

How to test hypotheses with geographic prisms

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“Geography matters, not for the simplistic and overly used reason that everything happens in space, but because *where* things happen is critical to knowing *how* and *why* they happen.”

Warf, B., & Arias, S. (Eds.). (2008). *The spatial turn: Interdisciplinary perspectives*. Routledge.

Our research question: How can data about *where* things happen be generated and analyzed to explain *why* they happen?

Operationalizing Geographic Prisms

Our goal is to understand how to test research hypotheses spatially. A hypothesis says that a *process* explains observed properties of *participants*. We use this idea to operationalize the metaphor of a *geographic prism* as follows:

1. *Locate* the observed process participants with respect to other participants.
2. *Map* the observed properties of the participants for these locations.
3. *Correlate* the observed properties with other participant properties.

We demonstrate how geographic prisms work in two case studies: Snow’s historic study of cholera communication and a recent study on intergenerational mobility in the U.S.

Communication of Cholera

Snow, J. (1855). *On the mode of transmission of cholera*. Churchill, London.

Hypothesis: Deaths result from drinking contaminated water.

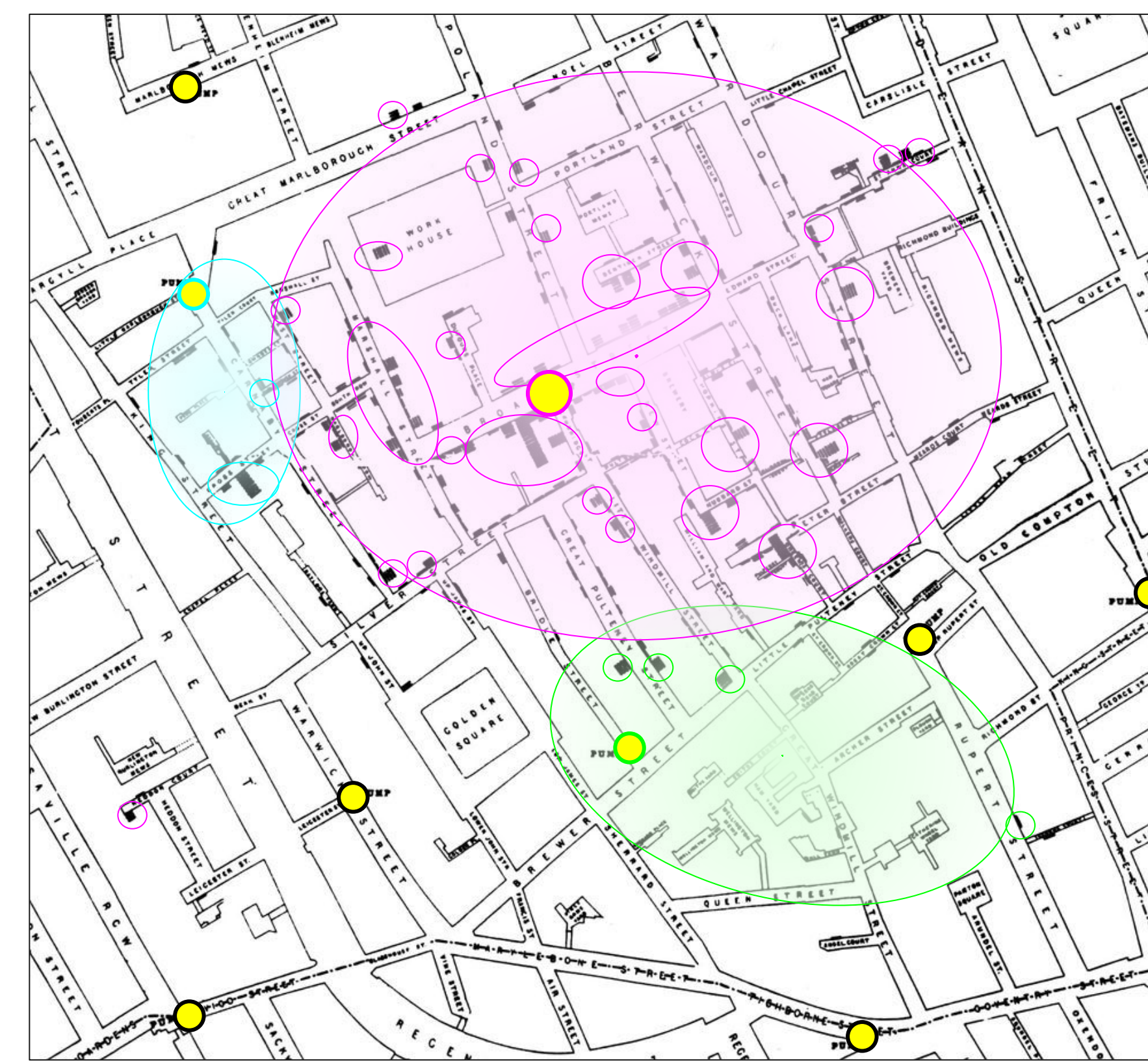


Figure 1. Deaths and service areas of water pumps.

Snow visually correlated deaths with service areas of pumps to verify his hypothesis.

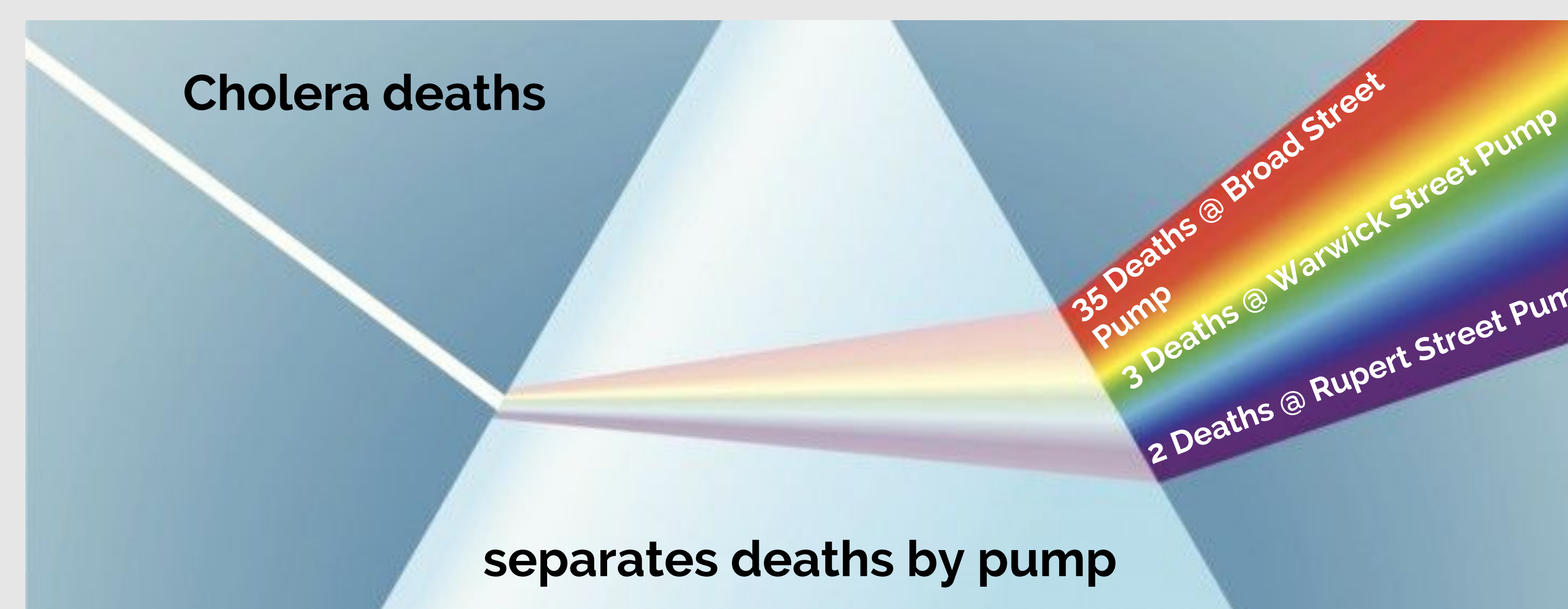


Figure 2. A geographic prism applied to John Snow’s Cholera study. Death is an observed property of patients (participants) consuming water (the process). The patients are located by the service area of a water pump.

