



# Beyond Spatial Proximity: Understanding Segregation and Job Accessibility among Racial and Low-Income Populations in Chattanooga

Shadi Omidvar Tehrani, Chandra Ward, Paul Speer, Megan Crawford, Abhishek Dubey, Philip Pugliese, Savannah Ward

VANDERBILT UNIVERSITY

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Department of Human & Organizational Development, Vanderbilt University, Nashville, TN  
Department of Social, Cultural, and Justice Studies, University of Tennessee at Chattanooga, Chattanooga, TN  
Department of Computer Science, Vanderbilt University, Nashville, TN  
Chattanooga Area Regional Transportation Authority (ARTA), Chattanooga, TN

## Background & Aim

**Spatial Mismatch and Accessibility in Disadvantaged Communities:** The spatial mismatch hypothesis highlights a divide between suburban job locations and residences of low-income and minority groups in urban centers (Kain, 1968). Despite residing in areas with high transportation accessibility, these communities face challenges like poverty and limited educational attainment, leading to a 'skill mismatch' in employment opportunities (Brunello & Wruuck, 2021; Restrepo, 2015). Additionally, systemic barriers like discriminatory hiring practices (Agocs & Burr, 1996; Beck, Reitz, & Weiner, 2002) and the lack of affordable childcare further hinder these communities from obtaining or retaining employment (Dominguez & Watkins, 2003; Edin & Lein, 1997).

**Aim:** This study aims to scrutinize the factors influencing transit accessibility and explore methods of measuring accessibility that are more sensitive to the specific contexts of different communities.

## Study Setting (Chattanooga)

**Location and Demographics:** Chattanooga, Tennessee, is a key metropolitan hub along the Tennessee River, the fourth-largest city in the state, with a population of 181,099, and part of a tri-state area.

**Transportation and Congestion:** The city is a crucial travel junction for the Deep South, Midwest, and Northeast, but faces significant traffic congestion.

