the main treatment under the Bicycle Strategy. How well this provides for children in particular varies by route and while children can use the footpath along these links, this is not an ideal situation. It is hoped that over time, reduced demand for on-street parking and increased cycling levels will contribute to make removal of car parking on one side of the street acceptable, to accommodate a protected treatment; or intersection realignment, etc, may contribute to other routes becoming acceptable alternatives for cyclists.

The effectiveness of the proposed streetscape treatments is also still to be assessed. As these build on LATM concepts (notably in the spacings of devices), speed reduction to 40km/h can be reasonably anticipated. As most streets having traffic volumes over 4,000 vehicles a day have been avoided, this is adequate to achieve a street environment conducive to integration even if the desirable 30km/h is not achieved. Currently, resident support for the Super Routes concept is high, which should assist in lowering traffic speeds. As cyclist volumes increase, lower speeds should become even more common.

Whether '8 to 80' cyclists will feel comfortable with integrating with traffic is another unknown factor at this stage. The Super Routes should certainly appeal to more of these cyclists than existing routes.

Finally, the network will take time to deliver – up to fifteen years at current expenditure levels, although some of the later routes will probably be those that feature bicycle treatments already, and the Super Routes have the highest priority.
However, the Super Routes philosophy has significantly addressed community and Council desires for high-quality infrastructure, without creating controversy or budgetary stresses. So perhaps it could be considered to have identified at least a '12 to 60' network – ready to be upgraded to '8 to 80' as conditions change, and in an environment where even delivering bicycle lanes on Bike*direct* routes is made difficult by narrow street widths and resistance to removing on-street parking.

How adaptable is the City of Burnside Bicycle Strategy's approach to other local government areas?

The use of alternative routes and cut-throughs contributed to the success of the concept, but may not exist in other areas. Whether the particular design toolkit used is appropriate for other local government areas will also depend on local conditions.

Ironically, the lack of impacts and low cost may not suit all Councillors' or Councils' political needs.

Nonetheless, insofar as the Bicycle Strategy demonstrates how a Council resolution for a cycle network suited to school children and commuters can be embraced, progress has been made towards cycle planning's 'Holy Grail'.

This should give hope to other councils wishing to create a high-quality cycling environment, within budgetary and political constraints.

8 Acknowledgements

Thanks are due to the Councillors of the City of Burnside, whose commitment to children's cycling made the development of the Super Route concept possible; and to Kevan Delaney, for his support.

Everybody's cycling. But what about Australians with disabilities? What are the prospects for a more inclusive and diversely mobile society?

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Key words*: social model of disability, rights, cycling, impairment, diversity, social inclusion, assistive technologies, inclusive street design and construction*

Introduction

Clearly, everybody in Australia is not cycling. The question I ask in this paper is why are some Australians not able to cycle? Or put another way, what disables people in relation to using a cycle for mobility? I note the slow movement towards more inclusive street design which would benefit people with disabilities and other population groups but also note that in Australia there is little public interest in more inclusive assistive cycling technology for people with disabilities. Access to diverse (assistive technology) cycles would make inclusive street design increasingly usable by many people with disabilities and facilitate greater social inclusion.

1 Objectives for this paper

Given current social conditions and policy decisions, only some Australians have the choice to cycle. The objectives of this paper are to

- Outline the social model of disability using cycling examples
- Reference Australia's commitment to the Convention on the Rights of Disabled Persons (CRDP 2008) indicating that there is more to be done to facilitate inclusive street use for more people with disabilities in order to achieve the rights established by the Convention
- Indicate the social health, employment and income position of Australians with disabilities, which cycling for people with disabilities could partially address
- Explore recent Australian literature relating to disability, streets and mobility
- Foreground diverse cycles
- Provide some draft recommendations which assist the promotion of cycling options for people with disabilities so that they have increased access to affordable mobility, chosen mobility, and increased access to employment, income and recreation.

This paper then is about the situation now and the situation which could eventuate were Australians to take next steps towards building more inclusive streets and promoting use of diverse cycles for people with disabilities.

2 Social model of disability

I write this paper using a social model of disability. In this context I have no interest in medical definitions of the so called impaired bodies (or disabled bodies) and so contribute nothing to discussions about fixing individuals with impairments in efforts to achieve some kind of bodily normalcy.[1](Oliver and Barnes, 2012, 576)

Bodily normalcy (Harpur, 2012, 332) is possibly unable to be defined and if it can be it is probably a temporary state. Normalcy becomes even more unstable in an ageing population where experiencing bodily impairments, for example, may be numerically normal. I, for example, use assistive technology (glasses) to see better. Without them I feel disabled. I could not safely ride my bicycle without such technology. Sometimes I have a left knee impairment which limits my ability to be mobile and so I need to use a private motor vehicle more often. On neither count do I meet usual definitions of being a person with a disability. I am not entitled to social or health benefits on account of my disabilities. What this points to is that disability can fluctuate, can be socially and politically defined and universal definitions are difficult to sustain. Disability, like normalcy, in the senses that I am using these terms is unstable and socially constructed.

A second example - in the greater Adelaide area I am able to ride my bicycle in many places. I require hard surfaces because of the tyres and bicycle I choose to use. I am able to travel long distances with considerable

[1] There is a bigger discussion to be had in relation to disability and impairment, and it is not my intention to contribute to a simple ...either social disablement or bodily impairment...position. 'Disability is experienced in and through the body, just as impairment is experienced in terms of the personal and cultural narratives that help to constitute its meaning' (Hughes and Paterson, 1997, 335).

comfort. Should I travel with my *Trek Allant* to an inland indigenous community which has no sealed hard surfaces but a lot of spinifex patches amid stony country and lots of sand drifts, I will not be able to travel on my bicycle. My bicycle and my body remain the same, but the infrastructure required disables me. I'm the same person but disabled by the infrastructure or lack of it. Infrastructure is socially provided (publically funded) for a range of purposes. What this example shows is that the social and political decisions to provide or not provide infrastructure, enable or disable an individual's mobility.

A third example: A person in a wheelchair is often considered a paradigm case of a person with a physical disability. A person in a wheelchair in Adelaide may be able to travel long distances aided by trams, buses and trains as well as travelling along well designed and managed city pedestrian paths. Many city buildings and recreational places are readily accessed using wheelchairs. Situate the same person in Jakarta, a major metropolis where I have worked recently, and much of Jakarta disables the same person. The 'wheelie' (wheelchair user) had better not go there and I with working legs find it hard to negotiate the streets due to the number of pot holes, food stalls, motor cycles, cars, unregulated obstructions, trucks and other pedestrians. There is also a lack of pedestrian lights, regulation of the myriad street activities and a lack of a well entrenched city mobility culture which facilitates pedestrian and cycle mobility. Infrastructure investment and attention to detail in the streetscape would benefit me as well as 'wheelies' and even cyclists who have mostly been driven out of city streets. Better street design and regulation in Jakarta will benefit 'wheelies', the blind, parents with prams, children, the frail and the aged and the poor who walk a lot as well as aging visitors like myself. The whole population could benefit if pedestrian and cycling access was improved as personal mobility would be enhanced in a cleaner air environment. What I am arguing is that enhancing pedestrian and cycling infrastructure in Jakarta benefits many population groups simultaneously and need not be dependent on any particular definitions of disability – but people with disabilities would be a major population group to benefit. This conclusion seems clearer in the crowded conditions of Jakarta than for example in car dominated orderly Adelaide.

I will benefit by improved infrastructure, but not all would benefit equally. A wheelie, a child, a blind person or a person with unstable balance who walks assisted by a frame or stick would benefit more. In fact their inclusion in society significantly depends on well designed and constructed streets. Improved street infrastructure would create greater equality of mobility and greater social inclusion.

The social model of disability implicit in my three examples relates to human rights conventions to modify social and economic oppression and focuses on social barriers which disable people in society. Those who adopt a social model recognise that people have impairments, but argue it is society which significantly disables the impaired body (Barnes and Olive, 2012, 576, Borg et al 2012, 152-153). For example, society may not provide the appropriate technology (or the training or education which leads to income generation which supports the purchase of the appropriate technology which then can assist the impaired person/body toward increased mobility) or street infrastructure to enable mobility (Harpur 2012 326).

Let us take this discussion about the social model of disability only one step further (there are many further steps). Among disability advocates in the United Kingdom the preferred term in discussion about disability is to refer to 'disabled persons', whereas in Australia and the United States the preferred term is 'persons with disabilities'. The UK advocates place the word 'disability' before 'person' because they argue people continue to be disabled by society. That is *the* issue. In the UK, they are 'disabled persons'. Society does not enable all persons (Oliver and Barnes 2012). Society does not enable all mobilities.

In Australia and the USA the use of 'persons with a disability' places disability after the person in an effort to use language to emphasise that the individual person should not be defined by impairment or disability. First and foremost people with a disability should be entitled to their personhood (Harpur 2012 327) and abilities, and the disability (disabilities) or impairment are secondary – many abilities are present. What this discussion shows is that language around disability issues is contested by advocates and cultural and language issues are diverse in different locations.

In short, bodily impairment may limit mobility, but in this context of cycling and street design the social/political/economic limitation on people's mobility is considered. 'Normal' bodies and disability (disabilities) are unstable ideas. It makes sense then to look at *enabling* broad diversity when designing for inclusive mobility as one pathway to greater social inclusion. When considering mobility, street design and construction, discussions should not remain within narrow considerations of a person's impairment/s – rather, while people with disabilities have much to gain, a much broader population will also gain by more diverse mobility options, as I argued in my Jakarta example.

Seeking more diverse mobility options is not only a matter of good design and good street building, it is also a response to Australia's international treaty obligations.

3 Law, rights, social change and disability

Treaty obligations are shifting understandings of disability in Australia and internationally, and this shift is relatively recent. The shift is manifest in a broad social movement favouring diversity, disability action and social inclusion.

Twenty-one years ago, in 1992, the Disability Discrimination Act was passed by the Australian Government. This Act provides protection for everyone in Australia against discrimination based on disability (DDA 1992). This Act has made significant contributions to people with disabilities in many areas. Planners will be especially aware of required access plans which have led to actions which have done much to improve pedestrian comfort, building and public transport access.

As recently as July 2008, Australia signed the Convention on the Rights of Persons with Disabilities (CRPD). The impact of the CRPD is now modifying the attitudes and practices of Australians. Australia now has anti-discrimination legislation (1992) but has also signed this right's based United Nations Convention (2008).

In February 2011 the Council of Australian Government's (COAG) signed the National Disability Strategy. This strategy encourages cooperation between governments, businesses and communities to improve the lives of people with disabilities (COAG 2011). Of the four policy areas for development, cooperation and funding the first is:

- Inclusive and accessible communities—the physical environment including public transport;
- parks, buildings and housing; digital information and communications technologies; civic
- life including social, sporting, recreational and cultural life.

Another policy area is 'Personal and community support—inclusion and participation in the community'.

Other indicators of social change favouring diversity and disability action include the introduction of the Gillard Labor Government's widely accepted National Disability Insurance Scheme (NDIS), a more comprehensive response than the COAG agreement (2011) but one which followed rapidly from it. A Bill for the establishment of the NDIS was introduced on 29 November 2012 (ABC, 2012). Also, the widely heralded success of the Beijing and the London Paralympic Games and discussions about the South African sprinter Oscar Pistorius and his carbon fibre prostheses centre on assistive technology in sport but raise wider questions about the meaning of ability and disability.

In South Australia there is a political party, Dignity for Disability Inc, with one representative sitting in South Australia's Legislative Council, the Honorable Kelly Vincent (D4D, 2012). The South Australian houses of parliament have been significantly modified since Ms Vincent's arrival. Times are changing. Popular political change on issues affecting Australians with disabilities is occurring in Australia right now.

There are currently 153 Signatories and 119 Parties to the CRPD (UN 2012). The CRPD establishes broad conventions:

> *Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for his (sic) dignity and the free development of his personality.*

The CRPD Article 19 establishes '*the equal right of all persons with disabilities to live in the community, with choices equal to others, and shall take effective and appropriate measures to facilitate full enjoyment by persons with disabilities of this right and their full inclusion and participation in the community' (UN 2012).*

Of greatest relevance to this paper is CRPD Article 20, which is included in full:

> *States Parties shall take effective measures to ensure personal mobility with the greatest possible independence for persons with disabilities, including by:*
>
> *a. Facilitating the personal mobility of persons with disabilities in the manner and at the time of their choice, and at affordable cost;*
>
> *b. Facilitating access by persons with disabilities to quality mobility aids, devices, assistive technologies and forms of live assistance and intermediaries, including by making them available at affordable cost (UN 2012).*

Article 23 states that:

> *Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment.*
>
> *To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation (UN, 2012)*

The CRPD is relatively recent. Australia has been a signatory for only five years. The CRPD establishes rights for people with disabilities to access employment, to live as independently as possible and to mobility.

To focus on the most pertinent aspects for cycling and cycling related possibilities, personal mobility is to be facilitated '...in the manner and at the time of their choice and at affordable cost' (Article 20a). Article 20b suggests to me that mobility aids, devices and assistive technologies built around the concept of cycling have yet to be exploited in Australia (UN 2012). Borg et al notes as a part of a recent content analysis of the CRPD:

> *Except for personal mobility, the CRPD seems not to give persons with disabilities the right – or legal support – to approach their government to demand necessary assistive technologies at affordable cost, which for many may be at no or very little cost (2011, 162).*

Put positively, it appears that there is legal support for governments to provide assistive technologies[2] at affordable cost, for mobility. This appears to present a significant opportunity for diverse assistive technology cycles to be used on more inclusive streets in Australia.

This leads to a discussion of assistive devices (in our case cycles of diverse kinds) as well as street design and street building.

I am arguing that assistive technology cycling provides significant opportunities for redress and the possibility of achieving some rights established by the CRPD. It appears that government may have to provide assistive technology (which could be cycles) at affordable cost. However, it seems these opportunities are not well known about in Australia compared with some other OECD countries. Before discussing streets and assistive devices, I want to provide some indicative contextual information about people with disabilities in Australia.

4 Indicative data

Disability is prevalent in Australia. It is becoming more prevalent as the population ages. This prevalence should encourage greater diversity in mobility opportunities, to ensure ongoing social inclusion.

People with disabilities are less likely to be employed and when employed they are more likely to work part time. People with disabilities are more likely to have low incomes than other Australians, and therefore less opportunities to own private motor vehicles, to own modified private motor vehicles or to be able to afford taxis – even subsidised access cabs. The following are direct quotations from the original sources. Language referring to disability varies and I have not chosen to standardise it.

Disability is prevalent.

> *18.5% (or 4 million) Australians have a disability (ABS 2009). In the ABS (2009) survey disability is defined as having at least one of a list of 17 impairments, health conditions or limitations that had lasted, or were likely to last, for at least 6 months, and that restricted everyday activities.*

Disability becomes more common with age.

> *The 'average male' born in 2009 in Australia could expect to live 61.6 years without disability and another 17.7 years with some form of disability. The 'average female' born in 2009 in Australia could expect to live 64.3 years without disability and 19.6 years with disability. Years lived with disability account for 22% of total life expectancy for males and 23% for females (Productivity Commission 2011, 136-137).*

Labour force participation

> *Labour force statistics showed that people with disability are much less likely to participate in the labour force than people without disability. Just over half (54%) of all people with disability of traditional working age participated in the labour force in 2009 compared to 83% participation of people without disability (Productivity Commission, vol 1, 2011).*
>
> *People with disability who were employed were more likely to work part time: 22% of employed males and 56% of employed females with disability worked part time in 2009, compared to 16% of males and 47% of females without disability (AIHW Australia's Welfare 2012 157).*

People with disabilities are in a weaker financial position

> *In line with these less favourable labour market outcomes, people with disability have a substantially weaker financial position. The average weekly income for a working-age person with a disability is $344, nearly half that of a person without a disability ($671).*
> *Interestingly, data from the OECD from the mid-2000s shows that despite the weaker financial position overall, income for people with disability that are employed is only slightly below that for people without disability. In contrast, income for people with disability who are unemployed or not in the labour force is*

[2] Borg et al (2011 143-154) writes that the 'UN system defines assistive products and technology as any product, instrument, equipment or technology adapted or specially designed for improving the functioning of a person with disability.'

half of the average working age population, which is among the lowest in the OECD (Deloitte Access Economics 2012 14).

