



Roadway Bicycle Compatibility, Livability, and Environmental Justice Performance Measures

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Overview

1. Introduction
2. Bicycle Compatibility
3. Environmental Justice
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Introduction

U.S. Partnership for Sustainability Principals Livability Principal # 1:

Provide more transportation choices.

Develop safe, reliable and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions and promote public health.



Introduction - Bicycling & EJ, What's the Problem?

- Regional Equity (Duthie, Cervenka and Waller 2007)
- Pollution (Deka 2004)
- Road user safety (Dumbaugh and Rae 2009)
- Access to jobs (Boschmann and Kwan 2010)

Introduction

What's the Problem?

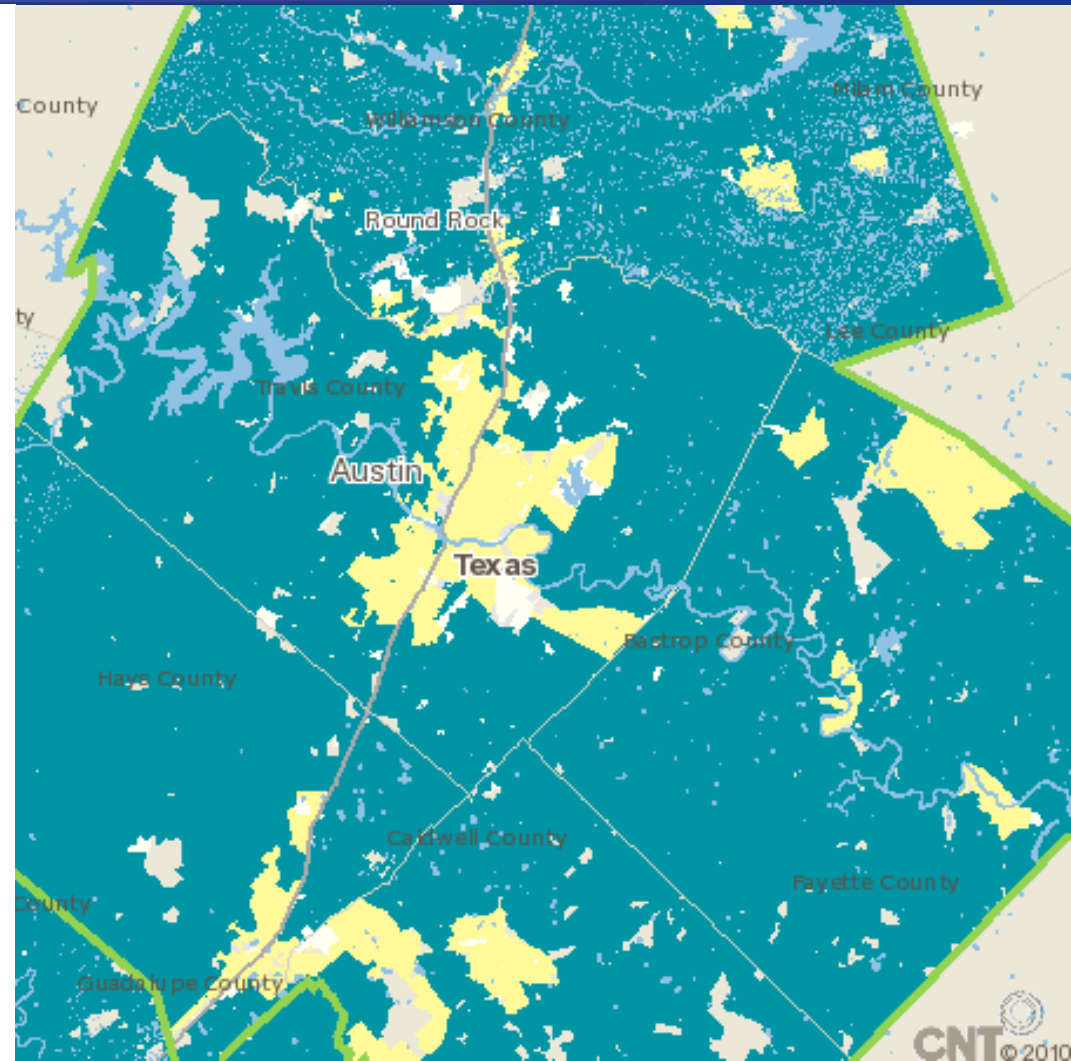
"Do we really want to restrict cycling to a tiny percentage of the population and exclude most women, children, and seniors? Or should we be truly inclusive and design our cycling policies for everyone?" (Pucher and Buehler 2009, 63)