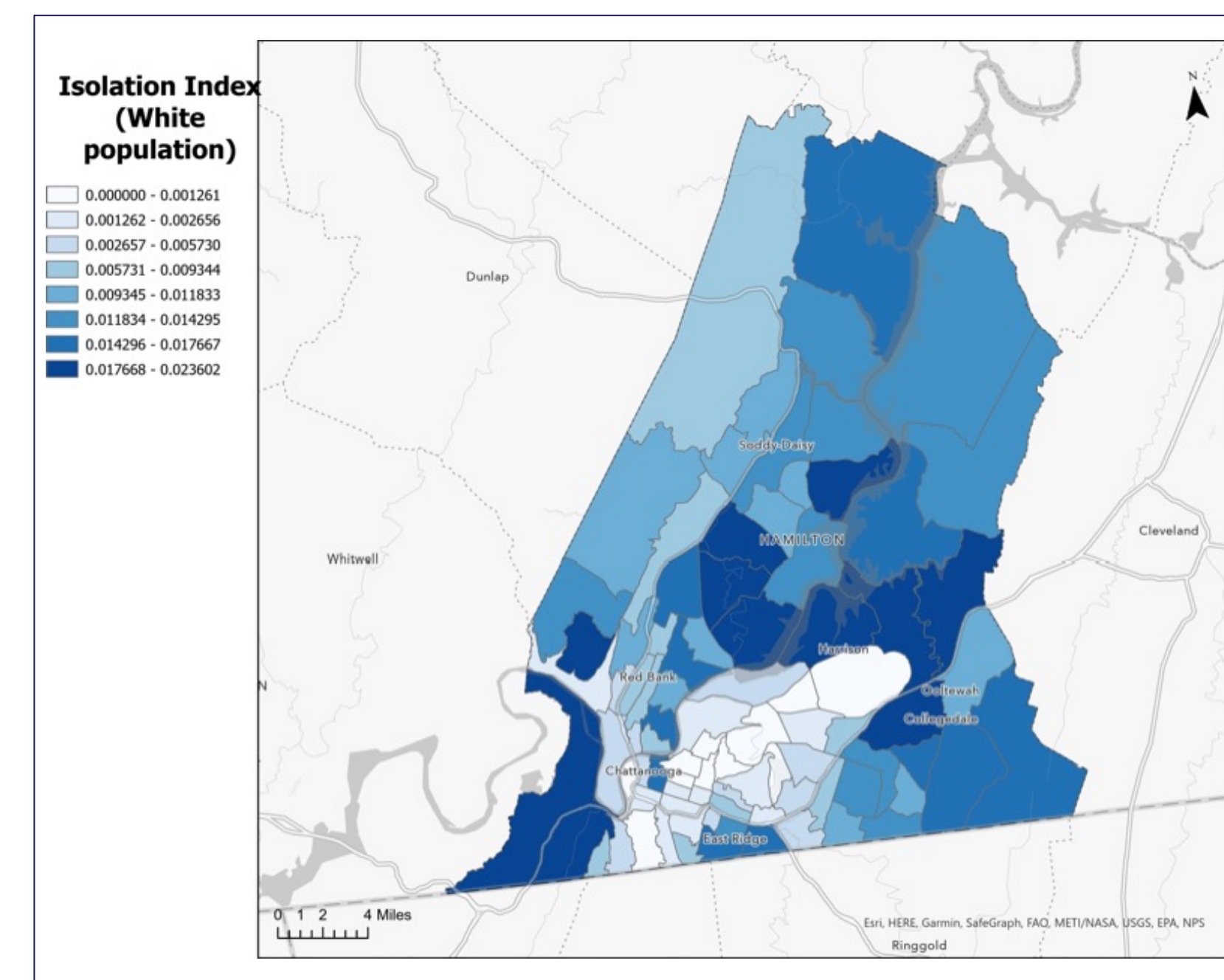
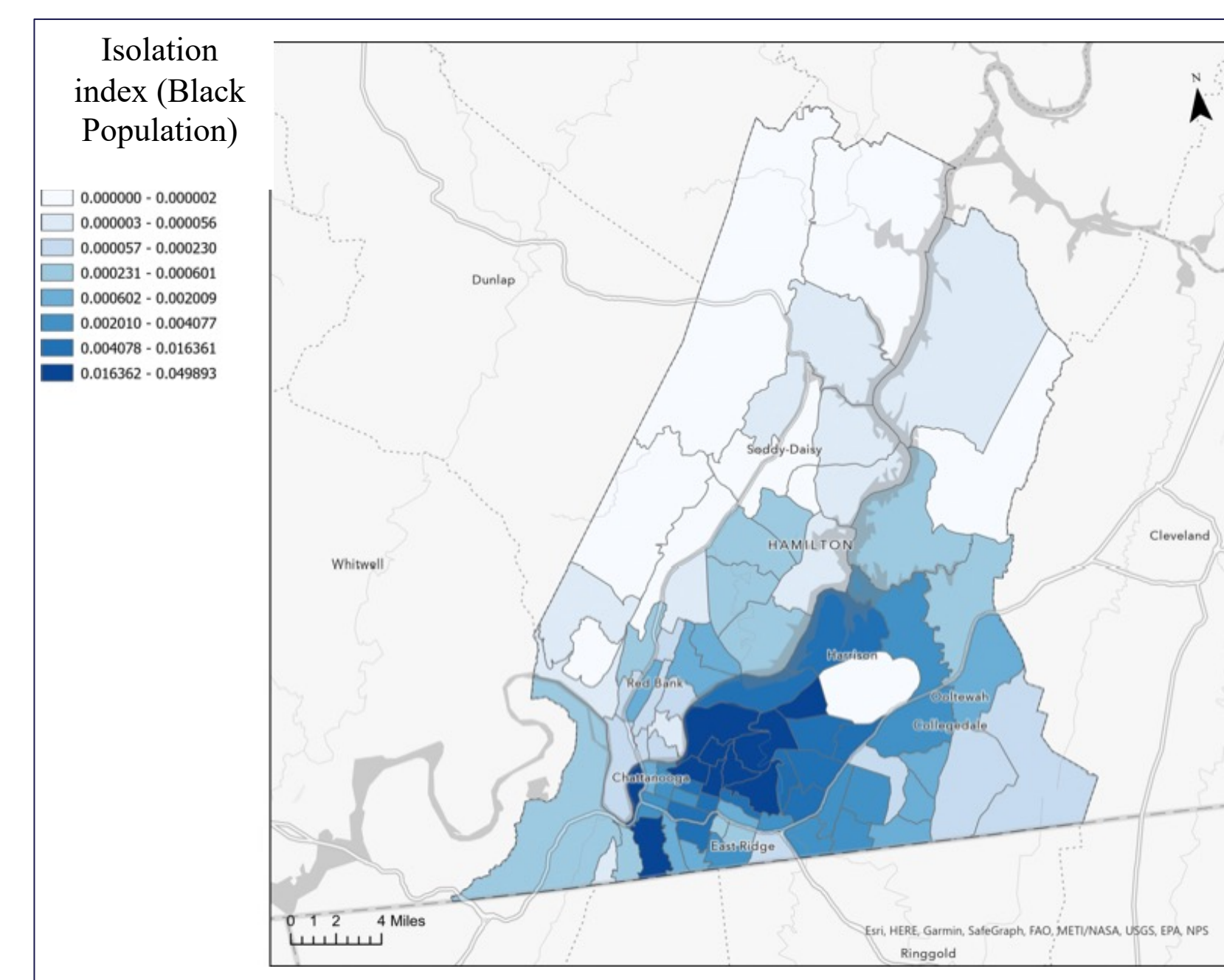
**Historical and Social Context:** Chattanooga, like many other US cities impacted by redlining, continues to be affected by socioeconomic disparities and impeded access to resources by its low-income, minority communities.

