HOW MUCH DOES PHYSICAL SPACE MATTER IN THE DISSEMINATION OF CYBERSPACE? EXPLORING THE SPATIAL HETEROGENEITY OF NEW MEDIA HEALTHCARE OUTREACH

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How do local effects impact the creation of big data?

Answering this allows us to understand how biases in physical space translate into cyberspace

Divisions in Big Data and its Meaning

- **Questions of access**
- Potential bias as to whom the data describes.
- 39.65% do not use new media regularly (within past three months)
  - 51.74% of non-users live below the poverty line
- **Questions of behavioral influence**
- Not clear how new media affects behaviors
- Based on the survey question: "Have you used social media to connect with organizations that provide services in your community by following, liking, or commenting on their pages?"
  - 57% answered no

Source 2014/2015 Public Health Management Corporation's Southeastern Pennsylvania Household Health Survey

Key Questions

- We need place user context under closer scrutiny.
  - How is the information collected through new media being disseminated across physical space?
  - What local effects bias new media dissemination?

Case Study: HIV Testing

- Contradictions underlie the spread of information on HIV testing
  - Mass Social Media Outreach
    - Various New Media Campaigns
  - Substantial Stigma
    - Among some local communities
- Theoretical Framing: Andersen's Behavioral Model of Healthcare Usage
  - Predisposing, Enabling, Need

Data

- Public Health Management Corporation
  - 2014/2015 Southeastern Pennsylvania Household Health Survey
  - 7838 Respondents
  - Philadelphia Metropolitan Area
  - Geocoded to census tracts
  - X Y Coordinates generated with ArcGIS

Variables

- Dependent Variable
  - HIV testing
- Focal Independent Variables
  - Social Media Outreach
    - "Have you used social media to connect with organizations that provide services in your community by following, liking, or commenting on their pages?“ (Yes 1; No 0)
  - Social Capital
    - Composite of trust, belongingness, and cooperativeness
- Other demographic variables
  - Race, Gender, Education, Employment, Poverty, Marital Status

Table 1. Descriptives

Variable	Mean
HIV Testing	0.464
Predisposing	
Race/ethnicity (ref.=non-Hispanic White)	
Black	0.216
Hispanic	0.048
Other Race	0.042
Age	54.188
Female	0.632
Educational Attainment (ref.=no High School Diploma)	
High School	0.262
Some College	0.216
College or Greater	0.471
Married	0.579
Enabling	
Living in Poverty (1=poor, 0=non-poor)	0.103
Employment status (1=employed, others=0)	0.595
Insured (1=having health insurance, 0=no health insurance)	0.972
Social Capital	0.052
Group Membership	1.735
Social Media Outreach	0.431
City	0.399
Need	
Poor Selfrated Health	0.369
N	7838.000

Table 2. Global logistic regression results of HIV testing (1= Yes; 0= No)