Introduction – Housing + Transportation Costs

H+T Costs, % Income
(median)

- Data not available
- Less than 45%
- 45% and Greater

Source: Center for Neighborhood
Technology, htaindex.cnt.org.
For more, see Haas, et al (2009)



Introduction

Datasets:

- Regional roadways (bicycling subset)
CAMPO, 2009
- Census Tracts, American Community
Survey, 2009

Bicycle Compatibility Index



BCI= bike lane, width, volume, speed,
parking, land use, adjustment factors
(Harkey, Reinfurt and Sorton 1998)



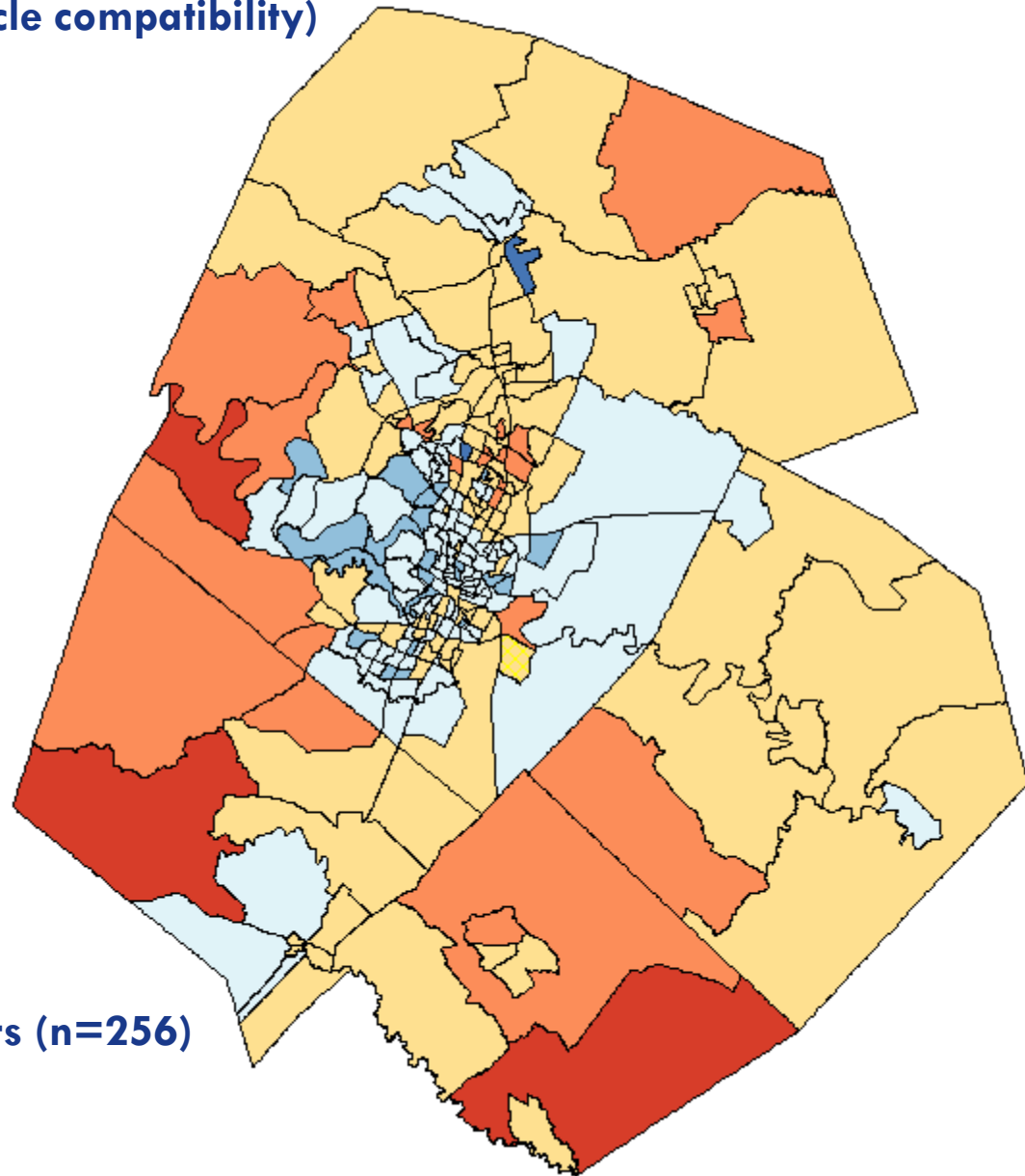
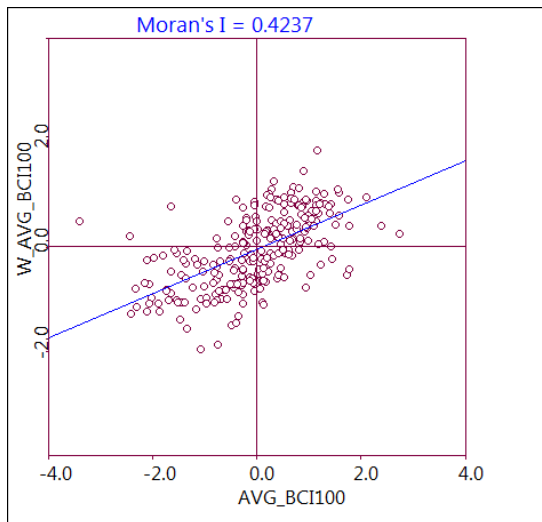
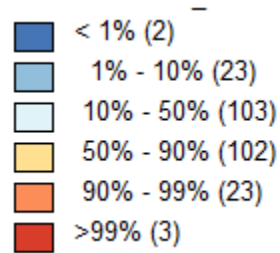
Bicycle Compatibility

