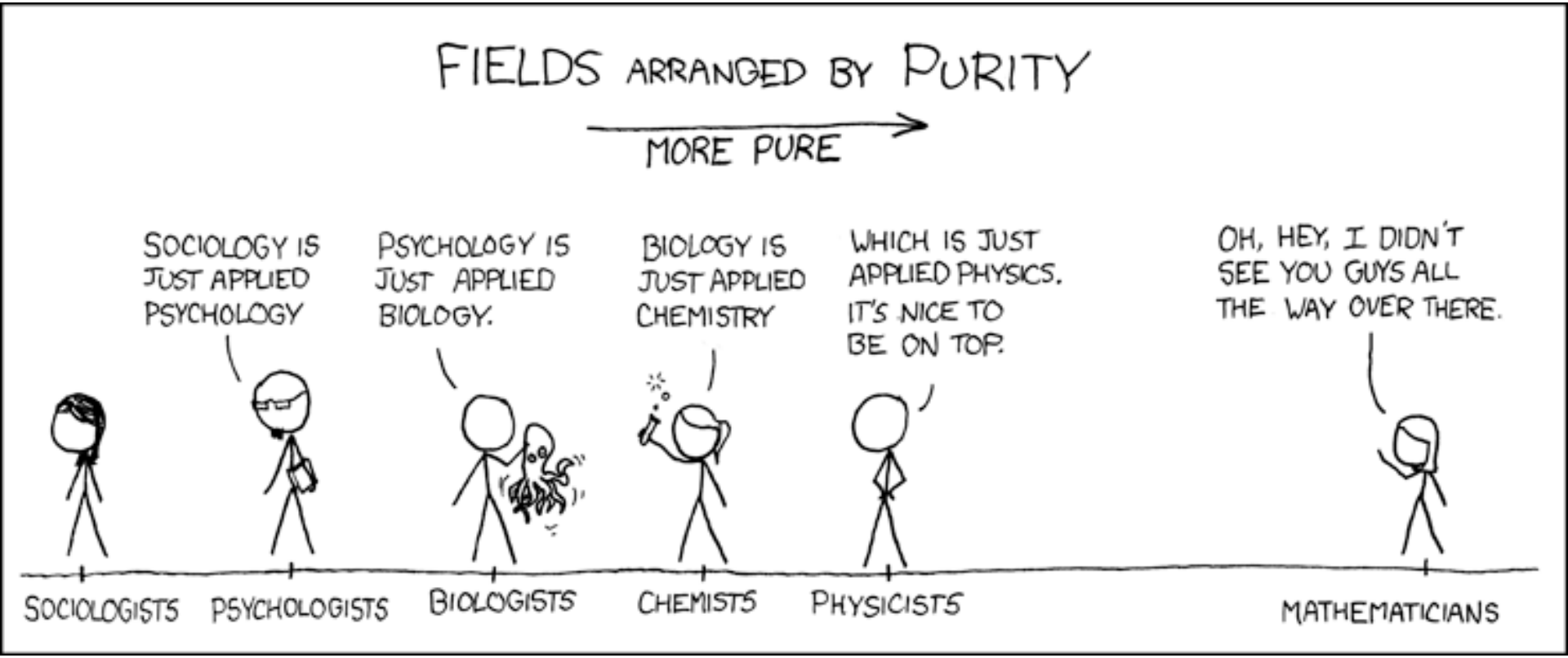
Soc 5: Evaluation of Evidence

Lecture 2: Sociology and Social Science



Agenda

- A few reminders
- Practice Quiz
- What is social science?
- Unit of Analysis
- Variables
- Research Designs and Time

Course Outline

1.	**Sociology & Social Science**	**Sept 3, 5, 10**
2.	Research Design	Sept 12-26
3.	MIDTERM – Review & In-Class Exam	Oct 3 & 8
4.	Ways to Gather and Analyze Data	Oct 1, 10-Nov 26
5.	Ethics	Dec 3
6.	Review	Dec 5
7.	FINAL EXAM	Dec 17

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bCourses website: be sure to opt-in to received course announcements (check your settings ASAP)

Syllabus: It is your responsibility to read and understand the syllabus. Ask if something is unclear.

Clearing the Waitlist

- If you're enrolled and considering dropping:
  - Please do so quickly so students who are on the waitlist can get in.

