

Bike Lane Accessibility In Seattle, WA

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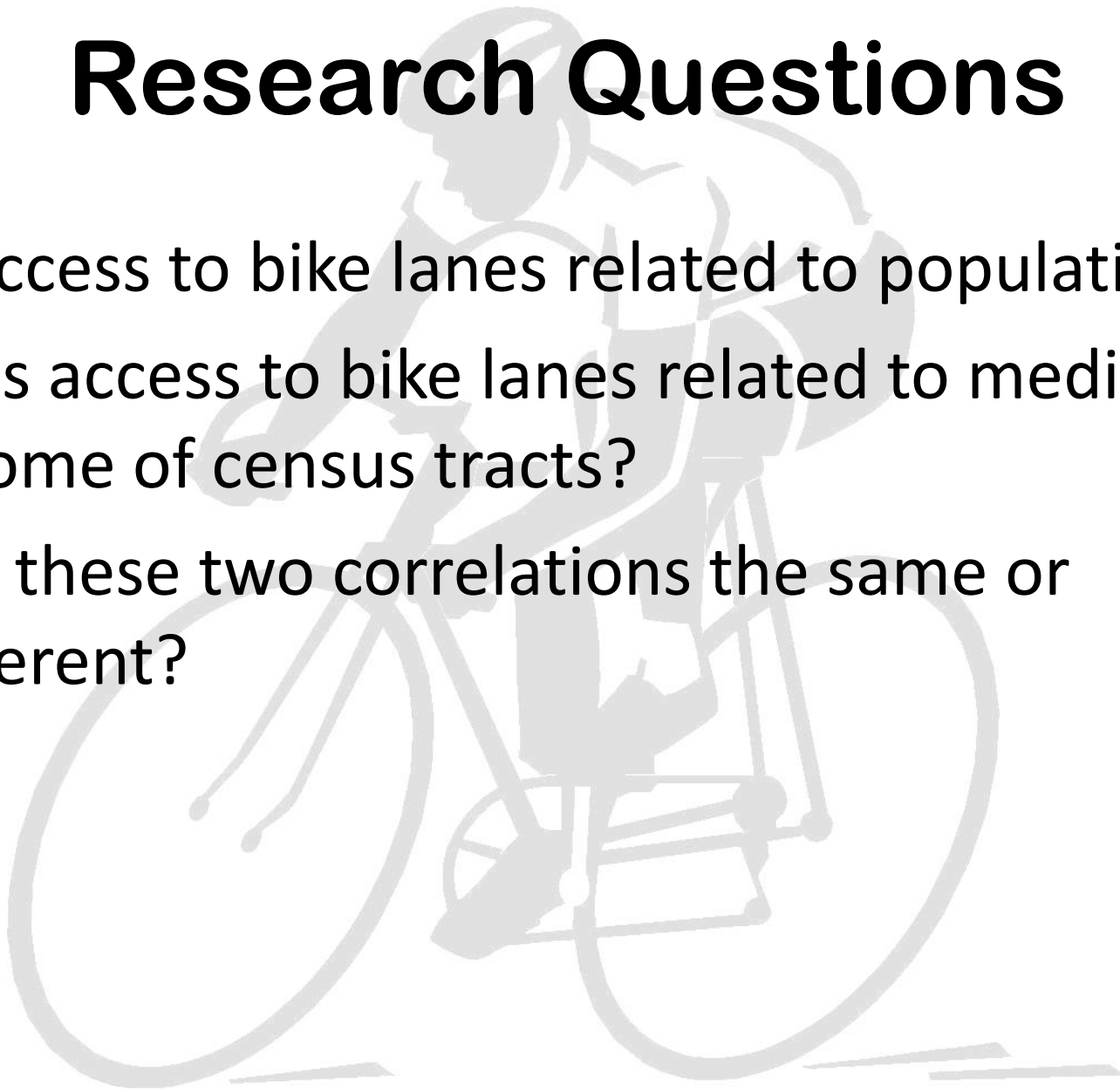
Significance



- Promote Alternative Transportation
- Active Living by Design (ALbD)
 - National movement for active lifestyles
 - Initiative to promote bikeable cities
- Promote adherence to climate standards
 - Municipal participation
- Promote healthy lifestyles across socioeconomic boundaries

Research Questions

- Is access to bike lanes related to population?
- Or is access to bike lanes related to median income of census tracts?
- Are these two correlations the same or different?



