TRANSPORT FINDINGS

Who Bikes? An Assessment of Leisure and Commuting Bicycling from the Canadian Community Health Survey

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Findings

We used 2013/2014 Canadian Community Health Survey to describe who bicycles for leisure, commuting, or both leisure and commuting. Nearly one-quarter of Canadians bicycled in the 3 months prior to the survey: 7 Canadians bicycled for leisure for every 1 person who bicycled for commuting purposes. People bicycling for leisure were more likely to be younger, male, higher income, and identify as white. Commute bicycling captured a very small proportion of the bicycling population; men were nearly twice as likely to commute compared to women and there was little difference in bike commuting across racial identity.

Questions

In Canada, primary commute mode to work recorded in census data is one of the few sources to assess bicycling behaviours. Unfortunately, it misses bicycling for leisure and other purposes. The Canadian Community Health Survey (CCHS) – a, nationally representative survey - captures both people who bicycle for non-commuting and leisure as well as for commuting purposes. Our goal is 1) to describe the prevalence of commute bicycling as compared to leisure bicycling and 2) to identify demographic characteristics associated with bicycling for different purposes.

Methods

We used the CCHS Public Use Microdata Files (PUMF) 2013/2014 cycle; subsequent iterations do not isolate bicycling as an activity. The CCHS sampling frame is Canadians at least 12 years old, but with exclusions (Statistics Canada 2008). Person-level survey weights enable representative estimates across provinces and socio-demographic strata. CCHS assesses bicycling behaviour through the Physical Activity Module, which asks respondents a) whether they bicycled in the past 3 months as a leisure activity or for any purpose not related to work or school, and b) whether they bicycled to and from work or school in the past 3 months.

We calculated the weighted prevalence of three types of bicycling behaviours: people who only engage in leisure and other non-commute bicycling ("leisure only"), people who commute to work or school by bicycle, but do not engage in leisure bicycling ("commute"), and people who do both—leisure and commute bicycling ("leisure + commute"). To identify demographic characteristics associated with different bicycling behaviours, we calculated the prevalence by age, gender, racial identity, and quintiles of household income (adjusted for household and community size). Because the CCHS PUMF

reports income data for people living in provinces only, our analysis excludes the 110,000 people, or 0.4% of the Canadian population, who live in territories. Further, racial identity was missing for 4,174 respondents and excluded from analysis.

Finally, we modelled the likelihood of engaging in bicycling using separate weighted logistic regression models for each type of bicycling behaviour. In each model, the outcome was '1' for respondents who bicycled at least once in the past 3 months for a given type of bicycling and '0' for participants who reported none. Covariates were demographic characteristics (age, gender, racial identity, income). We reported odds ratios (OR) and 95% confidence intervals (CI).

Findings

Nearly one quarter (23.3%) of the 28,887,405 Canadians represented in the 2013/2014 CCHS survey reported bicycling for leisure, and/or to get to work or school in the previous 3 months (Table 1). Most report leisure only bicycling (19.9% of the population, or 85.6% of those who reported any bicycling). Only 2.7% of the population report leisure + commute bicycling, or 11.4% of those who report any bicycling, and 0.7% of the population report only commuting, or 3.0% of those who report any bicycling. People who bicycle for both leisure and commuting take twice as many trips as people who ride for commuting only (52 and 25 trips in the past 3 months, respectively). People who only bicycle for leisure report the fewest number of trips, 16 trips in the past 3 months (Table 1). Population prevalence of any type of bicycle use was highest among people who are men, 20 to 29 years old, identifying as white, with higher household incomes (income quartile 4 and 5) (Table 1).

The multivariable models highlight the demographic differences in who bicycles for each purpose (Table 2). Men were more likely to bicycle than women across all purposes. The disparity was greatest for commute, where men were about twice as likely as women to bicycle for commute (OR: 2.06, CI: 1.45,2.92), or leisure + commute (OR: 1.95, CI: 1.67,2.28), while the disparity was less for leisure-only bicycling (OR: 1.40, CI: 1.32,1.48). Adults over the age of 30 were less likely to bicycle for any purpose. Relative to 20 to 29 year-old bicycle users, those aged 12 to 14 years old were 2.56 times as likely to leisure bicycle only (OR: 2.56, CI: 2.28,2.88) and 75% more likely to bicycle for leisure + commute (OR: 1.75, CI: 1.42,2.17). Those 15 to 19 years old were more likely to leisure only (OR: 1.75, CI: 1.57,1.94), leisure + commute (OR: 1.40, CI:1.14,1.71), or commute only (OR: 1.65, CI: 1.07,2.54).

