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Effects of the Objective and Perceived Built Environment on Bicycling for Transportation

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EFFECTS OF THE OBJECTIVE AND PERCEIVED BUILT ENVIRONMENT ON BICYCLING FOR TRANSPORTATION

Portland State UNIVERSITY

OTREC OREGON TRANSPORTATION RESEARCH AND EDUCATION CONSORTIUM

U.S. Department of Transportation Research and Innovative Technology Administration

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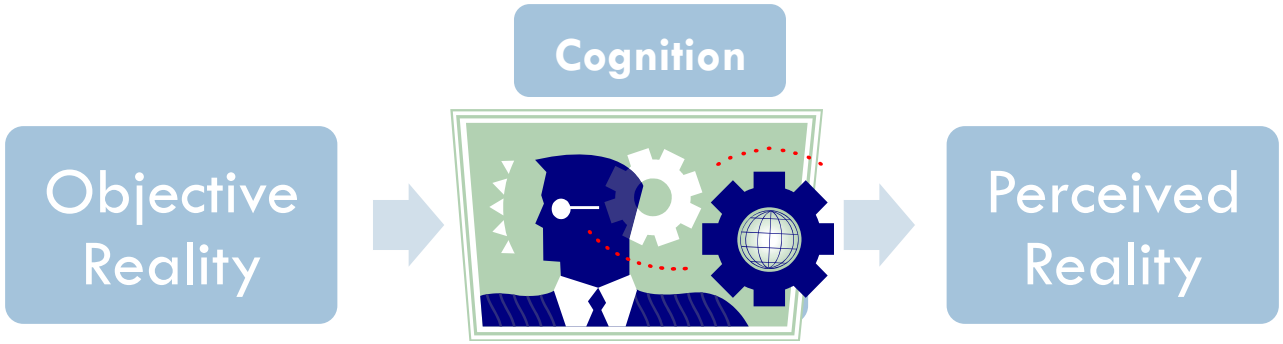
INTRODUCTION

- A growing number of studies link various features of the built environment to walking and bicycling behavior
- Two types of built environment measures are generally used: **Perceived** (self-reported) measures and **Objective** (GIS-based) measures
- Little previous research, however, questions whether perceptions of the built environment correspond to the objectively-measured built environment

INTRODUCTION



- We perceive outside environment through primary receptive senses: sight, smell, hearing, taste and touch
- All these sensory inputs are then integrated to form our cognitive representation of the environment
- A mix of individual and societal factors influence the understanding of these cognitive representation

OBJECTIVE

- This study aims to test the relative effects of perceived environment and objective environment on bicycling behavior

Data

- The data were obtained through a random phone survey of adults in the Portland, Oregon region.
- The sample included both land-line and mobile phone numbers and was conducted July 19 through August 10, 2011. A total of 902 interviews were completed. Of those, 130 (14 percent) were completed on mobile phones.
- The mobile phone sample was used to help reduce sampling bias, particularly among younger adults. The overall response rate was 20%.

METHOD

- Built Environmental Variables:

Perceived Measures (Survey)	Candidate Objective Measures (GIS)
There are off-street bike trails or paved paths in or near my neighborhood that are easy to get to. (Likert Scale: 1-4)	Miles of off-street bike path within 1/8-, 1/4- 1/2- and 1-mile circular and network buffers
	Distance to the nearest off-street bike path
There are bike lanes that are easy to get to. (Likert Scale: 1-4)	Miles of bike lane within 1/8-, 1/4- 1/2- and 1-mile circular and network buffers
	Distance to the nearest bike lane
There are quiet streets, without bike lanes, that are easy to get to on a bike. (Likert Scale: 1-4)	Miles of minor street within 1/8-, 1/4- 1/2- and 1-mile circular and network buffers
	Distance to the nearest minor street
Many of the places I need to get to regularly are within biking distance of my home. (Likert Scale: 1-5)	# retail jobs within 1/8-, 1/4- 1/2- and 1-mile circular and network buffers

METHOD

- Correlation between objective and perceived measures

	Perceived off-street bike paths	Perceived bike lanes	Perceived quiet streets	Perceived bike destinations
Miles of off-street bike path (GIS)	0.1553			
Miles of bike lane (GIS)		0.1410		
Miles of minor street (GIS)			0.1837	
Number of retail jobs (GIS)				0.1533

Method

- Dependent Variables:
  - (1) whether the respondent had transportation bicycling in the past month? (Binary logit model)
  - (2) if yes, how many days did she or he bicycle for transportation in the past month? (Multivariate linear)

Method

- Models

Model 1	Model 2	Model 3	Model 4
Socio-Demographics	Socio-Demographics	Socio-Demographics	Socio-Demographics
Perceived Built Environment		Perceived Built Environment	Perceived Built Environment
	Objective Built Environment	Objective Built Environment	Objective Built Environment
			Attitudes and Social Environment

RESULTS- does a person bicycle?