GIS Methodology



- Allows us to quantify access
- Allows us to contextualize transportation in demographic context
- Allows a statistical analysis of relative levels of access

Challenge of Quantifying Access

- Enumeration units

County>City>Census Tract>Block Group>Block

- Median income vs population

County:

Census Block Group		Block							
Census Tract									
City									



Data Acquisition

Data Source



- Washington State Geospatial Data Archive
- Central File Server
- Contains data sets created by University of Washington students or researchers.
- Accessible by students through a license agreement
- Some data sets are available through public domain

Geodemographic



- King County Census Tract polygons
- Summary File 3 Data (Long form attributes)
 - Population
 - Median Income

Bike Lane Distribution



- City of Seattle GIS Department
- Line shapefile
 - Segment distance
 - Street info
 - Lacking locational attribute
- Required further preparation

Data Preparation



Data Classes

- Census Tracts
- Bike Lanes

ArcGIS Software Functions

- Joined SF3 data to polygons
- Spatial Join of Bike lanes to polygons

Census Tracts



- Trimmed to extent of bike lanes
- Limits geographic context to Seattle Census tracts only
- Joining of Median Income and Population data
- Based on a relational key

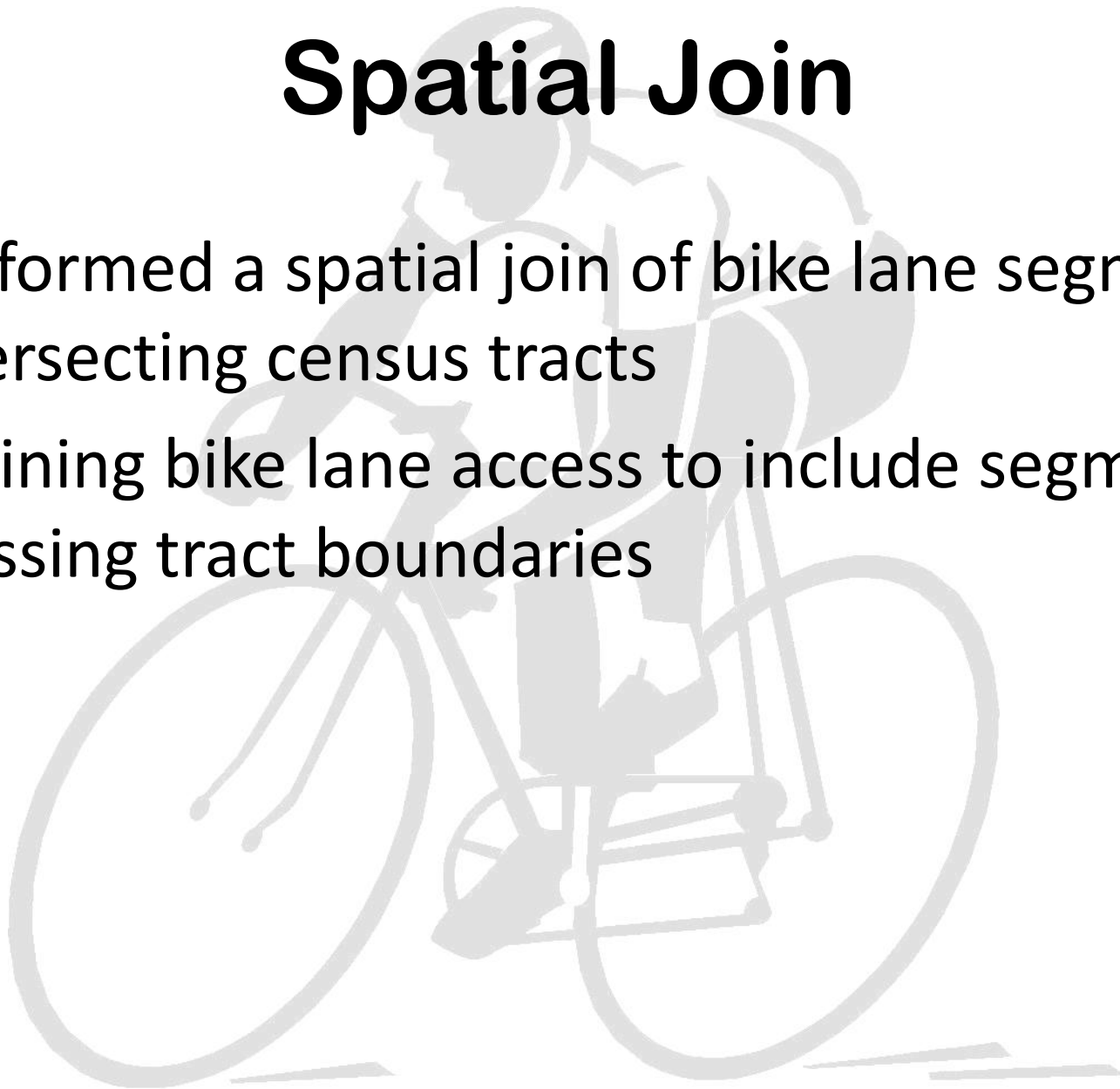
Bike Lanes



- Deleted bike lanes extending outside of our study area
- “Trimmed” the “loose threads”
 - Possibility of over-counting bike lanes for edge tracts
 - Removed possible confounding variable

Spatial Join

- Performed a spatial join of bike lane segments intersecting census tracts
- Defining bike lane access to include segments crossing tract boundaries



Statistical Analysis

Using Correlation coefficient w/ Pearson Table

Control variables:

- Population of the census tract
- Median income of the census tract

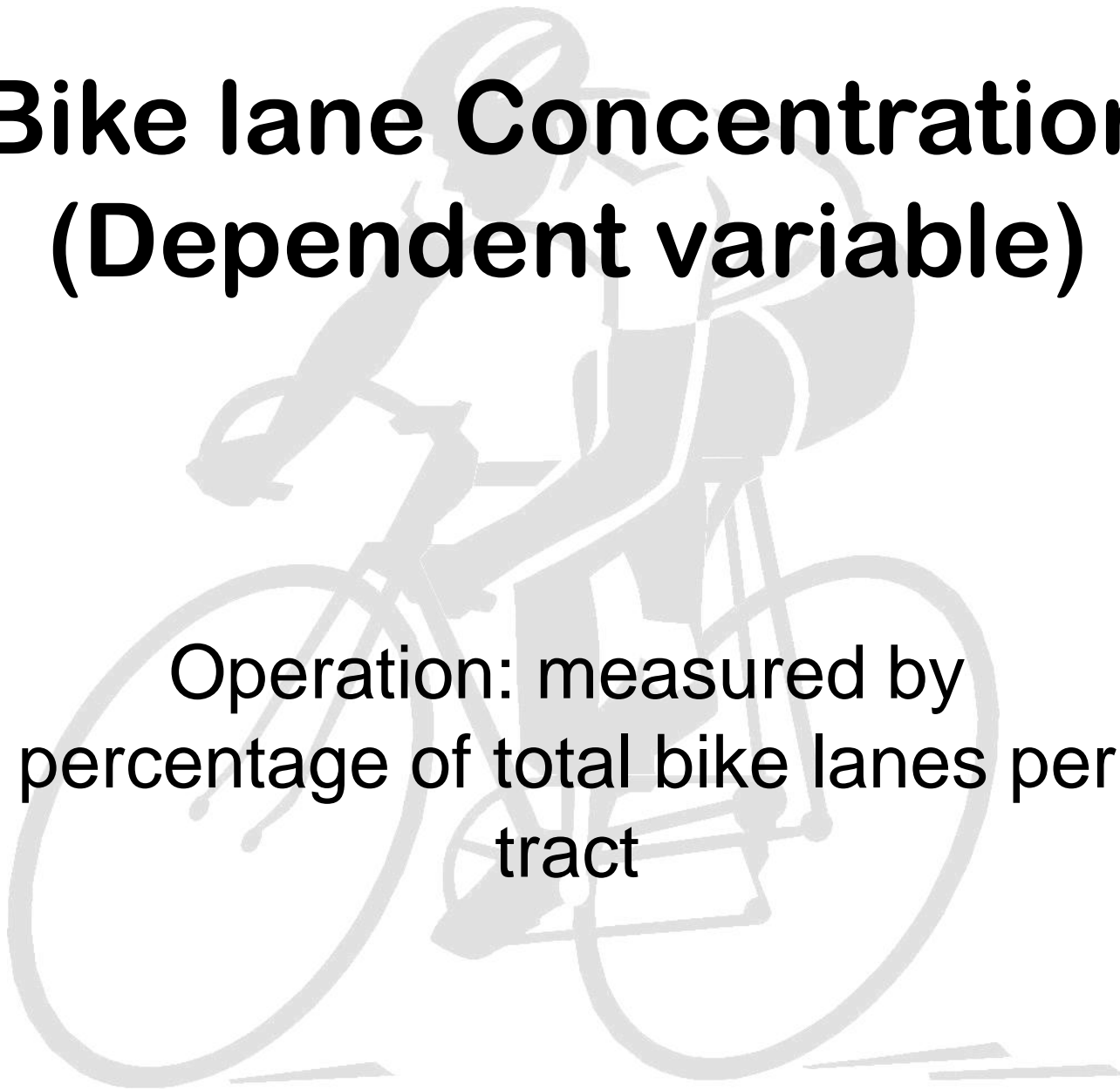
Operation of variable:

