

# Descriptive Inference

POST 8000 – Foundations of Social Science Research for Public Policy

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## Goal for Today

*Introduce students to basic descriptive inference.*

# What Makes Good Scientific Research?

1. Generates inference.
2. The research procedures are transparent/public.
3. The conclusions are “uncertain” (i.e. includes reasonable estimates of uncertainty).
4. The content is the method.

# Interpretation and Inference

KKV spend much of chp. 2 contrasting “interpretation” with “inference.”

- “Interpretation” seeks accurate summaries of historical detail, placing them in historical context in which we can understand their meaning.

KKV want something more with “inference.”

- i.e. to use the facts we know to learn more about the facts we don’t yet know.

# A Generalized Model of Research Design

KKV build on the “model” metaphor to formalize research design. Definitions first:

- **Data collection:** a wide range of methods for gathering information, ideally connected to the question we want to answer.
- **Variable:** an empirical measurement of a characteristic, typically denoted as  $y$ .
- **Unit:** a level of analysis (e.g. individual people, countries, counties, etc.)
- **Observation:** an individual observation of  $y$ , typically denoted like  $y_i$ .

## An Example from the General Social Survey (2018)

My `gss_spending` package has a `gss_spending` data frame from the GSS in 2018.

- **Data collection:** a probability sample of individuals living in the U.S.
- **Variable:** (take your pick of various demographic attributes and attitudes toward spending programs)
- **Unit:** individuals living in the U.S.
- **Observation:** a numeric value (again, take your pick, type `?gss_spending` in R for more information).
  - example: `race` = 1 for white people, 2 for black people, 3 for other.

# Summarizing Historical Detail

There are any number of ways of summarizing your variable into a *statistic*, but two principles apply:

1. The statistic should focus on the outcome the researcher wishes to describe or explain.
2. *The goal of the model is to simplify.*

# Descriptive Inference

“Descriptive inference” is the process of understanding the unobserved from the observed.  
Two governing principles:

1. There are *systematic* differences we can explain by reference to something fundamental/predictable.
2. There are still *nonsystematic* (or *stochastic*) differences from stuff we can't explain.

Our goal is to distinguish the former from the latter.



# Discussion

1. How do we evaluate descriptive inference?
2. What can we do about stochastic/nonsystematic differences in our variable?
3. What is the difference between “realized” and “random” in our variables?
4. What can interpretative methods teach us about inference?

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