Applying to a regional network:

1. Start with MPO's modeling network
2. Add missing variables with Google Streetview, functional class estimations
3. Calculate BCI or BLOS in spreadsheet
4. Summarize in polygons

Average Bicycle Compatibility Index

Percentile (1st % = best bicycle compatibility)



Geography: Census Tracts (n=256)

Environmental Justice

Common variables are % minority and income

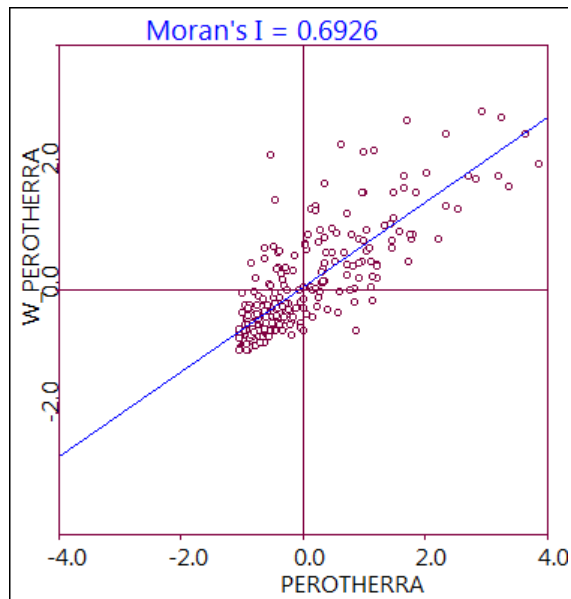
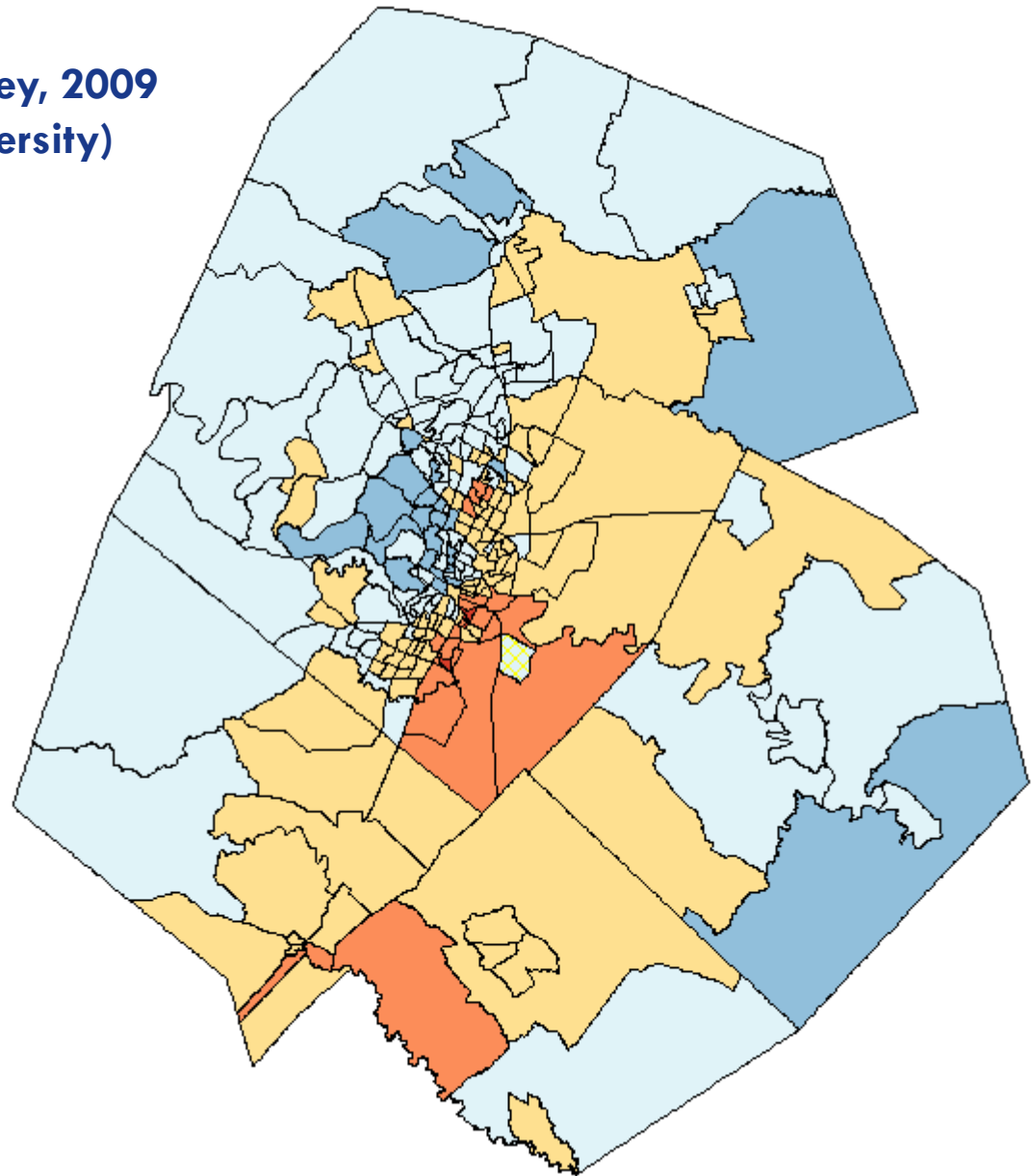
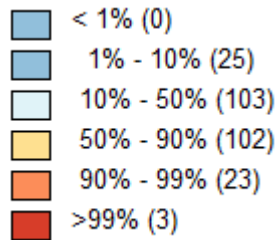
1. American Community Survey ' % Other Race' & 'median income' joined to Census Tracts
2. Roadway BCI joined to census tracts via 200' buffer (Dumbaugh and Rae 2009, p. 317)



