Does Driving While Intoxicated Differ by Substance and the Urban/Rural Divide?

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Introduction

Driving while intoxicated is a dangerous health behaviour with high risks legally and wellbeing-wise. How does geography and in particular, the rural/urban divide, affect risk behaviours related to driving while intoxicated, and are there differing patterns between cannabis consumption and alcohol consumption while driving? These questions will be explored using data from the 2019 Canadian Alcohol and Drugs Survey.

There is relevant research in this area. Fan et al. (2019) analyzed drinking and driving behaviours in the 2012-13 NESARC-III survey of the civilian US population and found that overall, there was no significant difference in the prevalence of drinking and driving between urban and rural areas. Leadbeater et al. (2008) studied intoxication while driving behaviours amongst youth in British Columbia and found that rural drivers reported higher rates of driving after consuming intoxicating substances. 17 percent of youth rural drivers reported having driven after drinking compared to 11 percent of urban youth drivers. For cannabis, the proportions for rural and urban youth drivers were 22 percent and 19 percent respectively. After controlling for age and sex, regression results reported insignificant differences along the urban-rural divide.

Methods

Data comes from the 2019 public version of the Canadian Alcohol and Drugs survey, which uses a sample representative of the makeup of the Canadian population by province. For regression analyses, the dependent variable is whether a respondent, in the previous 12 months, consumed two or more drinks within two hours before driving, or consumed cannabis within two hours before driving. Given the binary outcome, logit regressions were used to estimate coefficients.

The primary independent variable is a binary variable indicating whether the respondent lived in a rural or urban area. Controls included sets of educational achievement, province of residence, and household income.

Results

Prevalence of driving while intoxicated

	Alcohol					Cannabis				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
urban	-2.721***	0.271**	0.255**	0.218	0.189	-2.327***	-0.002	-0.011	-0.026	-0.010
	(0.059)	(0.130)	(0.129)	(0.133)	(0.135)	(0.103)	(0.206)	(0.204)	(0.216)	(0.220)
const		-2.892***	-3.631***	-3.024***	-3.462***		-2.214***	-2.189***	-2.254***	-2.042***
		(0.128)	(0.241)	(0.207)	(0.305)		(0.200)	(0.327)	(0.324)	(0.444)
Education controls		Yes			Yes		Yes			Yes
Income controls			Yes		Yes			Yes		Yes
Prov. Fixed Effects				Yes	Yes				Yes	Yes
Observations	6660	6660	6660	6660	6660	1563	1563	1563	1563	1563
Note:										*p<0.1; **p<0.05; ***p<0.01
										Regression type: Logit

Table 1: Regression results for alcohol consumption (models 1-5), cannabis consumption (6-10), and driving prevalence on living in a urban area

The results in Table 1 show a simple correlation between rural areas and more incidence of drinking and driving amongst drinkers who have driven a vehicle in the previous 12 months. The same result exists for cannabis. For alcohol, the coefficient changes signs once education and income controls are added, whereas the coefficient becomes insignificant for cannabis. With the education controls, being in an urban area increases the likelihood of drinking before driving by 31 percent. This may suggest that inequalities in income and education between urban and rural areas could explain this behaviour.

Figure A1 (see Appendix) plots the proportion, separated by province and urban/rural designation, of survey respondents who reported either having two or more drinks or consuming cannabis within two hours before driving. There is notable provincial variation, with Saskatchewan, rural Alberta, and Quebec having proportions of survey respondents who consume cannabis and drive above the national average.

In every province-urban segment except for urban Ontario, consuming cannabis before driving is reported more frequently than drinking and driving. Cannabis consumption before driving is markedly higher amongst cannabis consumers in rural Alberta and Quebec than drinking and driving for drinkers. Rural Albertans were 10 percentage points more likely to report they have consumed cannabis before driving than having two or more drinks. Rural Quebec residents were 7 percentage points more likely to report consuming cannabis before driving compared to drinking.