People with disabilities experience poorer health

In 2007–08, almost half (46%) of people aged 15–64 years with severe or profound disability reported poor or fair health, compared to 5% for those without disability.

Almost half (48%) of people with severe or profound disability had mental health problems, compared to 6% of people without disability.

About 69% of adults aged 18–64 years with severe or profound disability were overweight or obese, compared with 58% for those without disability.

Compared to people without disability aged 15–64 years, people of the same age with severe or profound disability were more likely to do a very low level of exercise or no exercise (43% versus 31%) (AIHW 2010).

In Australia employment and the resulting income are the main pathways to 'full inclusion and participation in the community' (CRPD Article 19 UN 2012). Employment relies on a reasonable standard of physical and mental health. The data above indicates that people with disabilities not only must manage the impairments of their bodies, but also they are far more likely to have to manage poverty and poor health. I argue that in Australia we need to pay more attention to assistive technologies, in the form of a diversity of cycles so that people with disabilities are more able to access employment and recreation which will in addition enhance physical and mental health and ultimately inclusion. The assistive technology of more diverse cycles will be optimised when infrastructure for cycling is more encouraging and protective of a greater diversity of users.

5 An exploratory critical discussion of literature

Having significant population numbers who are underemployed or unemployed and who experience additional burdens of illness in addition to a defined disability is a concern because it means that many Australians with disabilities are unable 'to live independently and participate fully in all aspects of life', and 'to access, on an equal basis with others, the physical environment' (CRPD Article 23 UN 2012).

Recent Austroads papers about disability and mobility were reviewed.

Lansdel et al (2000), writing for Austroads in a publication titled *Catering for people with disabilities*, provide an overview of available guidelines, standards and criteria for people who have disabilities and who use roads. There is a lot of useful and practical detail to guide good practice reviewed in this publication, but the scope of the practice is very limited. 'Mobility aids' considered by the authors are wheelchairs and motorised gophers (scooters). The authors conclude that there should be 'a fully accessible transport system which facilitates travel from door to door' (2000, 21). By this they mean a public transport system with greater than usual flexibility. Apart from a fully accessible transport system, infrastructure treatments are those which improve pedestrian movement. Significant discussion is allocated to pedestrian crossing design, pedestrian signals, audible pedestrian signals, puffin crossings, pedestrian footpaths and crossings, tactile pavements, curb cuts and depressed curbs, and to signage and traffic signals for visually impaired drivers. Apart from visually impaired drivers, this publication does not consider increasing mobility along lengths of streets or by paths (the linking aspect of streets) for people with disabilities using more diverse assistive technologies, such as specially designed cycles.

The second Austroads report (Taylor and Damen 2001) one year later involved a nationwide stakeholder consultation and comprehensively considers road modifications so that pedestrians, the elderly, children, people with disabilities and cyclists can have safe mobility. This report takes accessibility, mobility (rather than transport) and equity seriously. It provides a long list of potential practices to improve mobility and equity for all road users, and argues for limiting private motor vehicle use and speed (Taylor and Damen 2001). In the Austroads context, and from a cycling perspective, it is a strong statement in favour of inclusive streets and diverse uses by otherwise 'vulnerable' populations.

The vision of the report is 'to allow equally for the needs of all road users including non-motorised and vulnerable (unprotected) road users' (2001 3). This comes closer to meeting the rights later established by the CRPD (UN, 2012).

The Australian Network on Disability commissioned Deloitte Access Economics to report on the economic benefits of increasing employment for people with disabilities. The report, as expected, sets out in detail economic modelling. The modelling indicates significant national economic gains of increasing employment for people with disabilities. Social barriers to employment are briefly canvassed and discrimination or employer attitudes are identified as main barriers. More generally the report states that:

> *Improving access to transport, the built environment, as well as education, training and support are integral in providing opportunities for people with disability to access employment (Deloitte Access Economics 2012 5).*

In the Deloitte Access Economics report (2012) transport remains undefined and the discussion does not extend to inclusive street design which could favour personal mobility by people with disabilities. Rosier and McDonald, writing for the Communities and Families Clearinghouse Australia (2011), review literature which discusses the relationship between transport and disadvantage in Australia. Transport disadvantage they report is most likely to be experienced by low income families in outer urban areas, unemployed people, rural and remote Australians, especially indigenous Australians, young mothers and sole parents as well as people with disabilities. Transport disadvantage it is argued contributes significantly to social exclusion. Transport disadvantage is about not being able to get to where you need or want to go. It is about the lack of access to transport as well as about stress related to the cost of owning and using transport, especially private motor vehicles. The discussion of transport disadvantage for people with disabilities in this report focuses entirely on difficulties accessing public transport. There is no discussion about people with disabilities for example managing their own mobility in motor cars or using diverse other assistive technologies, including a diversity of cycles in civilised inclusive streets which link significant places, including workplaces.

Munro and Knight Mertz's Austroads report (2011), written for the Australian Bicycle Council in 74 pages, fails to mention or discuss 'disability', 'disabled', 'impaired', 'impairment', 'companion cycling', 'diversity' etc. The participation survey was concerned with 'bicycle' riding, but the definition could have just as well been applied to cycles.

South Australia's DTEI (2009) report on 'Guidelines for disability access in the pedestrian environment', was written after wide consultation with disability consumer groups and specialised consultants. The report limits the discussion to disability access in pedestrian environments like paths, road crossings and public transport, and does not consider using inclusive streets which link points like homes, workplaces, recreational locations and so on.

The Taylor and Damen Austroads paper (2001) has relatively little discussion about people with disabilities as a 'vulnerable' road user group. However their options for inclusion of vulnerable groups into street and shared space mobility is strongly inclusive, and quite radical by today's standards of discussion about streets, and what and who they are for. Issues suggested by the authors include transit first, planning for fewer cars, priority for vulnerable road users, traffic calming, slower speeds, separated paths etc (Taylor and Damen 2001 22-23). None of the other authors noted suggest increasing person powered mobility for people with disabilities, that is, using diverse cycles as assistive technology ridden in better designed and built inclusive streets.

The SA Active Living Coalition *Streets for people compendium* (2012), takes disability seriously, although addressing street mobility issues for people with disabilities is not listed as a purpose for the compilation of the Compendium. The Compendium (2012) though takes over from where Taylor and Damen left off in 2001, and takes over with considerably more detail and illustrations. While disability is not fore-grounded, and disability organisations or spokespeople were apparently not a part of the Coalition, the vision included in the compendium of inclusive design for shared streets, in my view encourages inclusion of people with disabilities. The Compendium refers to the social model:

> *Based on the social model of disability – that people are disabled or disadvantaged by society's failure to recognise and meet their needs, not an inherent lack of capability, inclusive design aims to remove the barriers that create undue effort and separation (2012 E4 23).*

The Compendium highlights health, economic and environmental benefits of inclusive street design and the major focus is on increasing cycling and pedestrian activity. Chapter B 'Street design approach' features 'human centred approaches' and advocates rethinking the conventional (road) hierarchies. This Compendium could move South Australian at least towards establishing inclusive streets using a link and place matrix system which will potentially better facilitate the mobility of people with disabilities so they can access work and therefore income as well as recreation and therefore better health. The next major step in meeting these objectives is making known and making accessible and affordable a more diverse range of cycles appropriate for people with disabilities.

Until the publication of the Compendium, the Australian focus for inclusivity has been on access to buildings, public transport and road crossings, rather than ensuring that people with disabilities are enabled to link to places through the use of inclusively designed and carefully constructed shared streets. Such streets are more likely to facilitate '...the personal mobility of persons with disabilities in the manner and at the time of their choice, and at affordable cost (CRPD Article 20a UN, 2012). The time has come to act so that many more people with disabilities can be independently mobile rather than being transported by others to access points in the social environment.

6 In short

Cyclists and their advocates are aware that cycling can improve physical and mental health and that cycling can be fun and reduce car dependence and CO2 emissions. However, cyclists and planners are less likely to argue that cycling can provide access to employment and therefore to income and therefore lead to a path out of poverty and towards social inclusion. For all the strengths of the Compendium (2012) it does not make the case for people with disabilities linking home to workplaces along inclusively designed and constructed streets. This kind of argument is not used in relation to people with disabilities in Australia. Given the relatively recent signing of the CRPD in 2008 and the Gillard Labor government's introduction of the NDIS (ABC, Nov 2012) as well as policy trends towards active social participation rather than passive receipt of welfare payments and other signs of social movement in favour of a more inclusive society, the time is ripe to consider more diverse cycling options *as well as* more protective and inclusive streets.

7 What is to be done to access (inclusive) streets? Diverse cycles for diverse needs

At the Paralympics we see tricycles, tandems and hand cycles. Para-cycling is now well established and relatively popular in Australia (Cycling Australia 2012). We do not commonly see the kinds of cycles used in para-cycling on Australian streets. There appears to be little argument to bring these cycles and cyclists on to the streets. When they are seen it appears they are not used to improve access to employment and therefore income but are more likely to be used for community recreational and sporting purposes. In Australia, riding for the disabled[3] means riding a horse so that abilities are developed and people enriched. Riding for the disabled is not about riding a bicycle to work or cycling for better health for people with disabilities. It could be.

Diverse cycles exist to provide mobility for diverse needs along inclusive streets. Not surprisingly they are mostly manufactured in the Netherlands. Van Raam is the main producer (Van Raam 2012). Here are a few of Van Raam's products.

O Pair (Van Raam 2012) wheel chair bike with suspension. The *O Pair* detaches so the wheelchair can be used independently in a workplace, theatre, cafe, home, etc.

Wheelchair transporter (Van Raam 2012) for wheelchairs up to 74 cms width plus passenger.

Fun 2 Go (Van Raam 2012). A companion cycle for carer and person with a disability. Companion cycling for people with complementary abilities (for example *Fun 2 Go* could accommodate a blind person with strong legs and a sighted person with low muscle tone).

[3] 'Riding for the Disabled Association develops ability and enriches lives through specialised programs and relationships with horses' (Riding for the Disabled 2012).

Maxi (Van Raam 2012) is a low step through stable cycle for adults with balance disabilities.

Twinny (Van Raam 2012) Tandem with low step through.

Easy Sport Tricyle (Van Raam 2012) Support and stability when sports cycling.

In Hampton, London there is a charity called Companion Cycling (2012) which has a fleet of diverse cycles and a team of volunteers. People with special needs (including school kids and residents of nursing homes) can access these cycles for recreation along cycle paths in a large park. Their cycle fleet includes diverse cycles from Van Raam and other manufacturers. Below is a cycle which allows one rider to foot pedal while another hand pedals. An Australian organisation like Companion Cycling could provide a pathway towards more integrated cycling activities for people with disabilities.

Companion Cycling (2012) A pedal cyclist pilot riding with a hand cyclist and a companion cycle suitable for shopping, recreation and trips to work.

8 Conclusion

People with disabilities are entitled to choice, and to affordable choice like any citizen. Mobility is essential to social inclusion and affordable mobility is important for employment. Somewhere between sport and occasional recreational riding on diverse cycles, there need to be inclusive streets and paths which can be used by people on diverse cycles.

Diverse cycles are available for purchase. They are expensive cycles but they are far cheaper than cars modified for a driver with a disability or other people movers[4]. In South Australia, subsidised Access Cabs3[5] used on a daily basis to access work for example, are very expensive and sometimes are an unreliable.

Some cycle routes in Adelaide, South Australia could be well suited to these diverse cycles and further developed. The Turtur Bikeway, the Coast Park Path, Sturt Creek Linear path, West Side Bikeway could be used. The Parkside, Frome Street project of the Adelaide City Council is promising. Most Van Raam cycles can be purchased with power assistance and this would make them suitable for the River Torrens Linear Path.

In Australia cyclists and cycling organisations could be a part of the social movement to develop more inclusive possibilities for people with disabilities so that 'the personal mobility of persons with disabilities is facilitated in the manner and at the time of their choice, and at affordable cost' (CRPD Article 20 UN 2012). Cyclists and cycling organisations could join forces with disability organisations to facilitate access by persons with disabilities 'to quality mobility aids, devices, assistive technologies and ...including by making them available at affordable cost'.

9 Recommendations

The Adelaide City Council *City Bike* scheme and other capital city bike share schemes, consult with disability organisations and consider as a beginning adding a side by side or companion cycle, a tandem and a tricycle to its fleet in order to broaden the range of people who can access *City Bikes* or similar schemes.

State located cycle lobbies (for example Bicycle Institute of SA) commit to partnering with disability organisations to form sub-committees aimed at lobbying for more cycling based mobility options for people with disabilities, to write grants to purchase diverse cycles and to provide 'Come n Try' activities. Grant writing should note the detailed analysis in the article by Borg et al (2011).

In consultation with disability organisations the Department of Planning Transport and Infrastructure (DPTI) develop slow street networks (15 kph?) for a broader range of mobility devices and assistive technologies to be used by people who are able to or who prefer to move at about 15 kph.

If you are an employer, employ people with impairments and support their trips to and from work by providing side by side or some other cycle. Diversify!

Cycling lobbies with disability organisation partners track developments in the NDIS for opportunities to talk up inclusive street use for people with disabilities and increase access to a diverse range of cycles which promote affordable mobility.

Generally cyclists, planners and advocates should eschew using the word 'bicycle' and use more inclusive and diverse 'cycles' and 'cycling'.

The Australian Bicycle Council be renamed the Australian Cycle Council and commission a report on diverse cycling options for people with disabilities and other people with special needs.

[4] Automobility is one many businesses which converts standard production line models to suit people with disabilities (Automobility 2012)

[5] Access Taxis SA
'State Government subsidised taxi travel program entitles members to a taxi fare subsidy of 50% for people not confined to a wheelchair and 75% for those confined to a wheelchair, with an upper limit of $40 a taxi fare.
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Urban bike space claiming and infrastructure use in Sydney

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***Key words**: gender, cycling, space claiming, visual preference survey, Sydney*

Abstract

This paper explores the infrastructure preferences, sense of (non)belonging, and re-negotiations of citizenship through the eyes of Sydney-based cyclists through three main arguments. Firstly, this paper argues that cyclists need to be legitimized in urban areas. Secondly, that there is a greater need for cycling to be normalised in a city. Thirdly, this paper argues that men and women interpret their inclusion into the cycling community differently, and that barriers need to be broken down within the cycling community itself to encourage participation. This paper focuses on the women's urban experience of cycling in relation to the change in bike infrastructure in Sydney. The research aims to recommend what the right kind of infrastructure could be to enable female-friendly cycling.

The research methodology used a qualitative approach, engaging the cycling community in a web-based survey that explored attitudes towards cycling, practice, and infrastructure use. Two discussion groups utilised a Nelessen-style Visual Preference Survey to identify characteristics of the built environment that influence infrastructure preference for cyclists, and discuss issues pertinent to participants.

Findings inform a gender perspective of contemporary urban cycling, emphasising the female right to the city and space claiming in an automobilised city. Although this study was based in Sydney, it is transferrable to other urbanised areas of Australia that are retrofitting for cycling.

1 Introduction

1.1 Problem statement: women and cycling in the city

Women are continuously highlighted as the way forward for cycling to increase participation rates in Australian cities, yet they remain on the margins of this alternative transport mode (Pucher, Garrard & Greaves 2011 344). The introduction of cycling policies at Federal, State, and Local Government levels in Australia, and the subsequent implementation of physical cycling infrastructure, has altered the spaces of our cities and generated new opportunities to explore the relationship between infrastructure and space claiming from a 'gender perspective' (Greed 2005 247). The view from the saddle and the 'women's urban experience' (Davidson & Fincher 1998 188) can help us begin to re-make the dominant influence that automobility (Sheller & Urry 2000) exudes on the urban environment, and the exclusionary influence of car culture on public space (Koglin 2011).