Intergenerational Mobility

Chetty, Raj, et al. (2014) "Where is the land of opportunity? The geography of intergenerational mobility in the United States." *The Quarterly Journal of Economics* 129.4: 1553-1623.

Hypothesis: Mobility results from segregation, income inequality, quality of schools, strength of social networks, and family structure.

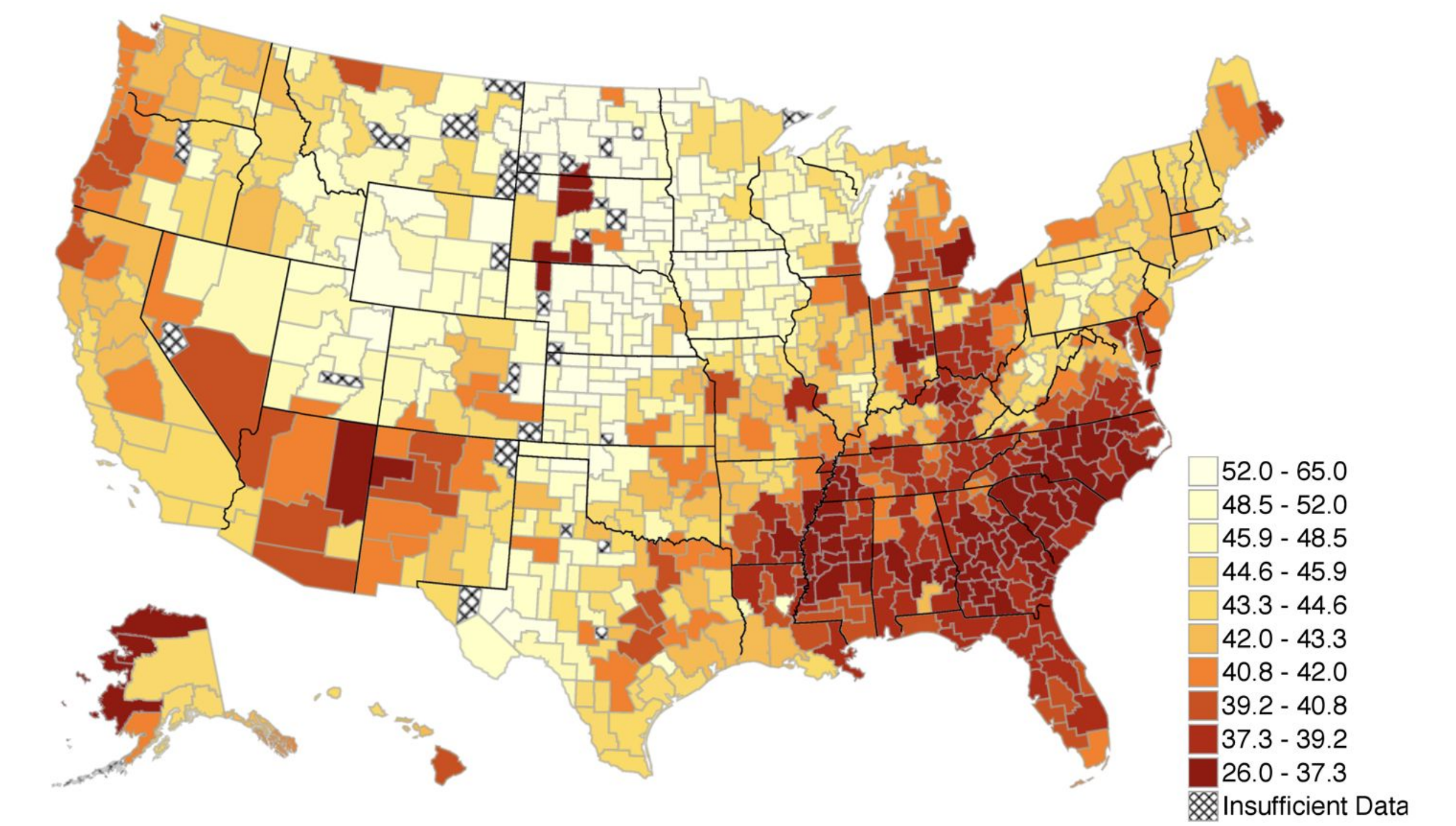


Figure 3. Intergenerational mobility: mean child rank for parents at 25th percentile by commuting zone.