Table 1: Bicycling behaviour by type and demographic characteristics in Canada, using 2013/2014 Canadian Community Health with survey weights.*

Characteristics	Leisure bicycling only		Both leisure and commuting bicycling		Commute bicycling only		No bicycling	
	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Total	5,757,383	19.9 (19.5, 20.4)	767,065	2.7 (2.5, 2.8)	204,840	0.7 (0.6, 0.8)	22,158,118	76.7 (76.2, 77.2)
Age (years)								
12 to 14	439,316	7.6 (7.1, 8.2)	80,443	10.5 (9.0, 12.0)	10,212	5.0 (3.1, 6.9)	515,772	2.3 (2.2, 2.5)
15 to 19	674,130	11.7 (11.0, 12.4)	125,871	16.4 (14.4, 18.5)	36,292	17.7 (12.5, 22.9)	1,186,379	5.4 (5.1, 5.6)
20 to 29	1,060,198	18.4 (17.4, 19.4)	211,088	27.5 (24.2, 30.8)	51,019	24.9 (18.5, 31.3)	3,331,825	15 (14.6, 15.5)
30 to 39	931,684	16.2 (15.3, 17.1)	133,718	17.4 (14.9, 20.0)	43,880	21.4 (14.2, 28.6)	3,327,534	15 (14.5, 15.5)
40 to 49	1,016,561	17.7 (16.6, 18.7)	102,920	13.4 (10.9, 15.9)	37,044	18.1 (11.0, 25.2)	3,419,829	15.4 (14.9, 16)
50 to 59	900,920	15.6 (14.6, 16.7)	89,655	11.7 (9.0, 14.4)	18,103	8.8 (5.7, 12.0)	4,081,528	18.4 (17.9, 18.9)
60 to 64	302,105	5.2 (4.8, 5.7)	17,425	2.3 (1.4, 3.1)	5,932	2.9 (1.4, 4.4)	1,771,234	8.0 (7.7, 8.3)
65+	432,470	7.5 (7.0, 8.0)	5,945	0.8 (0.4, 1.1)	2,357	1.2 (0.4, 1.9)	4,524,017	20.4 (20.0, 20.8)
Gender[1]								
Women	2,477,386	43 (41.8, 44.3)	256,722	33.5 (30.4, 36.6)	67,093	32.8 (25.5, 40.0)	11,836,229	53.4 (52.8, 54.0)
Men	3,279,996	57 (55.7, 58.2)	510,343	66.5 (63.4, 69.6)	137,747	67.2 (60.0, 74.5)	10,321,889	46.6 (46.0, 47.2)
Racial identity[2]								
White	4,630,296	80.4 (79.4, 81.5)	610,866	79.6 (76.5, 82.7)	152,658	74.5 (66.9, 82.1)	16,611,873	75.0 (74.3, 75.6)
BIPOC	1,127,086	19.6 (18.5, 20.6)	156,199	20.4 (17.3, 23.5)	52,182	25.5 (17.9, 33.1)	5,546,245	25.0 (24.4, 25.7)
Adjusted Income Quintile								
Q1 (Low)	831,955	14.5 (13.5, 15.4)	139,495	18.2 (15.1, 21.3)	44,683	21.8 (14.6, 29)	4,553,317	20.5 (20.0, 21.1)
Q2	872,971	15.2 (14.3, 16.0)	144,024	18.8 (16.1, 21.5)	38,446	18.8 (13.0, 24.5)	4,631,941	20.9 (20.4, 21.4)
Q3	1,177,367	20.4 (19.4, 21.5)	138,847	18.1 (15.4, 20.8)	33,728	16.5 (11.4, 21.5)	4,535,892	20.5 (20.0, 21.0)
Q4	1,360,289	23.6 (22.6, 24.7)	167,417	21.8 (19.2, 24.4)	53,452	26.1 (19.2, 33.0)	4,265,911	19.3 (18.8, 19.7)
Q5 (high)	1,514,800	26.3 (25.2, 27.4)	177,283	23.1 (20.4, 25.8)	34,530	16.9 (11.6, 22.1)	4,171,058	18.8 (18.4, 19.3)
	Sum	Mean (95% CI)	Sum	Mean (95% CI)	Sum	Mean (95% CI)	Sum	Mean (95% CI)
# of trips	92,806,602	16.1 (15.6, 16.6)	39,937,874	52.1 (48.9, 55.3)	5,201,786	25.4 (21.3, 29.5)	n/a	n/a

*Results are reported as population weighted counts (N) and column percentages within each characteristic and bicycle type.

[1]CCHS collects "sex", without information on non-binary gender.

[2]The CCHS PUMF collapses racial identity to "white" or "visible minority"

Table 2: Survey weighted logistic regression results for three different models of bicycling participation in the previous 3 months including: 1) leisure bicycling only, 2) both leisure and work or school bike commuting, and 3) work or school bike commuting only.