- If you're enrolled and want to stay in the course…

OR

- if you're on the waitlist:
  - Attend this class and the next 2 classes.
  - I will drop students who do not attend ALL 3 class sessions.
  - Course is locked – all additions will go through Carmen Brick (carmenbrick@berkeley.edu) and/or Soc Advisors

Sections

- Attendance in sections is MANDATORY.
- Participation in sections (based on attendance and active participation) is critical to your learning the materials presented in this course.
- Sections start:
  - Wednesday, Sept 11 for M/W sections
  - Thursday, Sept 12 for Tu/Th sections
- There will be NO section meetings until then.
- If you need to change sections, please fill out this form:

https://forms.gle/gEeVm5Ta7tRhCa6m6

(link is also on syllabus)

A Primer on In-Class Quizzes

- We will use google forms to take the quiz
  - Log in with your Calnet ID (same as attendance)
  - Order of questions and responses is randomized
  - Also serves to record attendance
  - Honor Code applies
  - Open book and open note

- Each quiz question will have 3-5 possible answers
  - You will have about 1 minute to answer each question.

- After all questions have been answered, I will show the distribution of results (data for us to evaluate!) and discuss the correct response.

Learning to Excel at Multiple-Choice Tests

- Psychological research suggests that people's skill sets are malleable: everyone can learn new skills – including taking multiple-choice tests.

- The quizzes in this course will challenge you. But they are a good way for you (& me & your GSIs) to assess what you do and don't get.

- Here are some tips on how to improve your performance in quizzes.

Suggestions:
How to Take a Multiple Choice Quiz

- Read each question through completely before answering.
- Cross out 1-2-3 answers that you are very sure are wrong.
- Compare the remaining answers. Which 1 is most likely? Choose it.
  - If 2 seem equally likely and you have time before the quiz runs out, ponder the reading you did before class.
  - If 2 seem equally likely and time is about to run out, just choose 1 – you probably have a 50/50 chance of being right.

More Suggestions

- Don’t be afraid to change your answer if, upon reflection, it seems wrong to you.
  - Dozens of studies have found that students who change dubious answers usually improve their test scores.
- Eliminate options that contain terms that are totally unfamiliar – they may be “ringers.”
- Eliminate options that seem funny – or that your weird professor might think are funny.

Suggestions: Tricky Questions

- Some questions will be tricky because they are phrased as “which one of these is NOT….”
  - To answer these, think of what sticks out – what does not belong.
- Some questions include “all of the above” as an option. If 2 or 3 of the other options seem correct, then “all of the above” is a strong possibility.

Practice Quiz

Sociology and Social Science

- Lessons to be learned today:
  - What is science?
  - What is (social) scientific research?
  - Sociological research:
    - What units/cases do sociologists observe? What are the attributes of those units?
    - How do sociologists gather data?
    - What are the main types of sociological research processes and sociological data?

Ways to Discover Reality

- Direct experience and observation
- Tradition
- Authority
- **Science**

What is Science?

Ernst Nagel, *The Structure of Science*, 1961:

- "The sciences seek to discover and to formulate in general terms the conditions under which events of various sorts occur…"
- "The distinctive aim of the scientific enterprise is to provide systematic and responsibly supported explanations."

Gary King, Robert Keohane, and Sidney Verba, *Designing Social Inquiry*, 1994:

- Science "seeks to arrive at valid inferences by the systematic use of well-established procedures of inquiry."

What is Scientific Research?

Gary King, Robert Keohane, and Sidney Verba,
Designing Social Inquiry, 1994:

- "The practice of scientific method is the persistent critique of arguments, in the light of tried canons for judging the reliability of the procedures by which evidential data are obtained, and for assessing the probative force of the evidence on which conclusions are based."