- Pop variance per tract
 - (z score)
- Median income variance per tract
 - (z score)

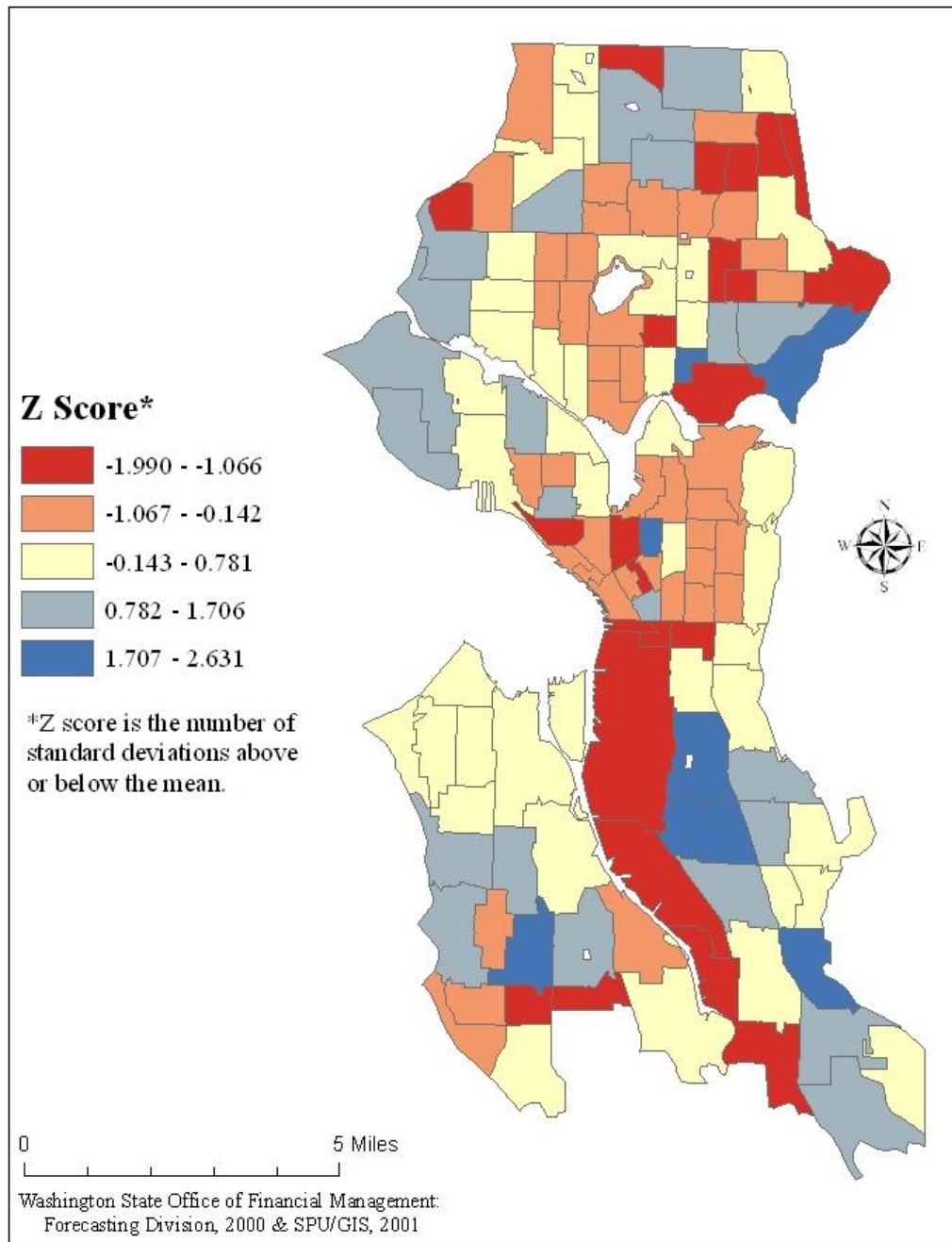
Reason: We wanted to assess the relative levels of population and income concentration in terms of their ability to predict our dependent variable: Bike lane concentration.