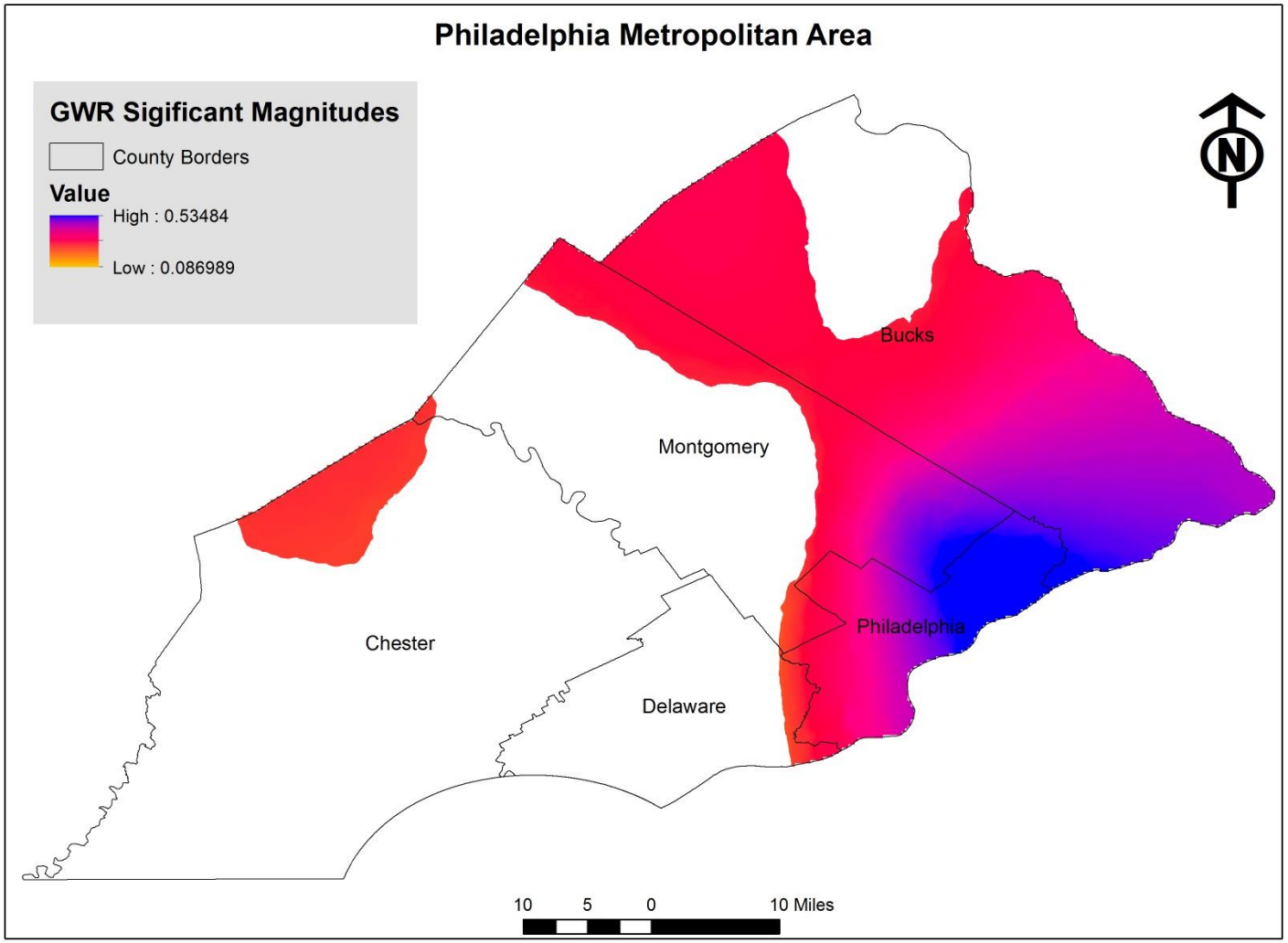
Variable	Coefficient	S.E.	Odds Ratio	95% Confidence Interval		Significance
Predisposing						
Race/ethnicity (ref.=non-Hispanic White)						
Black	1.060	0.074	2.886	2.499	3.332	***
Hispanic	0.814	0.129	2.256	1.737	2.930	***
Other Race	0.115	0.126	1.122	0.855	1.473	
Age	-0.049	0.002	0.953	0.948	0.957	***
Gender (ref.=Male)	-0.153	0.053	0.858	0.775	0.951	***
Educational Attainment (ref.=no High School Diploma)						
High School	-0.144	0.130	0.866	0.664	1.128	
Some College	0.067	0.134	1.069	0.820	1.394	
College or Greater	0.214	0.132	1.238	0.942	1.628	
Married	-0.007	0.059	0.993	0.880	1.119	
Enabling						
Living in Poverty (1=poor, 0=non-poor)	0.595	0.097	1.813	1.503	2.187	***
Employment status (1=employed, others=0)	0.030	0.064	1.030	0.908	1.169	
Insured (1=having health insurance, 0=no health insurance)	-0.159	0.164	0.853	0.596	1.221	
Social Capital	-0.098	0.021	0.907	0.870	0.945	***
Group Membership	0.001	0.004	1.001	0.993	1.008	
Social Media Outreach	0.303	0.060	1.354	1.209	1.517	***
City	0.363	0.060	1.437	1.266	1.632	***
Need						
Poor Selfrated Health	-0.028	0.053	0.973	0.876	1.081	***
Constant	2.079	0.249				
N	7838.000					
Akaike Inf. Crit.	9193.717					