Characteristics of Scientific Research

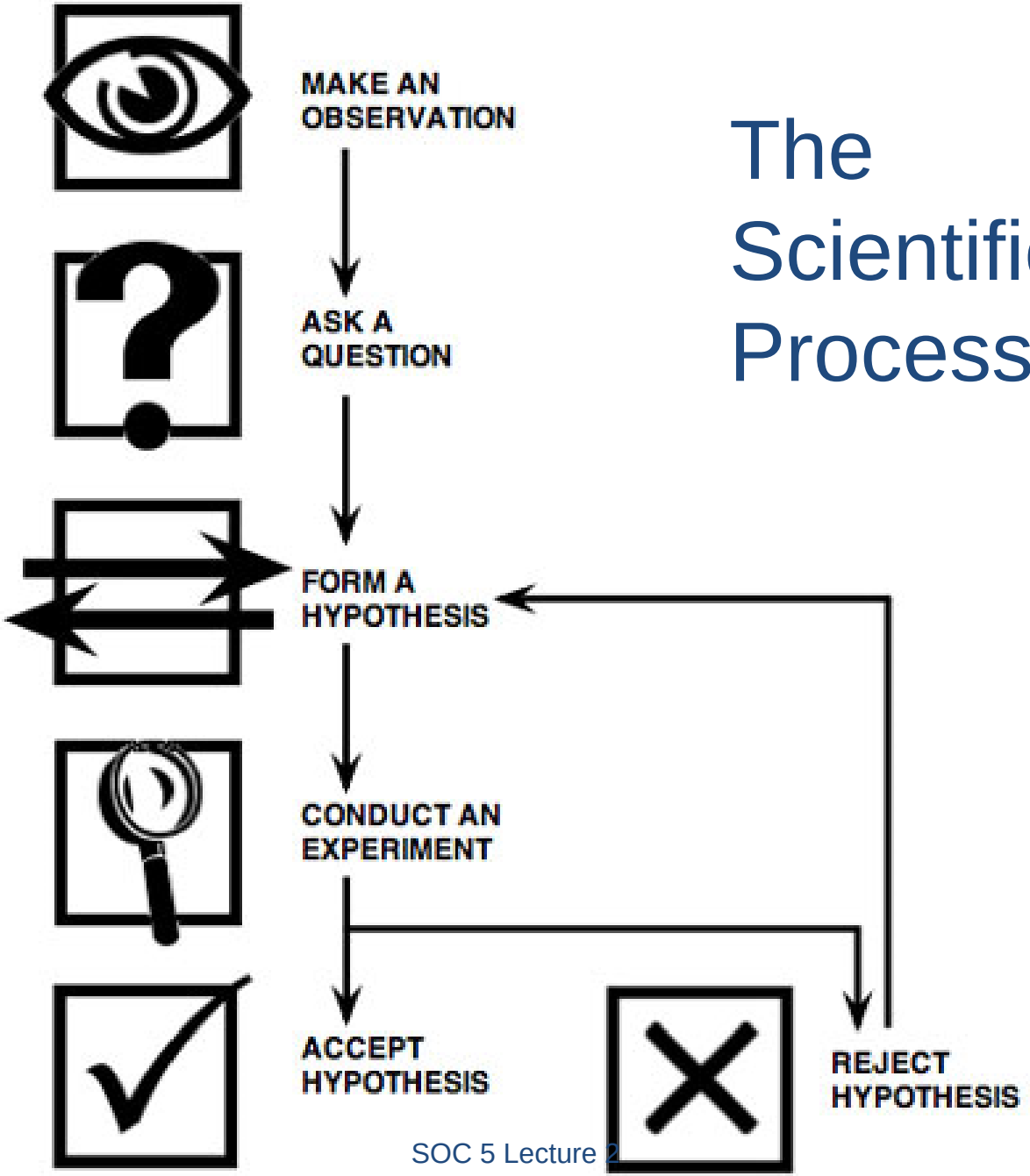
1. Scientific research is designed to make *descriptive or explanatory inferences* on the basis of empirical information about the world.

2. Scientific research uses explicit, codified, and *public methods* to generate and analyze data whose reliability can therefore be assessed.

3. *Uncertainty* is a central aspect of all research. Inferences without estimates of uncertainty are not science.

4. To be valid, scientific research must adhere to the *rules of inference*. The content of "science" is primarily the methods and rules, not the particular subject matter.