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'. Sydney's growing cycle network is characteristic of the re-making of, and the formation of 'new combinations' of different kinds of, public space that Iveson proposes. For cycling, infrastructure not only refers to the physical concrete barriers, green paint, signs, and bike parking being built across the city, it also refers to the social networks, community groups, support structures, and emerging cycling policies. The view from the bike-saddle is central to examining emerging conflicts in a changing city, as the city is historically a site of contestation and a locus for the re-negotiation and claiming of citizenship[1] (Soja 2010, Marcuse 2009, Holston & Appadurai 1999, & Mackenzie 1989).

1.2 Background: cycling in urban Sydney and infrastructure provision

It is commonly accepted that women cycle less than men. In Sydney females account for 17% of commuter cyclists (Pucher et al 2011 336) and comprise a mere 13% of cyclists overall in in the city (Environmetrics 2006 40). According to the Australian Bicycle Council (2011) the ratio of male to female cyclists is more than double in Australia, leaving one to 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 bike/self. These studies propose theories of women's fear in public

[1] I use Isin's (2000: 5) definition of citizenship 'as a social process through which individuals and social groups engage in claiming, expanding or losing rights … [where] the emphasis is less on legal rules and more on norms, practices, meanings and identities.'

urban space and self-preservation (Day 1999, Bowling et al 1999, Burgess 1998, & Valentine 1989) as primary reasons for choosing separated cycling infrastructure. Despite these studies, 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 on behalf of the City of Sydney Council (COS) with cyclists and non-cyclists (Environmetrics, 2006 & 2007), though this Sydney-based research is out of date and does not focus on women. Existing literature also suggests that the build-it-and-they-will-come model of infrastructure provision is concurrent with increasing cycling participation rates overall (Dill & Carr 2003; Nelson & Allen 1997). Given these two insights, 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.

Sydney's increased cycling rates have widely been attributed to the improvements in infrastructure, especially within the COS Local Government Area (LGA) (COS 2011). However to date there has been little research to identify *what* infrastructure cyclists use and *why*. Short of attaching video cameras to participants' helmets, this study used an innovative planning visioning technique, two discussion groups, and a web-based survey to answer core questions regarding how space is re-made and claimed by cyclists, identify the role of infrastructure in space-claiming processes and identify whether or not space-claiming differs for female and male cyclists.

2 Methodology

2.1 Conducting social research through surveys and discussion groups

Research methodologies were qualitative in nature, incorporating a web-based survey of cyclists from across the Sydney region (the extent of the region is shown in Appendix 1 for reference), and two discussion group sessions, divided by gender, which were combined with a Nelessen-style Visual Preference Survey (VPS). These methods focused on the view from the saddle, 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 any similarities and differences between men and women who cycled in Sydney, as well as a context for more in-depth methods. The VPS and group discussions concentrated closely on infrastructure, cycling narratives and social cohesion, and aimed to provide a micro view (from the saddle) of issues which cyclists felt were important to them.

2.1.1 Web survey

The survey asked demographic and background questions (e.g. age, sex, location, cycling group membership, previous involvement in cycling activities, age when first started to ride etc.), and asked questions about respondents' current cycling practice (e.g. frequency of rides, purposes the bike is used for, whether they engaged in commuting). The survey also asked questions about opportunities and barriers to cycling, and asked respondents about how they felt about cycling in Sydney, their social interactions, a sense of belonging or identity, and touched on opinions about ownership of public space. Questions were mixed, utilising multiple-choice, yes/no, and comment options.

Of the 357 survey respondents 38% were female and 62% were male, and all currently resided within the Sydney region.

2.1.2 Visual Preference Survey (VPS) and discussion groups

The VPS-discussion groups were divided by gender, with 9 male participants in the first session and 11 females in the second session (see Appendix 2 for a table of participants). The VPS is an innovative visual research tool developed by Anton Nelessen and Associates in the United States (US), relying on images that cohere together to measure community preferences, and has been widely used to measure community opinion on the design of new developments and urban renewal projects in the US. For full and detailed examples of the VPS as a research method see Nelessen (1994 & 2012), Zacharais (2011), Ewing & Handy (2009) and Ewing (2001). I have applied their processes carefully to a Sydney cycling context to encapsulate the main concepts and benefits of the method in my own Nelessen-style VPS. The driving notion behind using the VPS for this research was the malleability of the medium (that of a slide show of image pairs and participant evaluation form) to be applied to a wide variety of differing urban contexts, its reliance on using images which reflect the 'public viewshed' (Nelessen 1994 85) to inform decision making processes, and the view from the saddle which it has the potential to portray. The VPS model has been used to conduct walkability and public transport design studies (Zacharias 2011; Ewing & Handy 2009), yet the model has not been used in Australia, or purely for cycling or cycling path choice to the researcher's knowledge. Decisions about route or path choices help us to better understand why and where participants are cycling and the elements or characteristics of the built environment that influence these decisions.

Participants were shown a power point presentation (see Appendix 3 for full VPS) comprising 5 groups (outlined below) of 5 image pairs, with 1 pair per slide. Each of these groups represented a different area of concern for cyclists (drawn from the variables in Table 1) recorded during the extensive image collection phase between September 2011 and March 2012. The image pairs emulate path choice, a design decision influenced by stated preference research (Ewing 2001 272) and previous VPS studies (see Ewing 2001 & Nelessen 2012). Of the 400 images collected the final pairs are the most representative comparisons of the range of cycling infrastructure in Sydney, at different times of the day, with varying weather and path conditions. The intention of displaying both familiar and unfamiliar images was to summon ideas of the 'future' cycling city (Marcuse 2009 193) as well as the existing city for participants. The VPS model can present participants with what *might* be possible, as they depict spaces participants may or may not have ridden or recognise. The final image pairs are illustrative of Nelessen's public viewshed as applied to a Sydney cycling context, which is what we see when we are going for a bike ride and moving though the city.

Table 1: Variables used in the 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

Participants were asked to keep their own cycling in mind throughout the VPS and use the headings of each group as a guide to start to think about the available choices. The groupings used were: *Space*, *Path/road conditions*, *Activity*, *Level of light,* and *Vegetation.* In addition, participants were given an evaluation form to record:

a) A preference for one image in each pair: Left or Right OR to record 'no preference' if neither image was preferred
b) Make a preference rating for each chosen image from 1 to 5 (where 1 = *would not like to cycle here,* 3 = *wouldn't mind cycling here,* and 5 = *would like to cycle here*)
c) Give a short written reason as to why a particular image was chosen or rejected

2.2 Recruitment

Respondents (adults over the age of 18) were recruited through snowballing cycling mailing lists and advertising posters (see Appendix 4). Local community and cycling-related social media sites, such as cycling forums were utilised to introduce Sydney-based cyclists to the survey, and conventional poster advertising was carried out across inner Sydney suburbs, to target a broad section of the cycling community. As the central aim of the VPS-discussion groups, in addition to running the VPS was to draw out personal cycling narratives, only a small number of participants were required. The ideal discussion group has between 6 and 12 participants, according to Litosseliti (2007), to most conveniently manage each session and provide everyone involved with the opportunity to be heard. Discussion group participants were drawn from the web-survey and via word of mouth as part of the survey respondents were asked if they or anyone they knew would like to take part in further research to contact the researcher.

3 Uncovering the needs of cyclists

This paper posits that infrastructure (physical and social) has a role in both legitimising and marginalising cyclists and cycling in Sydney. This role is explored in the following three arguments through the language of space claiming, discourse of otherisation (Said 1978), and social cohesion (Jenson 1998; Jupp, Nieuwenhuysen & Dawson 2007).

3.1 Creating space/s for cycling

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

Sydney has undergone a resurgence of cycling in recent years, supported by COS Council's 2030 Vision for a greener and more liveable Sydney (COS 2008) and the 2007 Cycle Strategy and Action Plan. The 2007 plan aims to construct '200km of cycleways … including 55 km of traffic-separated cycle tracks [and] … on-road bike lanes protected from motor vehicle traffic by physical barriers' (Pucher et al 2011 340-1). To date 10 kilometres of separated cycleways have been constructed in the Sydney LGA (COS 2011b) and adjoining councils are colour coordinating and signposting cycleways and lanes throughout the region (see Appendix 5 for cycleway definitions). From March 2010 to March 2012 Sydney has experienced an 82% increase in cycling traffic along the completed network (COS 2012). The increases in participation are concurrent with improvements in cycling

infrastructure, including the installation of 'bike parking rings and racks… at more than 1,000 points' (COS 2011a 10).

Figure 21: Separated dedicated cycleways in Sydney


College St, Sydney


Wilson St, Newtown


Bourke St, Surry Hills

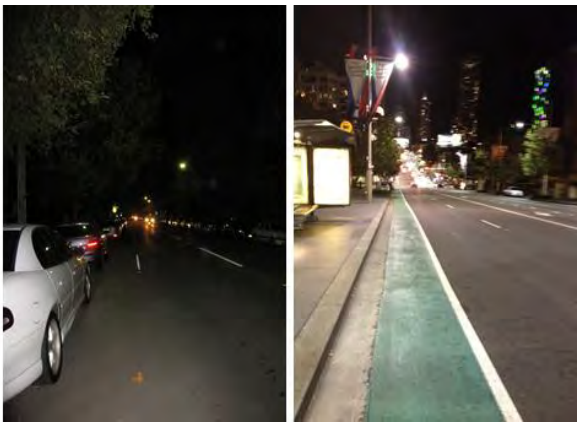
When discussing what cyclists thought about cycling infrastructure that provided separation or a physical barrier from vehicular traffic (see Figure 21 above for examples), participants in the all-female discussion group were in agreement that separated cycle paths were a positive aspect of cycling in the city, especially when paths were free from obstructions: 'not having cars parked in them'(P) or 'people standing around them'(C). Similarly, an overwhelming majority of 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). The majority (77%) of respondents had experience riding on the 10 kilometres of completed separated cycleways or along off-road paths such as the Cooks River cycleway which is shared with pedestrians. The most commonly stated advantages to the traffic-separated cycleways were feelings of safety, comfort and relaxation, as the greenways 'have no cars to harass my space' (#5). Furthermore, the traffic-separated infrastructure (i.e. greenways) inspired feelings of 'legitimacy … relief [and] less pressure' (#251) for some cyclists. These themes were echoed in the discussion groups by both male and female participants:

> *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 bike routes, and support the observational work of Garrard, Rose & Sing Kai (2008) in Melbourne. These preferences are illustrated in slides 12 and 18 below from the VPS depicting a path choice between traffic-separated lanes on the right of each slide and a footpath (figure 2) or on-road route (figure 3). In each example preference was given to the right hand images (100% for slide 12 and 90% for slide 18).

Figure 2: VPS slide 12

Figure 3: VPS slide 18



Both female and male 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 … a metre 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), 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. Of course these are all *ideal* urban bike spaces and overall there were more positive (*Wouldn't mind riding here/Would like to ride here*) responses to images than negative. A sense of enjoyment overshadowed fears of safety for the male discussion group participants: 'I really enjoy it, it makes me see the city more easily [and] you feel great, you feel like you're flying' (O). These sentiments were echoed throughout the research and negative comments tended to be balanced by positive comments, such as; 'I don't like the risks of riding on roads without any shoulder' (#231) but cycling 'opens up the city and makes it much more accessible' (#114).

For the majority of cyclists who took part, having the 'space on the road to ride comfortably' (#50) and 'respect and cycle-awareness from other road users' (#170) were both necessary to ensure a more pleasant 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), however 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) Participants in the discussion groups were in agreement that sometimes 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). Survey comments recalling situations when respondents had felt intimidated whilst cycling repeatedly mention taking and owning the lane in traffic and when going through roundabouts to ensure visibility and thus personal safety. 84% of female survey respondents and 95% of male survey respondents typically used routes which included roads without bike symbols or signs, reinforcing comments 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.

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) were mostly worn for practical and comfort reasons on a commute or a longer ride, and 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. Of the 91% of survey respondents who expected the same or a similar level of respect from other road users (93% of men and 88% of women 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).

3.2 '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 (bikes 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, offering different levels of separation attract different kinds of riders: '[riding in traffic] does give you a sort of adrenalin rush … which is part of the appeal' (I).

Terms such as 'aggressive', 'pushy', and 'intimidating drivers' were used repeatedly when discussing negative experiences of cycling in the city. It was acknowledged that 'there's a huge culture, on both sides, of aggression' (P) and it was easy for one female discussion group participant to 'get really defensive' (C) 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' (#16). The need to shift broader attitudes towards cycling was also a cause for concern for some discussion group participants: '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 bike and even the helmet was seen as something that 'dehumanises 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). 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, 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)

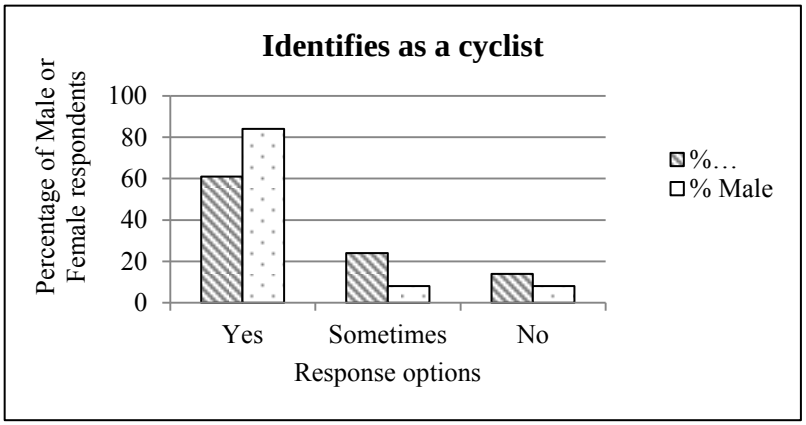
Community acceptance of, and normalising, cycling for the female discussion group was important: 'they [work colleagues] see me and another woman cycle every day and … it is normal. By not making a fuss out of it and just doing it, or saying "Where do you live? Why don't you cycle?"' (J) we could encourage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

3.3 (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 bike spaces differently to most men. Indicators of social cohesion[2] are useful to understand gender and difference within the cycling community of Sydney. Questions of identity and belonging were raised in the web-survey, and 41% of respondents commented on their understanding of identity. More male survey respondents answered *yes* to feeling a sense of identity as a cyclist (see Figure 22), often commenting that they felt this 'because I ride everyday' (#173) or 'I look the part' (#163). One respondent stated that 'cycling gives me a sense of freedom and confidence that I wish to hold onto and claim as part of my identity' (#52).

There was a difference between *identity* and *belonging* or *community* for survey respondents, as overall less respondents felt a sense of belonging or community when they rode (58% of male and 53% of female respondents), whereas 29% of male and 35% of the female respondents *sometimes* felt this. Identity was often linked to clothing and one's image of cycling as something that a lot of respondents just did because of 'my legs' (#334) whereas community and belonging were associated with interactions with other cyclists and participation in cycling activities: 'I'm always bumping into people I know out on the road' (#104).

Figure 22: Respondents who identify as a cyclist



A cycling identity (Aldred 2010) was often linked to clothing and was a contentious issue amongst respondents and participants. Lycra was associated with speed and professionalism: 'I'm not a pro, I don't wear lycra [and] I think that's part of it' (#24), and the 'MAMIL [stereotype] = middle aged men in lycra' (#133) was brought up repeatedly in comments. 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' (#25) and 'I am a person who rides a bicycle' (#321), 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'.' (#16)

Discussion group discussions 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 group challenged some comments made in the survey which cast male cyclists as 'macho competitive' (I) and 'rushed and rude' (#232) and the participants were in agreement that they had noticed increasing numbers of both male and female riders '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

[2] I use Jenson's (1998: 15) five dimensions of social cohesion: belonging, inclusion, participation, recognition, and legitimacy, as

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 measures of social cohesion in the survey looked at belonging to cycling-related groups or organisations, participating in cycling-related activities and cycling socially:

- 76% of male and 52% of female respondents reported that they had belonged or do belong to a cycling related group or organisation
- 64% of male and 56% of female respondents had taken part in social group cycling activities,
- 76% of male and 72% of female respondents had taken part in fundraising and BNSW events

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.* (#50)

4 Conclusion

Conflicts are inherent within cities. Historically conflicts have centred around struggles for social justice, and political and social rights (Iveson 2007; Isin 2000). In urban cycling-Sydney, conflicts are between road users, within the cycling community, and between male and female bike riders. In addition to identifying some of these quarrels, this research tells a very positive story – one of a growing community of people who ride bikes. The cycling community of Sydney is a vast and varied group of people, rather than a hegemonic 'lycra clad mob' (#16). This sample of Sydney's cycling community is not necessarily cohesive, 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 over cycling infrastructure use. Both groups held similar desires for safety and separation from vehicular traffic and/or pedestrians. Moreover both groups showed an awareness that cyclists were often marginalised in Sydney. Certainly attitudes towards urban cycling and claiming space differed between men and women, and although these differences were minor (i.e. risk-taking/cautious, competitive/relaxed), 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.