Frequency of intoxicated driving amongst intoxicated drivers

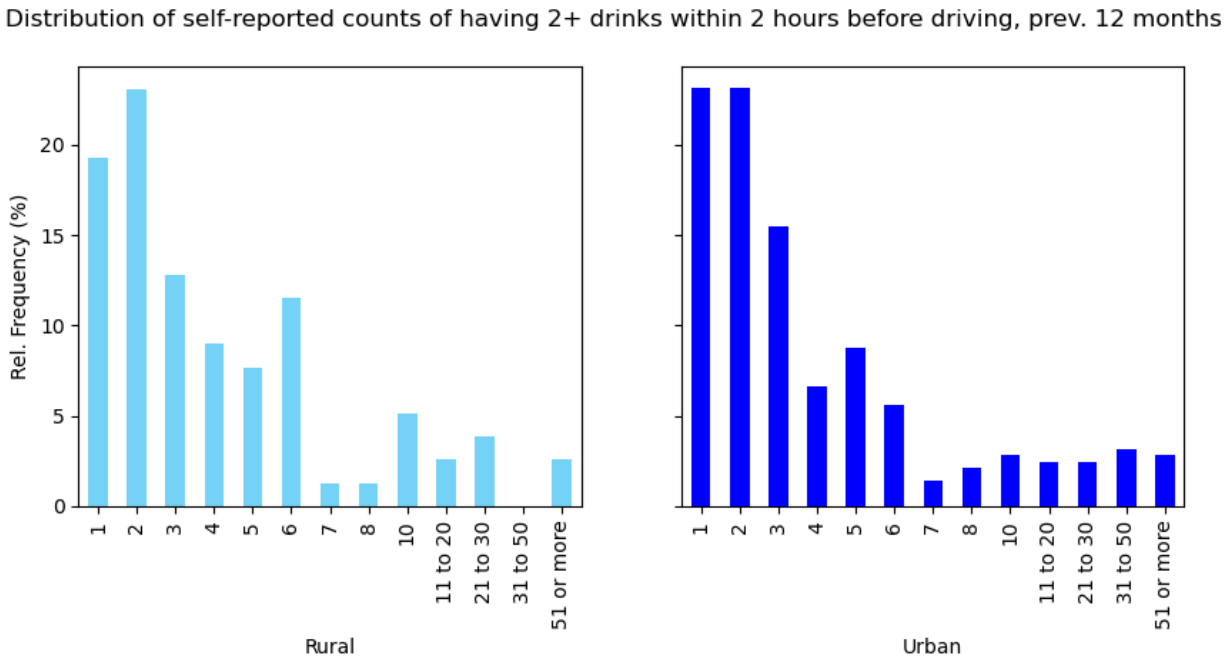

Figure 2: Relative frequency of drinking before driving incidents

Figure 2 shows the relative frequency, within rural and urban groupings, of the number of times over the previous 12 months that individuals had two or more drinks within two hours before driving. The data show that those in rural areas make up more of the moderate amount of incidences (4 to 10 times) compared to those living in urban areas. In the extreme cases (11+ times), the distributions are relatively more even. This suggests that, excluding the extreme cases, those in rural areas could be more inclined to drive under the influence of alcohol more frequently than their urban counterparts.

