TESTING GEODESIGN

COMPARING HOMICIDE RATES AND URBAN SPACES

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NULL HYPOTHESIS

From 2010 to 2015 there is no correlation between location of homicides in Baltimore City and management of urban spaces, which is measured by presence of vacant buildings, greenspace, and recreation centers.
### BALTIMORE CITY, MARYLAND

State of the City: **HOMICIDES**

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baltimore City:</strong> Total number of homicide occurrences</td>
<td>222</td>
<td>310*</td>
</tr>
<tr>
<td><strong>Baltimore:</strong> Murder Rate (# of homicides per 100,000)</td>
<td>35.8</td>
<td>49.9</td>
</tr>
<tr>
<td><strong>U.S.: Murder Rate</strong> (Average; # of homicides per 100,000)</td>
<td>6.1</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>Philadelphia: Murder Rate</strong> (# of homicides per 100,000)</td>
<td>19.8</td>
<td>16.3</td>
</tr>
</tbody>
</table>

(Census Viewer; Open Baltimore; Philadelphia Police Department; The Federal Bureau of Investigation; United States Census Bureau)
HOW DO HOMICIDES HAPPEN?

WHAT COULD DETER CRIMINAL ACTS, LIKE HOMICIDES, FROM OCCURRING?

WHERE DO HOMICIDES HAPPEN?
Literature Review

How could the urban environment influence the likelihood of a homicide occurring?

Attention Restoration Theory
(Kaplan 1995)

'Broken Windows' Theory
(Kraut 1999)

'Eyes on the Street' Theory
(Jacobs 1961)

'Tipping Point': Epidemic Theory
(Crane 1991)
Features of Interest:
URBAN SPACES

Homicide Occurrences
Greenspace
Vacant Buildings
Recreation Centers
Methodology: DATA ACQUISITION & PREPARATION

Greenspace

- Greenspace for 2010 data was acquired from Landsat Thematic Mapper 4 and 5. The image was collected from USGS Earth Explorer in September 2010 and references row 15,33.
- Greenspace for 2015 data was acquired from Landsat 8. The image was collected from USGS Earth Explorer in August 2015 and references row 15,33.
- Both images had unsupervised classifications run, changing the number of classes and sample sizes.
- Both images had supervised classifications run.
Methodology: 
DATA ACQUISITION & PREPARATION

Homicides

• Acquired table from Baltimore Police Department data available on Open Data Baltimore.

• Sorted data for all homicide events that occurred during our specific range of time (2010 and 2015).

• Used data attribute ‘latitude/longitude’ to delimitate data using Microsoft Excel program.

• We cut the 2010 data set to include the same period of time as the 2015 data set, which goes from January 1st through November 28th.
Methodology: DATA ACQUISITION & PREPARATION

Vacant Buildings

- DEFINITION: “An unoccupied structure that is unsafe for human habitation or other authorized use.” (Baltimore City Council 2015)


- Geocoded locations for 2015 data with MD iMap.
  - There were 70 tied addresses that needed to be matched.
  - Data was then exported and then projected.
Methodology: DATA ACQUISITION & PREPARATION

Recreation Centers

- DEFINITION: Centers run by the city that provide residents a wide range of activities and programs meant for the enjoyment of children and adults.
- Acquired shape file from Baltimore City data available on Open Baltimore.
- Applied a ¼ mile buffer as the area of service defined by The Standards of Outdoor Recreation Areas.
IDENTIFYING AREAS OF INTEREST

Where did the change occur?
Neighborhood Acres of Greenspace That Are Within 1/4 Mile of a Homicides in 2010
Percent Acreage of Greenspace per Neighborhood Within a 1/4 Mile of a Homicide

2015

Percent of Greenspace Within 1/4 mi of a Homicide

Neighborhoods
Homicides in 2010 vs. Greenspace

Density Raster Histogram
min = 0
max = 39.87
mean = 2.16
st. dev. = 4.55
Vacant Buildings 2015

Density Raster Histogram
min = 0
tabular data not shown
max = 3698.36
mean = 162.16
st. dev. = 448.09
Density Raster Histogram
min = -530.96
max = 78.37
mean = -2.62
st. dev. = 25.71

Baltimore City. Baltimore City Department of Housing: Code Enforcement. Database.


QUESTIONS?

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