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 door-zones. However cycling infrastructure can have a negative influence. Cycling infrastructure reinforces the notion that cyclists do not belong on the roads, increasing the need for cyclists to claim spaces for cycling.

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Appendix 1 – map of the Sydney region

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 **23** below.

Figure 23: Sydney Metropolitan LGAs.

Source: http://www.cityofsydney.nsw.gov.au/AboutSydney/documents/cityresearch/MetroLGAs.pdf

Appendix 2 - Combined VPS-discussion group participant profiles

(July 27 & August 10, 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 3 - VPS results combined (M & F discussion groups)

This table depicts 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: Activity



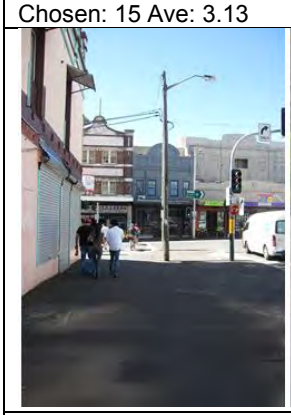
11

Chosen: 15 Ave: 3.13	Chosen: 5 Ave: 3.6



12

0	Chosen: 20 Ave: 4.75



13

Chosen: 9 Ave: 3.55	Chosen: 6 Ave: 3.66



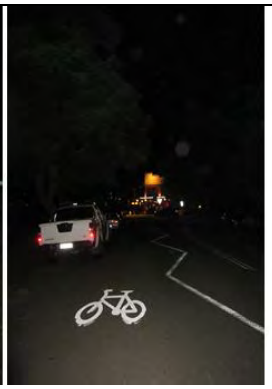
14

Chosen: 7 Ave: 3.42	Chosen: 5 Ave: 3.8


15

Chosen: 11 Ave: 3.9	Chosen: 8 Ave: 4

Group 4: Level of light

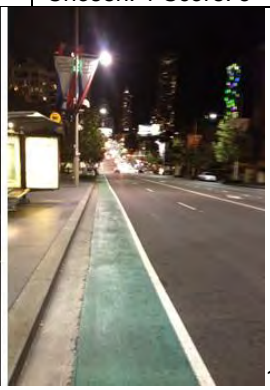



16

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

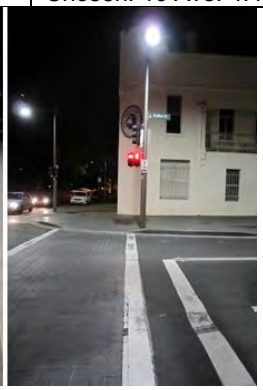

17

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

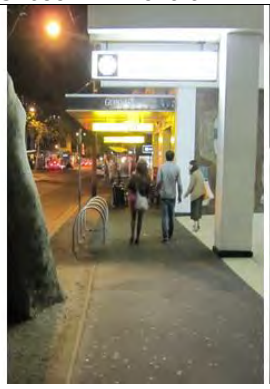
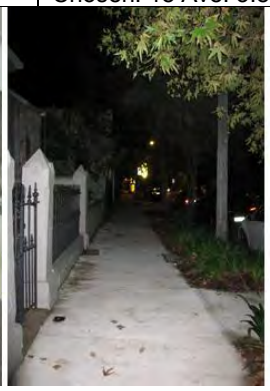
18

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

19

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

20

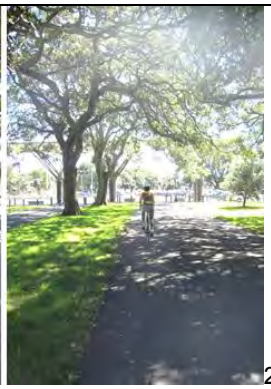
Chosen: 4 Ave: 3.25 | Chosen: 15 Ave: 3

Group 5: Vegetation



21

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



22

Chosen: 5 Ave: 4.33 | Chosen: 11 Ave: 4.4



23

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



24

Chosen: 13 Ave: 3.9 | Chosen: 7 Ave: 4.2



25

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

Appendix 4

State-bodies		Blogs/Forums
Bicycle NSW*	Clarence St Women's store	I heart Sydney's Cycleways and Greenways
Cycling NSW**	Clarence St Cyclery	Sydney Cyclists
Bike Clubs (racing)	Deux Ex Machina	Sydney Cycle Chic
Dulwich Hill Club	Tokyo Bikes	Sydney Cycleways Network – COS
Eastern Suburbs Club	Giant (City store)	**Bike User Groups (BUGS)**
Lidcome-Auburn	**Social ride groups & local organisations**	Ashfield
		BIKEast
Randwick-Botany Cycling Club	ArtCycle	BikeNorth
Sydney Cycling Club	Bike Babes	BikeSydney
Sydney Uni Velo Club	Chain Lynx	Canada Bay
Triathlon NSW	Cycle-re-cycle club	Dulwich Hill
Bike Shops/other shops/cafes	Muggacchinos	Leichhardt
Ashfield Cycles	Sydney GreenUps	Liverpool
Balmain Bikes	Sydney Uni BikeSoc	Marrickville
City Cycles	UNSW Bike Club	Sydney Spokes

* Bicycle NSW has over 30,000 members state-wide and represents the whole gamut of cyclists. They provide members with insurance for everyday cycling.

** Cycling NSW is the overarching body in NSW for Club racing

Sample recruitment poster

Appendix 5 - Cycleway classifications

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


</td>
<td> 


 </td>
</tr>
</table>

All photographs: taken by the researcher. All graphics: City of Sydney, *Types of Cycleways*
http://www.cityofsydney.nsw.gov.au/aboutsydney/parkingandtransport/cycling/TypesOfCycleways/default.asp

Women returning to cycling

Based on the chapter co-authored with Anne Wilson: 'Women cycling through the life course: An Australian case study' in J Parkin (Ed.) *Cycling and Sustainability,* Bingley, UK: Emerald

(Contact the author for copies of the full paper.)

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Key words*: women and cycling, life course, returning to cycling, active travel, sustainable transport*

Abstract

The research reported in this presentation focuses on the experiences of women who had decided to return to cycling in adulthood. It was anticipated these experiences could assist other women contemplating taking up cycling as well as cycling lobbyists, policy makers and planners. The research targeted women returning to cycling in the city of Adelaide, South Australia. It was conducted using qualitative research methods including in-depth interviews, helmet mounted video cameras and diary entries. Forty nine women participated in the study ranging in age from early twenties to mid-seventies. Respondents learned to cycle between the ages of 5 and 12 and most stopped in the early years of secondary school. Almost half the respondents had returned to cycling several times through the life course while another significant group had cycled occasionally up to the time of the interview. Women returned to cycling through a combination of circumstances but women in their early 20s emphasised the importance of social relationships while women in their late 30s (and older) stressed concerns about health and fitness. Becoming mothers or grandmothers was given as a reason for both taking up and giving up cycling. Although there was no pattern in the specific trigger that shifted women from 'thinking about cycling to getting on a bike', knowing someone who cycled – partner, family member, work colleague or acquaintance – featured in most women's experiences.

"Riding a bike is in my bones now." Creating a cycling habitus for teenage girls

(Contact the author for copies of the full paper.)

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Abstract

After over two decades with extremely low rates of transport cycling, many Canadian cities face an uphill ride to transform roads designed for automobiles, teach cycling skills and change socialized attitudes that view bicycling an unusual, non-aspirational activity, particularly for women and girls. In sharp contrast to European "cycling cities", where cycling is ubiquitous and cycling education is mandatory for school students, cycling is largely unseen, especially in winter, and there is very little formal cycling instruction for Canadian youth. This paper shares recent longitudinal research about a promising exception, a model of youth cycling training designed by a visionary environmentalist and educator in Guelph, Ontario. 'Bike Week' is part of a semester-long high school environmental leadership program and follows the latest thinking on behavior change that says it is critical to engage the minds, bodies and hearts of individuals before they will change ingrained attitudes and habits. It uses a holistic, experiential approach, including classroom-based teaching, off-road cycling skills training and on-road skills application riding bikes throughout the city. It enables teenaged participants, some of whom were non-cyclists, to become comfortable with the practice and image of cycling for transportation. The supportive group structure helps transcend internalized psycho-social and gendered barriers to riding a bicycle, at a time in life when social pressures to drive are compelling. Effectively, Bike Week changes the "habitus" of participants and produces a young cadré of young male and female urban cycling role models and advocates.

Everybody's writing

(This paper has been peer reviewed.)

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Key words: *mountain bike racing, phenomenology, anthropology, embodied cognition, blogs*

Abstract

As participation in cycling grows, so does the amount of research on the sport. But this writing often falls short of accurately conveying the experience of cycling – what it feels like to pedal along on two wheels, and how these experiences are understood through a complex interaction of sophisticated sensory pathways.

One place that is rife with detailed accounts of riding is the blogosphere. Online communities of mountain bikers (as an example of one particular cycling culture) provide countless, reflective, first person reports of riding. These reveal the myriad experiences had while racing, travelling and preparing for the next event. Although heavily coded with insider terminology, these accounts provide rich descriptions of what anthropologist, Michael Jackson, would call the rider's 'lifeworld'.

This paper discusses some of the opportunities these data provide for theoretical arguments about sport and performance. By considering the experience of riding in all its lived complexity, we can then build upon ideas about embodied action and awareness to reflect upon a wide range of other circumstances, projects and events.

1 Rubber side down

> The gun went and people were all over the grid trying to clip in, I fluked a good clip and picked my way through the madness straight into the killer climb. After getting blinded by waves of mud several times I was regretting leaving the Oakleys back at the start line. The barrow mud instantly showed me why 'MUD' was written on the side walls. As all riders dismounted due to lack of traction I stayed clipped in in a swarm of slip-running riders and I couldn't help but smile. Haas called out "Yeah dogg, smack that hill" because he witnessed the superior traction I was getting. The real test came soon after on the small chutes on the climb and after riders rag dolling it into the bushes I was happy to be keeping it rubber side down.
>
> […]The descent was looser than I could have ever imagined but the 'New' Geax Gato was biting though the slop and finding hope where I had none. I was pleased to be keeping on the wheels of the crazy Canadians who live and breathe these conditions.
>
> […]At the top of the jump line on the 5th lap I pulled the brakes on and it was suddenly evident that my NEW brake pads were down to the metal backing plates! This would have been 'negative goodness'. I hit the steep sections and applied the point and shoot technique, when I found both levers pulled straight into the bars it was all I could do. I opened my eyes at the bottom still on track, thanked my lucky stars and kept going (van der Ploeg, 2009).[1]

Three times Australian and Oceania cross-country mountain bike champion, and 2009 Discover Tasmania.com team member, Paul van der Ploeg provides an entertaining insight into the thrills of racing. The report above details his experiences at that year's 6th World Cup round held in Bromont, Canada. His playful use of language and 'insider' words, alongside references to specific cycling brands and products makes the report hard to understand for non-riders – and a lot of riders, too, depending on their immersion in different facets of the sport.

As the challenging course van der Ploeg raced on in Bromont became a sea of slimy mud, finishing with a good result meant keeping the tyres on the ground (rubber side down), pacing his energy expenditure and cradling the rest of his bike to the finish line. Enough grit rubbed over the brake pads to wear them down to the metal backing plate and render them useless for the rest of the day. His body sensed a small change in a familiar hand movement and knew immediately what it meant: with no braking compound remaining, the metal backing plates rub directly on the metal discs. Due to the hydraulic braking systems typically used in competitive mountain bike racing, this can irreversibly damage the pistons and the metal rotors. Not only had the environmental conditions led to a loss of braking ability, but if he continued to pull on the levers the damage to his bike would have become more extensive by the minute.

[1] Some small edits have been made to spelling and grammar. A link to the original article is at the end of this paper in the reference list.

But how do you tell your hands to stop pulling on the levers? You can't. You do what van der Ploeg did and focus on another skill entirely; in this case, the 'point and shoot' technique. This encouraged an embodied response to the terrain that steers clear of controlling speed by squeezing the brakes.

In this paper I ask what the documentation and analysis of experiences, such as van der Ploeg's, offers research on cycling and what benefit this may be to other academic fields. I will begin by showing how the excerpt above offers exciting new ways of reconsidering debates about reflective practice during embodied action. Then I will turn to phenomenological anthropology to discuss how we can think more explicitly about the use of experiential data within an academic method. Next I will briefly draw attention to other, similar, blog excerpts that offer further means to extend research into embodied expertise utilising such a method. Given the extensive number of people writing about cycling – racers and researchers being two such groups – this paper argues that critical analyses of the actual experience of cycling offers numerous opportunities for developing research in other areas of expertise as well.

2 Writing on cycling

As interest in cycling grows, so too does the amount of research on the sport. Past proceedings from the Australian Cycling Conference (2012) suggest that, at least locally, much of this research examines issues relating to uptake, infrastructure, sustainability, commuting, tourism and risk factors. One area of cycling research that has received little academic attention is that of the experience of riding: what it feels like, why it's fun, and how riders make sense of the relationship between bike, body and trail. Other disciplines that study sport, particularly those in the social sciences, certainly work toward documenting the meaning-making processes particular to specific sports or sporting groups, but such studies often seek to relate these findings to greater cultural processes such as ideas about gender, race, economics, national identities or politics.[2] Research in these areas misses the opportunity to consider what we might learn about sport, and from sport, by looking toward the experience itself.

But the exact nature of the cognitive and perceptive experiences had while riding can be notoriously difficult to articulate in tangible or measurable ways. In the case of expert level mountain bike racing, accessing the totality of these experiences as they happen is difficult due to the high-speeds and risky scenarios in which they occur. The risk of harmful consequences if riders are disrupted during the performance event for research purposes further complicates methods for accessing accounts of experience as it happens, as does the rapid switches in conscious awareness experienced by riders as they conquer technical and variable terrains.[3] Reports of riding by expert level racers is one way of overcoming this difficulty due to the nuanced ways they have for talking about highly sophisticated and skilled manoeuvres and their constant drive to maximise their performance abilities. The ongoing proliferation of cycling blogs, as insights into what some of these experiences may be, therefore provide a useful example of new challenges and avenues for researchers on the sport as it continues to grow.

Given the ties between my own expertise as a mountain biker and my capacity to discuss, or decode, some of the embodied experiences apparent in accounts by other riders, it is important to briefly discuss my own riding abilities before continuing with an analysis of the reports of others.[4] I don't have the fitness, muscle mass, skill level or international race experience of a rider like van der Ploeg. But my own immersion in the sport, as a high-level amateur racer, cycling journalist and skills coach, does allow me to communicate theoretically *some* of the ideas, experiences and lived practices that operate within this sport.[5] The key point here is that while I am not able to unpack a report like van der Ploeg's in it's entirety, there are elements of that experience – such as the pressures and performance implications of racing with worn brakes in the mud – that are shared by riders at many levels and offer up interesting points for discussion because of this.

Writing by others has its limitations too, and it is worth exploring this up front as well.
Van der Ploeg's blog site, and other blog sites by Australian representative cross-country riders that I'll mention later in this paper, are often written as reflective, first person accounts of experiences had while racing. These particular sites are maintained by the riders themselves to communicate racing experiences with friends, family, sponsors and the wider mountain biking community – often as part of a greater project to obtain further sponsorship to fund racing at a national or international level. The status of such riders as having represented their country in the international World Cup racing scene implies a high level of fitness, strength and expertise. For Australian XC athletes, a podium in an international event is a rarity (but a source of much excitement), meaning most reports are not written by the winner of a race, but by a hopeful competitor somewhere else in the field.

