

Current Cycling, Bicycle Path Use, and Willingness to Cycle More—Findings From a Community Survey of Cycling in Southwest Sydney, Australia

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Background: Encouraging cycling could increase levels of physical activity and health in the community. A population survey of cycling and physical activity was conducted as part of the baseline evaluation of a new intervention research project (Cycling Connecting Communities). **Methods:** A telephone survey of adults (18+) living within 2 kilometers of selected major new bicycle paths in 3 local government areas in south western Sydney, Australia was conducted using a 2-stage sampling method. Multiple logistic regression analyses examined factors associated with riding in the last year, wanting to cycle more, and use of local bicycle paths. **Results:** With a 65% response rate, 1450 interviews were completed. Having ridden a bicycle in the past year was associated with younger age, being male, having access to a bicycle, and living close to destinations of interest. Two thirds of respondents (65%) wanted to ride more than they currently did. Factors associated with wanting to ride more were having children aged between 5–18 years, having used local bicycle paths, and perceptions of ease of cycling. **Conclusions:** The study found that there is a latent desire for more cycling among respondents, prompted to some extent by having children of an age (5–18 years) that like cycling, and having a reasonable opportunity to cycle due to local bicycle paths. Being relatively close to destinations of interest increases the likelihood of recent cycling.

Keywords: health promotion, epidemiology, physical activity, cardiovascular health, bicycles

In Australia only about half of the adult population is sufficiently active to meet health recommendations of 30 minutes of moderate intensity physical activity on most days of the week.¹ Cycling is a moderate-intensity physical activity and is independently associated with many health benefits.^{2,3} It has unique potential to support an active lifestyle through recreational cycling and through active transport, when it could be integrated into daily travel routines. In Australia, cycling is the 4th most popular leisure time physical activity but its actual practice is low; in 2005 the yearly prevalence of cycling for leisure among adults was 10.3% and only 2.1% cycled at least once a week.⁴ Only 1% of Sydney's population cycles each day, despite increases from 37% of households having a bicycle in 2001 to 42% in 2005.⁵

Over half of all car trips in the state of New South Wales (NSW) are less than 5 kilometers,⁶ distances that

are amenable to cycling. Bicycles sales in Australia have been greater than new cars each year for the last 8 years.⁷ Thus, it appears that there is potential for increased participation in cycling as a form of travel or as physical activity in NSW.

There has been little research evaluating the effectiveness of infrastructure and environmental changes upon increasing population levels of physical activity.^{8–13} Yet better cycling infrastructure is often a focus of cycling organizations' advocacy efforts,¹⁴ and the lack of cycling infrastructure is the most commonly cited barrier to cycling from noncyclists and occasional cyclists.¹⁵ In countries where urban design and policies favor cyclists, the prevalence of cycling is much higher.¹⁶ Within Australia, variations in levels of cycling might also be attributed to infrastructure. For example, the NSW prevalence of leisure time cycling was the lowest (8.1%) among the States, with the highest levels in the Australian Capital Territory (17.4%).⁴

Although better infrastructure can explain some of this variation, it is not the only factor.¹⁷ Intervention studies so far have failed to demonstrate consistent evidence for population level effects on cycling or walking due to infrastructure or environmental changes.^{11,12} It is possible that users of new infrastructure are those already motivated and generally active, with a limited effect on more sedentary people.

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Programs aiming to increase population levels of cycling need to take advantage of existing infrastructure but also address barriers to cycling such as motivation to cycle, cycling confidence, and social support. As part of a new cycling intervention research project in south-west Sydney, Cycling Connecting Communities (CCC), a baseline survey was conducted. The purposes of this paper are to describe baseline levels of cycling among those living in close proximity to designated cycling paths, examine the relationship between cycling and meeting Australian physical activity recommendations, and examine factors associated with cycling in the past year, use of local bike paths, and “wanting to cycle more.”

