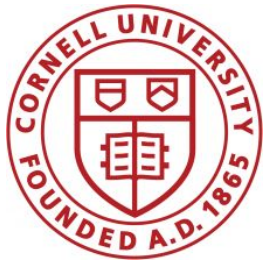


DSFA

Spring 2018

Lecture 15

Sampling

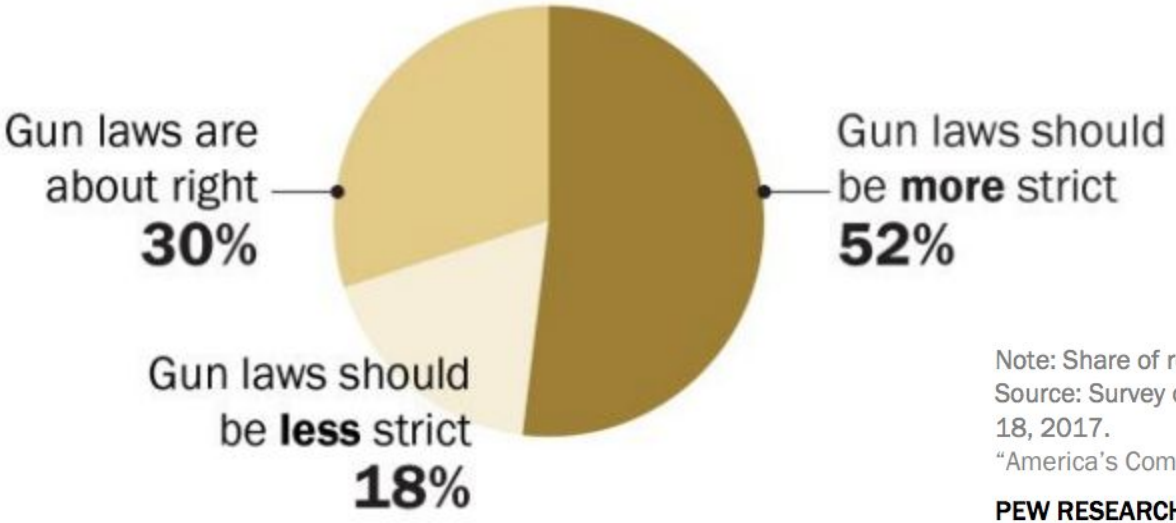
Announcements

- Prelim 1: Thursday, 7:30 pm

Probability and Simulation

About half of all adults say U.S. guns laws should be stricter

% saying ...



Note: Share of respondents who didn't offer an answer not shown.
Source: Survey of U.S. adults conducted March 13-27 and April 4-18, 2017.
"America's Complex Relationship With Guns"

PEW RESEARCH CENTER

http://assets.pewresearch.org/wp-content/uploads/sites/3/2017/06/06151541/Guns-Report-FOR-WEBSITE-PDF-6-21.pdf

WASHINGTON (CNN) — Support for stricter gun laws has spiked to the highest level since 1993, and almost two-thirds say government and society can take action to prevent future mass shootings, according to a new CNN poll conducted by SSRS.

The findings suggest the school shooting in Parkland, Florida, has shifted public opinion on gun laws in a way other recent mass shootings have not.

Overall, 70% now say they back stricter gun laws, up from 52% who said so in an October poll not long after a mass shooting in Las Vegas killed 58 people. Just 27% oppose stricter laws. Support for stronger gun laws has not been that high in CNN polling since a December 1993 survey conducted just after the Brady Bill was signed into law.

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https://www.cnn.com/2018/02/25/politics/cnn-poll-gun-control-support-climbs/index.html

Sampling

Sampling

Observe some *individuals* from a *population*

a. Examine 10 rolls of a d6 (six-sided die)
b. Coat color of the first 20 people who walk through door
c. Survey 1000 students living in campus dorms, where every student on campus is equally likely to be chosen, and ask them about their perspective on gun control

Sampling

- Deterministic sample:
  - Sampling scheme doesn't involve chance

- Probability (random) sample:
  - Before the sample is drawn, you have to know the selection probability of every group of people in the population
  - Not all individuals have to have equal chance of being selected

(Demo)

Sample of Convenience

- Example: sample consists of whoever walks by
- Just because you think you're sampling "at random", doesn't mean you are. If you can't figure out ahead of time
  - what's the population
  - what's the chance of selection, for each group in the population

  then you don't have a random sample

Does sample look like population?

(Demo)

Large Random Samples

If the sample size is large,

then the empirical distribution of a uniform random sample

resembles the population distribution,

with high probability.

Distribution

- A distribution is a description of the likelihood of *events*

- Empirical distribution:
  - Experimental: made from observations
  - Proportion of each event in sample

vs.

- Probability distribution:
  - Theoretical: made from mathematics
  - Probability of each event

Law of Large Numbers

If an experiment is repeated many times,
independently and under the same conditions,
then the proportion of times that an event occurs
gets closer to the theoretical probability of the event

Sometimes called *Law of Averages*

Terminology

Statistic

A number associated with the sample

Parameter

A number associated with the population

A statistic can be used as an **estimate** of a parameter