[2] See, for example, Dyck and Archetti (2003), MacClancy (1996), Martin and Miller (1999), Sands (1999), Spickard Prettyman and Lampman (2006) and Tomlinson (1999 and 2007).
[3] I will discuss this rapid switching later in this paper.
[4] A quote from "Jewish Hindu Buddhist atheist" Richard Schechner (2006, 1) comes to mind here: "Who I am is not irrelevant. I will be leading you on a journey. You ought to know a little about your guide."
[5] My non-professional racing and training status also makes it easier for me to contribute to academic debates on the sport, rather than trying to balance this work with a 20+ hour a week training load and long periods of international travel.

The public personality of such athletes and their expertise in relation to a more competitive international field also impacts upon the stories told, moments described and the language used to describe them. I argue that the proximity of most race reports to the events they describe, frequent spelling and grammatical errors characteristic of such accounts (indicating a lack of over-editing or revision) and the first person descriptive tone of many reports makes them a useful resource for unpacking some of phenomenological experiences they report.

Obviously riders have an obligation to positively mention products provided to them by sponsors. Such observations usually reflect on the specific advantage a certain piece of equipment provided the rider in specific circumstances (tyres on a muddy track, for example, or an energy drink on a hot day). Both the rider and the sponsor are in danger of losing credibility if these statements are 'over-blown' or untrue, so it can be assumed these elements of a report are fairly honest, or at the very least indicative of experiences had while using that equipment in a specific circumstance. It would, however, be unprofessional for a sponsored rider to represent a sponsor unfavourably, so if a component broke or compromised performance, this would not tend to be written about unless it is something that could clearly happen to any brand of component in such circumstances (such as a brake lever snapping in a crash). The written expression in these texts also reflects the familiarity of their assumed readership, with what riders call the riding culture.[6] While it's important to note that not everything typed on a blog site can be taken at face value, it is useful to look toward these texts for their insights into the possibilities they suggest for perceptive and cognitive experiences had on the race track.

So how do we move from bodily experience to theoretical debate? This is not just a problem for studies of cycling, but for research into embodied cognition.

3 Thinking, doing, communicating

Studies in embodied cognition are interested in the relation between thinking and doing. The more complex the movement, the more we can break it down to reflect on the sophisticated ways our bodies respond to challenging scenarios.

John Sutton, Doris McIlwain, Wayne Christensen and Andrew Geeves (2011) provide a detailed critique of the large body of work that argues thinking is absent during expert levels of 'doing'. Despite much superstition in the sporting world about the negative impact of thinking on doing ('don't think about it, just do it', 'I don't know how I do it, I just do', 'if I think too much, I'll crash'), research in the field of embodied cognition suggests that thinking is in fact very active during embodied performance.

Sutton et al argue that thinking (or mindfulness) is highly active but misunderstood. They examine different types of mindful thinking observed phenomenologically, through the senses, such as kinaesthetic awareness and the use of verbal maxims in realigning embodied techniques in cricket players and jazz musicians. Calling upon a well-known phrase or maxim can realign a complex series of actions far quicker than stepping through them one component at a time (Bicknell 2011). This means we can use thought strategically to guide action without thinking about each and every component of a performance process – what some refer to as 'analysis paralysis'. Riding well, then, means the right cues are called on at the right point in time.

> We argue that genuine expertise often requires the rapid switching of modes and styles *within* the performance context. Grooved embodied action must thus be open, under certain circumstances, to the influence of explicit knowledge, specific memories, or particular decisions. Admittedly, these influences cannot operate simply as top-down triggers of fully structured motor programs: rather, expertise is in part the training up of the right indirect links *between* thought and action, not the evacuation of thought from action (Sutton et al 2011, 93, italics in original).

Van der Ploeg's quick decision to try the 'point and shoot' technique calls upon a different terrain specific skillset to that of controlled braking during descending. It triggers a different whole-of-body approach to the action, which is guided by a few simple principles – look where you want to go, relax and commit, let the bike do it's thing.[7] Obviously this is a method with a lot more room for error than controlled braking, but in the absence of brakes to temper the speed of the bike on the descent, van der Ploeg called upon – and guided the execution of – a secondary approach to the obstacle. He had not had the need to rehearse it on this section of the track or in these conditions, but past experiences give him the confidence to 'give it a go'.

The 'point and shoot' technique was aimed at more than just saving the brakes. Damage brakes impair the rider's ability to ride some sections of the track at high speeds, which makes for slower lap times. Slower lap times then

[6] Of course, not all blog reports from similar level athletes demonstrate the phenomena I am interested in discussing here. Of these, some are either a simple reporting of facts, such as Katherine O'Shea (2010) and Jo Wall (2011), rather than a reflection on lived experiences. Some are very infrequently updated, such as Nick Both (2009), Rowena Fry (2010) and Adrian Jackson (2010). There are also some Australian representative athletes who do not tend to publish reports at all.

[7] Simple 'rules of riding' such as these are often used when learning to ride increasingly technical trail elements. For instance, by looking at the exit of a corner, rocky drop or other obstacle, the head and shoulders follow the eyes, and the hands (on the handlebars) tend to follow accordingly.

make for a dramatically lower finishing position. Given that a rider's finishing position has implications for further race experiences – such as start grid position, Olympic or World Championship team representation, team contracts and possible future results – it was important that van der Ploeg continued to ride as quick and safely as he could for the remainder of the race.[8] This aim was also reflected in his choice to continue racing despite the horrendous conditions and had governed his approach to the muddy event before this point in time as well. Here we can appreciate the relationship between thought, action and adaptability in relation to an overarching plan or goal. This also highlights the importance of considering the broader context of the moment in question.

4 Insights from experts

Central to Sutton et al's argument is the idea that thinking during embodied action is adaptable and context specific. The way we move through a crowd, get dressed in the morning or kick a soccer ball, for example, is never entirely an old repeated action, but never entirely new. Sutton et al critique the relatively thin examples of embodied practice that are often used by theorists in service of arguments about the lack of thinking needed in expert performance. The authors therefore call for more complex examples of embodied practice to be used for analysis in service of a more sophisticated understanding of embodied cognition (2011, 96).

This writing from van der Ploeg, above, provides multiple avenues for responding to the call for deeper enquiry into embodied expertise. In fact, while Sutton et al argue that thinking during embodied action may not be "reflective or considered deliberations" (2011, 78), van der Ploeg's writing, alongside numerous other blog-style accounts that show the problem solving that goes on in mountain bike racing scenarios, clearly demonstrates that embodied action is indeed adaptable and context specific. Further, it is part and parcel of a sophisticated matrix of highly reflective processes that are relied upon in order to race well at this level.

In the report above, van der Ploeg constantly notes the equipment that was being used and how it related to the process of riding in the environmental, and placial, conditions of the day. While we may question the impact of product sponsorship in how he discusses this, we still see evidence of reflective practice during the activity of racing. We see indications of his past and present experiences informing his choices, decisions and performance, and a heightened consciousness (shared by other members of the race team such as Nathan Haas) about the surprising ability of the tyres, which he had not ridden in such conditions before. In other sections of the report he expresses his surprise at how well other bike parts are holding up given the punishment that wet weather riding conditions dish out.

Alongside the constant reflections on the technological elements of racing, van der Ploeg also discusses other elements of the racing experience. He responds to a range of visual and kinaesthetic cues which inform his own performance strategies – the fluking of the good clip as he connects his feet to the pedals, and his keen awareness of his skills on the climbs, chutes and descents. This helps him to carefully monitor his pace, anticipate action, maintain a sense of flow and enjoy the fun side of the race despite the adverse conditions.

In addition to monitoring his own performance, van der Ploeg compares his abilities to those of the Canadian riders who "live and breathe in these conditions". Their local knowledge of place is identified culturally as part of their embodiment of muddy or wet weather riding skills. They know how to minimise damage and maximise speed and overall racing performance. While local knowledge alone is not enough to ensure the win (or the whole Canadian team would have crossed the finish line at the same time) one Canadian rider, Geoff Kabush, won his first World Cup at that event after racing for several years on the professional circuit (Jones 2009).[9] This is testament to the level with which a deep knowledge of place can enhance sporting performance of this type and the impact of context and adaptation on the development of embodied schemata in the first place.

As a cyclist, or as a very keen mountain biker who has also experienced fading brakes part way through a muddy race, my own experiences help me to understand the nuances of van der Ploeg's report and find ways to communicate these to the non-riding world as a result. But how can we think of this in terms of a more rigourous method, one that feels like it holds more academic weight? The key to this lies in the ways I relate to his embodied expertise on the bike with my own and identifying words that might be familiar in some social cycling circles but do not have the same communicative effect when used in other contexts; clipping in, rag dolling, smacking a hill, keeping it rubber side down.

[8] He eventually finished the race 54th from 94 starters in the Elite Men's category (Union Cycliste Internationale 2013).
[9] This article also mentions several other riders who suffered from worn brakes and includes several photos of the muddy racing.

5 Looking at what language is made to mean

Rather than impose our own ideas and sensibilities on that which we observe anthropologist, Michael Jackson (1996), calls into question the differences between how people experience the world and how people (participants of a culture as well as those observing a culture) theorise those experiences. He describes phenomenological anthropology as a method toward achieving this. Phenomenology refers to the study of our immediate sensory experience of the world, before we begin to reflect upon and categorise or describe those experiences. Anthropology refers to the study of how these phenomena are made sense of by a particular cultural group. Jackson discusses considering an informant's 'lifeworld' as a conceptual framework for such an enquiry:[10]

> […T]hat domain of everyday, immediate social existence and practical activity, with all its habituality, its crises, its vernacular and idiomatic character, its biographical particularities, its decisive events and indecisive strategies, which theoretical knowledge addresses but does not determine, from which conceptual understanding arises but on which it does not primarily depend (Jackson 1996, 7-8).

By studying how experiences are made sense of, in ways that may sometimes seem contradictory or illogical, Jackson argues that instead of looking for the intrinsic or absolute meaning of beliefs – and the words people use to describe them – we should look at what those beliefs are *made to mean*. One way he advocates for doing this is to move away from "explanatory models" and look toward "lived metaphors" (Jackson 1996, 9). In this way we can appreciate insider terminology as approximations of experience and begin to separate out the drama (and potential for exaggeration) from van der Ploeg's report and the actual lived experiences he is describing. Rag-dolling is a light hearted way of describing a type of crash where riders fly off their bikes and limply land on the side of the track; in terms of the potential for injury it's better to land relaxed than land tense. By contrast, smacking a hill can be read as a metaphor for aggressive riding – attacking that which is slowing you down.

By taking an anthropological view of the interpretation of riding processes, we are better equipped to discern the significance of what is perceived: what adds colour and descriptive atmosphere to the blog report in question, and what suggests perceptive and reflective experiences had by the rider in the context of the race? By critically examining web reports, such as van der Ploeg's, in relation to ideas about language and experience, phenomenological anthropology helps us to translate the matrix of complex, detailed sensory experiences had while riding in ways that can respond to questions and debates in other fields.

6 Further reflections on writing about riding

One thing that makes the language choices of high-level cross-country mountain biking so useful is that riders develop very nuanced ways of talking about complex bodily experiences. Lowell Lewis writes:

> Because adults learned how to walk and speak at such a young age, they often can't remember the struggles these activities involved (especially with the former), but a parent can clearly observe such striving. Then later, as an adult, one cannot easily access or influence one's movement or speech patterns, precisely because they are so deeply embodied. However, sports people and theatrical actors, to name two types, are often confronted with the need to change or influence these deeply embodied habits. Accordingly, they may try to develop techniques for communicating between unconscious or pre-conscious habits and higher order modes of thought and action that are more readily accessible (Lewis 2010, 72).

The ongoing process of skill development in mountain biking, alongside the constant need for thoughtful, reflective responses to terrain, as repeatedly discussed in blog style accounts of racing and training, are rich with expressions about how experiences are made sense of within the sport. In the same way that Eskimos have several words for snow reflecting the different qualities of frozen water, mountain bikers have an expansive vocabulary for describing types of riding surface and sensations of speed. They also have a heightened awareness of elements of racing that contribute to increasing or decreasing their embodied responses to the demands of the sport. Unpacking these terms with a view to discovering more detailed information about what it is to ride offers numerous opportunities for conversations within the field of cycling, and also outside of it.

Consider the following excerpts from other expert level Australian riders. These riders, like van der Ploeg, have all represented their country in international levels of competition such as World Championship and World Cup events indicating a high level of fitness and expertise. Also like van der Ploeg, their blog posts detail reflective, first person accounts of race experiences posted by the author shortly after the event that suggest nuanced ways of understanding embodied action and cognition in a performance context. Andrew Blair (2009) considers place in relation to speed, movement, environmental conditions and a sense of fun and challenge:

[10] Jackson is by no means the only person to explore the concept of the lifeworld. I refer to his article here for the articulate way in which he builds upon this concept as part of a phenomenological anthropological method. Readers with an interest in this work may also want to look at earlier writing by Buttimer (1976) or Seamon (1979). Jackson (2012), which was published after this paper had been submitted for review, may also be of interest.

> The surface is so fast with a few very steep descents and it is very easy to go into the corners with bit too much hot sauce. Having said all that, this track will be hilarious if it rains. Some of the steep descents are so off camber and I have a suspicion that the surface will be so slick in the wet. I'm not actually sure that too much would be rideable, I wouldn't mind if it did rain though because it would be an interesting challenge.

Gracie Elvin (2009) reflects on experiences of place, time, skills specific to obstacles on the trail and the impact of riding on physiological processes (experienced phenomenologically). She also mentions the impact of spectators on the racing experience:

> The last third of the course traversed the side of the hill and was the section that you could easily lose a lot of time due to the many frustrating rocks and tree roots to navitgate [sic] through. Unlike the week before with the one scary 'Squirrel' run where the crowd flocked to view potential carnage, the Bromont course offered many points for spectators to watch us battle through. All of us were complaining of sore arms after one lap!

Ben Henderson (2009) provides an open window into the difficult bodily battle that can take place during the last lap of a tough race and the motivation that keeps him pushing hard to the finish line:

> I concentrate hard on riding it right. Any small mistake would be costly and without the energy it's so easy to do. With 20 metres to go I can't make it. I keep everything straight, perfectly balanced and on track, but I've simply run out of power to ride the last pinch. Reaching the top I jump back on the bike. "How much time did I just lose" I think. A phrase that will echo through my mind with every section I struggle through for the next 14 minutes.

These excerpts clearly demonstrate the challenges the authors have while racing and how they prepare for these during training. We hear about the ways they fight the limitations of their embodied abilities such as questioning how much longer they can continue to race or the extra strength and tactics they draw upon to fight for their position. They consider the process of riding in relation to ideas about place, speed, movement, environmental conditions, strategy, audiences and events.

Reports such as these provide vivid descriptions of reflective practice during elite level competition offering further insights into embodied cognition. In a previous paper, for example, I have drawn upon Henderson's (2009) report as a case study suggesting the strategic reflective processes that are undertaken by athletes in states of flow (Bicknell 2010). By exploring parallel observations of time in Henderson's reflections this paper critiques notions of the mind going blank in flow-type states. This supports Sutton et al's observation about the possibility of quick switches in conscious awareness noted above. Such data also offer possibilities to intervene in debates about the (largely undocumented) impact of audiences on performers, relationships between places and bodies that extend beyond anthropological notions of dwelling and suggest new ways of understanding the gap between laboratory testing of athletes and results at live events. This, in turn, increases our understanding of the lived experience of riding further still.

7 What are bloggers not discussing?

Despite the steadily growing number of blog style accounts that are filling up internet storage spaces, there are still many aspects of cycling that remain invisible in this area. We hear a lot about races, but not much about spectating for instance, or the finer, more personal elements of tactics and strategy. Also, not all blogs are filled with rich descriptions of the process of riding, and some are rarely updated, if at all. It is also difficult, in an (auto-)ethnographic sense, to relate to the riding style and the value systems that govern people racing bikes in cultures and locations very different to our own. And, as stated before, there is also the question of audience – who are they intended for, what assumptions are made about additional knowledge, and, where sponsored riders are concerned, how does this further inflect what is written and what remains unsaid?

