Subjective Neighborhood Identification and Analysis

Full paper on arXiv

Cory McCartan,[1] Jacob R. Brown,[2] Kosuke Imai [1,2]

1. Department of Statistics, Harvard University
2. Department of Government, Harvard University

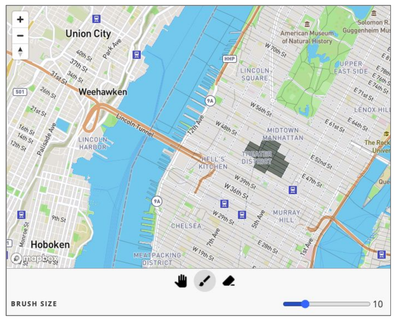
2,527 voters in 3 cities drew us their neighborhoods.

We developed a model to analyze them.

Background

- Many social science studies about neighborhoods:
  - Effects of segregation on inter-group conflict, social trust, and socio-economic outcomes [1, 2, 3]
  - Behaviors spreading through geographic networks [4]
- Limited methods to measure how and why people define their neighborhood
  - Objective measures (distance, administrative boundaries)
  - Subjective definitions have real-world effects [3]

1 We built a **custom survey tool** that allows respondents to easily **draw their neighborhood** on a map.

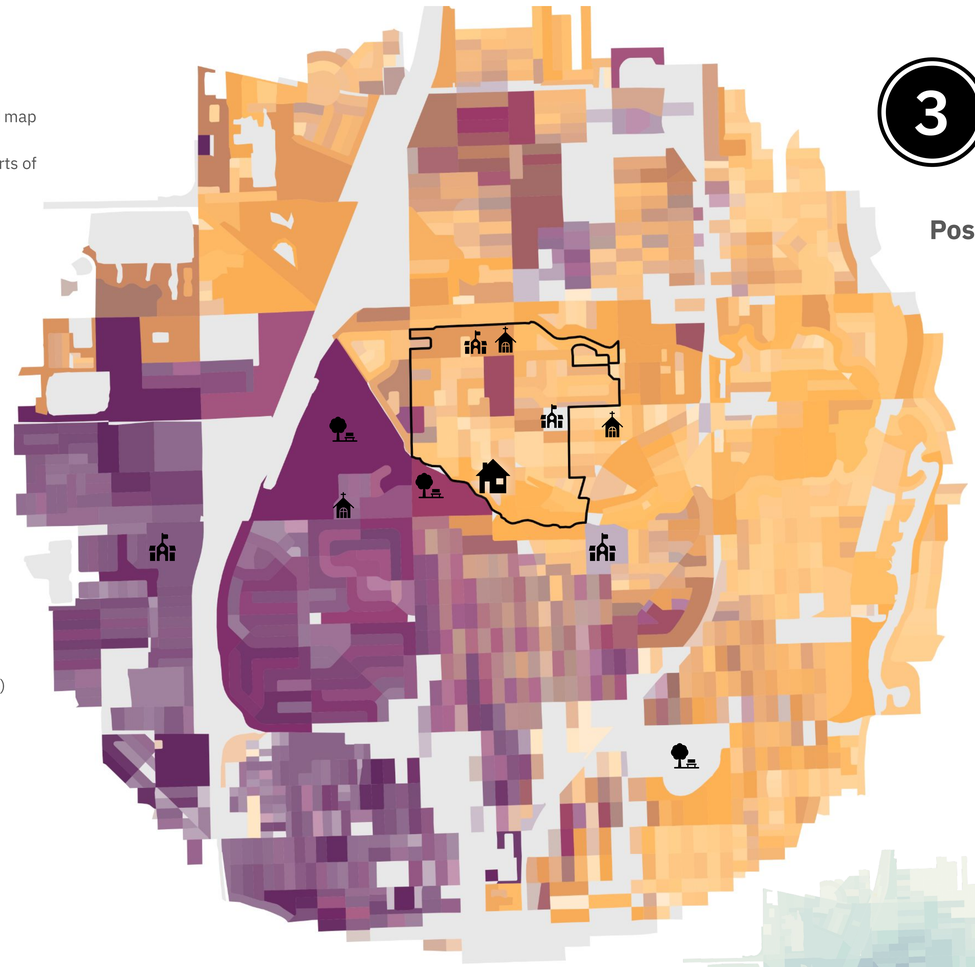


The TOOL

- Respondent types in home address and map zooms to local area
- Respondent can "paint" and "erase" parts of the neighborhood on the map
- Editor enforces contiguity requirement

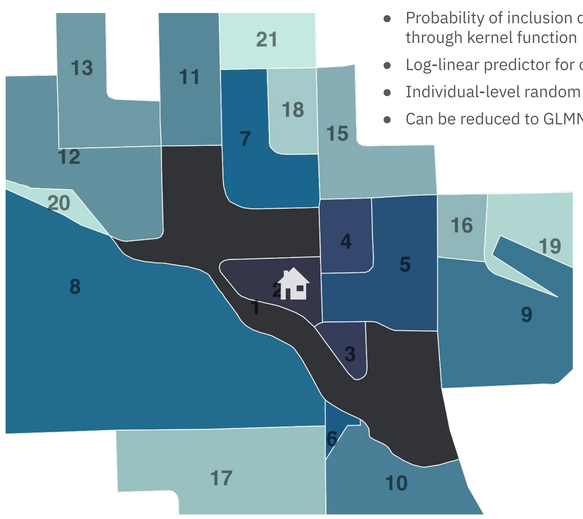
The SURVEY

- E-mailed to sample of voter file in NYC, Phoenix, and Miami metropolitan areas
- Collect demographics, political views
- Experiment: color map by party, race, or nothing



