An Introduction to Scientific Research Methods in Geography

Chapter 3
Data Collection in Geography
Learning Objectives

• What is the distinction between primary and secondary data sources?
• What are the five major types of data collection in geography?
• What are some of the ways geographers and others have made a distinction between quantitative and qualitative methods, and how do they relate to scientific and humanistic approaches in geography?
Primary vs Secondary Data

- Primary data is collected specifically for the purpose of a researcher's particular study.
- Example: A survey of people's attitudes about a particular topic
- Secondary data is not collected specifically for the purpose of a researcher's particular study but for another research or non-research purpose.
- Example: Using Landsat imagery (which is not collected by the researcher) for a landslide study
Primary Data: Pros vs Cons

- A major advantage of primary data collection is the ability to tailor data to a particular research question rather than fitting your question to the data available.
- Disadvantages include the amount of time, effort, and money that go into collecting new, original data.
Secondary Data: Pros vs Cons

- Secondary data is often less expensive – in time, money, and effort
- Secondary data is also sometimes the only data available to answer a particular research question
  - Example: Census data
- A major con is accepting the data as is and fitting your research around it (data-driven research)
  - Example: Accepting the scale of data, such as census tracts, though it may not be ideal
Data types in Geography

- Though many geographers use mostly primary data, geographers, both human and physical, generally use more secondary data than other disciplines.
- Phenomena in geography are often studied at large spatial and temporal scales. It is often too difficult and expensive to generate primary data at these scales and so secondary data is used.
- Geographers, therefore, often must deal with the aforementioned issues with secondary data.
Primary or Secondary?

What kind of data do you think you will be using in your research and why?
Data collection methods in geography can be grouped into 5 categories:

- Physical Measurement
- Observation of behavior
- Archives
- Explicit records
- Computational Modeling
Physical Measurement

- Popular in physical geography
- Consists of data collected by recording physical properties of the earth or its inhabitants
- Physical properties examples: size, number, temperature, chemical makeup, moisture content, texture and hardness, the reflectance and transmissivity of electromagnetic energy, air speed and pressure
Physical Measurement

- Remote sensing innovations have been extremely important in geography for gathering large amounts of physical data
- Human geographers may look at "physical traces" left behind like housing designs
Observation of Behavior

- Human geographers observe and record human behavior directly.
- They record overt and potentially observable actions or activities of individuals or groups – NOT their thoughts, feelings, or motivations.
- Observations are made in person or with recording media.
- The observations must be “coded” into categories before they become data.
Observation of behavior

- Behavior is not cut and dry
- Observations vary greatly depending on how aware people are that they are being studied
- Behavior also is not always based on people's explicit choices or decision-making
- What type of data is this? Primary or secondary?
Archives

- The use of existing records that others have collected primarily for NON-research purposes (or at least not the geographer's research)
- Examples: financial records, birth and death records, newspaper stories, industry and business records, museum records, historical documents, diaries, letters
- Archives often need to be “coded” as well
- What type of data is this? Primary or secondary?
Explicit Reports

- Popular in human geography
- Beliefs people express about things – about themselves or other people, places, events, activities, or objects.
- Can also be observations of behavior
- They are “explicit” because respondents know they are giving information requested by a researcher
  - A strength and limitation
Explicit Report or Test?

- Explicit reports study opinions, attitudes, and preferences
- Tests have right or wrong answers and the correctness of those answers are of interest to the researcher
Computational Modeling

- Model – simplified representations of portions of reality
- Conceptual, physical, graphical, or computational
- Computational modeling – modeling that evaluates theoretical structures and processes expressed mathematically, typically in a computer
- Things to think about: modeling as an alternative to standard experimental and non-experimental approaches, how well models fit portions of reality, modeling of “artificial realities”
- Much more in Chapter 7
What type of data is most appropriate for your research???
The distinction between quantitative and qualitative is difficult to define. It reflects a continuum as much as two categories.
Quantitative Methods

- Broad term referring to scientific methods that incorporate some combination of collecting numerical data such as metric-level measurements, collecting data using relatively structured and closed-ended approaches and formats, and analyzing data with numerical and statistical approaches
- Physical and human geography
Qualitative Methods

- Broad term referring to scientific methods that incorporate some combination of collecting nonnumerical data such as verbal or pictorial records, collecting data using relatively unstructured, and open-ended approaches and formats, and analyzing data with nonnumerical and nonstatistical approaches
- Human geography
Quantitative and Qualitative

- Structure affects the classification
- Quantitative methods have a great amount of prior structure
- Qualitative methods have less prior structure
  - Often the constructs, variables, and measurement values for the variables are determined as observations are made or afterward
- Example: A survey asking respondents to choose one of a finite number of predetermined categories is relatively quantitative while an interview asking “how they feel” about a topic would be relatively qualitative
Quantitative and Qualitative

- Data analysis is also important in the distinction.
- Open-ended responses in an interview, for example, could be coded into categories that can be analyzed statistically and become more quantitative.
- They could also be analyzed more informally and less repeatably which would be more qualitative.
Is one better than the other?

- NO!!! Some researchers believe one is best and criticize the other
- An approach that fits the topic is best
- Qualitative methods are better for topics where little is known, but often come with small sample sizes and coding can be unreliable
- Quantitative methods are sometimes criticized for not understanding human experience, activity, and society adequately
- Starting with qualitative methods and applying quantitative approaches later may be best
Will your method be qualitative, quantitative,
Review Questions

- What is the difference between primary and secondary data sources?
- What types of data collection are more common in human geography and physical geography?
- What are some factors that distinguish between quantitative and qualitative methods?