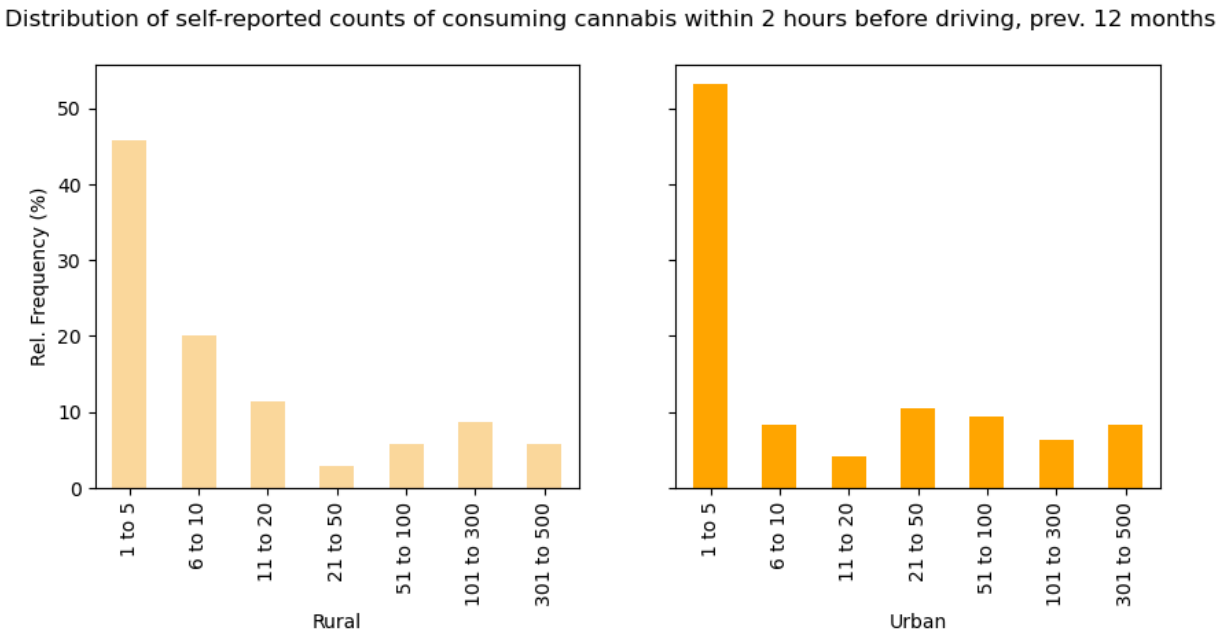

Figure 3: Relative frequency of consuming cannabis before driving incidents

Figure 3 shows the distribution of how many times respondents who reported having driven a vehicle after consuming cannabis, had done so in the previous 12 months. Rural areas more frequently consumed cannabis in the middle part of the scale (6 to 100 times) as opposed to urban areas. The proportion of those who reported consuming cannabis 6 to 10 times and 11 to 20 times before driving within the previous 12 months were 11.6 and 7.3 percentage points higher respectively in rural areas.

Compared to alcohol consumption, drivers who consume cannabis frequently before driving do so at an alarmingly larger relative rate. 38.4 percent of respondents in urban areas and 34.3 percent in rural areas who used cannabis before driving reported doing so more than 10 times during the previous year. In contrast, only 10.9 percent of respondents in urban areas and 9.0 percent in rural areas who reported having two or more drinks before driving did so more than 10 times in the previous year.

Conclusion

There is a simple correlation between living in a rural area and higher likelihood of consuming either alcohol or cannabis before driving. Adding education and income controls reverses the sign for alcohol consumption and makes it zero for cannabis. Segmented by province, there is notable variation in differences between alcohol and cannabis consumption and driving between rural and urban areas.

Those who consume cannabis while driving do so much more frequently on average than those who drink and drive. Comparing those who reported drinking before driving and consuming cannabis before driving respectively, the proportion of those who had driven under the influence

more than 10 times in the last 12 months was three times higher amongst cannabis users than drinkers. Future research should look into reasons for this disparity and examine in further detail what inequities between rural and urban areas explain the simple difference in driving-while-intoxicated prevalence.

References

Fan, A. Z., Grant, B. F., Ruan, W. J., Huang, B., & Chou, S. P. (2019). Drinking and driving among adults in the United States: Results from the 2012–2013 national epidemiologic survey on alcohol and related conditions-III. *Accident Analysis & Prevention*, *125*, 49–55. https://doi.org/10.1016/j.aap.2019.01.016

Leadbeater, B. J., Foran, K., & Grove-White, A. (2008). How much can you drink before driving? The influence of riding with impaired adults and peers on the driving behaviors of urban and rural youth. *Addiction*, *103*(4), 629–637. https://doi.org/10.1111/j.1360-0443.2008.02139.x

Statistics Canada. (2019). *Canadian Alcohol and Drugs Survey: Public Use Microdata File* [dataset]. https://www150.statcan.gc.ca/n1/pub/13-25-0005/132500052021001-eng.htm

Appendix

Figure A1 - Provincial segmentation of rates of consuming intoxicants before driving

