Can Housing and Accessibility Information Influence Residential Location Choice and Travel Behavior?
An Experimental Study

Daniel A. Rodriguez
danrod@unc.edu
The University of North Carolina, Chapel Hill
April 4, 2013
Travel behavior change

- Strongly focused on travel-specific factors
  - Subsidies/cost, information, infrastructure

- Travel is largely habitual
  - Automaticity of response
  - Depth of deliberation decreased, simplified decision making process

- Once we decide where to live, travel mode options set
Hypotheses

- Bundled housing and accessibility information to individuals seeking homes will lead to more transit-friendly and accessibility-rich location choices

- Location impacts translate to changes in SOV, transit use, and ped-bike modes
Methodology

■ Experimental approach
  ▪ Subjects: Incoming graduate students to UNC-CH and NCSU
  ▪ Intervention

  • Apartment Complexes
  • Transit Routes
  • Bike paths
  • Distance to campus
  • Tips on how to ride the bus
  • Phone numbers
  • Fare information
Intervention administration

Registrar provided contact information for 1,600 students at each university

Students join experimental group, receive a map in the mail, and answer questionnaire about the map

Travel survey completed by students in the experimental and control groups

April  May  June  July  August  Sept  October

Brief email contact with the students in the experimental group
Travel Survey

- Personal Characteristics
  - Gender, student status, age, etc.

- Travel Details
  - To and from the campus, familiarity with transit, etc.

- Housing information
  - Type of housing, desired housing type, etc.
Outcomes

■ Travel behavior
  ▪ Daily solo VMT to campus (self-reported and GIS)
  ▪ Modal use (for any leg of trip to campus)

■ Residential location
  ▪ Access to transit
    □ Average network and bird’s eye distance to closest transit stop (mi)
    □ Within ¼-mile of a transit stop (%)
    □ Average number of bus stops within a ¼ and ½ mile of residence
  ▪ Pedestrian and bicycling friendliness
    □ Average network distance to campus (mi)
    □ Population density (population/acre)
    □ Connectivity or effective walking distance
## Participation rates

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>NCSU</th>
<th>UNC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Exper.</td>
<td>Control</td>
</tr>
<tr>
<td><strong>Initial</strong></td>
<td>-</td>
<td>303 (19%)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Completed Survey</strong></td>
<td>322</td>
<td>121</td>
<td>170</td>
</tr>
<tr>
<td><strong>After data cleanup</strong></td>
<td>189</td>
<td>103</td>
<td>85</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>N=292</th>
<th>Sign expectation</th>
<th>Cont.</th>
<th>Exper.</th>
<th>% Δ</th>
<th>P&lt;0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT to campus (SR)</td>
<td>✅</td>
<td>9.5</td>
<td>5.8</td>
<td>39%</td>
<td></td>
</tr>
<tr>
<td>VMT to campus</td>
<td>✅</td>
<td>8.5</td>
<td>5.3</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Use of other modes (Tr)</td>
<td>✅</td>
<td>62.9</td>
<td>65.0</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Distance to closest stop</td>
<td>✅</td>
<td>1.58</td>
<td>0.27</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td>Within ¼ mi of stop</td>
<td>✅</td>
<td>75%</td>
<td>84%</td>
<td>12%</td>
<td>✅</td>
</tr>
<tr>
<td>Stops within ¼ mi</td>
<td>✅</td>
<td>4.1</td>
<td>5.0</td>
<td>22%</td>
<td>✅</td>
</tr>
<tr>
<td>Distance to campus</td>
<td>✅</td>
<td>6.69</td>
<td>5.40</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>✅</td>
<td>1,522</td>
<td>1,699</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Connectivity</td>
<td>✅</td>
<td>0.275</td>
<td>0.274</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>
## Results for NCSU subgroup

<table>
<thead>
<tr>
<th></th>
<th>Cont.</th>
<th>Exper.</th>
<th>% Δ</th>
<th>P&lt;0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT to campus (SR)</td>
<td>14.5</td>
<td>4.5</td>
<td>69%</td>
<td>✓</td>
</tr>
<tr>
<td>VMT to campus</td>
<td>13.4</td>
<td>6.8</td>
<td>49%</td>
<td>✓</td>
</tr>
<tr>
<td>Use of other modes (Tr)</td>
<td>53.9</td>
<td>55.6</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Distance to closest stop</td>
<td>2.46</td>
<td>0.24</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Within ¼ mi of stop</td>
<td>72%</td>
<td>87%</td>
<td>21%</td>
<td>✓</td>
</tr>
<tr>
<td>Stops within ¼ mi</td>
<td>4.4</td>
<td>5.3</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Distance to campus</td>
<td>8.21</td>
<td>3.48</td>
<td>58%</td>
<td>✓</td>
</tr>
<tr>
<td>Density</td>
<td>1,633</td>
<td>1,917</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Connectivity</td>
<td>0.267</td>
<td>0.258</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

- Prior research simulation (lab) suggested similar effects
  - Both found that individuals located closer to transit stops
  - We found a greater reduction in travel distance from the residence to the campus (NCSU)
Discussion

- NCSU students selected residences closer to the university after viewing the map, while UNC students did not
  - Parking availability
  - Size of the catchment area
  - Transit accessibility

- Consistent with emerging approaches
Discussion

- Findings with the University population may not be applied to the general population
- Overall travel effects unknown
- Challenges of using experimental methods in open systems
- Potential limited power to detect differences
Conclusion

- Potential of approaches to influence travel via upstream decisions (location)
  - Average NCSU student travels 4.2 to 6.2 fewer miles per day when traveling to the university campus
  - Reduction of 50%-68% VMTs