		Leisure bicycling only	Both leisure and commute bicycling	Commute bicycling only
		OR (95% CI)	OR (95% CI)	OR (95% CI)
Age	12 to 14 years	2.56 (2.28, 2.88)	1.75 (1.42, 2.17)	0.89 (0.55, 1.43)
	15 to 19 years	1.75 (1.57, 1.94)	1.40 (1.14, 1.71)	1.65 (1.07, 2.54)
	20 to 29 years	Reference		
	30 to 39 years	0.87 (0.79, 0.96)	0.65 (0.52, 0.82)	0.90 (0.55, 1.48)
	40 to 49 years	0.90 (0.81, 1.00)	0.48 (0.38, 0.62)	0.74 (0.43, 1.26)
	50 to 59 years	0.65 (0.58, 0.72)	0.38 (0.28, 0.50)	0.32 (0.20, 0.51)
	60 to 64 years	0.52 (0.46, 0.58)	0.18 (0.12, 0.26)	0.26 (0.14, 0.46)
	65+	0.32 (0.29, 0.36)	0.03 (0.02, 0.04)	0.04 (0.02, 0.09)
Gender[1]	Women	Reference		
	Men	1.40 (1.32, 1.48)	2.01 (1.74, 2.32)	2.06 (1.48, 2.88)
Racial Identity[2]	White	Reference		
	BIPOC	0.68 (0.63, 0.74)	0.62 (0.50, 0.75)	0.80 (0.55, 1.17)
Income Quintile	Q1	Reference		
	Q2	1.04 (0.94, 1.16)	1.04 (0.80, 1.34)	0.87 (0.52, 1.47)
	Q3	1.32 (1.19, 1.46)	0.85 (0.65, 1.11)	0.66 (0.40, 1.1)
	Q4	1.53 (1.38, 1.69)	0.96 (0.76, 1.23)	0.99 (0.60, 1.64)
	Q5	1.74 (1.57, 1.92)	1.03 (0.80, 1.31)	0.64 (0.38, 1.06)

[1]CCHS collects "sex", without information on non-binary gender.

[2]The CCHS PUMF collapses racial identity to "white" or "visible minority".

An inverse relation between race and bicycling was not statistically significant for commute only (OR: 0.80, CI: 0.54,1.17), but was significant for bicycling for other purposes. Black, Indigenous, and People of Color (BIPOC) were 32% less likely to bicycle for leisure only (OR: 0.68, CI: 0.63,0.74) and 38% less likely to engage in bicycle for both commuter and leisure (OR: 0.62, CI: 0.50,0.75). The lack of racial diversity in leisure bicycling has been well documented in Canada and US (Hansen-Gillis 2020; Matthew 2016; Butler 2020). Advocates have called upon the cycling industry and city planners to address barriers to cycling and build safe and inclusive spaces for all people to have opportunities to cycle (Butler 2020; McGowan 2020).

While no clear pattern emerged for commute-related bicycling by household income, there was a pattern observed with leisure-only bicycling: people in the highest income quintiles were 74% more likely to leisure bicycle compared to people in the lowest income quintile (OR: 1.74, CI: 1.57,1.92) (Table 2).

Leisure is by far the most common reason for bicycling in Canada; there are 7 Canadians who bicycled for leisure for every 1 person that use their bicycle for commuting purposes. There are differences in who cycles for which purposes (leisure versus commute). This analysis of national data shows that people who bicycle for leisure were younger, male, and people who identify as white and have higher incomes. Commute bicycling captures only a very small

proportion of the population. Men were nearly twice as likely to use their bicycle for commuting purposes as compared to women, and there was a lower prevalence of commuting among BIPOC compared to whites, albeit this difference was not statistically significant. There are some caveats with using CCHS to characterize bicycling behaviour across Canadian populations. For instance, CCHS excludes on-reserve populations from their sampling frame. Better data sources are needed to capture bicycling among rural, remote, and Indigenous populations in Canada.

Census data provide finer geographic resolution than CCHS, but only count the number of people who use a bicycle as their main mode for commuting. We see here that only counting commute bicycling misses the majority of people who bicycle in Canada, and in particular women and younger cyclists. We note that the data used in this analysis are 7 years old, but are the most recent data available, given that the CCHS dropped bicycling questions following the 2013/14 cycle. Research is needed that incorporates data on bicycling purposes, and high geographic resolution census data to generate more accurate and small area estimates of bicycling. In addition to re-instating bicycling questions on the CCHS, Canada needs a national population-based household travel survey (Branion-Calles et al. 2021).

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