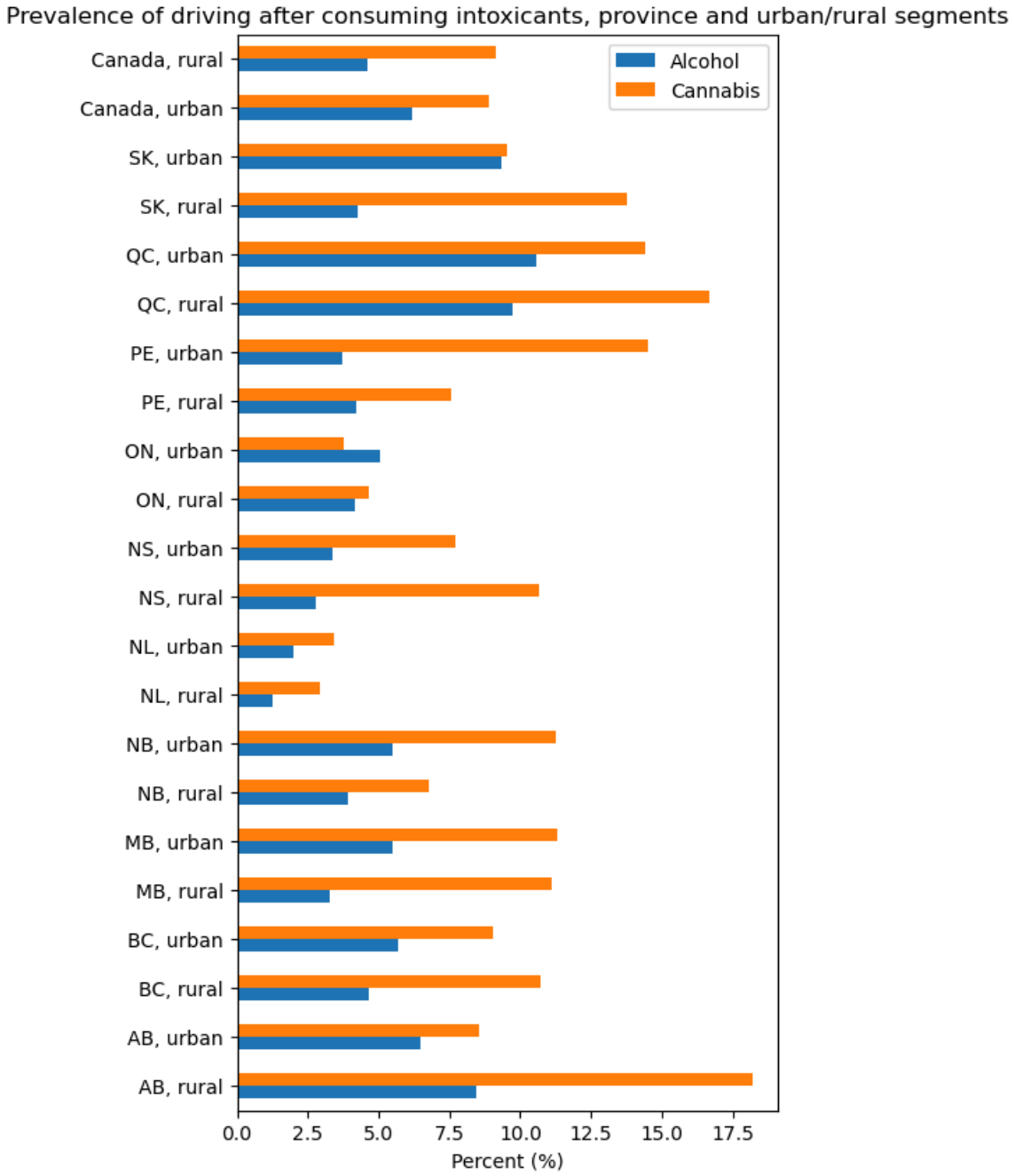

Table A2 - Detailed regression results for Models (2,3) and (7,8) of Table 1 (Education and income segment controls)

	Alcohol		Cannabis	
	(1)	(2)	(3)	(4)
urban	0.271**	0.255**	-0.002	-0.011
	(0.130)	(0.129)	(0.206)	(0.204)
HS	-0.328**		-0.083	
	(0.152)		(0.233)	
bel_BA	-0.734**		-0.087	
	(0.304)		(0.450)	
BA	0.019		-0.226	
	(0.133)		(0.238)	
abv_BA	-0.156		-0.342	
	(0.170)		(0.328)	
inc20_40		0.097		-0.093
		(0.296)		(0.393)
inc40_60		0.448*		0.142
		(0.267)		(0.359)
inc60_80		0.407		0.040
		(0.269)		(0.366)
inc80_100		0.964***		-0.122
		(0.260)		(0.387)
inc100_150		0.735***		-0.510
		(0.250)		(0.373)
inc_abv_150		1.088***		-0.193
		(0.244)		(0.360)
Observations	6660	6660	1563	1563
Note:		*p<0.1; **p<0.05; ***p<0.01		
				Regression type: Logit