Do People’s Perceptions of Neighborhood Bikeability Match Reality?

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The built environment & travel behavior

Suburban Neighborhood

Traditional Neighborhood

- Single Driver (1 person)
- HOV/ Carpool (2+ people)
- Transit (Bus + Rail)
- Non-Motorized (Bike + Walk)

Data source: RLIS
Questions remain

Built Environment

Perceptions Social Norms

Attitudes

Active Travel Behavior
This study focuses on
Cognitive Theory

Objective Reality → Cognition → Perceived Reality → Behavior
Hypothesis

Objective Measured bikeable

Perceived bikeable

Socio Demographics | Attitudes | Neighborhood Safety
Years in Neighborhood | Social Norms | Health
Data

• A random phone survey of adults in the Portland region was conducted July 19-Aug. 10, 2011
• A total of 902 interviews were completed.
  – Of those, 130 (14 percent) were completed on mobile phones
• The overall response rate was 20 percent
Measures of Perceived Bikeability

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are off-street bike trails or paved paths in or near my neighborhood that are easy to get to.</td>
</tr>
<tr>
<td>There are bike lanes that are easy to get to.</td>
</tr>
<tr>
<td>There are quiet streets, without bike lanes, that are easy to get to on a bike.</td>
</tr>
<tr>
<td>There is so much traffic along nearby streets that it would make it difficult or unpleasant to bike.</td>
</tr>
<tr>
<td>How satisfied are you with your neighborhood design in terms of bike safety?</td>
</tr>
<tr>
<td>Many of the places I need to get to regularly are within biking distance of my home.</td>
</tr>
</tbody>
</table>
## Measures of Objective Bikeability

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of destinations within 1-mile network buffer</td>
<td></td>
</tr>
<tr>
<td>Street connectivity index within 1-mile network buffer</td>
<td></td>
</tr>
<tr>
<td>Ratio of area with a slope equal or higher than 25 percent within 1-mile network buffer</td>
<td></td>
</tr>
<tr>
<td>Miles of minor street within 1-mile network buffer</td>
<td></td>
</tr>
<tr>
<td>Miles of bike boulevard within 1-mile network buffer</td>
<td></td>
</tr>
<tr>
<td>Miles of bike lane within 1-mile network buffer</td>
<td></td>
</tr>
<tr>
<td>Miles of off-street bike path within 1-mile network buffer</td>
<td></td>
</tr>
</tbody>
</table>
Methods

Individual measures of bikeability

Factor 1, 2, 3...

Factor analysis

Cluster analysis

Group 1, 2, 3...
Two groups identified for perceived bikeability

Group 1: High perceived bikeability (HP)
Group 2: Low perceived bikeability (LP)

Three groups identified for objective bikeability

Group 1: High objective bikeability (HO)
   (high connected & low-traffic streets; some bike lanes and paths; mostly flat area)

Group 2: Moderate objective bikeability (MO)
   (high bike lanes and paths; moderate accessibility, low connected streets; mostly flat area)

Group 3: Low objective bikeability (LO)
   (Low accessibility, lack bike lanes and paths, and many hilly areas)
A mismatch exists

- High Objective High Perceptions: 12%
- High Objective Low Perceptions: 7%
- Moderate Obj. High Perceptions: 10%
- Moderate Obj. Low Perceptions: 11%
- Low Objective High Perceptions: 25%
- Low Objective Low Perceptions: 35%

Match: 47%
Mismatch: 32%
?: 21%
Comparisons of Bicycling Frequency among Different Groups

# Days bicycling overall

- HOHP: 10.4
- HOLP: 6.0
- MOHP: 6.5
- MOLP: 4.3
- LOHP: 4.7
- LOLP: 4.1

# Days bicycling for errands

- HOHP: 6.0
- HOLP: 3.7
- MOHP: 2.4
- MOLP: 1.7
- LOHP: 2.0
- LOLP: 1.8

# Days bicycling for commuting

- HOHP: 3.0
- HOLP: 1.9
- MOHP: 1.9
- MOLP: 0.4
- LOHP: 0.7

# Days bicycling for recreation

- HOHP: 4.4
- HOLP: 3.2
- MOHP: 4.8
- MOLP: 3.9
- LOHP: 3.7
- LOLP: 2.6
People who live in high bikeable environments but perceive them as low bikeable

<table>
<thead>
<tr>
<th>Social demographics</th>
<th>Coef.</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female with children</td>
<td>1.42</td>
<td>4.14 ***</td>
</tr>
<tr>
<td>Age: 18-34</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>Age: 35-54</td>
<td>-0.83</td>
<td>0.44 ***</td>
</tr>
<tr>
<td>Age: 55 or older</td>
<td>1.22</td>
<td>3.39 ***</td>
</tr>
<tr>
<td>Education: college degree or above</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>Education: below college degree</td>
<td>0.56</td>
<td>1.74 ***</td>
</tr>
<tr>
<td>Income: $50,000 or higher</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>Income: less than $50,000</td>
<td>1.36</td>
<td>3.88 ***</td>
</tr>
<tr>
<td>Self-reported health condition (1-5)</td>
<td>-0.23</td>
<td>0.79 ***</td>
</tr>
<tr>
<td>Years lived in current neighborhood</td>
<td>-0.04</td>
<td>0.96 **</td>
</tr>
<tr>
<td># vehicles in the home</td>
<td>0.43</td>
<td>1.54 ***</td>
</tr>
</tbody>
</table>

* p<0.10, ** p<0.05, *** p<0.01
People who live in high bikeable environments but perceive them as low bikeable

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>Coef.</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro-bike</td>
<td>-0.18</td>
<td>0.83</td>
</tr>
<tr>
<td>Pro-transit</td>
<td>-0.04</td>
<td>0.96</td>
</tr>
<tr>
<td>Pro-car</td>
<td>-0.03</td>
<td>0.97</td>
</tr>
<tr>
<td>Pro-walk</td>
<td>-0.10</td>
<td>0.90</td>
</tr>
<tr>
<td>Travel is negative</td>
<td>0.19</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Social environment

<table>
<thead>
<tr>
<th>Supporting social environment for bicycling</th>
<th>Coef.</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.12</td>
<td>0.89</td>
</tr>
</tbody>
</table>

Perceived crime rate in the neighborhood

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Coef.</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>I never ride a bike</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>I ride a bike occasionally</td>
<td>-0.97</td>
<td>0.38</td>
</tr>
<tr>
<td>I ride a bike regularly</td>
<td>-1.22</td>
<td>0.29</td>
</tr>
</tbody>
</table>

*p<0.10, **p<0.05, ***p<0.01
Main Findings

• Inconsistencies exist between perceptions and objectively measured bicycling environment

• People who live in High Bikeability environments, but perceive them as Low:
  – lower socioeconomic status
  – women having children
  – elder adults
  – those having bad health condition
  – new movers
  – having negative attitudes towards bicycling and walking
  – having low levels of bicycling
Main Findings

• Social environment matters
  – Support from family and friends
  – Perception of crime in neighborhood
• Both actual and perceived environment are important for bicycling
Thank You!

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