In the past, blogs on biking by Australian riders tended to be dominated by expert amateurs and cycling tourists communicating the ups and downs of long journeys away from home to family and friends. An increasing number of blogs by developing riders, and people who simply enjoy riding but don't have the training and racing aspirations of the elite field, are filling this gap.[11] As writing in this area grows, so too does the potential for better understanding some of the myriad other ways riders engage with and experience the sport. These include experiences on racing, training, and skilled performance by riders with developing – as opposed to expert levels of – expertise, observations on specific trail networks in relation to ideas about fun and pleasure, and how cycling impacts the author's life away from the bike.

Researchers such as Justin Spinney (2006) and Michael Austin (2010) have used their personal experiences as developing riders as part of their own research. These articles draw upon phenomenology as a key component of their method as well and offer an alternative approach to collecting experiential data in the service of a particular

[11] See, for example, Downing (2012), Thompson (2012) and Wells (2012).

set of research questions. Spinney trained for, and climbed, Mont Ventoux – a long, sealed road hill climb that has been made famous by Le Tour de France. His writing on the experience forms the main case study for an exploration of a keen road cyclist's kinaesthetic responses to place. Meanwhile, Austin's work explores the embodied incorporation of a new skillset, and the impact of this on his sense of self, as he hung up his running shoes and began to discover the world on two wheels. Both these studies represent an alternative approach to discovering 'experience rich' ways of asking not just what is it to ride, but what can these experiences teach us about other things.

8 What to write next?

Viewed critically, blogs provide unique opportunities for discussing the experiences had while cycling, and ways of looking beyond riding and contributing to complex debates in a broader number of interdisciplinary fields. As a guide toward a method for such studies phenomenological anthropology offers a useful starting point for discovering more about cycling, and ways of communicating these findings, or suggestions about possibilities of experience, which can then be explored in relation to other disciplinary debates.

In this paper I have suggested ways in which such data can contribute to debates about the reflective processes experienced in extreme states of embodied action. I have also suggested the potential for reports of expert level racing as a way into understanding highly sophisticated, embodied relationships to place, equipment, spectators, past and present experiences, time, strategy and motivation, skill development, physiological processes and speed. The complex matrix of perception, action and cognition such analyses give rise to also offers new ways of thinking about additional phenomenological debates too, such as the relations between language and experience, and the complex filtering systems we use in everyday life that challenge the smooth operation of artificial intelligence programs.

Given the large amount of cycling research currently taking place far beyond my own disciplinary interests, it would be interesting to hear about how the approaches to cycling research discussed here can be used elsewhere. This could include further explorations into some of the cognitive, perceptive and emotional experiences made possible by riding and the impacts these have on the bigger picture of the cyclist's life. Other areas where such data could be useful include links between sport participation and mental health, trends in trail building and psychophysical responses to place, expectations, attitudes and responses to bike tourism or staged events, and new insights into the relations between gender, cycling, uptake and participation. If we are more aware of how experiences are processed and made sense of, within the rider's lifeworld, we are better positioned to look outward and respond to theoretical questions in other circumstances, projects and events.

It takes time and an interest in cycling, rather than large amounts of funding, to scan the web for written reports detailing diverse experiences had while riding and the attitudes they give rise to. Given the large volume of writing available, it simply makes sense to consider this for insights that can help writing of our own.

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Crowd-solving cycling and recommendations from the BMW Guggenheim lab

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1 The BMW Guggenheim Lab

The BMW Guggenheim Lab is the result of the collaboration between the Solomon R. Guggenheim Foundation and the BMW Group. The Lab is a six-year project travelling to nine cities around the world that will conclude in late 2016.

The Lab is a combination think tank, public forum, and community centre with the aim to raise awareness of important urban challenges, including cycling, and yield sustainable benefits for cities around the world.

In the simplest terms, it is often described as being like a conference but rather than just attending and listening participants can get involved and participate with everything. Attendees discuss and they debate; they talk and they listen; they make, do, experiment and they can be involved in pilot projects. Furthermore the Lab is for anyone regardless of their previous knowledge and experience in urban issues.

Maria Nicanor one of the Guggenheim Curators says *"If we can achieve meaningful conversations, if people can come to the Lab, and other urban projects, learn something new, take an idea out of it, do some experimenting in their own city or neighbourhood and later apply it to anything in their lives that is success. In the end it's about starting a conversation and talking about cities".*

Through its live programs and online presence, the BMW Guggenheim Lab engages with individuals at a personal level, encouraging them to be agents of change. Ultimately, the BMW Guggenheim Lab strives to generate ideas and potential solutions for cities of the future.

The cities for the first cycle of the BMW Guggenheim Lab are New York, Berlin and Mumbai. The theme of the first cycle is Confronting Comfort. Cities for additional cycles will be announced. Each city in each cycle will have a BMW Guggenheim Lab Team, consisting of four people, who together with Guggenheim curators develop the programming for that city. Each cycle also has a distinct Advisory Committee. Each cycle will end with an exhibition at the Guggenheim Museum in New York.

1.1 The 'Confront Comfort' theme

The world is highly globalized and urbanized. Yet complex urban landscapes that are increasingly intertwined in transitional and informational networks continue to be based on rigid systems of urban planning, architecture and infrastructure. These systems have fostered an expanding homogeneity that puts at risk the relationship of cities and urban areas with the specific conditions of their immediate context and their own past. More important, the systems put at risk the relationship urban dwellers – as citizens and individuals – have with their environments, affecting their sense of ownership and awareness of the surrounding space, and the sense that it should be changeable and improvable.

The monotony of these static landscapes is only alleviated by relentless systems of consumerist comfort that block interaction with the surrounding environment. The comfort derived from these solutions – which range from communication commodities to fancy gadgets, to privacy and security devices, to comfort food and other ways to appease the body – diverts the mind from the repetitive processes of everyday life in cities that feel impossible for change.

Maximizing comfort has not only fostered the ability to cope with sometimes gruelling urban conditions, but it has also become a measure of individual wealth, success and status, especially the case with car-ownership in many societies. Unfortunately, the irrepressible human aspiration to find ease often leads in unsustainable directions, for example it is often easier to jump in the car. How can social individuals find a balance between notions of modern comfort and the urgent need for environmentally responsible and empowering solutions? Would the creative solutions that achieved such equilibrium change the idea of comfort as it is now understood? What response would the newfound ease, attained through responsible and restrained means, evoke?

1.2 The BMW Guggenheim Lab Berlin team

Nominated by the BMW Guggenheim Lab Advisory Committee, the Berlin Lab Team was a multidisciplinary group of four international experts, evolving talents and professionals from the creative, academic and urban planning fields who complement each other's distinctive skills and knowledge and bring the BMW Guggenheim Lab to life. The team drew inspiration from their individual experiences coming from dramatically different urban situations –Honduras, Italy, Berlin and Brisbane, respectively. Additionally the Lab Team collaborated with local organisations, curators, neighbourhood residents and experts from many fields to create a multifaceted program that interrogated the Lab's overarching theme of Confronting Comfort in Berlin. The BMW Guggenheim Lab Berlin Team comprised ofJosé Gómez-Márquez, Carlo Ratti, Corinne Rose and Rachel Smith.

Rachel Smith was nominated by Enrique Penalosa the former Mayor of Bogota and international urbanist and selected by the advisory committee and curators of The Solomon R. Guggenheim Foundation in New York.

2 'Dynamic Connections'

Rachel's theme for public programs and 'out in the city' projects was 'Dynamic Connections'; making cities and urban places with people and dynamically connecting people and places through dynamic transportation and community connections.

2.1 Dynamic Connections public program themes

The Dynamic Connections programs had eight key, and overlapping, topic areas

Cycling	We asked how can cities be 'cycling cities' and how we can make the bicycle a normal and viable mode of travel for all ages and genders.
Space for everyone	Cities, streets and public spaces should be for everyone. We challenged how streets and public spaces should address the needs of everyone; children, an aging population, people with disabilities, pedestrians and cyclists. We hosted a day of tactical and temporary urbanism, transforming car parking spaces into spaces for people
Plug-In, Park-Up	We challenged the future of car parking in cities with the imminent rise of electric cars, debated whether the rise of e-mobility will ease or create congestion and discussed the move towards 'access' rather than the 'ownership' of transportation. We experimented with how electric and solar powered bicycles can help change our cities and provoked debate about our own personal travel behaviour.
City Transformation	In a fast-paced daylong Marathon of Transformation we shared success stories, obstacles encountered and current processes for transforming cities with an array of bottom-up, top-down and self-organizing projects from around the world. We used "City Conversations' to empower people to design changes in their cities immediately, soon and in the future
Transformation Champions	We turned our gaze to the community catalysts and 'people's champions' who have made city and social transformation possible. We celebrated agents of change and local heroes
Dare to Share	We challenged and questioned the future of sharing, borrowing, bartering, shopping, freight and economics in cities of the future in light of the rapid rise in technology. We experimented with sharing and swapping of 'resources', time, skills and knowledge to involve people in courageous acts of collaboration. For example car sharing, bike sharing and sharing cargo bikes
Talking Tourism	We debated the saying "Tourism can warm your home or burn down your house" by exploring the positive effects and risks of tourism and discussed the future of tourism in Berlin and cities around the world? We discovered how to effectively communicate and positively promote sustainable and resilient tourism. For example cycle tours.
Reverse Garbage Infrastructure	We challenged waste because it never really goes 'away' and we need to re-use the commodities that we dispose of in our cities. We investigated how to create and build civic infrastructure out of household waste and prototyped with trash salvaged from Berlin. For example recycling and reusing bicycles.

2.2 Dynamic Connections public programs recommendations

Rachel's initial conclusions (full conclusions for the BMW Guggenheim Lab to follow in the coming months) are set out below.

2.2.1 We need an 'Infrastructure Revolution'

The rise in 'access' to private vehicles rather than ownership and substituting cars for e-bikes will provide more space to accommodate sustainable modes of travel. Cycling increases social cohesiveness in neighbourhoods and across cities. People want safer cycling infrastructure for children, cycling infrastructure that is completely separated from parked and moving cars, more community cycling projects including cycle training and social events as well as better cycle parking. The Los Angeles Department of Transport said "for the bicycle to catch on we need a revolution in our infrastructure". The Lab, and its participants, has confirmed the need for that revolution and for dedicated Cycling Super Highways.

2.2.2 We need people to 'ignite the fuse' for change to happen

Urban transformation stems from a 'can do' attitude and not having a fear of failure. People don't need permission to put their stamp on their city. We need to create opportunities for people to experiment (on a small-scale) because temporary use of space is a fast and efficient transformation tool that can lead to immediate change and foster future uses for urban spaces. Urban engagement can happen in a variety of creative ways with people and technology in the digital and physical realm. Individuals with a personal motivation to change their environments are needed as inspirational examples for the possibilities for change. Basically, for change to happen you just need someone to light the fuse. We need to show people what already exists to empower them to get involved but success is innovation and not just rolling out a project, which another city has developed or implemented.

2.2.3 We need to communicate with positive messages

We need to release our 'Trojan Mice'. Trojan Mice are small, well focused changes, introduced in an inconspicuous way. They are small enough to be understood and owned by all concerned. We should take a 'scary idea' into our own networks and problem-solve together because our networks trust us and that's how we can really influence change. In the tourism world a 'Trojan Mouse' is someone like Peter Fraser, owner of award-winning fish and chip shop Harbour Lights in Falmouth. Peter sent 'Cod on Holiday' for one week to persuade customers to try other species. Peter said "In challenging economic times, it may seem like financial suicide to take your best seller off the menu for a week, but we are also in challenging environmental times, and one thing that would really help the world's marine resources would be if we were not so stuck in our ways and were more willing to try different species of fish. There are so many tasty alternatives available. It's about not being selfish. I really enjoy cod and chips and I think my grandchildren should be able to as well".

We need to tackle difficult and complex issues in a fun, positive, encouraging and inspirational way. We need to be passionate, to be personal – tell stories not facts, and to be humanistic – people don't buy what you do, they buy why you are doing it. If we avoid confusing people with mixed messages, avoid telling people what to do, avoid making people feeling guilty and stop boring people. If we start exciting them we can change people's behaviour without them even realizing!

2.2.4 We need to experiment with temporary and tactical urbanism

We can't all redesign the main street in the centre of famous cities nor can we all be part of removing cars from the centre of cities. But we can all be part of experimenting with and transforming a car parking space.

By experimenting we transformed a street dominated by cars into a space where people felt they 'owned the space'. The very fact that people stood in the middle of the road to have a conversation with other people and that parents let their children 'roam free' and that cars drivers chose to use alternative roads is testament that people felt empowered to use public spaces in unconventional ways. The fact that cars drivers chose to use alternative roads shows that we all need to decide what we want our cities to be like. The highlight of the day was a mother and her two daughters who came to the lab unaware of the concept of transforming car parking spaces. They took some of the resources and materials donated by a Berlin recycling company and went out into the street and transformed a parking space. Not only did they have a wonderful time and made new friends but they also told passers-by about the day, the philosophy and why it was so much fun – that's what community projects are all about.

The Lab, our experiments and our speakers confirmed that all public spaces are important places, that we need to rethink the way that we use our streets and that we can use temporary projects and experiments as a platform to make cities more people friendly. Furthermore the de-regulation of traffic and pedestrian rules are a crucial step towards improved safety for everyone.

2.2.5 We need to connect our communities and self-organize to enable sharing

The desire to share 'resources', time, skills, information and knowledge has been a common theme across every day and every program theme in the Lab, but this will require complete changes in our western culture.

There are two different schools of thought. The first perspective is that ‘share shops’ and ‘sharing’ needs to be more glamorous, cool and clean. People don’t want the stigma of using someone else’s “junk”. The second perspective is that of a ‘sense of urgency’. In these times, on the edge of financial, resources and environmental crisis, we need to learn how to share because we won’t have time to ‘learn’ and change our culture and behaviour when we are in the midst of crisis. In both cases people need to estimate the value of things/time/knowledge themselves.

We can’t replicate initiatives. We can’t just ‘drop’ or ‘plonk’ an idea from one city into the next city. Communities need to develop their own projects relative to their own needs and their own ‘cultural literacy’.

Online shopping and sharing will change the way our streets and cities look as storefronts decrease and internet-based purchases and peer-to-peer sharing/borrowing rises.

2.2.6 We need to confront our waste comfort for innovative infrastructure

Some countries are ‘comfortable’ with their waste and wastage behaviours whilst others are working to eliminate materials such as plastic from their supply chains. Berlin already has numerous successful schemes for recycling and waste management, but success can always be built upon and it is important that other cities can learn from their initiatives and adapt them to their own needs.

It is important to focus on the ‘big picture’ global change requirements and waste elimination as well as waste behaviour change at the household level.

Recycled and waste materials are not only good for small objects in everyday life, for example making park benches out of plastic bottles, but also for large scale urban infrastructure projects such as plastic bottles being used as the materials for road bridges. Communication, collaboration and innovation are required to continue to raise awareness of elimination, reducing, recycling and reusing issues.

3 Dynamic Connections ‘Out in the city’ project

In 2011 Rachel led a bicycle route options analysis in Australia for a public sector client. The client thought the number of options would be limited and Rachel agreed that the topography, traffic volumes and visibility at intersections were not perceived as the most amenable for cycling, especially for less-confident bicycle riders. The AECOM team, fearless, enthusiastic, and novice bicycle riders, set out on bikes and cycled every street in the study area. The team colour-coded each street based on our cycling experience and using five assessment criteria and discovered that there many more options than everyone had first anticipated. The client was thrilled with AECOM’s tactical experimentation but unfortunately the ‘paper’ colour coded map had limited usage. When the opportunity arose to produce an “Out in the City” project in Berlin for the BMW Guggenheim Lab Rachel leapt at the opportunity to experiment with bicycle maps.

The Dynamic Connections Map is a world-first experiment to crowd-source and crowd-solve cycling using an interactive map based in the city of Berlin. While traditional mapping efforts show the here and the now and what type of bicycle infrastructure is located on given roads, the Dynamic Connections Map allows confident, regular and potential bicycle riders to assess the current Berlin biking network, to rate streets on how cycle friendly they are and, as a result of data processing, the potential future cycle network is recommended.