The Scientific Process



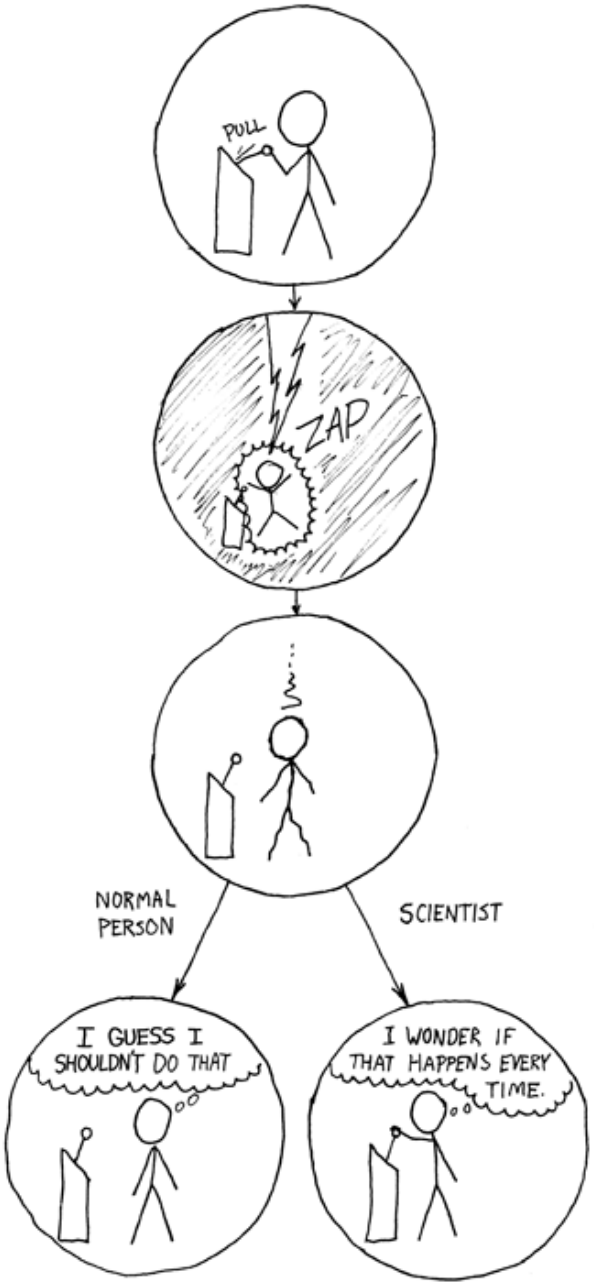
Key Components of Scientific Research Studies

- Research question
- Theory
- Data
- Analysis of data

Data – A Critical Concept

- "**systematically** collected elements of **information** about the world"
  - Gary King, Robert O. Keohane, and Sidney Verba. 1994. *Designing Social Inquiry*. Princeton: Princeton University Press.
- Also called evidence – as in "the evaluation of evidence," the title of this course, or empirical evidence.

The difference between a normal person and a scientist...



Example

- Research question: Do macro-economic shocks increase or reduce relationship quality?
- Theory #1: Hard times bring couples closer.
- Theory #2: Financial stress causes inter-personal conflict.
- Data: Gathered from romantically involved couples in 20 cities around the US from 2001 – 2010 merged with data on severity of Great Recession in city.
- Analysis: statistical analysis of quantitative data.
- Results: women exposed to worse economic conditions were subject to more controlling behavior by their romantic partners.

Daniel Schneider, Kristen Harknett, and Sara McLanahan. 2016. "Intimate Partner Violence in the Great Recession." *Demography.*

Attendance Time

tinyurl.com/soc5attend

- *available from now until end of lecture*
- *sign in using your berkeley.edu account*
- *you will receive email confirmation*

If this does not work for you, sign in on my yellow pad at the end of lecture

Units of Analysis

The types of entities we are analyzing:

- Individuals
- Groups (families, classes, gangs, …)
- Political units (cities, counties, countries, inter-governmental agencies)
- Organizations and Industries
- Social artifacts (flags, mottos, poems, …)

Individual Units of Analysis: Examples of their Aspects

- Age
- Race/ethnicity
- Gender
- Sexual orientation
- Nationality
- Education level
- Income
- Political orientation
- Political party membership
- Marital status
- Number of children
- Employment status
- Wealth (assets net of liabilities)
- Religion
- Hobbies
- Location (neighborhood, city, state, country)
- Music preferences

Family/Household Units of Analysis: Examples of their Aspects

- Number of members
- Number of adults
- Number of children
- Household income
- Accommodation type (single-family house, townhouse, apartment, farm…)
- Rent or own?

- Household wealth (assets net of liabilities)
- Number of cars/trucks
- Number of televisions
- Location (street, neighborhood, city/town, state…)
- Time in location

Municipality (city, town, county) Unit of Analysis: Examples of their Aspects

- Population Size
- Percentage white, black, hispanic, asian, native american…
- Percentage foreign-born
- Average temperature
- Average rainfall
- Number of colleges & universities
- Whether or not medical marijuana is legal
- Average individual (or household) income
- Average house price
- Average rent
- Crime rate
- Migration (into region/ state & out of it)
- Economic production
- Percentage voted D/R/other in last election.

How can we identify the unit of analysis?

- Ask ourselves, what is being described?
- What is being compared?
- What units do we want to generalize to?

