Tree Satisfaction for Distributive, Procedural, and Recognition Justice

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Introduction

- **Environmental justice (EJ)** requires a fair distribution of benefits, meaningful participation in the decision-making process, and recognition of marginalized individuals' unique needs and preferences
- In cities across the US, the distribution of trees tends to disproportionately advantage white and affluent residents, which constitutes an environmental injustice
- Methods of determining tree canopy distribution usually rely on GIS and Census data alone, leaving participation and recognition out of consideration
- Measuring satisfaction with trees offers a more complete picture of how trees and their benefits are distributed
- This research aims to determine whether tree satisfaction is explained by actual canopy distribution, or whether neighborhood and individual characteristics are more significant

Figure 1: PASS Study area (credit: Jeff Clark)

Legend:
- PASS Neighborhood
- Desert
- Desert Park
- Water
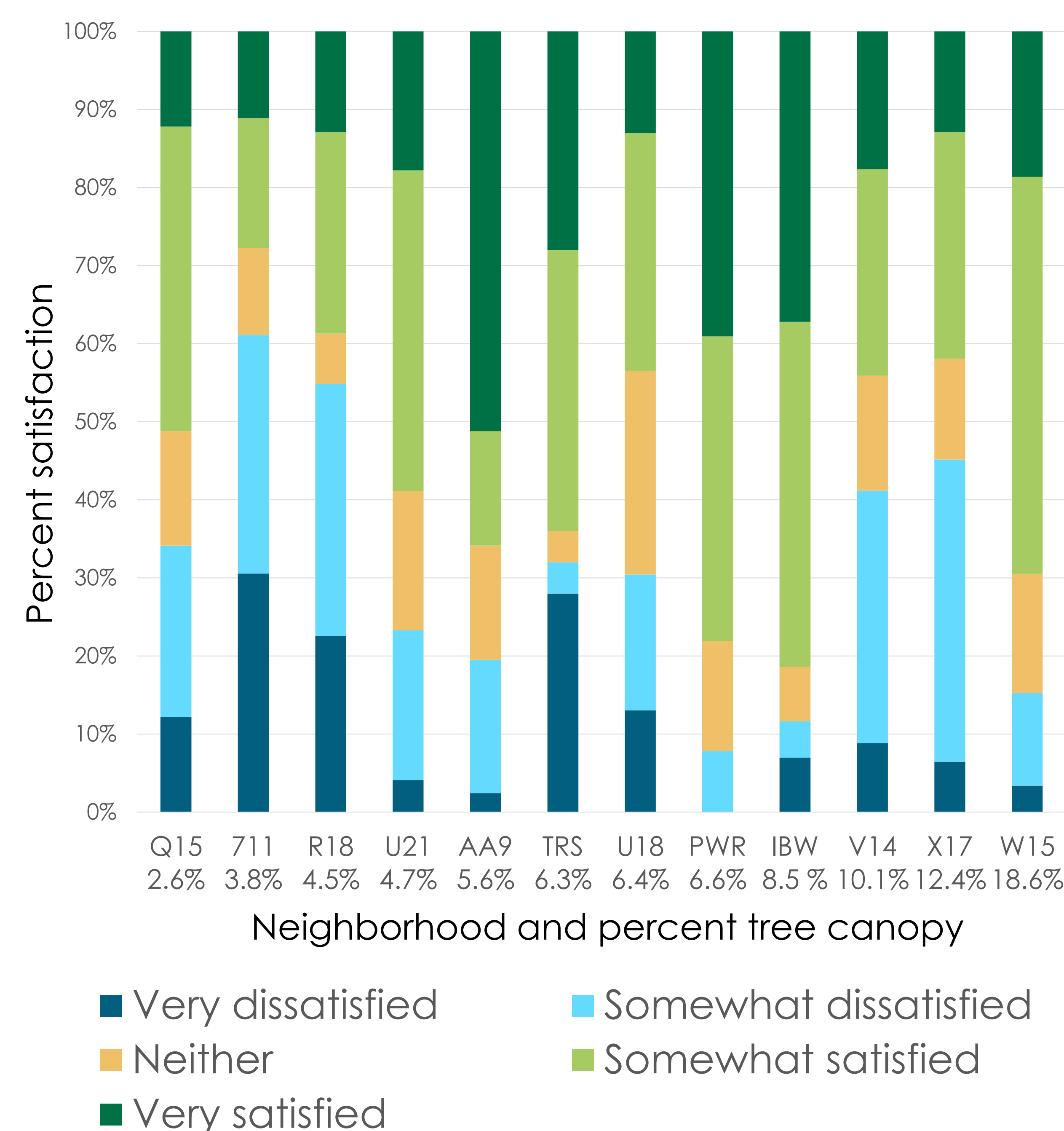- Major Roads
- Community Park
- Golf Course
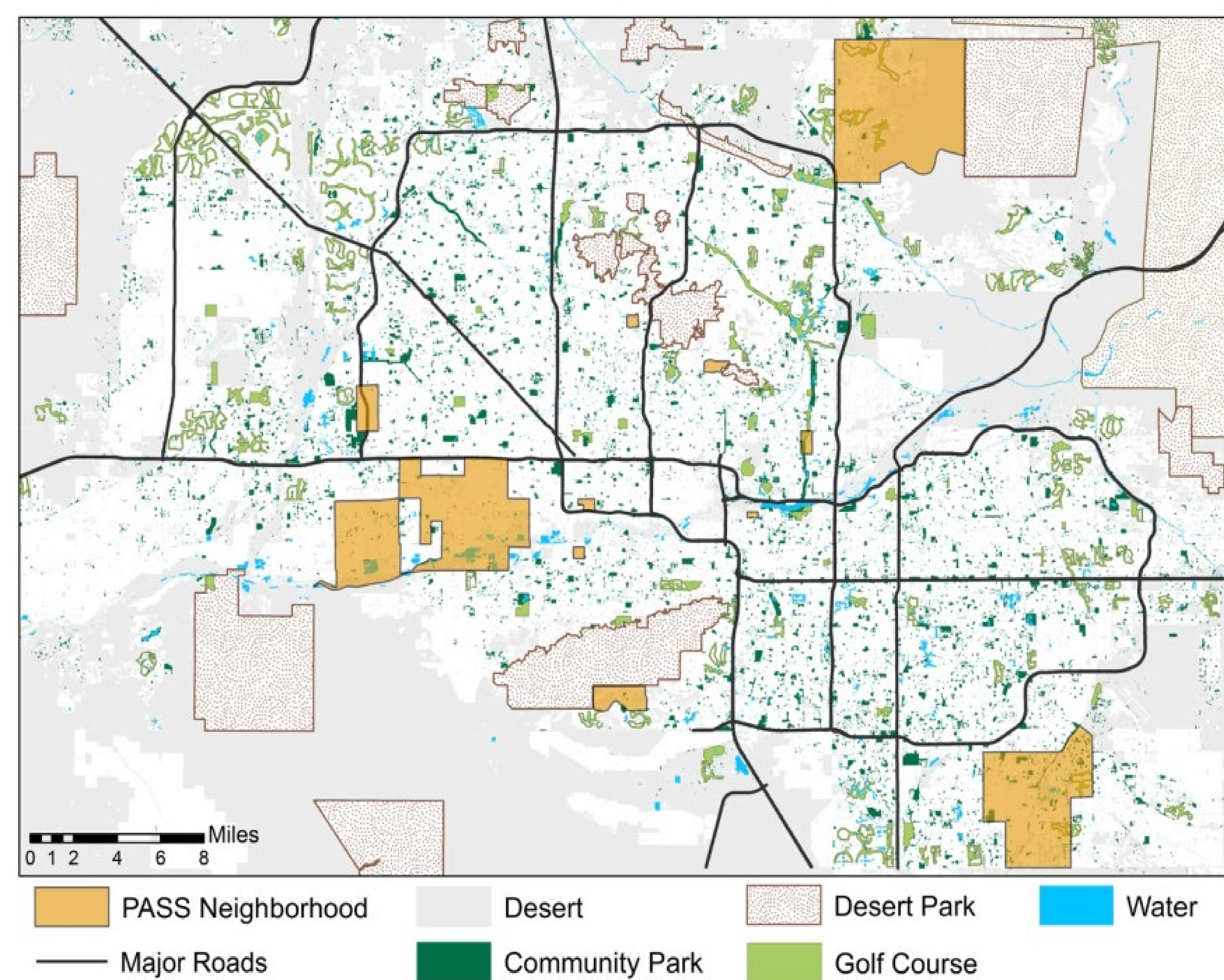
Survey Methods