Chetty et al. correlated intergenerational mobility in commuting zones (Fig. 3) with candidate explanatory variables to test their hypothesis.

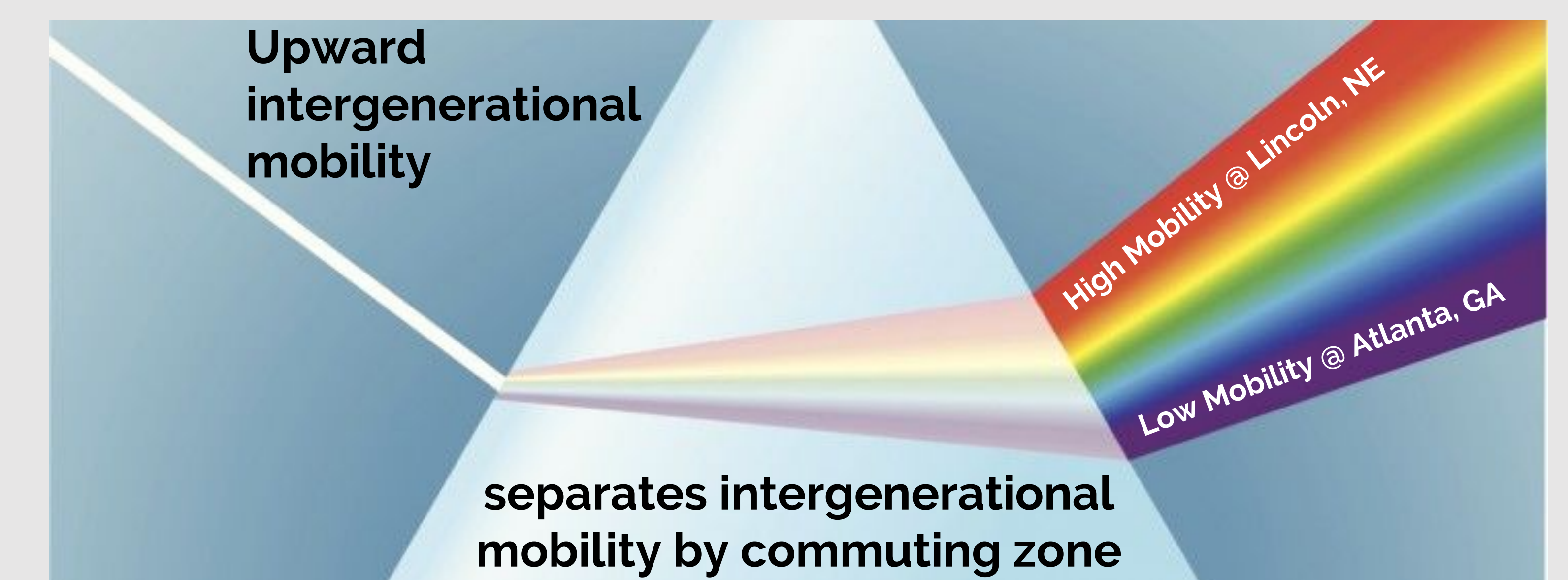


Figure 4. A geographic prism applied to Chetty et al.’s intergenerational mobility study. Mobility is an observed property of people (participants) over the course of their lives (the process). The people are located by commuting zones.