Method

A telephone survey was conducted in May-June 2007 using a 2-stage sampling method. Study area addresses within 2 kilometers of selected major new bicycle paths in the intervention and comparison areas were coded. The intervention and comparison areas were adjacent but distinct local government areas with similar socioeconomic status and similar types of new off-road cycling infrastructure. Telephone number prefixes that matched postcodes within the local government areas of interest were identified using the Electronic White Page Directory (EWPD), an accurate method of distinguishing different communities. The final 4 digits of the telephone number were randomly generated to create a sampling frame. Eligible respondents to the telephone survey were those aged at least 18 years and spoke English, and were randomly selected if there were 2 or more eligible persons per household.

Questions recorded sociodemographic variables (age, sex, educational attainment, marital status, presence of children in the household, and car ownership using standard questions used in the NSW Health Survey,¹⁸ physical activity in the last week (using the Active Australia questionnaire¹⁹), cycling behavior and frequency (assessed with previously used questions²⁰ but without known validity and reliability), self-reported use of local bicycle paths, perceptions of ease of cycling, and self-reported proximity to destinations of interest.

Results were weighted by age and sex to reflect the demographic profile of the 3 local government areas surveyed. As there were no statistically significant differences between the intervention and comparison areas, data for the 2 areas were combined for the purposes of these analyses. Frequencies and cross-tabulation were conducted in STATA using weighted data. Associations with the key outcome variables ‘ridden a bicycle in past year,’ ‘use of local bicycle paths,’ and ‘wanting to ride more’ were examined in multiple logistic regression models using STATA with forced entry into the model of variables considered to be potentially important influences on the outcome variable. All variables included in the model are listed in Table 2.

Results

A total of 1450 interviews were completed, with a response rate of 64.7%. Overall, 17.8% (n = 258) of the sample self-reported a disability which prevented them from riding a bicycle, and these were excluded from subsequent analyses.

Of those people without a disability, 28.7% had ridden a bicycle within the last 12 months, and 10.8% had never ridden one. Men (39.6%) were more than twice as likely to have ridden in the last year compared with women (17.5%), and there was a general decline with older age (see Table 1). Almost 3 quarters of people rode for recreation (66.3%) or fitness (13.6%) the last time they rode, with other reasons being to be with friends or socializing (8.3%), going to shops (7.2%) or to work (4.6%). Women were more likely to ride for recreation compared with men who were slightly more inclined to ride for fitness. Younger people were more likely to be riding for social reasons or to shops. Overall, two thirds of respondents wanted to ride more than they currently did (65.4%), and the greatest interest in the 30 to 60 year age ranges (see Table 1).

Physical Activity Level and Cycling

Cycling in the past year was significantly associated with being sufficiently physically active ($P = .01$), after adjusting for age and sex, but this association did not remain significant when the variables listed in Table 2 were added to the multivariate model (see Table 2). However, when having “cycled in the past month” was used as the outcome variable instead of “past year,” being sufficiently physically active was independently associated with having ridden in the past month ($P = .018$), along with sex and having access to a bicycle (data not shown in Table 2).

Factors Associated With Cycling in the Past Year and Use of Local Bicycle Paths Respondents with children less than 5 years (23.6%) were as likely as those without children (23.2%) to ride within the last year, but those with children 5 to 18 years were most likely to have ridden within the last year (42.2%) ($P < .01$). Respondents who thought it was easy to cycle around their neighborhood were more likely to have ridden a bicycle in the last year (49%) than those reporting it was not easy (36%), and this association was significant after adjusting for age and sex ($P = .033$). Similarly, proximity to destinations of interest (31.6% vs 25.3%) was associated with riding in the past year and statistically significant after adjusting for age and sex ($P = .048$). However, in a multiple logistic regression model with having ridden in the past year as the outcome, only living close to destinations remained independently significant ($P = .048$), along with having access to a bicycle to use, younger age and being male. In addition to these variables, this regression model included having children (no children, children under 5 years, or 5 to 19 years), whether ever used local cycle paths, if adequately physically active, if

Table 1 Key Cycling Variables by Age and Sex (Weighted Data) (%)