*Note: *p<0.1; **p<0.05; ***p<0.01*

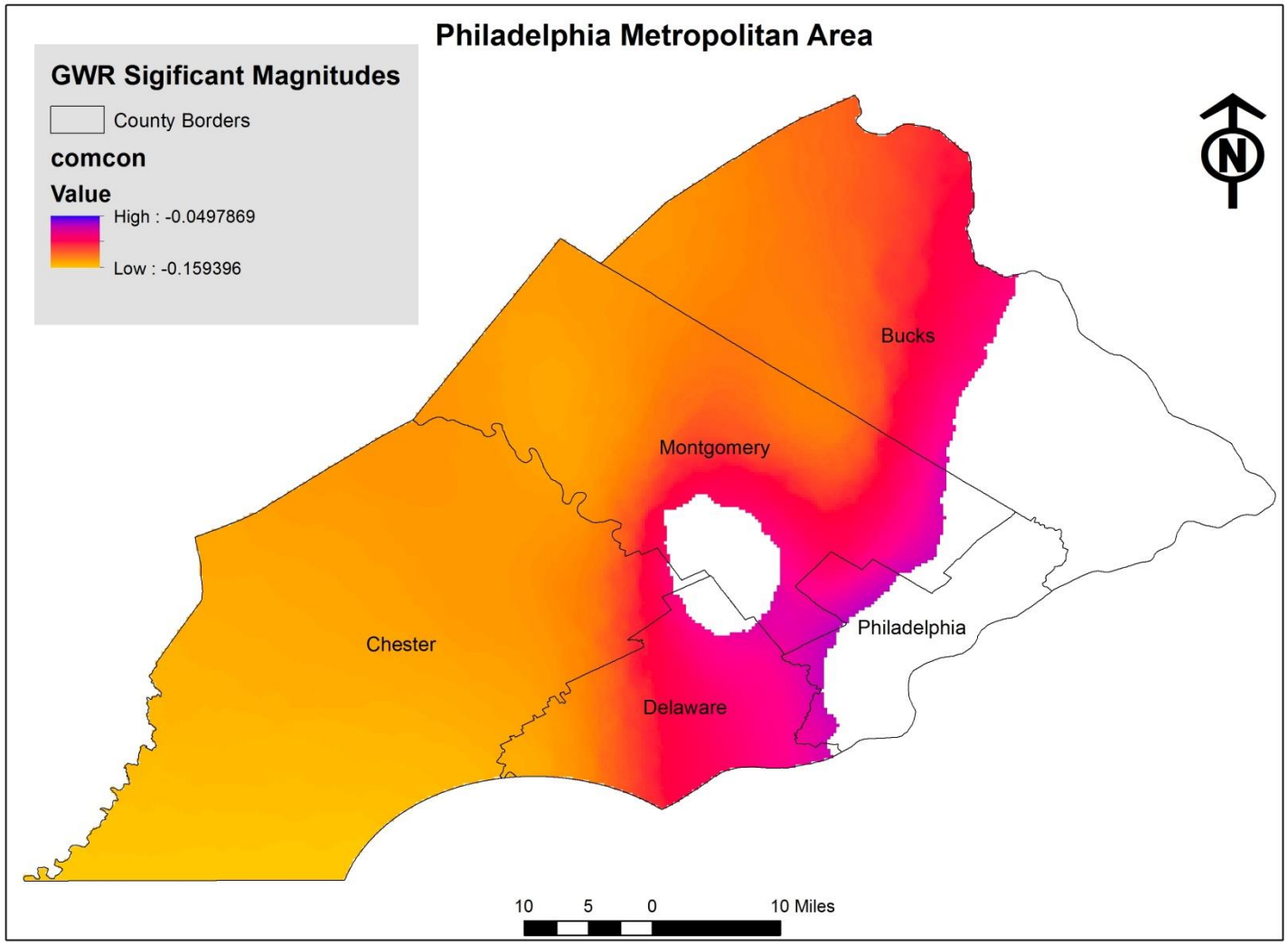
Spatial Method

- Logistic Geographically Weighted Regression (GWR)
- Uses distance-based spatial weights to look at how the coefficients between the predictors and dependent variable vary over space.
  - Using a 'moving window' weighting strategy

Social Media Outreach



Social Capital



Implications

- How big data is disseminated is not consistent across space
- Differences in forms of social connectiveness
- More attention needs to be placed on local contextual factors
- Mixed methods strategies to augment big data

Supplemental Slides

Table 3. Five-number summary of the GWR logistic regression results

Variable	Min	Q1	Median	Q3	Max
Predisposing					
Race/ethnicity (ref.=non-Hispanic White)					
Black	0.895	0.992	1.090	1.191	1.754
Hispanic	-0.912	0.746	0.997	1.117	1.473
Other Race	-0.564	-0.183	0.254	0.543	0.690
Age	-0.061	-0.055	-0.053	-0.048	-0.041
Female	-0.312	-0.261	-0.193	-0.124	0.030
Educational Attainment (ref.=no High School Diploma)					
High School	-0.412	-0.192	-0.157	-0.061	0.206
Some College	-0.249	0.014	0.077	0.145	0.422
College or Greater	0.000	0.071	0.187	0.302	0.673
Married	-0.142	-0.092	-0.010	0.055	0.320
Enabling					
Living in Poverty (1=poor, 0=non-poor)	0.253	0.485	0.536	0.648	1.013
Employment status (1=employed, others=0)	-0.364	-0.030	0.009	0.043	0.258
Insured (1=having health insurance, 0=no health insurance)	-1.371	-0.301	0.027	0.149	0.398
Community Connection	-0.159	-0.126	-0.082	-0.064	-0.050
Group Membership	-0.006	-0.002	0.002	0.003	0.016
Organizational Media Usage	0.087	0.203	0.287	0.424	0.535
City	-0.297	0.178	0.297	0.367	0.501
Need					
Poor Selfrated Health	-0.273	-0.083	-0.052	-0.005	0.097
Constant	1.110	1.907	2.466	2.593	3.630
Akaike Inf. Crit.	9183.441				

Bandwidth 4000; Min=minimum, Q1=first quartile, Q3=third quartile, max=maximum.