- Note: the concept of unit of analysis is directly linked to the concept of “variables”
  - Variables describe the unit of analysis
  - If you can identify the variables, that will help you identify the unit of analysis, and vice versa

- If **the city** is the unit of analysis, what variables might be associated with it? (List 4)
  - For the city **Berkeley**, guess-timate values on those variables.
  - For the city **Los Angeles**, guess-timate values on those variables.

- If **the novel** is the unit of analysis, what variables might be associated with it? (List 4)
  - For the novel ***The Hunger Games***, guess-timate values on those variables.
  - For the novel ***Pride & Prejudice***, guess-timate values on those variables.

For each statement, what is the unit of analysis?

- Are schools in poorer neighborhoods more prone to violence than schools in richer neighborhoods?
- Are women more likely than men to be religious?
- Do records that win Grammy awards sell more than otherwise-similar records that do not win Grammy awards?
- Are married couples richer than non-married cohabiting couples?

Reconcile These Statements

- “Our schools are getting worse: 60% of schools had lower test scores this year than last year.”

vs.

- “Our schools are getting better: 80% of students had higher test scores this year than last year.”

Reconcile These Statements

- “Our economy is in the crapper: 30 states had falling incomes last year.”

vs.

- “Our economy is showing great gains: 70% of Americans had rising incomes last year.”

The Language of Variables

Gender

Age

Organizational Performance

Political Ideology

Demographic Diversity

Education Level

Gross Domestic Product

Organizational Size

Economic Expansion

Political Participation

Key Components of this Language: Attributes & Variables

- **Attribute**: a characteristic or quality of a social actor (individual, family, class, group, region, organization, industry, ….)
  - *e.g.*, 22-year-old female, sophomore, Democrat, Catholic, biology major

- **Variable**: a logical grouping of attributes that describes the entities being studied
  - Gender = male, female, other, *etc.*
  - Class = freshman, sophomore, junior, senior
  - Political Party = Democrat, Republican, Green, *etc.*
  - Age = 0 (newborn), 1, 2, 3, ….., 90, 91, 92, ….
  - Religion = Lutheran, Catholic, Muslim, Presbyterian, Jewish, *etc.*

Uses of Attributes and Variables

- We can describe the distribution of attributes on variables
- We can also find cause/effect relationships of the form variable 1 → variable 2
    - Read as “change/difference in variable 1 causes change/difference in variable 2.”
    - Often shown in figures as X → Y, where X is the cause and Y is the outcome.

In Sum…

- We are interested in ***variables***, specifically, in developing and testing ideas about causal relationships between variables (X → Y).

- ***People, social groups*** (informal groups, formal organizations, families, etc.)***, and social artifacts*** (flags, songs, novels, etc.) are the carriers of attributes and variables.

How should we gather data?

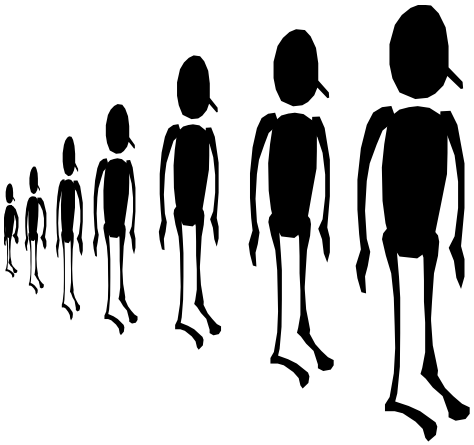
- At one point in time?
- Over time?
  - Should we track the same entities over time?
  - Should we get new samples for each point in time?