Percent Other Race

American Community Survey, 2009

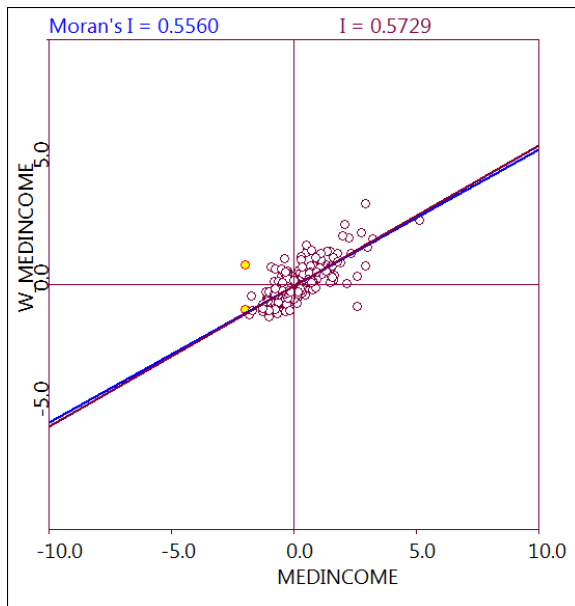
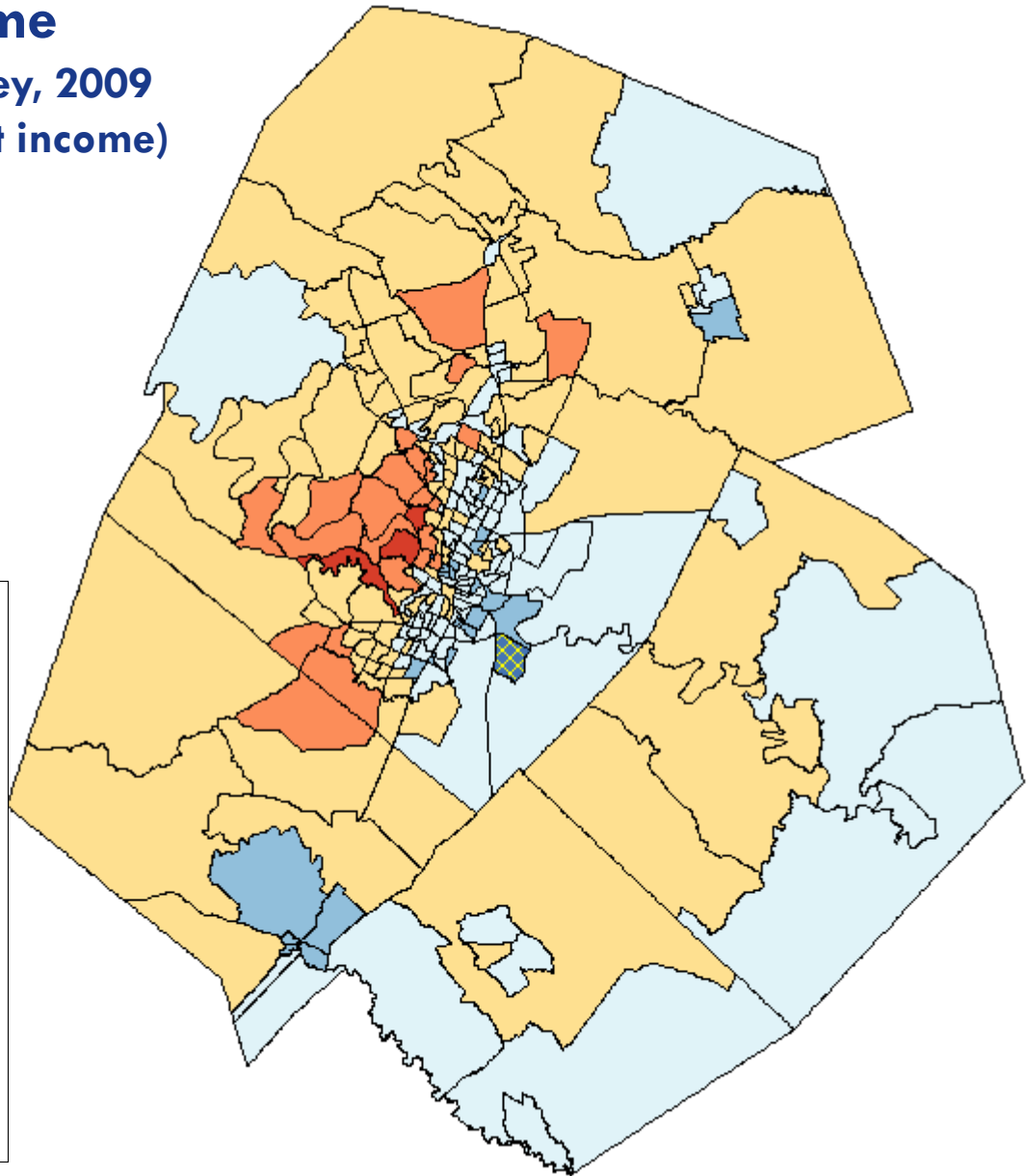
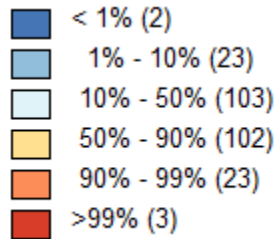
Percentile (1st % = least diversity)



