

How Much does Physical Space Matter in the Dissemination of Cyberspace? Exploring the Spatial Heterogeneity of New Media Healthcare Outreach

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Author: Joseph Gibbons, Department of Sociology, San Diego State University

At last year's workshop, I encouraged those attending to reconsider the questions we are asking with Big Data. My goal today is to push further on this issue. Most Big Data studies treat its influence as superseding the local. However, we need to ask how the location affects the nature of the conversation itself. I would argue that the local can matter greatly on how this data is both 'generated' and disseminated, such as through new media usage. In this position paper, I take a preliminary step towards answering these questions through an exploratory study of the dissemination of new media across space. Working in collaboration with HDMA Associate Director, Eric Walsh-Buhi, I used data on the Philadelphia metropolitan area collected for the 2014-2015 wave of the Public Health Management Corporation's (PHMC) Corporation's Southeastern Pennsylvania Household Health Survey. We examine the spatial variation of the influence that service organization outreach over new media has for HIV testing. We find that where new media outreach seems to matter most for HIV testing is highly confined to specific places, instead of dispersed randomly. This suggests a local effect is shaping Big Data's dissemination.

An ongoing challenge with Big Data is the digital divide, the idea that the socially disadvantaged are less likely to use new media. Data from the 2014-2015 PHMC shows that of the 9,556 respondents surveyed in the Philadelphia metropolitan area, 39.65% do not use new media regularly. Over half of this group, 51.74%, live below the poverty line. In addition to the distinct social disadvantage of lacking access to new media, this disparity cuts back on what big data can tell us about socially disadvantaged populations. Complicating matters, the use of social media does not say how much it will affect behavior. For example, we look at the effect of new media outreach from service organizations onto individual behavior with the PHMC's question: "Have you used social media to connect with organizations that provide services in your community by following, liking or commenting on their pages?" Over half of the sample, 57%, said no: engaging in the social media did not connect them to services.

It is not enough to say that the usage of big data generated through social media is biased. In keeping with the theme of this workshop, I argue that space can also have a major role in this dynamic. My previous research, in particular, that published in the *Journal of Urban Affairs* found that the attachment of service providing organizations to their clients is affected by the neighborhoods for which they are located. To better situate the disparities in new media outreach identified by the PHMC, I make use of Logistic Geographically Weighted Regression (GWR), an approach to multivariate analysis which uses distance-based spatial weights to look at how the coefficients between the predictors and dependent variable vary over space. Controlling

for socio-economic and demographic variables, I modeled for the relationship between new media outreach, as defined in the previous paragraph with yes coded 1 and no coded 0, and whether or not one received HIV testing, again with yes coded 1 and no coded 0. HIV testing was chosen given its taboo nature as well as the efforts social service organizations have used to promote testing over new media. Around half of the full sample, 47.52%, had tested.

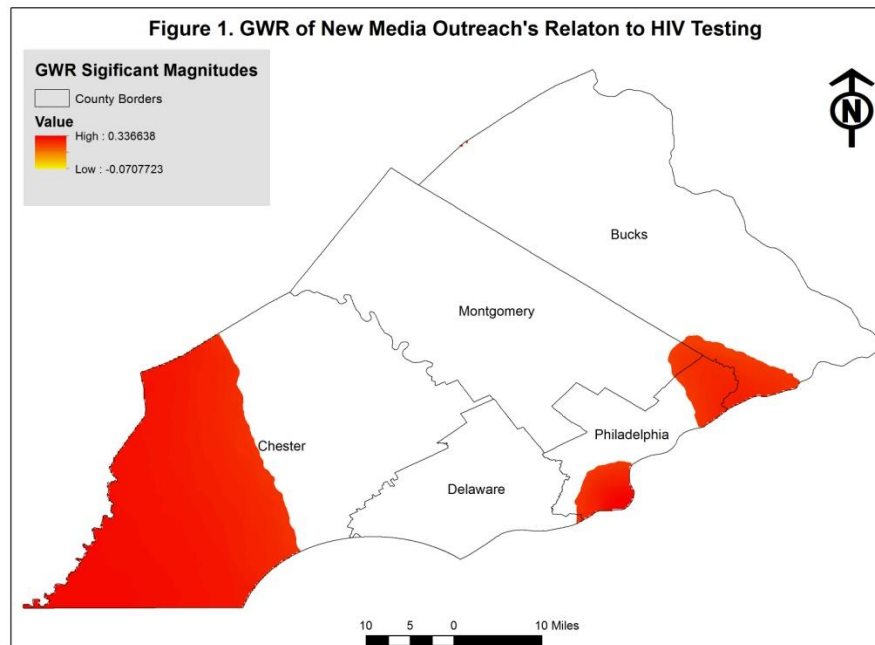


Figure 1 presents the GWR results. The areas with red color have statistically coefficients of a positive relationship between new media outreach and HIV testing. As this map shows, the influence of new media on individual behavior is strongly subject to local context. Indeed, there are only a few areas in the Philadelphia metro where engaging with an organization's new media is related to getting tested: namely in corners of the city and county of Philadelphia as well as a rural section of western Chester County. There are some limitations to this analysis; we cannot be sure where those surveyed are getting tested and if engaging in the new media of service organizations specifically is leading to testing. Nonetheless, these results suggest space biases the effect social media has on testing.

To conclude, this exploratory analysis carries reverberations raises some fundamental questions for how we understand new media, and by extension Big Data. What is it about the red areas in Figure 1 that encourage a relation between new media outreach and HIV testing? Why are the white areas not experiencing a relationship? Moving forward, traditional social science can be used contextualize these findings. In-depth interviews would do much to unpack how social media outreach is affecting behaviors and why location matters. At present, though, this analysis warrants caution in the inference of Big Data. Just because we have large counts does not mean we should not pay attention to who, and where, these numbers represent.