Bike lane Concentration (Dependent variable)

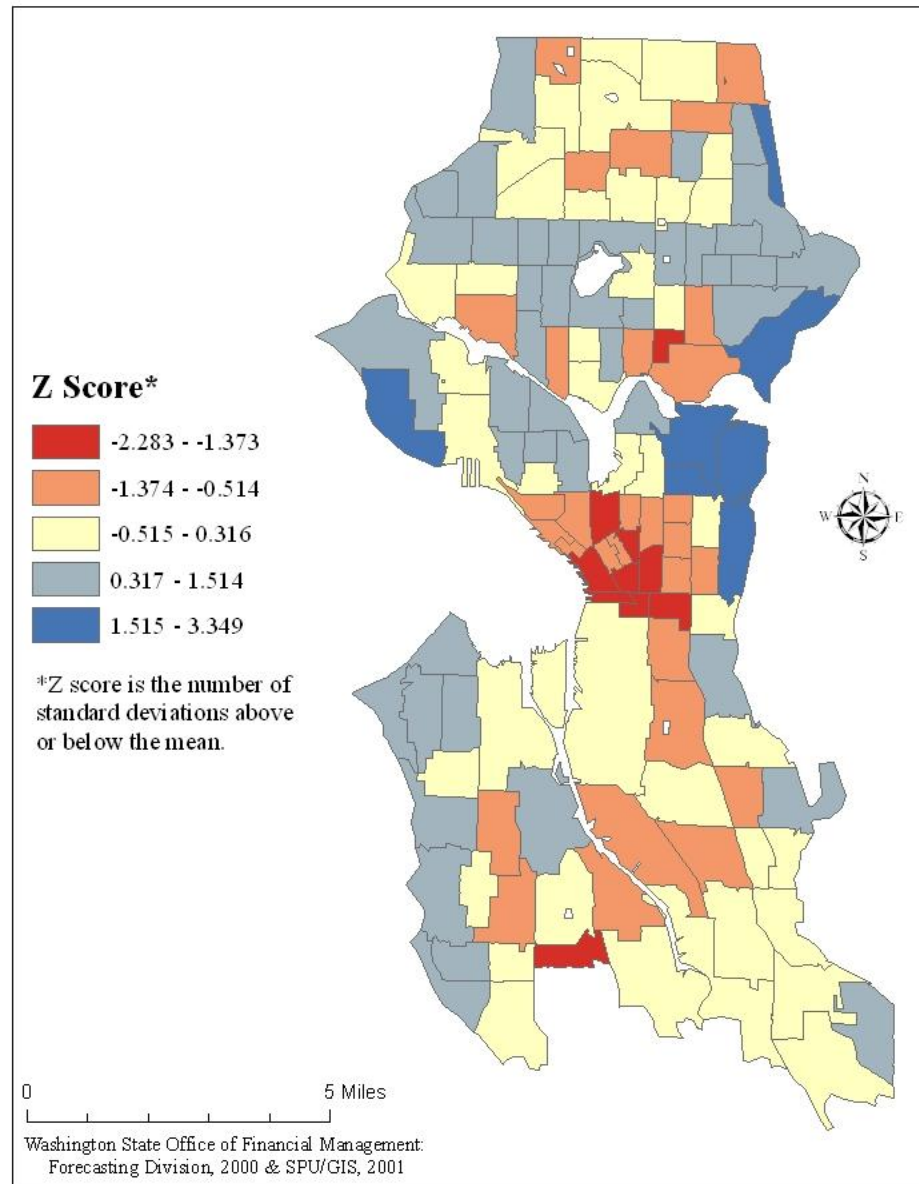
Operation: measured by
percentage of total bike lanes per
tract



