Equitable Park Access: Advancing Sustainable Transportation for Urban Nature in Metro Vancouver, Canada

Urban Nature DEsign Research LAB
https://park.forestry.ubc.ca/

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Highlights

- **High car reliance in accessing urban nature leads not only to traffic and parking problems, but also to environmental and social equity issues**
- **Logistic regression models revealed the association between multiple attributes and mode choice to parks. Principal component analysis (PCA) identified the key improvements motivating mode shift from cars to sustainable modes**
- **Park visitors' use of sustainable modes (e.g., transit, biking, and walking) is associated with a complex interplay of their socio-demographics and trip-related attributes**
- **Urban planning, design, and policies for improved park facilities, transit services, and initiatives can shape towards a more sustainable mode share to access nature**

Introduction

- Accessing **larger open spaces** (e.g., national parks and forests, and regional parks) offers diverse opportunities for physical, cultural, and social activities, leading to a broader array of **health and social** benefits for urban residents
- Research showed that **marginalized groups**, such as low-income individuals, disabled populations, seniors, children, and people of color, heavily rely on **sustainable/alternative transportation**, due to **limited mobility choices and financial constraints**
- The **reliance on automobiles** in accessing large parks is particularly pronounced in North American cities, leading to various **social, environmental and park operational challenges**

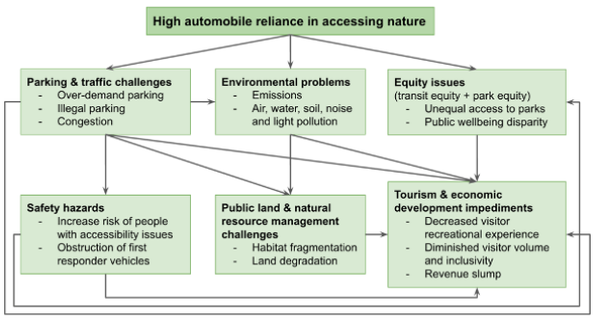

Figure 1. The negative impacts related to high automobile mode-share visiting nature

Research questions:

1) Which **socio-demographics** and **trip-related attributes** are associated with current and potential sustainable mode choice?
2) What are the **motivators and barriers** for park visitors to use sustainable travel modes?

Methods

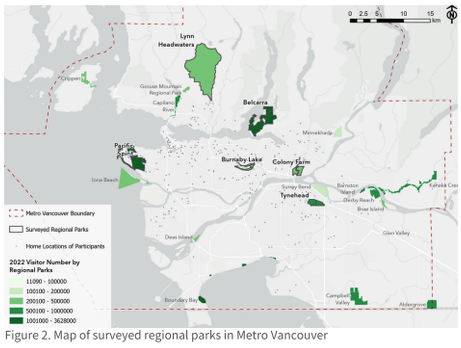

Figure 2. Map of surveyed regional parks in Metro Vancouver

Study sites:

- Six regional parks in Metro Vancouver, British Columbia, Canada

Data sources:

- Intercept surveys on park visitors June to July 2023 (n=430)
- Google API (trip distance)
- CANUE (neighborhood walkability index)

Data analyses:

- Descriptive statistics
- Multi-nominal and binary logistic regression
- Principal component analysis (PCA)

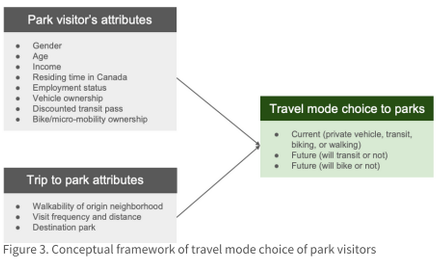

Figure 3. Conceptual framework of travel mode choice of park visitors

(Credit: Craig Sobering)

Figure 4. Photo of a surveyor intercepting visitors

Results

- Over **three-quarters** of the park visitors (77%) drive to regional parks
- Compared to travels to other destinations, there is a **higher car dominance in travels to parks**
- Park visitors having cars **less likely chose sustainable modes**, and indicated l**ower willingness to use transit and bikes** for their future visits
- Park visitors from neighborhoods **with higher walkability index and closer to the destination parks** more likely chose walking

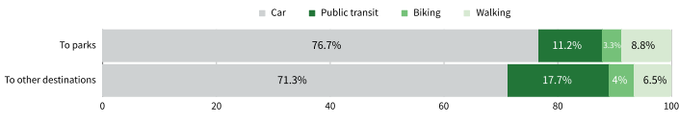

Table 1. Coefficients of logistic regression models by independent variables (***p<.01, **p<.05, *p<.1).