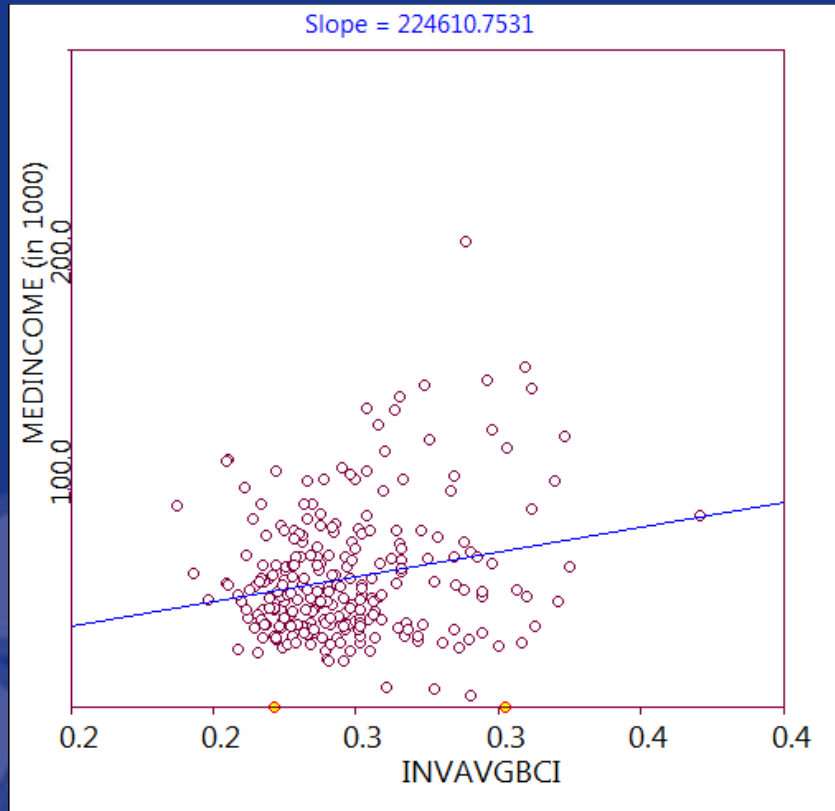
Median Family Income

American Community Survey, 2009

Percentile (99th% = highest income)



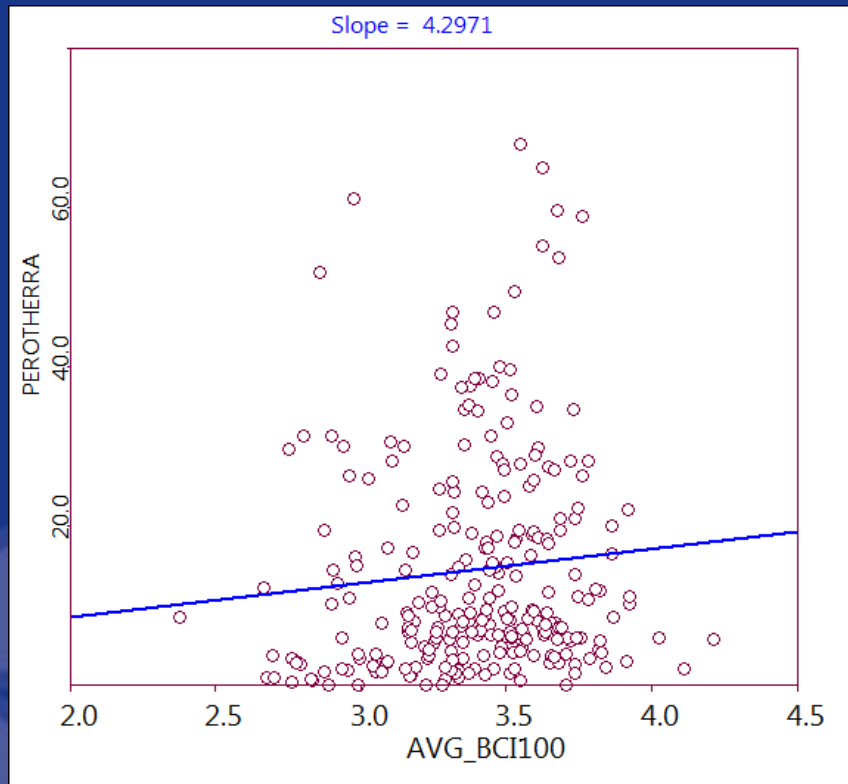
Median Income & Bicycle Compatibility (inv.)



OLS R^2 : 0.003086

F-statistic: 0.786387

% Other Race & Bicycle Compatibility



OLS R^2 : 0.008614

F-statistic: 2.20702



Bicycle Compatibility & Environmental Justice

Conclusion:

- In the Austin metro area, income or race are not significantly correlated with bicycle compatibility.



Future Work

- Improve data sources
 - Complete sidewalk network & add PLOS variables
 - 2010 Census data & new EJ definitions
 - Enhance bicycle network data with BCI or BLOS variables

Future Work

- Apply the method in other places
 - Are there locations that reveal clustering (Moran's I) and BCI inequities to demographics (R^2)?
 - Texas, U.S., international?



Future Work

- Monitoring Results
 - Perform counts at different locations with similar urban form variables to isolate socio-demographic influences



Future Work

Consider demand, not just supply:

- Apply Iacono et al.'s (2010) non-motorized accessibility to an EJ framework.
- Is WalkScore more predictive of active transportation than infrastructure?



Questions?

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