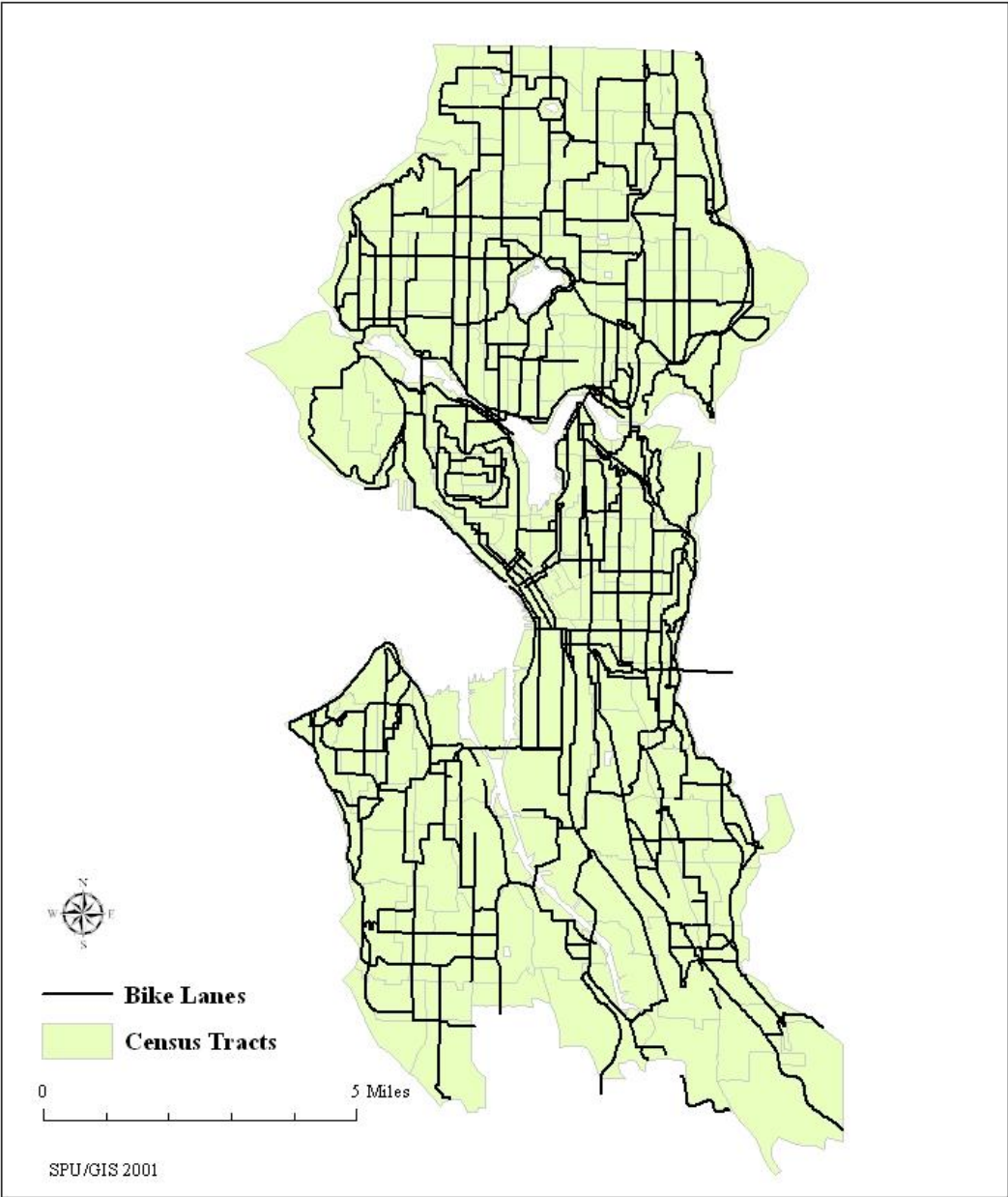
Population Z Score for Seattle, WA, 2000



Median Income Z Score for Seattle, WA, 2000



Bike Lanes of Seattle, WA, 2000



Hypothesis Test



- H_0 : There is *NO* association between population/median income and % bike lane per tract

- H_a : There *IS* an association between population/median income and % bike lane per tract

Method: Calculate correlation coefficient, test for significance using Pearson table of critical values at .05 significance level.

