Disparities in Streetscape Environments in Communities across the United States

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Background/Methods

- Various environmental factors known to be correlated with active transport
- Environmental disparities identified in previous research of local or regional scope
- Pooled cross-sectional study, data collected annually from 2010 to 2012 in 471 communities around the US
- Community defined as enrollment zone of traditional neighborhood middle or high school
- Stratified proportionality-to-population-size sample of street segments

Direct field observation of sampled segments using 74-item BTG-COMP Street Segment Observation Form
- Measures include land use mix, physical activity (PA) venues, traffic and pedestrian characteristics (e.g. sidewalk, traffic calming, crossing features), signage, disorder, transit, and other characteristics
- 30,458 eligible segments observed and included in the analyses

Descriptive statistics and logistic and negative binomial regression for survey data

Community Sample Characteristics (n=471)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Freq/ Mean</th>
<th>Percent/ SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Prevalence of Built Environment Features (n=30,458)</td>
<td></td>
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<tr>
<td>Sidewalk</td>
<td>40.1%</td>
<td>37.5, 42.8</td>
</tr>
<tr>
<td>Mixed Land Use</td>
<td>09.7%</td>
<td>09.0, 10.5</td>
</tr>
<tr>
<td>Bike Lane</td>
<td>01.4%</td>
<td>01.1, 01.8</td>
</tr>
<tr>
<td>Bicycle Parking</td>
<td>00.4%</td>
<td>00.3, 00.5</td>
</tr>
<tr>
<td>Marked Crosswalk</td>
<td>09.4%</td>
<td>08.4, 10.4</td>
</tr>
<tr>
<td>Off-road Trail</td>
<td>00.8%</td>
<td>00.6, 01.0</td>
</tr>
<tr>
<td>Physical Disorder</td>
<td>48.6%</td>
<td>46.2, 51.0</td>
</tr>
<tr>
<td>Active Transport Scale</td>
<td>02.25</td>
<td>00.07</td>
</tr>
</tbody>
</table>

Mixed land use refers to the presence of both residential and commercial uses.
- Physical disorder includes litter, graffiti, vacancy, bars on windows, broken windows.
- Active transport scale is the sum of indicator variables for presence of a sidewalk (SW), SW buffer, continuous SW within/between segments, SW shade, lighting, marked crosswalk, bike lane, bike parking, off-road trail, and mixed land use (range 0-11).

Prevalence of Built Environment Features on Street Segments by Urbanization, Racial/Ethnic Composition, and Median Household Income

Results from Negative Binomial Regression of Active Transport Scale

Variable                                      | IRR    | 95% CI   | p-value |
-----------------------------------------------|--------|----------|---------|
Urban                                          | 1.00   | (1.00, 1.00) | 0.000   |
Suburban                                       | 0.92   | (0.81, 1.04) | 0.169   |
Rural                                          | 0.43   | (0.34, 0.54) | 0.000   |
Race/Ethnicity                                 |        |          |         |
≥50% White                                     | 1.00   | (1.00, 1.00) | 0.000   |
≥50% Black                                     | 1.53   | (1.33, 1.76) | 0.000   |
≥50% Hispanic/Latino                           | 1.32   | (1.10, 1.58) | 0.003   |
Other composition                              | 1.54   | (1.32, 1.80) | 0.000   |
Median Household Income                        |        |          |         |
Highest tertile (ref)                          | 1.00   | (0.84, 0.80) | 0.000   |
Middle tertile                                 | 0.76   | (0.67, 0.87) | 0.000   |
Lowest tertile                                 | 0.81   | (0.69, 0.96) | 0.014   |
Census Region                                  |        |          |         |
West                                           | 0.90   | (0.90, 1.91) | 0.000   |
Midwest                                        | 1.18   | (0.99, 1.59) | 0.000   |
Northeast                                      | 0.98   | (0.99, 1.00) | 0.000   |
South                                          | 1.65   | (1.65, 1.67) | 0.000   |
Median Household Income                        | 0.58   | (0.33, 0.99) | 0.045   |
Area (square miles)                            |        |          |         |
Mean                                            | 22.84  | (22.84, 22.84) | 0.000   |
Area (square miles)                            | 1.113  | (1.113, 2.089) | 0.000   |
Population Density (per square mile)           | 2,417  | (2,417, 4,898) | 0.000   |

Conclusions

- Broad socio-demographic and geographic variation in streetscape environment in the US
- Increased urbanization, median household income level, and racial/ethnic diversity were generally associated with increased walkability/bikeability of streets
- Relationship between street environment and race/ethnicity moderated by income and geographic location
- Communities in the South census region had lower mean active transport scale scores than communities in the West whereas urban Midwest communities had higher scores (urban areas only)
- Very low prevalence of bicycling facilitators (i.e., lanes, parking) was found in this study

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