- This study uses data from the 2021 Phoenix Area Social Survey (PASS).
- 12 neighborhoods were chosen for their diverse demographic characteristics and location within the region (Figure 1)
- A 5-wave mailing was used to implement the survey with a $5 pre- and $25 post-incentive
- Valid N = 509
- Response rate = 35.6%

Analysis Methods

- Dependent variable: satisfaction with amount of trees
- Independent variables: neighborhood and individual % tree canopy
- Control variables: income, race, educational attainment, and homeownership
- Linear regression models:
  - **Neighborhood** characteristics vs **neighborhood** satisfaction
  - **Neighborhood** characteristics vs **individual** satisfaction
  - **Individual** characteristics vs **individual** satisfaction
- Statistical significance (p < 0.05) was used to determine whether % tree canopy correlates with satisfaction

Figure 2: Neighborhood satisfaction with the amount of trees, ordered by percent tree canopy

Legend:
- Very dissatisfied
- Somewhat dissatisfied
- Neither
- Somewhat satisfied
- Very satisfied

Key Findings

- Tree canopy was significant in
  - 3 of 6 bivariate models (Figures 3-5, column 2)
  - 1 of 12 control models (Figures 3-5, column 3)
  - 3 of 12 interaction models (Figures 3-5, column 4)

Figure 3: Significance of tree canopy in **neighborhood** satisfaction model (control: **neighborhood** characteristics)

Variable	Bivariate	Control	Interaction
Median income ($10k)	Insignificant	Insignificant	Insignificant
% White population		Insignificant	Insignificant
% College attainment		Insignificant	Insignificant
% Homeowners		Insignificant	Insignificant

Figure 4: Significance of tree canopy in **individual** satisfaction model (control: **neighborhood** characteristics)

Variable	Bivariate	Control	Interaction
Median income ($10k)	Significant	Insignificant	**Significant**
% White population		Insignificant	Insignificant
% College attainment		Insignificant	Insignificant
% Homeowners		**Significant**	**Significant**

Figure 5: Significance of tree canopy in **individual** satisfaction model (control: **individual** characteristics)

Variable	Bivariate	Control	Interaction
Income ($10k)	**Significant**	Insignificant	**Significant**
White	Insignificant	Insignificant	Insignificant
College attainment	**Significant**	Insignificant	Insignificant
Renter	Insignificant	Insignificant	Insignificant

Discussion

- Tree canopy somewhat explains tree satisfaction, but the variables income, race, college attainment, and homeownership are more significant
- This indicates that to understand EJ implications of tree canopy, researchers should look at more than simply the spatial distribution of trees

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