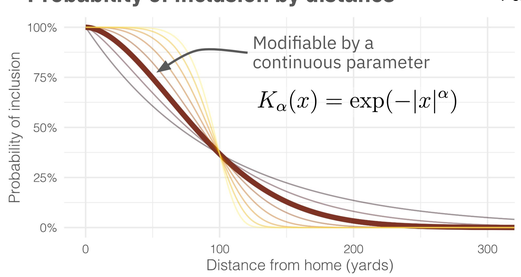
2 We fit a **hierarchical Bayesian model** incorporating demographic information and local geographic features.

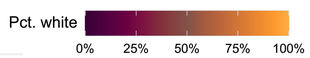
- Model the probability that each Census block is included in the neighborhood
- Visit blocks one at a time, working outwards from respondent's home (as below)
- Blocks excluded if no *nearer* neighbors are included
- Block inclusions independent, *conditional on being connected*



- Probability of inclusion driven by distance, through kernel function
- Log-linear predictor for covariates
- Individual-level random effects
- Can be reduced to GLMM with cloglog link

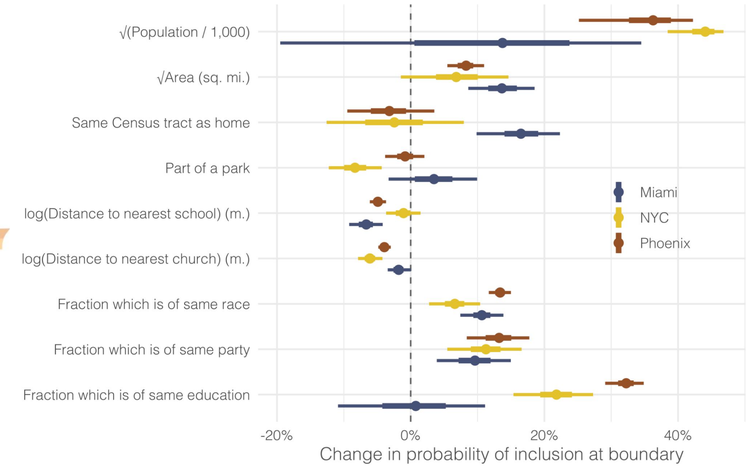
Probability of inclusion by distance





3 Coefficient estimates show the importance of local features, and the **consistent influence of demographics**.

Posterior effect sizes, control group (boundary probability at 50%)

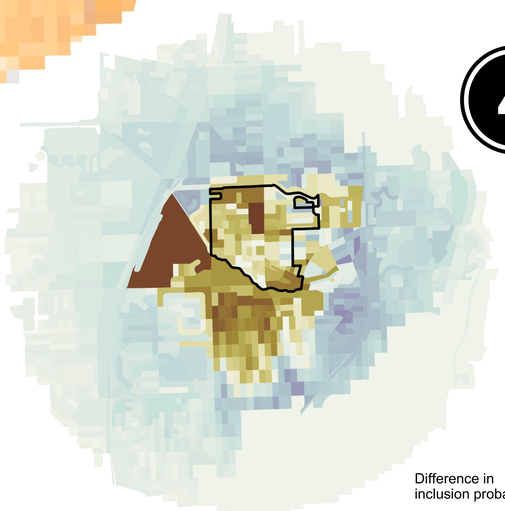


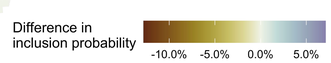
Similar coefficients are found across experimental groups

⇒ No evidence that subjective neighborhood definitions are easily influenced by providing additional demographic information.

4 We can **simulate from the model** to understand how subjective perceptions of neighborhood are shaped.

- Fit full model with all demographic information
- Fit baseline model with purely geographic information
- Compare differences in model predictions between baseline and full models





Shown here is the neighborhood and surrounding area of respondent #1497, selected for display due to their location near a strong racial boundary.

1. Massey, D. S. & Denton, N. A. (1993), *American Apartheid: Segregation and the Making of the Underclass*, Havard University Press, Cambridge, MA.
2. Dinesen, P. T. & Sønderskov, K. M. (2015), 'Ethnic diversity and social trust evidence from the micro-context', *American Sociological Review* 80(3), 550–573.
3. Legewie, J. & Schaeffer, M. (2016), 'Contested boundaries: Explaining where ethnoracial diversity provokes neighborhood conflict', *American Journal of Sociology* 122(1), 125– 161.
4. Huckfeldt, R. & Sprague, J. (1987), 'Networks in context: The social flow of political information', *American Political Science Review* 81(4), 1197–1216.