	Males (n = 493)					Females (n = 703)				
	Age groups					Age groups				
	18-29 (n = 85)	30-44 (n = 107)	45-60 (n = 155)	61+ (n = 146)	Total	18-29 (n = 144)	30-44 (n = 165)	45-60 (n = 184)	61+ (n = 210)	Total
Has a bicycle	52.2	47.9	51.7	24.0	45.5	47.0	36.3	40.7	11.9	34.9
Rode today	1.8	3.1	2.0	3.1	2.4	-	-	-	-	-
Last week	14.0	9.6	12.0	4.9	10.7	2.0	3.6	1.2	-	1.7
Last month	16.6	12.5	12.5	2.6	11.8	4.7	4.3	2.9	1.0	3.3
Last year	17.5	17.3	15.1	6.9	14.7	22.0	7.9	13.4	3.5	12.5
Sum	49.9	42.5	41.5	17.4	39.6	28.6	15.7	17.4	4.5	17.4
Longer than a year	49.2	53.9	56.0	7.7	57.5	56.3	73.9	59.1	69.3	63.8
Never	8.4	3.6	2.5	6.0	2.9	15.1	10.4	23.5	26.3	18.9
Would like to ride more	53.3	73.8	74.6	59.4	64.4	72.5	73.7	58.7	55.9	67.0
Used paths	20.6	19.6	21.5	19.9	20.5	22.9	18.3	20.7	15.2	19.5
BMI > 25	48.2	56.1	68.8	57.8	57.4	24.7	52.7	52.1	49.0	43.1
Physically active	60.7	49.1	44.2	56.3	52.9	49.7	41.8	44.3	40.5	44.5

Table 2 Factors Associated With Having Ridden a Bicycle in the Past Year, Wanting to Ride More, or Having Used Local Bicycle Paths (n = 620)

	% cycled in past year	Adjusted odds ratio	95% CI	% used local bicycle paths	Adjusted odds ratio	95% CI	% wanting to ride more	Adjusted odds ratio	95% CI
Age		1.39	1.10–1.72		1.09	0.88–1.34		1.05	0.87–1.26
18 to 29	39.8			21.7			61.3		
30 to 44	29.3			18.9			73.8		
45 to 60	30.0			21.1			68.6		
61+	10.6			17.4			58.0		
Sex		3.33	2.04–5.26		1.25	0.80–1.95		1.13	0.77–1.66
Male	39.6			20.5			64.4		
Female	17.4			19.5			67.0		
Children		0.84	0.68–1.05		1.05	0.86–1.28		1.18	0.99–1.39
None	23.1			18.3			63.0		
One or more 5–18	42.2			23.8			62.7		
One or more under 5	23.6			19			75.9		
Cycled in last year		–	–		0.84	0.50–1.40		0.74	0.46–1.18
No	71.2			18.1			65.6		
Yes	28.8			24.9			65.1		
Used local bicycle paths		0.87	0.53–1.43		–	–		1.80	1.09–2.97
No	27.1			80.0			61.8		
Yes	35.7			20.0			76.6		
Has access to a bicycle		28.40	15.56–52.14		2.05	1.23–3.44		1.28	0.82–2.00
No	6.4			15.3			62.0		
Yes	61.5			27.1			67.7		
Important that cycling be easy		1.00	0.64–1.56		0.92	0.59–1.44		2.03	1.34–3.07
Not important	36.8			20.8			58.5		
Quite/very important	49.1			25.2			74.8		
Live close to destinations		1.62	1.02–2.57		0.76	0.48–1.20		0.73	0.49–1.10
Not close	25.3			21			68.3		
Very close	31.6			19.1			62.9		
Is physically active		1.32	0.85–2.08		1.98	1.30–3.03		1.16	0.78–1.73
No	23.5			15			64.7		
Yes	34.1			25.3			66.1		
Want to ride more		0.80	0.49–1.30		1.80	1.09–2.98		–	–
No	42.9			15.4			34.6		
Yes	42.3			26.9			65.4		
Safe to use bike paths		1.02	0.54–1.97		2.07	1.05–4.06		1.22	0.76–1.96
No	19.2			10.8			60.8		
Yes	32.5			24.9			66.8		

* Adjusted for the variables listed which were all included in the model.

overweight or obese, wanting to ride more, whether it is important for cycling to be easy, and whether respondent thinks it is safe to cycle in the local area.