	Model 1	Model 2	Model 3	Model 4
	Coef.	Coef.	Coef.	Coef.
Socio-Demographics				
Age	-***	-***	-***	-***
Female	-**	-**	-**	-**
General health condition	+***	+***	+***	+**
Built Environment				
Perceived there are off-street bike paths	+		+	+
Perceived there are bike lanes	+		+	-
Perceived there are quiet streets easy for bike	+		+	-
Perceived there are many bike destinations	+***		+***	-
Miles of off-street bike path (GIS)		+	+	+***
Miles of bike lane (GIS)		-	-	+***
Miles of minor street (GIS)		+***	+***	+***
Number of retail jobs (GIS)		-	-	-***
Attitudes and Social Environment				
Pro-bike attitudes				+***
Supporting social environment for bicycling				+***
Terrain				
% area with a slope larger than 25 percent	-***	-***	-***	-
Pseudo R2	0.134	0.128	0.155	0.370

RESULTS- how often she/he bicycle?

	Model 1	Model 2	Model 3	Model 4
	Coef.	Coef.	Coef.	Coef.
Social-Demographics				
Age	-**	-	-**	-**
Whether child in household	-**	-*	-**	-*
Female	-***	-***	-***	-***
General health condition	+**	+**	+**	+
Built Environment				
Perceived there are off-street bike paths	-**		-**	-***
Perceived there are bike lanes	-		-	-
Perceived there are quiet streets easy for bike	+**		+**	+**
Perceived there are many bike destinations	+***		+***	+***
Miles of off-street bike path (GIS)		+***	+***	+***
Miles of bike lane (GIS)		-	+	-
Miles of minor street (GIS)		+***	+***	+
Number of retail jobs (GIS)		+***	+*	+**
Attitudes and Social Environment				
Pro-bike attitudes				+***
Supporting social environment for bicycling				-
Terrain				
% area with a slope larger than 25 percent	-	+	-	-
Adjust R2	0.164	0.083	0.184	0.288

Main Findings

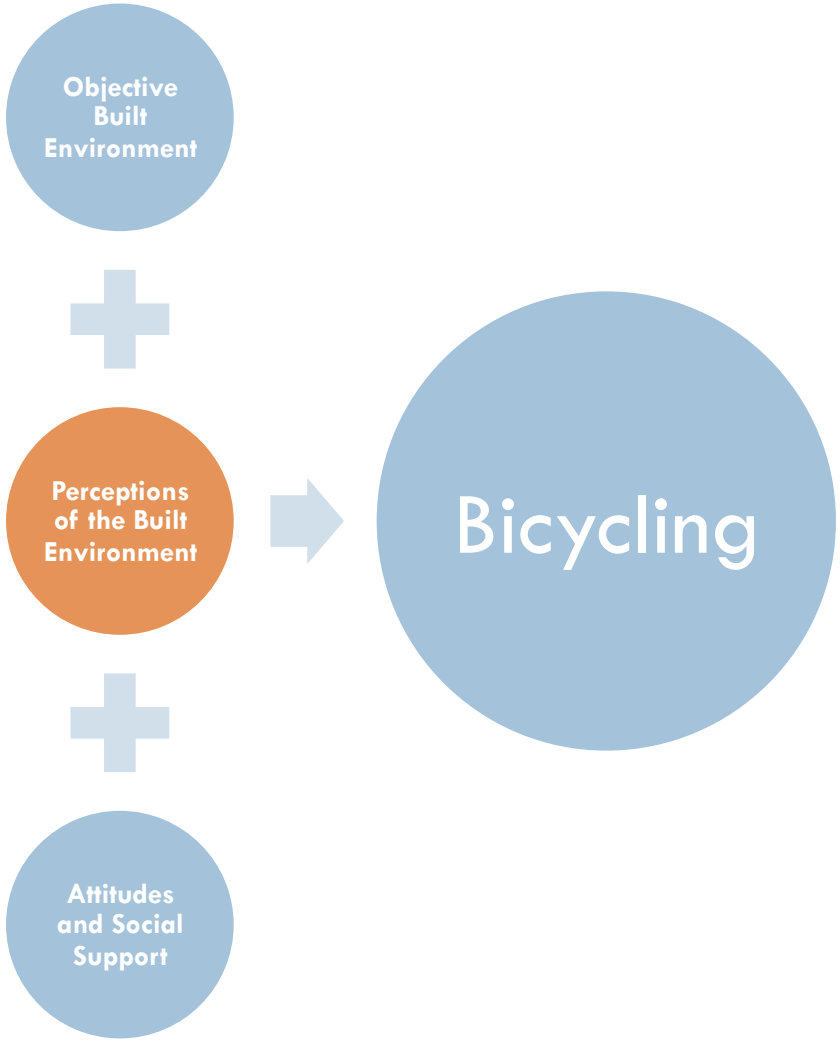
- Perceived and objective built-environment have independent associations with bicycling propensity and bicycling frequency.
- Models with both perceived and objective measures explain more than models with just one or the other.
- Attitudes and social environment play important roles on their bicycling behavior, and therefore interventions programs aiming to encourage positive attitudes and supportive culture on bicycling are necessary.

Conclusions

Urban Planning and Design

Marketing Programs
Public bicycling events, such as "ciclovias" and the city of Portland's Sunday Parkways

Bicycling education programs
Interventions at early ages



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- Questions and Comments?