## Methodology

The study's methodology employed a streamlined approach to evaluate segregation and accessibility:  
**Step 1: Segregation Indices-** Calculated Isolation, Exposure Indices, and Index of Dissimilarity at the Census tract level to identify local segregation patterns.  
**Step 2: Accessibility-** Applied the Gravity Model (Hansen, 1959) using ArcGIS and Network Analysis at the block group level to assess job accessibility, incorporating GTFS and OSM data for realistic travel times.  
**Step 3:** Used GIS for mapping and conducted correlation analysis to understand the relationships between job accessibility, socioeconomic status, demographics, and housing.

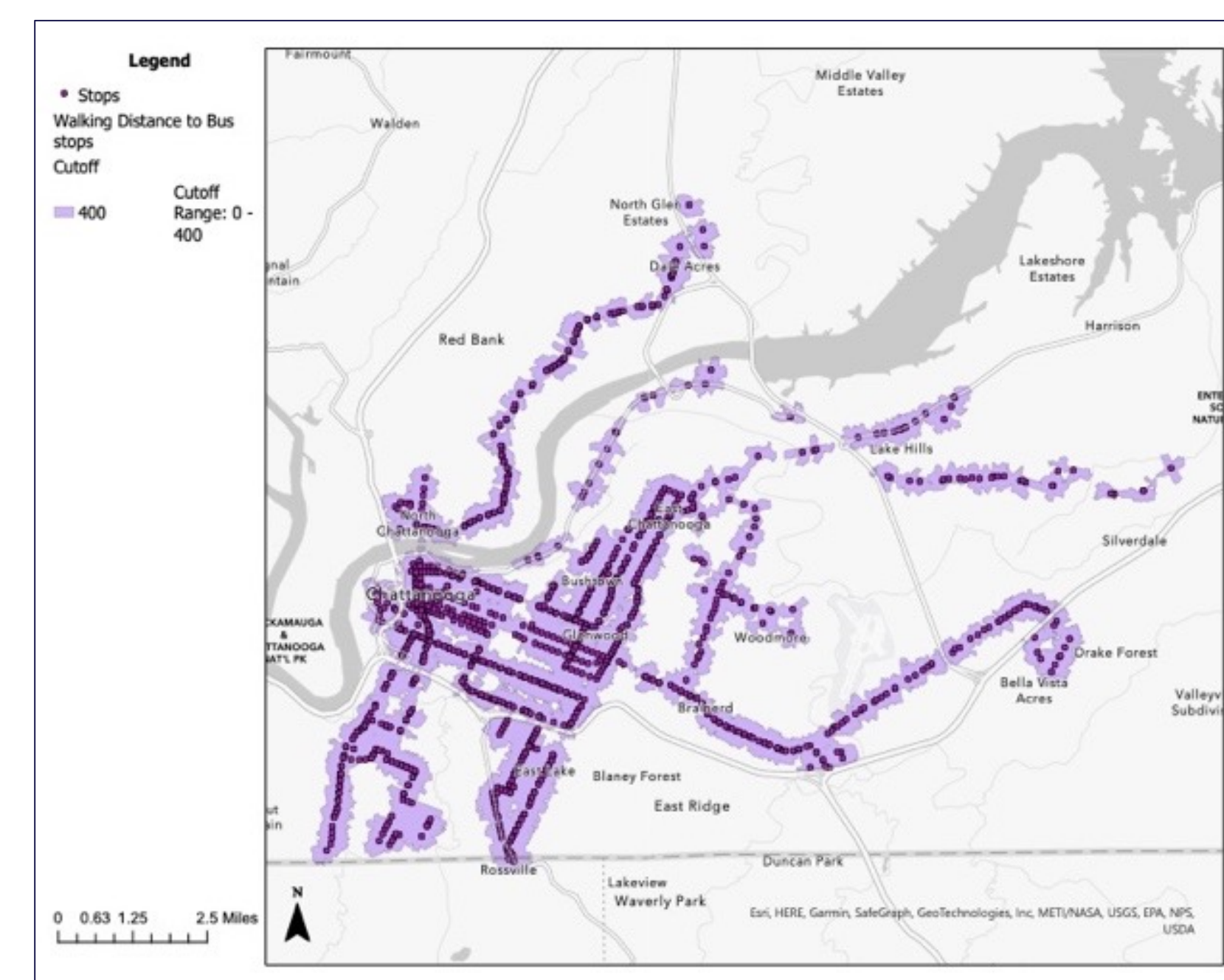
## Segregation Results

**Segregation:** Isolation Indices for both White and Black populations depicted a tendency for each group to live among their own, with White residents experiencing higher isolation, especially in the outskirts, and Black residents more so in the city center.

