**Racial Disparities in Cycling: Associations Between Bicycle Accidents and the Urban Built Environment in the City of Sacramento**

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**Research Advisor: Dr. Mario Moran**

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**Introduction**

- Cycling provides a means for sustainable transport, healthy lifestyles, and compact communities for individuals across the globe.
- Historically, transportation inequity and transportation injustices have been considerably linked to racial minorities and low income communities.
- Racial minorities are involved in bicycle accidents at a higher rate when compared to other races and the national population at large.
- Although walking and cycling occur more frequently in low income communities, safe infrastructure is typically constructed in higher income communities.
- The dependent variable of this analysis was bicycle accidents, while the independent variable included the socioeconomic characteristics of the census tracts.
- This model assesses if there are any socioeconomic and racial disparity of bicycle accidents in Sacramento.

**Research Questions**

- What is the frequency, proportion, and geographic pattern of total bicycle accidents, as well as those among each race being observed?
- Which independent variables (median household income, population of race(s), population density, vehicular availability, etc.) were most strongly associated with bicycle accidents in Sacramento, California?

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**Results & Analysis**

**American Community Survey - Adjusted R-Squared Results**

<table>
<thead>
<tr>
<th>Significant Variables</th>
<th>Adjusted R-Squared</th>
<th>VIF Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Density***</td>
<td>0.37</td>
<td>1.9</td>
</tr>
<tr>
<td>Vehicular Availability (0)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicular Availability (1)**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**U.S. Census Bureau - Adjusted R-Squared Results**

<table>
<thead>
<tr>
<th>Significant Variables</th>
<th>Adjusted R-Squared</th>
<th>VIF Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Density***</td>
<td>0.26</td>
<td>19.75</td>
</tr>
<tr>
<td>Median Disposable Income**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic Population***</td>
<td></td>
<td></td>
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<tr>
<td>Asian Population***</td>
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</tbody>
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**Findings**

- The number of bicycle accidents were directly proportionate to the population of the race being observed.
- In every scenario, the number of accidents decreased as the income of the census tract in which it occurred increased.
- In the regression model, the following increase in variables typically meant an increase in bicycle accidents: employment density, vehicular availability (0,1), and population density.
- In the regression model, a decrease in the following variables typically meant an increase in bicycle accidents: vehicular availability (2), median disposable income, Hispanic population, and Asian population.

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**Future Research**

- The next phase of my research is to perform a more through statistical analysis. This will include a comprehensive database of the socioeconomic and sociodemographic variables. In addition to this, it is my hope to model and compare results for numerous cities across the United States.

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**Acknowledgements**

**Research Advisor: Dr. Mario Moran**

**Future Research**

**Works Cited**

**Methodology**

- In order to adequately measure and test racial disparities in cycling activity and safety, two separate models were used.
- The first model tested the frequency, proportion, and geographic pattern of the total bicycle accidents, as well as the number of accidents among each race.
- Each independent variable was grouped by quartile breaks, in order to assess which percentile the census tract fell within.
- The bicycle accidents were spatially joined to the census tracts in which they occurred.
- The second model performed an exploratory regression model to identify which independent variables were most strongly associated with bicycle accidents.
- The regression model was performed for two separate datasets: United States Census Bureau and American Community Survey.
- For each regression, the best results were chosen, based on a low Max Variation Inflation Factor and high Adjusted R-Squared value.
- Significant variables were set to a 95% confidence interval.

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**Future Research**

**Acknowledgements**

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**Works Cited**