The Dynamic Connections Map allows anyone and everyone to rate/score different Berlin streets on how acceptable and safe they are for cycling by answering, in less than three minutes, five simple questions. Firstly, and to ensure the survey is completed by a wide-cross-section of the community, participants are asked what type of bicyclist they are. The survey has four types of bicycle rider: confident cyclists who are highly experienced riding on the road with the traffic and who seek out the fastest and most direct route; regular bicycle riders who choose to cycle on dedicated bike paths or bike tracks; ‘potential’ bicycle riders who are interested in cycling but who are concerned about safety and traffic volumes; and people who don’t cycle and who are not currently interested in riding a bicycle.

Participants are asked to select a road or street by clicking on the Google-based map provided. The following two questions ask the respondent if they think the traffic volumes, vehicle speeds, number of parked cars, visibility at intersections and topography on the selected road/street are 'bicycle friendly' and if the road/street selected provides good access to a large number of destinations, for example, schools and workplace. The final two questions ask participants if they feel safe, neutral or stressed when cycling through intersections and when riding a bike on the selected street. The information collected is processed using an algorithm that designates each street to be either bicycle-friendly (green) or -unfriendly (red). Participants, planners, policy makers and people simply interested in cycling alike can filter the data to meet their own personal needs, for example streets with safe intersections.

Rachel is excited about this because people, everyone and anyone - not just engineers, are auditing existing bike networks and they're auditing existing streets that don't have facilities, and they're creating a map as a community, of which streets are safe and which aren't. And as Christine McLaren the BMW Guggenheim Lab blogger wrote said in her blog "Perhaps their most glaring shortcoming of all bike maps is that they also fail to recognize that even if the "official" routes are the best option (which they often aren't), every now and then we need to leave the official network of cycling infrastructure in order to get to the places we need to go. We don't just need information about bike routes. We need information about every route".

Rachel created the Dynamic Connections Map as part of the BMW Guggenheim Lab in collaboration with John Schimmel an Adjunct Professor at NYU and designer and developer of technology for people with disabilities and Dave Dawson a graphic and digital designer. Dynamic Connections is currently only available in Berlin.

http://www.dynamicconnections.de/

http://www.facebook.com/DynamicConnectionsBikeMap?ref=h

http://www.bmwguggenheimlab.org/berlin-lab-city-projects/237

Against the flow: the evidence for contra-flow cycling

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Abstract

Adelaide City Council has had a strategic objective of implementing contra-flow cycle facilities for over fifteen years – an objective that has recently been reiterated in its updated (and draft, at time of writing) transport strategy.

Despite this, there are currently no locations where contra-flow cycling has been enabled in the Council area. Council's frustration on the issue has been generated by the carriageway width requirements for contra-flow lanes coupled with a demand for on-street parking that has made it politically difficult to achieve such lanes. The most recent attempt to tackle this issue acknowledged from the outset that formal contra-flow lanes were unlikely to be part of the solution. As part of the project, a brief review of international research was undertaken as the basis of understanding and addressing the risk associated with enabling contra-flow cycling without contra-flow bicycle lanes.

The results may be surprising: all identified research concludes that enabling contra-flow cycling in streets, using 'bicycles excepted' signage and without formal contra-flow lanes, reduces rather than increases the crash risk for cyclists.

This paper presents the evidence for a simple, inexpensive means of improving cycling convenience and safety in urban conditions.

Noting the difficulty or reluctance of European municipalities in adopting this measure – experience that has led to cyclist contra-flow using 'bicycles excepted' signage becoming mandatory in Belgium and in 30km/h zones in France – this paper further discusses use of a risk management methodology as the most responsible means of applying new and innovative treatments to Australia conditions.

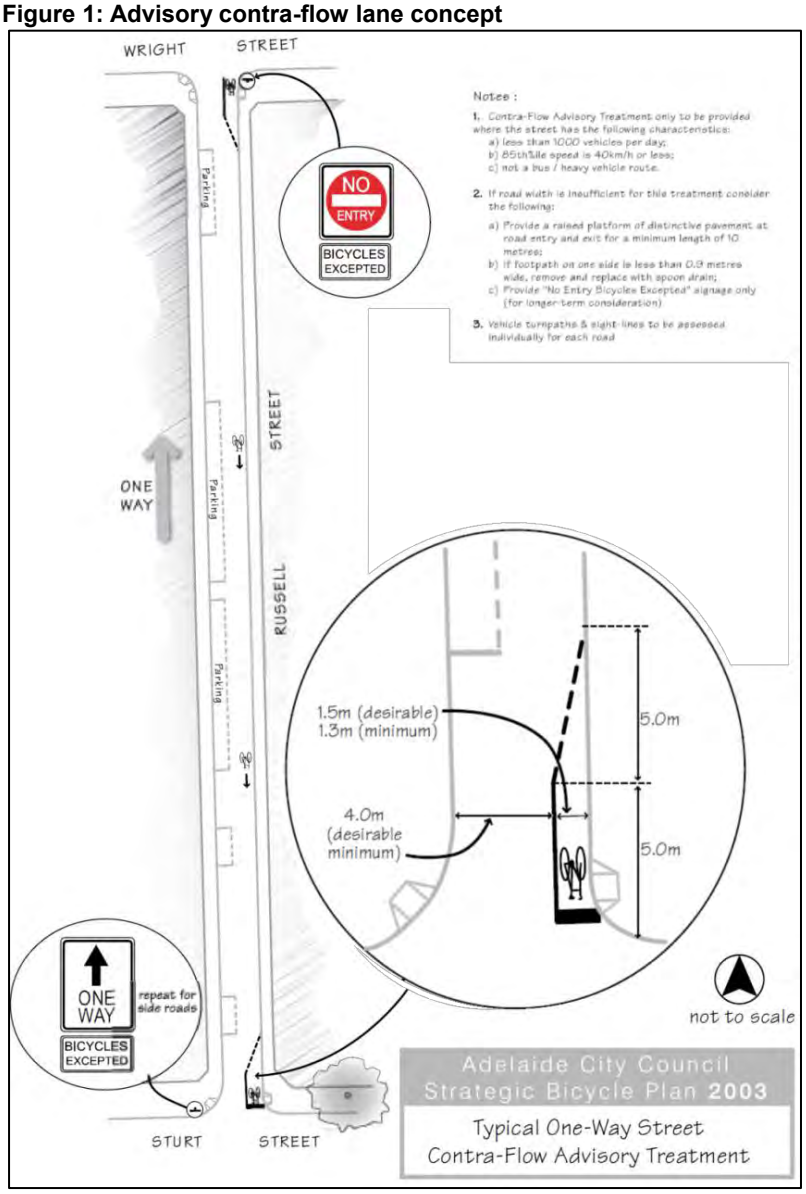
1 Background

Adelaide City Council has something of a history regarding contra-flow cycling.

Its first bicycle plan, the *Strategic Bicycle Plan* (Dorrestyn, 1995), recommended that Council look at measures to allow cyclists to travel against the flow in one-way streets. By the time of Council's *Integrated Movement Strategy, Bicycle Report* (Adelaide City Council, 1999, adopted as part of the *Integrated Movement Strategy* in 2000), a contra-flow bicycle lane could be found on state government land in Botanic Drive, but Council had found width requirements and the political difficulty of parking losses to be constraints to providing contra-flow bicycle lanes.

The *Strategic Bicycle Plan 2003* (QED, 2003) attempted to progress contra-flow cycling by including this in a section on treatments not well addressed by the appropriate guidelines – then the *Guide to Engineering Practice Part 14* (Austroads, 1999). This treatments section referenced British research in developing what it called 'advisory' contra-flow lanes, aimed at complying with the Australian Road Rules while enabling contra-flow to occur in constrained conditions. The concept for these advisory contra-flow lanes is shown in *Figure* (slightly manipulated for clarity, with the notes transcribed to the side of this figure).

Figure 1: Advisory contra-flow lane concept



Notes:
1. Contra-Flow Advisory Treatment only to be provided where the street has the following characteristics:
a) less than 1000 vehicles per day;
b) 85th%ile speed is 40km/h or less;
c) not a bus / heavy vehicle route.

2. If road width is insufficient for this treatment consider the following:
a) Provide a raised platform of distinctive pavement at road entry and exit for a minimum length of 10 metres;
b) If footpath on one side is less than 0.9 metres wide, remove and replace with spoon drain;
c) Provide "No Entry Bicycles Excepted" signage only (for longer-term consideration)

3. Vehicle turn paths & sight-lines to be assessed individually for each road.

However, the concept was never pursued. No further contra-flow lanes have been provided in Adelaide City Council and the Botanic Drive contra-flow lane was removed as part of an upgrade to the Adelaide Zoo precinct in 2010.

With the 2012 draft transport strategy calling for cyclists to be enabled to cycle in both directions in one-way local streets, Council commissioned InfraPlan Pty Ltd[1] to design a contra-flow facility along a strategic route from Central Market to the South Park Lands. This route comprises four sections of one-way street with on-street parking on one side. One of these streets is Russell Street, which was used to illustrate the advisory contra-flow lane concept presented in the *Strategic Bicycle Plan 2003* and shown in Figure 1.

The consultants recognised from the outset that the narrow one-way streets being considered would not support formal contra-flow lanes without the removal of all on-street parking, so undertook a brief review of national and international research and practice to support new approaches – such as the 'advisory' contra-flow lane concept.

An overview of the research is provided in Section 2. The main conclusion may seem counter-intuitive – that allowing contra-flow without formal lanes is safer than to not allow it.

[1] InfraPlan contracted Hub Traffic and Transport to provide additional resourcing.

Given that preliminary research was provided to Council's traffic engineers a decade ago, this raises the question of why it was never followed up. There were mitigating circumstances:

- The most comprehensive and persuasive research currently available was not available in English when the *Strategic Bicycle Plan 2003* was prepared
- There was no-one within the Corporation or Council actively pursuing the issue
- Although used as a reference, the *Strategic Bicycle Plan 2003* was never adopted by Council – arguably being too far ahead of its time (many of its elements can be recognised in the current draft transport strategy).

In failing to undertake further research to pursue its strategic aims, Adelaide City Council is no orphan: few jurisdictions around the nation are known to be implementing contra-flow cycling using only 'bicycles excepted' signage (Marrickville Council in New South Wales is one) and no other jurisdictions at local, state or national level are known to have researched international evidence regarding the practice.

And while Adelaide City Council did not act on the research presented to it in 2003, it is a single local government authority and any action would have been limited to the council area. The omission of the treatment in Austroads' updated guidelines means that many if not most Australian councils have been overlooking a cheap and effective means of improving cyclist access and safety that could have been promoted in 2008/09, when the new guidelines came into effect.

2 Summarising the research

The research undertaken for Adelaide City Council was not intended as an exhaustive review, but sufficient to provide Adelaide City Council with confidence and to underpin the Traffic Impact Statement for the contra-flow treatment. An overview of the main findings follows.

2.1 Australian practice

A quick internet search found little reference to contra-flow cycling in Australia, except in the context of contra-flow lanes. Three examples were found where contra-flow lanes are used (there are no known examples in South Australia or the Northern Territory):

- The City of Sydney uses a treatment known as *contra-flow cycleway no lane*, in which the one-way bicycle lane is demarcated by the use of bicycle logos only. However, a discussion with Council staff clarified that this is only used in formal shared zones, which have a 10km/h speed limit and pedestrian priority.
- Marrickville Council is implementing contra-flow in one-way streets using only "bicycles excepted" signage in accordance with the Australian Road Rules, on a case-by-case basis. These are in 50km/h zoned streets. Council considers the risk element in its assessment of the suitability of streets for this treatment.
- The City of Yarra is implementing widespread contra-flow cycling and has adopted a policy that any new one-way streets should cater for two-way cycling. When this involves contra-flow without formal bicycle lanes, threshold treatments are used, essentially comprising short sections of bicycle lane at the junction between the one-way street and the intersecting major roadway.
-

As noted, the research was not exhaustive and other jurisdictions may use this approach. No Australian research was found regarding the practice, either as primary research (a jurisdiction's formal assessment of the safety performance of these) or secondary research (reviewing other sources of research).

2.2 International practice

The most relevant research found (freely available and in English) was European. This was examined in reference to both safety research and the associated design practice. The safety findings follow.

2.2.1 Germany

Extensive background research has been translated by John Allen and is available via www.bikexprt.com.

Different methods for providing cyclist contra-flow access in one-way streets led to an experimental change in the StVO (German traffic laws) in 1997, which allowed cyclists to be exempted from one-way restrictions through the use of signage. However, municipalities remained concerned about the safety impacts of doing so and the best approaches, both to conform with legal requirements and in terms of safety.

The Federal Road Research Institute conducted research, completed in 2000, examining traffic safety in one-way streets where contra-flow bicycle traffic was permitted according to the new StVO provision. This was used to

determine whether the trial provisions should be retained after the year 2000 and whether any modifications were required.

Alrutz D et al 2002 summarises the most important research, including its quite exhaustive methodology. This examined streets with 30km/h speed limits. The main statistical results are:

- Streets with a 30km/h speed limit had very few crashes. 80% of the streets examined had none over the 3 to 4 year period.
- Exempting cyclists from one-way restrictions did not markedly change the proportion of contra-flow cyclists (about 40-45% of all cyclists), although it could attract cyclists from nearby main streets.
- 60% of contra-flow cyclists used footpaths before being exempted from one-way provisions, reducing to 20% afterwards. Not surprisingly, crashes on footpaths, and generally with pedestrians, occurred less often when cyclists were exempted from one-way restrictions.
- The crash density in the 669 one-way streets given bicycle exemption decreased slightly once contra-flow cycling was allowed, and was lower than in nearby two-way streets. Crash severity also decreased.
- Significantly more children and youths were involved in crashes while riding in the contra-flow direction if bicycle exemption had not occurred.

A detailed before and after study in Frankfurt am Main also identified network-wide safety improvements as bicycle traffic transferred from busy main streets and arterials to quieter one-way streets having bicycle exemption.

2.2.2 Belgium

The Belgian Highway Code has allowed road managers to authorise contra-flow cycling in one-way streets since 1991. These are called "limited" one-way streets, because the one-way signage applies to the motor vehicles and not to cyclists.

After a first positive assessment, the Ministry for Transport and Infrastructure sent a circular to promote the limited one-way streets (Ministerie Van Verkeer En Infrastructuur 1998), noting municipal concerns about:

- The safety for cyclists
- The number and cost of the road signage
- The minimum recommended free carriageway width of 3.50 meters as a general rule, with the possibility in special cases of deviating from this.

The circular advised municipalities that the Minister had established a commission to examine the preceding issues, and that this found from studies conducted both abroad and in Belgium that crashes did not increase when contra-flow cycling was introduced. Where more crashes were recorded, these were not necessarily the result of the contra-flow operation itself. Moreover, as those crashes that did occur were not in the street itself but at intersections, the implementation of (essentially) a short section of bicycle lane at intersections or bends would address safety issues.

Despite this, municipalities still hesitated to implement the measure more broadly. So the Minister of Transport and Mobility mandated contra-flow cycling in one-way streets from July 1 2004. All road signs indicating a one-way street must now be combined with signs authorising contra-flow travel for cyclists, except if specific local circumstances form a legitimate counter-indication against the measure.

Subsequent research examined crash data for six municipalities of the Brussels Region from 2005 to 2007 (Dupriez 2009). This excluded the most important municipality – Brussels City – as it only implemented the treatment in 2007.

165 crashes were recorded, of which 16 were located in, or at an intersection with, a limited one-way street. Of the latter 16:

- the cyclist was not riding in the contra-flow direction in 8 cases
- the direction of travel of the cyclists was unclear in 5 cases
- the cyclist was riding in the contra-flow direction in 3 cases.

The crash causes for the three cases of contra-flow cycling were similar: the motorist failing to yield to a cyclist with right of way to the right (our left), where the cyclist had right of way. In two of these cases, infrastructure could have given the motorist the perception that he/she had right of way.

Compared to the rest of the road network, the crash rate for limited one-way streets was lower in terms of both accidents/km (0.18 compared to 0.28) and accidents/section (0.022 compared to 0.049). The crash risk for cyclists travelling in the contra-flow direction was even lower, but statistically unreliable since this was based on only three crashes.