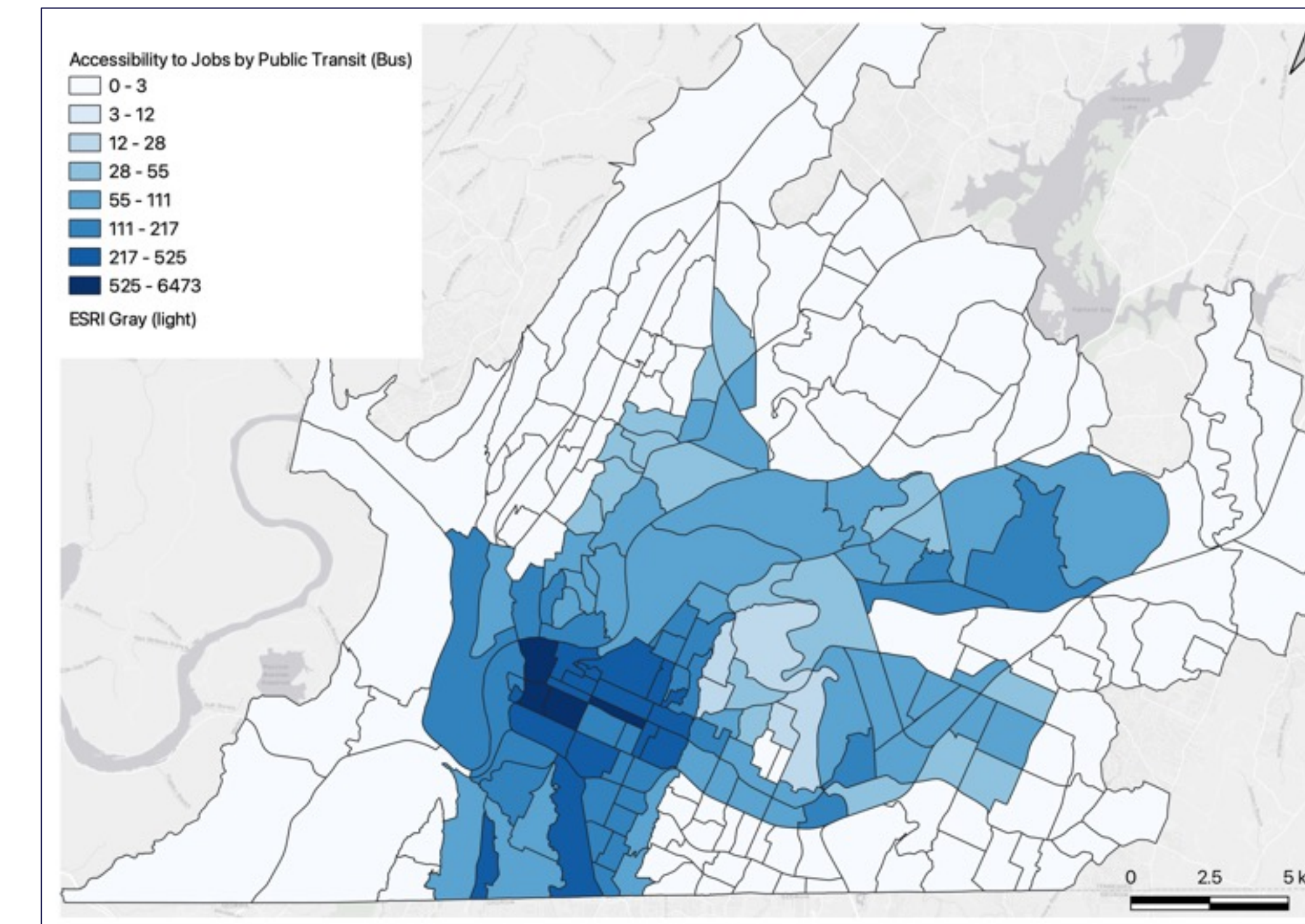


## Accessibility Results

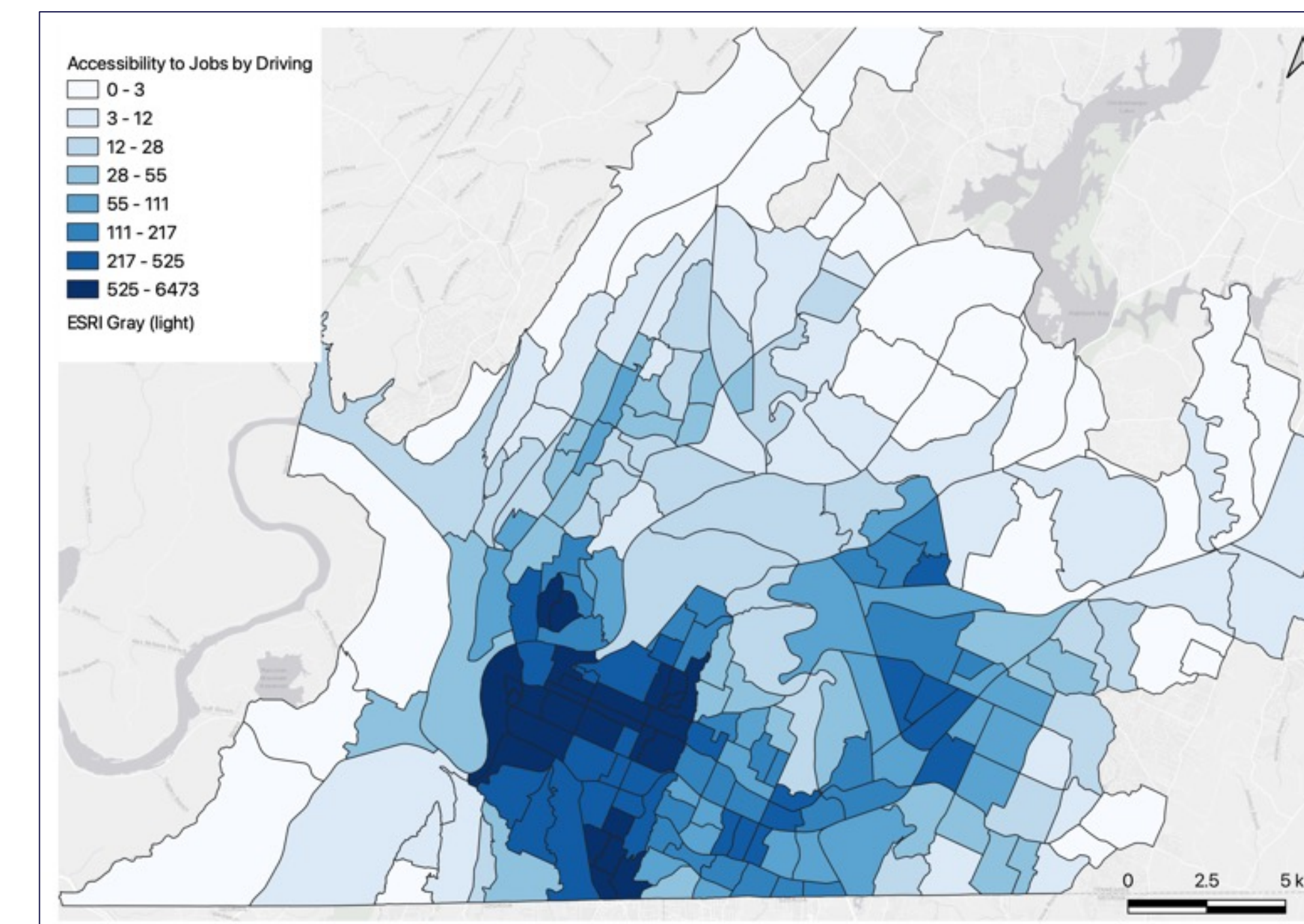
**Public Transit Accessibility:** Accessibility scores for public transit, specifically buses, are lower than for driving but still maintain the pattern of higher access in central areas.