Calculations:

Covariance

Covariance between
population z
score/bike lane %

$$r = .231^*$$

Covariance between
median income z
score and bike lane %

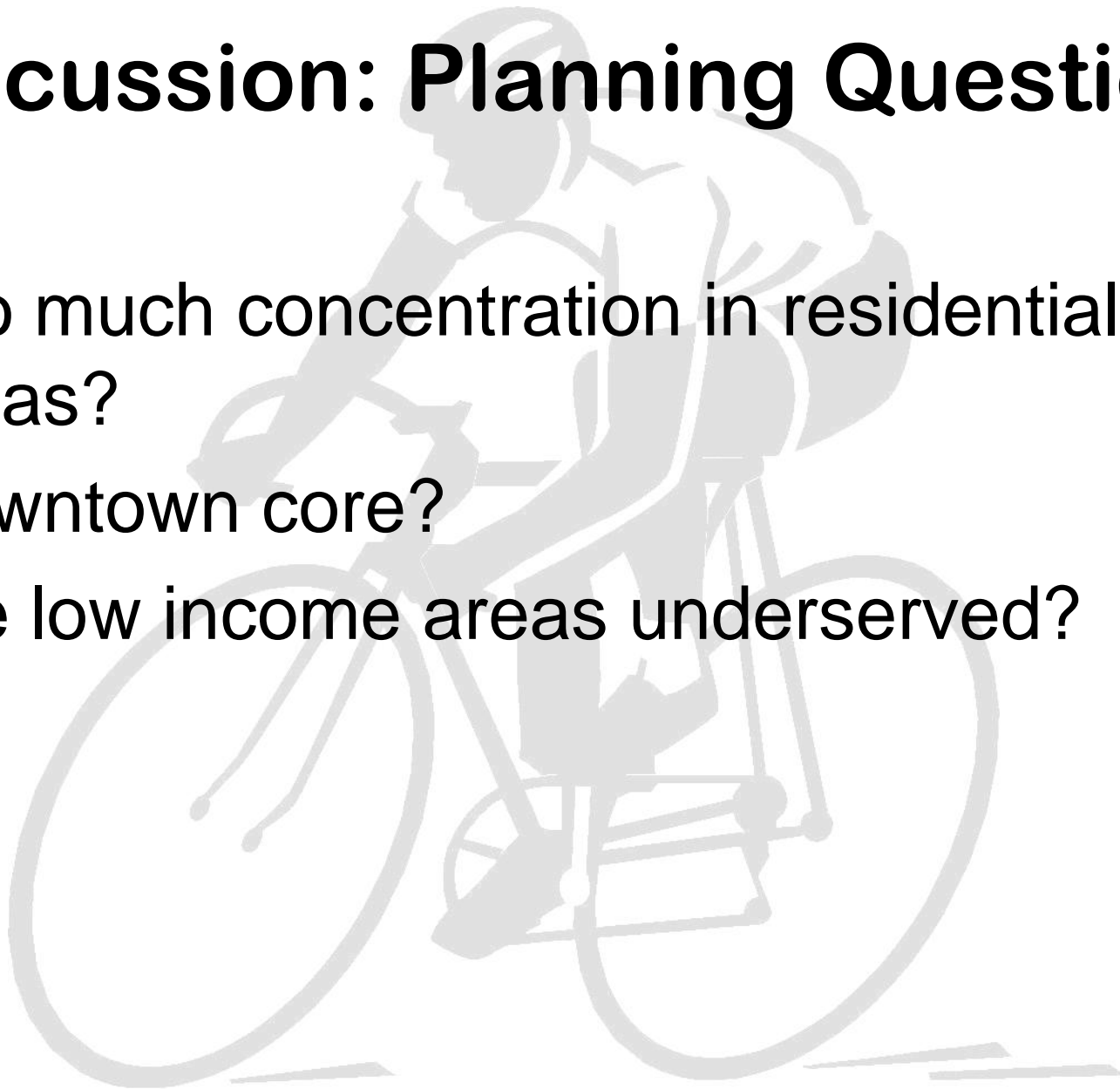
$$r = .235^*$$

**Both are higher than the critical values, so
we reject both null hypotheses**

*129 degrees of freedom

Discussion: Planning Questions

- Too much concentration in residential areas?
- Downtown core?
- Are low income areas underserved?



Discussion: Data Quality Issues and Areas for Improvement



- More accurate bike lane data needed
- Census tracts too broad
 - Maybe census blocks would work better?
- Census tracts lack real-world significance
- Modifiable Areal Unit Problem (MAUP)