Overall, the research indicated that contra-flow cycling did not pose a safety risk. Instead, Dupriez considers it to be a road safety solution, and that minor treatment at intersections and cross-roads could be used to address site-specific safety issues.

2.2.3 France

France made contra-flow access mandatory in 30km/h streets in 2008 (CTC 2012, VeloBUC 2012). The Dublin Cycling Campaign (2012) notes that this followed good safety results experienced in trials in Sevres and Ill-kirch-Graffenstaden (Bas-Rhin), a town of 25,000 near Strasbourg.

A report by the UK's Department for Transport (MVA Consultancy 2010) summarises this research, which was undertaken as part of the localised implementation (1983 to 2000) and subsequent generalisation of contra-flow schemes to all one-way streets in Strasbourg (2000).

From 1997 to 1999, 4,004 road collisions occurred, of which 452 involved a cyclist. Of these 452 collisions, only five occurred whilst a cyclist was travelling contra-flow. All of the five collisions occurred at junctions. While comparative crash and exposure is not known, the magnitude of crashes considering the large number of contra-flow schemes implemented indicates that the crash risk from contra-flow cycling is low. This interpretation supported France's subsequent adoption of contra-flow cycling as a mandatory measure.

2.2.4 UK

The UK has had a long history of examining contra-flow cycling, including publishing technical guidance regarding allowing contra-flow cycling using only signage (Department for Transport 1998) – as referenced by the *Strategic Bicycle Plan 2003*. This guidance recommended formal entry treatments to address safety issues. DfT interpreted this as a mandatory requirement for approval; the technical and cost impacts of this have led to very few contra-flow treatments being implemented.

With all secondary research pointing to the safety of contra-flow using signage only, moves to enable this treatment led to trials in various boroughs (MVA Consultancy 2010). This found:

- an increase in the number of cyclists travelling in contra-flow following installation of the 'No Entry Except Cycles' signage
- few interactions in both the 'before' and 'after' signing scenarios
- no significant association between the signing changes and severity of interactions
- otherwise no validity to DfT's concerns (in particular, rather than devaluing the 'No Entry' sign, compliance was found to be better due to improved understanding).

As a result, the UK government is considering changing its position to enable easier implementation of counter-flow cycling (London Cycling Campaign 2011).

3 Implementing the research

The concept design for the one-way streets project involves a continuous footpath treatment at thresholds of each of the four subject streets, to:

- Encourage/ maintain low traffic speeds in the subject streets
- Improve pedestrian access in the streets that cross the route
- Highlight the route as a strategic bicycle route
- Address the current infrastructure at thresholds.

As such, the concept design is particular to the route. Notably, while continuous footpath treatments may be desirable at other locations (continued use of the treatment is included in the draft transport strategy to improve walking conditions), this would be a high-cost means of implementing more general cyclist contra-flow.

Clearly, implementing cyclist contra-flow in minor streets on an area-wide basis would be the most efficient and effective means of improving cycling conditions, and achieving the draft transport strategy*'s* aim in this respect. All available research, now provided to Council, indicates that this is a safer course of action than continuing to prohibit contra-flow cycling in one-way streets.

But will this be sufficient to enable Adelaide City Council to adopt a simple, inexpensive, easy means of improving cyclist convenience and safety? The signs are not encouraging. There are few examples of cyclist treatments within the Adelaide City Council area that could be considered as being innovative or new. But difficulties with new and innovative treatments are not limited to this council or even this country. As noted, Belgium and France have reached the stage of mandating cyclist contra-flow in minor one-way streets to overcome municipal reticence to implement a legal treatment that has demonstrated safety benefits.

Why?

Essentially, issues of risk, liability and professional responsibility are similar in Australian and overseas municipalities and the limited resources of local government bodies affect their willingness and ability to address these issues.

There are two main reasons why a council may feel unable to implement a new treatment:

- Compliance with standards and guidelines and the resulting liability issues
- Legal authority.

These are discussed in sections 3.1 and 3.2.

3.1 Compliance and liability

The approach of complying with relevant standards and guidelines in order to overcome liability risks is common amongst councils. A recent publication (Austroads 2012) seeks to provide guidance on civil liability issues for road authorities, albeit in the context of asset management and focusing on highways.

As this explains in its background (p1):

> "…specific civil claims for compensation brought by road users against road authorities remain a significant issue across Australia…
>
> "At an individual practitioner level, a degree of unease and uncertainty has been detected, especially within those officers responsible for front line delivery or in developing and implementing local policy…
>
> "…road authority officers [are] seeking reassurance and further guidance regarding legal issues. …the need to provide more specific guidance on managing legal risk within the demands of the asset management function has been formally recognised [through this document]."

Austroads 2012 then provides this information about civil liability:

> "…the concepts and processes of highways-related civil liability exist to be a deterrent to road authorities against future inaction. This further reinforces… [the aim of] preventing similar incidents from occurring and [acts] as a catalyst for continual improvement of asset management related strategies, policies, standards and procedures." (p7)
>
> "Fear of civil litigation should never be the primary concern when forming a local strategy, policy, standard or procedure; making a local decision or determining an action; nor should it stop reasonable innovation and pilot studies from taking place that have the objective of securing a better outcome for all road users." (p13)

So civil liability as a legal mechanism supports a proactive approach to managing roads. Inaction on the basis that a particular risk complied with the standards of the day, or is unknown, is entirely at odds with this legal mechanism. Indeed, it is this attitude – embodied in the concept of 'nonfeasance' – that led to the 2001 High Court judgements overturning the concept in favour of road authorities demonstrating reasonable care (Austroads 2012).

That councils are and will remain a target for civil liability claims is regrettable, but not a reason to hide behind standards and guidelines (Austroads 2012):

> "[Do] …identify and consider available international and national best practice and guidance documents, and what peer organisations (neighbouring and/or similar road authorities) have in place. However, as valuable as such resources can be, as guidance, following them to the letter must not be seen as a guarantee of a safe outcome at a location, nor are they always fully applicable to a local situation. Professional judgement must be used in determining if the particular concepts and clauses within a best practice or guidance document would actually be better replaced by an amended or locally drafted item." (p16)
>
> "Being able to robustly demonstrate that reasonable and effective measures have been consistently implemented in managing and maintaining the road network will go a long way towards the road authority being able to demonstrate that it has fulfilled its duty of care to road users." (p2)

Indeed, insofar as compliance with standards and guidelines does not address duty of care, it does not actively demonstrate that a council has met its obligations. Hence compliance does not guarantee that civil liability risk is addressed: standards and guidelines can be and are applied incorrectly and/or without due regard for local circumstances.

Further, by only complying with existing practice, this approach has the potential to:

- de-skill professionals (they have limited capabilities when faced with situations that lie outside established practice)
- marginalise professionals' standing (they cannot respond to requests for treatments that lie outside of the existing framework, and so fail the community, elected members and other professionals)
- frustrate both professionals using a compliance approach (they are disempowered and unable to achieve desired results) and create a barrier for other professionals (by rejecting treatments based on an alternative approach).

The alternative is for professionals to apply their judgement and undertake safe and responsible measures in managing the road system: the risk management approach.

Risk management has been applied to some council processes, but its use to adopt new cycling treatments is arguably more complicated and has been limited. (It is notable that both Marrickville Council and the City of Yarra are using a risk management approach to support their cyclist contra-flow treatments. The *Strategic Bicycle Plan 2003* was also prepared on this basis.)

A risk management approach directly addresses duty of care and demonstrates council's attempt to meet its obligations – but must be undertaken with care and diligence if it is to effectively mitigate civil liability exposure. It places a significant responsibility on council's staff. As Austroads 2012 warns, (p16):

> "It is important to remember that in the conduct of any legal proceedings, national best practice or guidance will be the default standard used in the absence of a locally developed document. Therefore, it is crucial when developing a local response that significant departures from national best practice or guidance are formally identified and the rationale explained…"

Reluctance amongst professional to move to a risk management approach is therefore not surprising. Few technical professionals will be confident in adopting new philosophies and processes in a legislative and risk environment that has changed markedly over the last decade and a half and lies outside their area of competence – just as it is too much to expect legal professionals to be technical experts. Most councils will also have limited resources with which to support technical professionals in navigating legal issues, let alone moving to a new framework.

A final point about a risk management approach is who takes the decision to adopt this or retain a compliance approach. A council's authority to act is vested in a body and delegated to staff. But most staff who apply a compliance approach under their delegated authority have not provided their elected members with the opportunity to decide whether a risk management approach is more appropriate – and to enable resources to be allocated that enable this approach to be pursued.

Given that the elected members are ultimately responsible to the community for a council's actions, it is questionable whether professional staff should be making such a decision without informing their elected members of the issues and implications.

3.2 Legal authority

Councils have a responsibility to act within the law. However, road authorities also have a general responsibility towards the safety of road users, and there is a difference between 'the law' as a set of rules and 'the law' as a legal system.

In the example of cyclist contra-flow, the Australian Road Rules establish use of signage as the only necessary condition for enabling cyclist contra-flow. As no standards or guidelines exist regarding cyclist contra-flow without cycle lanes, the question could be raised: does a council have the legal authority to install such a treatment? Let us consider the possibilities.

Option 1: it does. Someone who takes the council to court loses the case.

Option 2: it does not, and someone takes the council to court.

a) The complainant is the state road authority. It is difficult to see why an action would be mounted against a council, except in response to safety concerns that have been raised but not addressed. Research and communication should obviate the need for legal action. In the extreme case that a council and road authority cannot agree, a council might conceivably go to court to resolve the difference in professional opinion. This would probably take the form of a test case and even if it were to lose, the court would probably not inflict the maximum penalty – in South Australia, this is $5,000 plus removal of the treatment.
b) Someone else takes the council to court and it is established that the council does not have the legal authority. If the council has research demonstrating that the treatment should improve road user safety, it is difficult to see why a court would apply the maximum penalty or that the state road authority would

require the removal of the treatment. The most likely outcome would be that the council's responsibility is clarified and the council seeks retrospective approval.

Actually, except for a particularly pedantic complainant, a more likely court case would contest the safety of the treatment – the civil liability route already discussed.

Here, demonstrating that the council is acting in a reasonable way (eg the risk management approach) is more important than whether or not the council has the legal authority to install a particular traffic control device. Indeed, as road users must comply with any traffic control devices that *appear* to be legal, whether or not they are legally installed is virtually a moot point: the important matter is its safety.

As a final note, law is not immutable. Most cycle planners would be aware of Australian Road Rules Amendment Package No. 6, which enabled bicycle boxes (forward storage areas) to be made legal in Australian jurisdictions. As the regulatory impact statement for this notes (National Transport Commission 2007), Victorian and Western Australian practice with respect to bicycle boxes was not only not supported by the Australian Road Rules, but lay outside the (then) national guidance: Austroads' *Guide to Traffic Engineering Practice Part 14: Bicycles* (1999).

4 Conclusions

This paper provides good news for jurisdictions that wish to improve cyclist convenience and safety through the simple measure of exempting cyclists from one-way restrictions in minor streets. While practices and design features have not been covered, this paper also points practitioners to research references where more information may be gleaned.

The case study presented in this paper also reinforces the value of adopting a risk management approach for implementing new and innovative treatments. Under a risk management approach, the importance of research and analysis in assessing a new or innovative treatment – particularly one commonplace overseas – is also clear.

Finally, this paper supports the Australian Cycling Conference's aim of encouraging and disseminating research in the cycling field. The next Velo-city Global cycling conference, to be held in Adelaide in 2014, will showcase cycling research from around the globe and provides a valuable opportunity for Australian practitioners to learn from their international counterparts. This paper is a timely reminder that we are not alone in seeking to improve cycling conditions and that a little understanding can go a long way.

5 Acknowledgements

I would like to acknowledge Adelaide City Council, the Department of Planning, Transport and Infrastructure, InfraPlan, Tonkin Consulting and Hub Traffic and Transport as supporters of the Australian Cycling Conference mentioned in this paper. Such organisations assist the Conference encourage quality research and disseminate data on cycling issues and are taking a proactive approach to the learning that the conference brings to the cycling field.

Opinions presented in this paper are those of the authors and should not be seen as reflecting the opinions of these organisations.

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Australian Cycling Conference
Everybody's Cycling?

Day One – Monday January 21

8:30 Registration

Welcome and invited speakers ***Chair: Dr Jennifer Bonham***

9:00 Conference Welcome

9:05 The Right Honourable the Lord Mayor of Adelaide, Stephen Yarwood

9:20 Keynote address: Cycling in India – past present and future — Dr Rajendra Ravi
Includes time for questions

10:15 Everybody's Cycling in Australia? A data overview — Dr Ian Radbone
Includes time for questions

10:30 Morning tea – 30 minutes

Session 1 Policy and planning ***Chair: Matt Mayes***

11:00 Moving People 2030: A transport plan — Peter Bourke

11:20 Barossa cycle planning — Bim Lange

11:40 Cycling Tourism policy and practice in Europe — Dr Richard Weston

12.00 *Discussion and questions: Session 1*

12:20 Lunch – one hour

Session 2	***Cycling health and safety***	***Chair: Katie Gilfillan***
1:20	Safer in the country? An investigation of the safety issues related to cycling in regional Victoria	Dr Marilyn Johnson
1:40	Countries with bicycle friendly road networks are safer for all road users	Alan Parker
2:00	Ride a bike to prevent falls – two pilot studies	Professor Chris Rissel
2:20	*Discussion and questions: Session 2*	
2:35	**Afternoon tea – 20 minutes**	
Session 3		***Chair: Ben Russ***
2:55	Cyclists and road rules – what influences the decision they make?	Louise Shaw
3:15	The role of safety awareness programs in addressing the actual and perceived conflicts on shared paths	Caitlin Brookes
3:35	Towards the Holy Grail? 'Super Routes' in Burnside	Fay Patterson
3:55	*Discussion and questions: Session 3a*	
4:10	**Stretch your legs - break**	
4:20	Everybody's cycling – but what about Australians with disabilities? What are the prospects for a more inclusive and diversely mobile society?	Peter Lumb
4:40	Everybody's Cycling in SA?	Gemma Kernich
5:00	*Discussion and questions: Session 3b*	
5:10	**Day one close**	

7:00 **Conference dinner (optional) – everyone is welcome**

Wright Street Hotel, 88 Wright Street, Adelaide

An easy one kilometre walk from the Science Exchange

If you haven't booked for this and want to attend, see Jeremy Miller during the day.

Day Two – Tuesday January 22

8:30 Registration

Welcome and invited speakers ***Chair: Graham Bradshaw***

9:00 Day two welcome

9:05 Rod Hook, Chief Executive Dept of Planning, Transport and Infrastructure
'Creating Australia's most cycling and walking friendly city'

9:15 Invited speaker: Power assisted bicycles – their place in a cycling future Scott Dickason
Includes time for questions

10:00 Infrastructure tours by City Bike or roundtable discussions at the Science Exchange
Includes morning tea

12:15 Lunch – one hour

Session 4 Gender and cycling ***Chair: Peter Lumb***

1:15 A gender perspective of built environment influences on cycling behaviour in Sydney Nicole McNamara

1:35 Gendering cycling:
On making associations between bikes,bodies and practices Dr Jennifer Bonham

1:55 "Riding a bike is in my bones now":
Creating a cycling habitus for teenage girls Clare Wasteneys

2.15 *Discussion and questions: Session 4*

2:30 Afternoon tea – 30 minutes

Session 5 Culture and cycling ***Chair: Jeremy Miller***

3:00 Everybody's writing Kath Bicknell

3:20 Dynamic Connections: crowd sourcing cycling and cycle planning Rachel Smith

3:40 *Discussion and questions: Session 5*

Session 6		*Chair: Anna McDonald*
3:50	Contraflow lanes and cycling: the evidence	Gayle Buckby
4:10	Sustainability and commuting in Australian capital cities	Alan Parker
4:30	*Discussion and questions: Session 6*	
4:40	Velo-city Adelaide 2014 announcement	Margaret Howard
4:50	Presentation of prizes and Conference close	Fay Patterson
5:00	**Farewell – we'll see you next year at Velo-city 2014, in Adelaide**	