One in 5 respondents (20%) had used the local bicycle paths. Regular riders were more likely (31.2%) to have used local paths compared with self-reported novice or beginner riders (18.8%), with occasional riders (22%) similar to beginners in their use of local paths. Respondents who had ridden a bicycle in the past year (24.9%) had used local paths more than nonriders (18.1%), and while this association was statistically significant after adjusting for age and sex ($P = .042$) it was no longer significant when other variables were entered into the model. Factors significantly associated with local bicycle path use were having access to a bicycle to use, being sufficiently physically active, thinking the bike paths were safe, and wanting to ride more, after adjustment for all other variables in the model (see Table 2).

Factors Associated With Wanting to Ride More. Logistic regression modeling of multiple factors associated with wanting to ride a bicycle more indicated that respondents with children under 5 years of age, that had used the local bicycle paths, and thought that it was important that cycling be easy were significantly likely to want to cycle more, adjusting for other factors in the model including current riding status (see Table 2). Being sufficiently physically active was not associated with wanting to ride more, suggesting that the desire to cycle and be active is common across a wide spectrum of the community.

Table 1 shows that younger women wanted to ride more than older women, and also more than younger men. This age and sex interaction was statistically significant ($P = .004$).

Discussion

The pattern of cycling observed is broadly similar to that in Sydney,⁵ despite survey respondents living reasonably close to existing cycle paths. It was surprising that cycling in the past year was not associated with path use, as many riders (particularly less experienced riders) will take a longer route if it means being able to use a better cycling facility.²¹ Living close to destinations of interest was also not associated with path use, suggesting that the current paths may not go where people want to.

About 1 in 5 respondents had used the local bicycle paths, which for men is only half that of people who had cycled in the last year, suggesting there is potential for increases in path use among men. Path users were likely to have access to a bicycle and be physically active, although it is unclear whether path users were already physically active before using the path or became sufficiently active as a result of path use. To increase path use, better signage, with information about destinations and distances, widely distributed maps of the bicycle path network, and promotion of the availability of the paths is needed.

Interestingly, despite women cycling less than men they were equally as likely to report that they would like to ride more, suggesting unmet cycling needs among women, particularly younger women. Garrard posits that the rate of female cycling is indicative of the cycling environment, and that women are more likely to be discouraged by a hostile environment than men.²² The finding that about two thirds of both men and women want to cycle more is encouraging from a cycling promotion perspective.

It was important for those people wanting to cycle more that cycling be easy. This may seem obvious, but in the Australian (and US) context there are many barriers to cycling and it is generally only a committed core of cyclists that ride regularly. Cycling needs to be made *much* easier before it will significantly increase transport mode share. Consistent with this finding is that those people wanting to cycle more had used local bicycle paths, and were therefore likely to have some appreciation of good cycling facilities.

There was an association between cycling in the past year and past month, and being sufficiently physically active for men, but not for women (data not shown). This is consistent with other health survey research that found that men who cycled to work, but not women, were less likely to be overweight or obese compared with other journey to work modes.²³ It is reasonable to conclude that for men, cycling makes a substantial contribution to their total physical activity, and therefore cycling is associated with a lower risk of overweight and obesity among men. This association might change for women if more women cycled to work. The association between meeting recommended levels of physical activity and cycling in the past month was stronger than for cycling in the past year, after taking into account other factors, which is reasonable given they are more likely to be within a similar timeframe.

There were some limitations in this study, including the cross-sectional design and the smaller number of respondents included in the analyses due to skip patterns in the computer assisted telephone interview. The exclusion of non-English speaking respondents limits the generalizability of the results to some extent, with 8.2% of residents in the south-west Sydney region not speaking English well (Pop Health Division).²⁴ Further, some of the measures used do not have known validity and reliability and require further development.

Although the overall baseline level of recent cycling is relatively low, the potential for change is high. Increasing the ease of cycling, most likely through building high quality cycling infrastructure such as bicycle paths with good connectivity that link destinations of interest, can potentially influence cycling behavior and contribute to higher levels of physical activity.

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