		Travel mode to park			Will take transit to park	Will bike to park
		Public transit	Biking	Walking		
Park visitor's attributes	Gender (Cisgender)	0.461	0.739	0.472	-0.224	**-0.545****
	Income (More than 50,000$)	-0.136	-0.083	-0.112	0.293	0.183
	Residing time (More than 5 years)	-1.054	0.659	**-1.972***	-0.650	**-0.859***
	Employment status (Working)	0.201	0.397	-0.386	0.119	0.518*
	Age	-0.558	-0.305	0.214	**-0.404***	-0.336
	Access to car	**-2.952*****	**-2.521****	**-2.045****	**-1.295****	**-1.158****
	Access to bike	-0.626	18.812	1.044	-0.268	**1.031*****
	Discounted transit pass	**1.254****	-0.510	-0.526	0.071	-0.564
Trip-to- park attributes	Walkability of home neighborhood	**0.506***	1.607	**3.033****	-0.263	-0.174
	Visit frequency	-0.092	-0.229	**0.353***	-0.079	**0.144***
	Trip distance	0.003	**-0.232****	**-0.264*****	0.012	-0.003
	Park 1	**1.894****	14.446	13.277	**0.877***	0.643
	Park 2	0.168	-5.910	11.623	**0.906****	**0.766***
	Park 3	0.310	-3.842	13.337	-0.514	0.538
	Park 4	1.322	14.192	15.316	**1.009****	**1.151****
	Park 5	-15.129	14.352	14.439	0.066	0.873

- Male participants indicated **lower willingness to bike** for future visits compared to other genders. People owning bikes more likely chose cycling to parks
- Participants visiting parks with **Good to Excellent Transit/Biking Accessibility Rating** more likely indicated higher willingness to use transit and bikes for future visits
- Improvements in **gears and amenities**, and **transit connectivity** are most likely encouraging more visitors shift from driving to transit
- Improvements in **facilities and programs**, and **quality of cycling routes** are two key factors in promoting bike use to parks

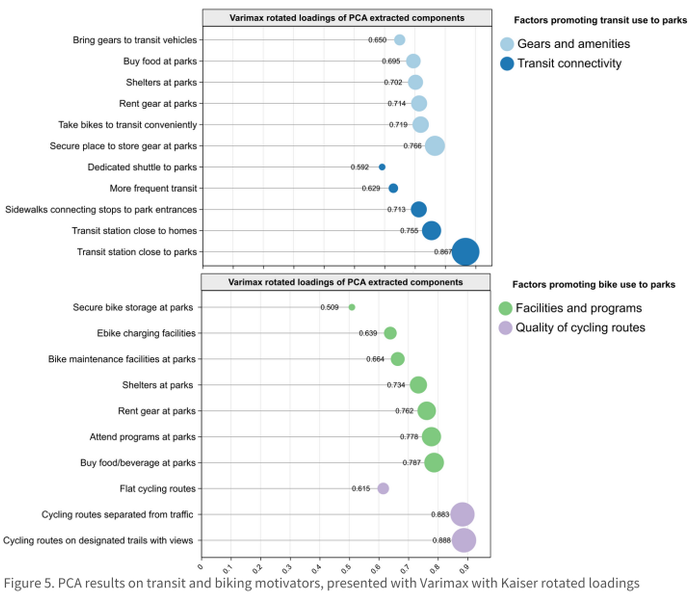

Figure 5. PCA results on transit and biking motivators, presented with Varimax with Kaiser rotated loadings

Discussion and conclusions

Greener — *Low-carbon travels*

Healthier — *Active living & benefits of nature*

More Equitable — *Park equity & environmental justice*

- The current and future use of sustainable transportation modes by park visitors are associated with **a complex interplay of socio-demographic factors and trip-to-park attributes.** These include gender, car and bike ownership, possession of discounted transit passes, features of the destination park, and the walkability of their home neighborhoods
- Although travels to large parks present a greater reliance on car compared to other destinations, there is significant potential for a shift towards more sustainable modes. This can be achieved through **strategic planning and design improvements in park facilities, transit services, infrastructure, and various programs and initiatives**
- Our findings offer globle insights for **urban planners and policymakers,** aimed at improving urban residents' access to nature. Effectively fostering the adoption of alternative transportation modes on a systemic level will require plans and designs tailored to unique national, regional, and municipal contexts. This efforts signifies our collective contribution toward shaping urban futures that are **healthy, equitable, and environmentally sustainable.**