Statistics and Personal Experience

POSC 3410 – Quantitative Methods in Political Science

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Goal for Today

Discuss aims and uses of statistics.

Statistics in Daily Life

The world is moving toward statistics and quantification.

- Macroeconomic indicators
- Polling information
- "Big Data"

All these and more inform politics and policy.

- Understanding statistics may be necessary to being a good democratic citizen.

Statistics in Daily Life

Still, statistics are maligned in education and society.

- Lies, damned lies, etc.
- AP Stats is optional in high school.
  - Some states (Texas, prominently) are eliminating math requirements like Algebra II.
- Many statistics departments don't offer undergrad majors.
- Stats (i.e. math) anxiety

Statistics pervade society but are simultaneously treated with dread and suspicion.

What Do Statistics Do?

Statistics hold no intrinsic fact.

- They're contingent on a good interpretation.

For example, what would a 10% unemployment rate mean?

- Lazy people not looking for work.
- Recession (i.e. cutting payroll to maintain a profit).
- Younger working-age population (i.e. supply $>$ demand).

Absent any other information, this statistic means little.

- But, it can easily sway opinion, absent a solid foundation for inference.

What Do Statistics Do?

There are three main purposes of statistics.

1. Summarizing data (i.e. central tendency and spread)
2. Inferring from sample data to population
3. Forecasting the future from data

This class will focus on all three purposes (the first two more than the third).

Personal Experience

Drawing conclusions about a population from a sample is called "inferential statistics"

- A random sample statistic conforms to a known population statistic given a decent-sized *random* (or small, but repeated) sample.

This is often the hardest thing for the uninformed to accept about statistical practice.

- "How can this be accurate if I've never been polled and no one I know was polled?"

Personal Experience

There are many intuitive responses to this.

- There are 300-million-plus Americans. The odds of appearing in a random sample are quite small.
  - About 500,000 to 1.
- Your experience may not be typical. Don't assume it is absent other information.
  - You're also likely to surround yourself with people in similar circumstances.

An Application: The Wage Gap

Students should be familiar with the wage gap between men and women.

- i.e. Women make about 77 cents of the man's dollar for equal work and credentials.
- Given this, we should expect a future random sample of the population will yield the same results.

Possible objection: "How can that possibly be true? I know plenty of women who make more than men."

An Application: The Wage Gap

Well, both are true. Just be mindful what you're saying. Using 2011 GSS data:

- Average income for men: about $48,000
- Average income for women: about $32,000
- 20% of women earned more than the average man.
- 36% of men earned less than the average women.

In short, men make more than women and many women earn more than the average man.

Cautious Inference

Your individual experience does not invalidate a general pattern.

- No number of anecdotes can invalidate a properly established general pattern.
- This is akin to the problem of induction.

How is this not a logically valid means to inference?

- "Black swan events"
- Need infinite confirming events.
- Ultimately, the premises may be true but the conclusion could be false.

Related, group statistics may not be good for constituent group members.

- This is an "ecological fallacy", akin to a form of stereotyping.

Hasty Generalizations and “the Food Stamp Surfer”

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Induction and personal experience invite "hasty generalizations".

- i.e. "all X are Y"
- We see this in the case of Fox News' infatuation with "the Food Stamp Surfer".

Accepting the conclusions of his peculiar case requires all the following:

- Leveraging just one case over a population of cases.
- Excluding other potential antecedent conditions.
- Infinite cases like him among the food-stamp-recipient population.

Conversely, the opposite generalization is also hasty and equally fallacious.

Conclusion

Your personal experience makes you who you are, but it's a poor guide to inference.

- You cannot generalize (in any direction) from your personal experience.
- This is tough for beginners to grasp, but it's one of the most important lessons.

Proper use of statistics allows for generalizable claims, albeit with specified limits and qualifiers.

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