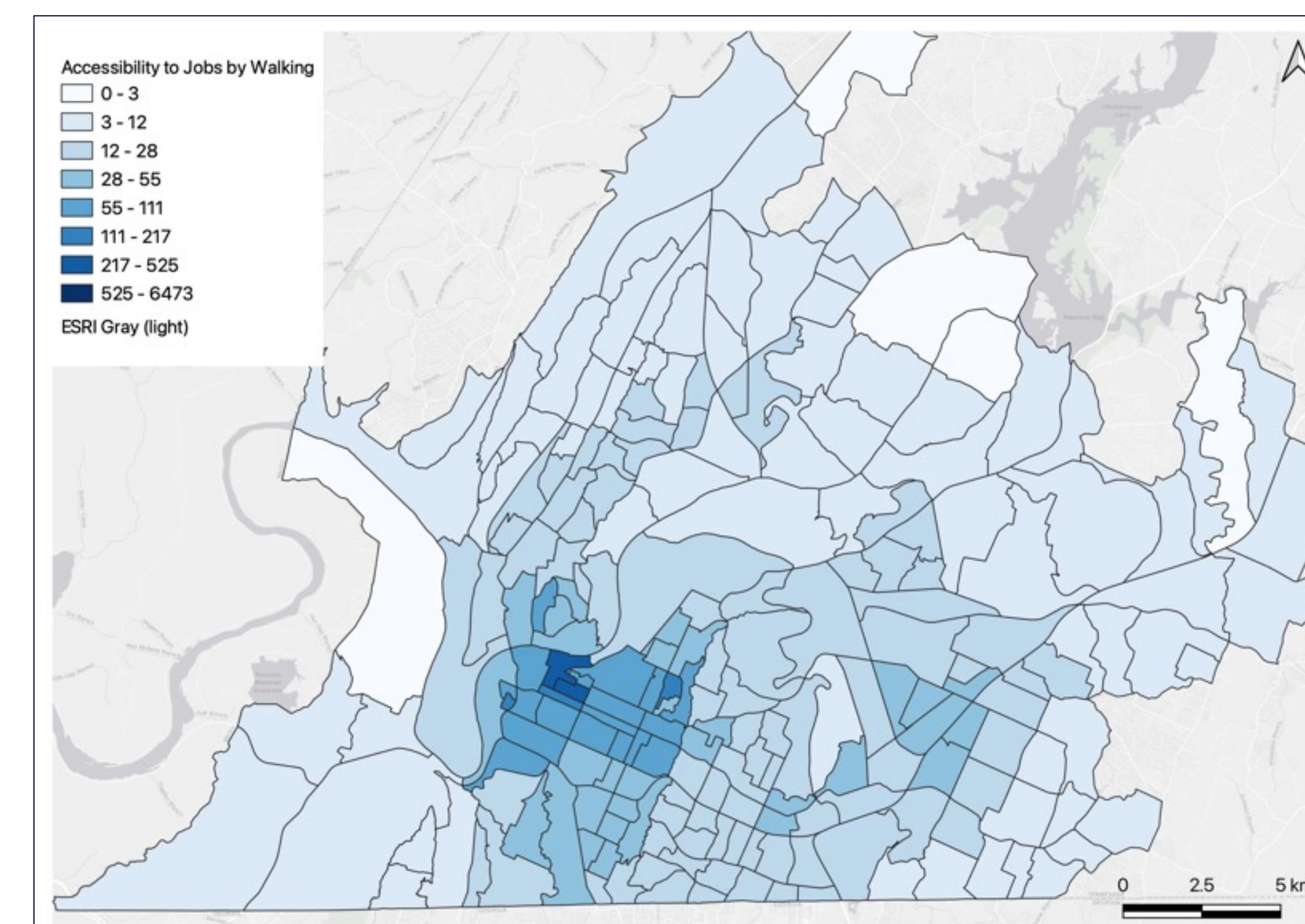
## Accessibility Results



**Driving Accessibility:** High levels of job accessibility are concentrated in the city center and diminish with distance from it, indicating the city's core offers the most job opportunities for drivers.



**Walking Accessibility:** Accessibility for pedestrians drops off more sharply with distance from the city center, with the most walkable job opportunities highly localized to the central area.



## Correlation Results

**Socioeconomic Disparities and Racial Correlations**  
**Accessibility:** White populations negatively correlated with all transportation modes, while Black populations showed positive correlations.  
**Education:** Higher education levels positively correlated with Whites but negatively with Blacks.  
**Income:** Whites positively correlated with higher median incomes and negatively with poverty levels, whereas it was the reverse for Blacks.  
**Employment:** Employment positively correlated with Whites and negatively with Blacks, with unemployment showing the opposite trend.  
**Housing:** Whites had positive correlations with home and vehicle ownership, while Blacks had positive correlations with renting, both with and without vehicles.

## Discussion & Conclusion

- Disadvantaged communities with high job access still face systemic barriers and skill gaps.
- The gravity model shows that proximity doesn't fully capture job accessibility issues.
- Black populations have positive correlations with all transportation modes but negative with higher education and income.
- Housing disparities are pronounced, with Whites more likely to own homes and vehicles, impacting job access.
- This study calls for urban planning that integrates equity and tackles systemic barriers to improve access for all.

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