Time

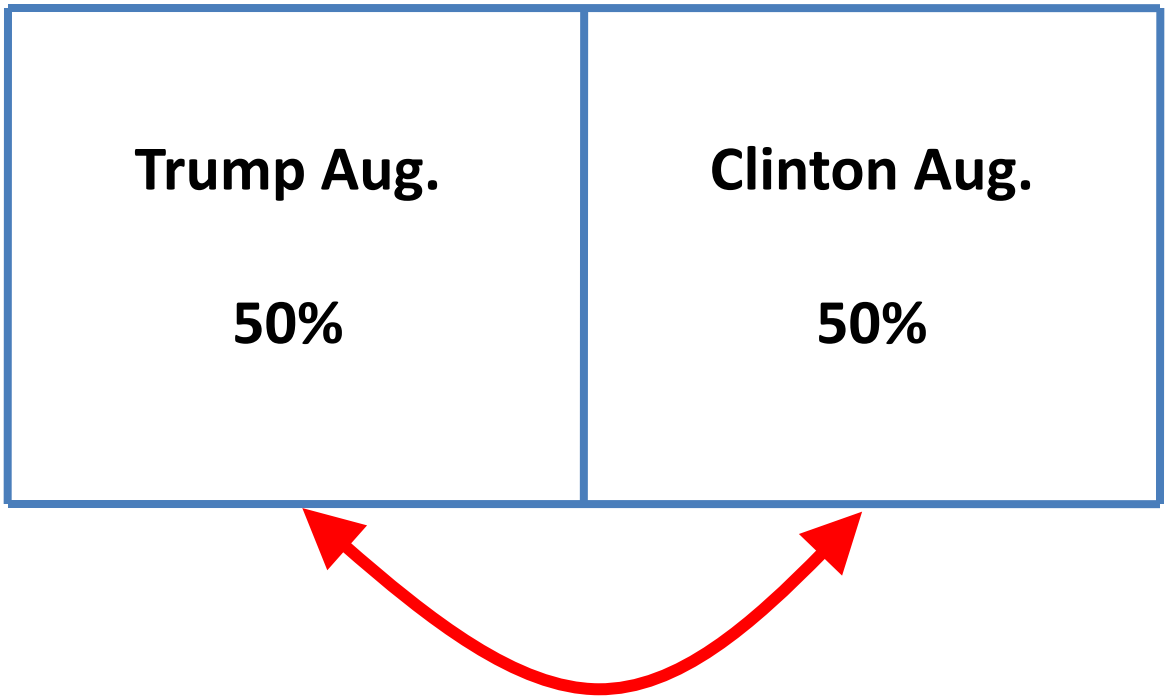
- Cross-sectional studies
- Longitudinal studies
  - Repeated cross-sectional
  - Cohort
  - Panel
- Approximating longitudinal studies

Cross-Sectional

- Snapshot in time
- Pick a sample from a population and measure its members

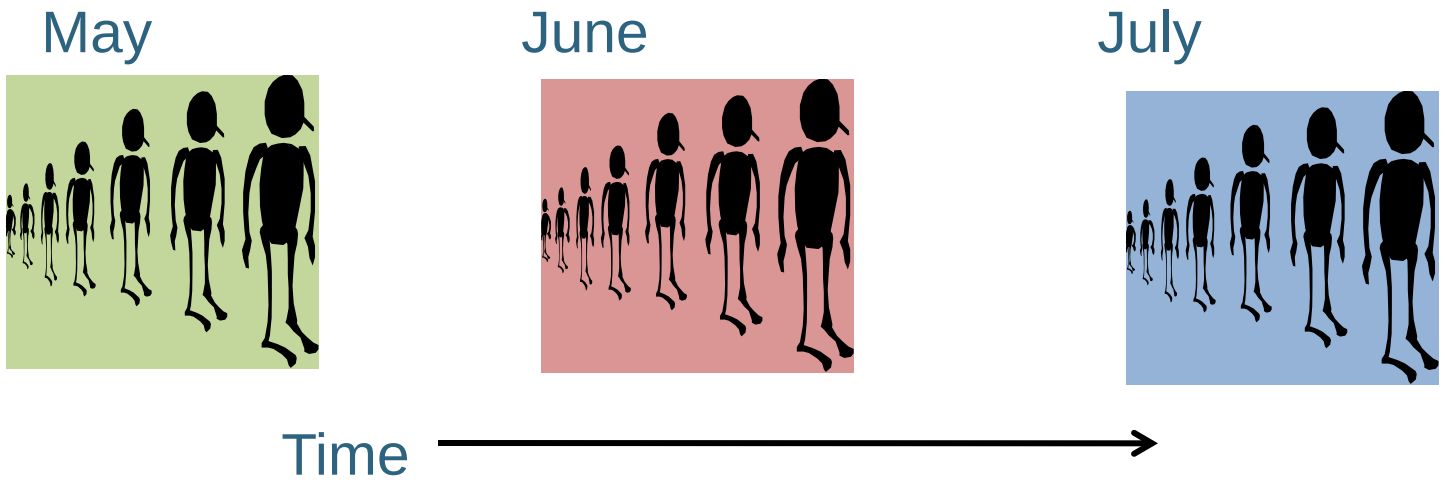


Cross-Sectional Study

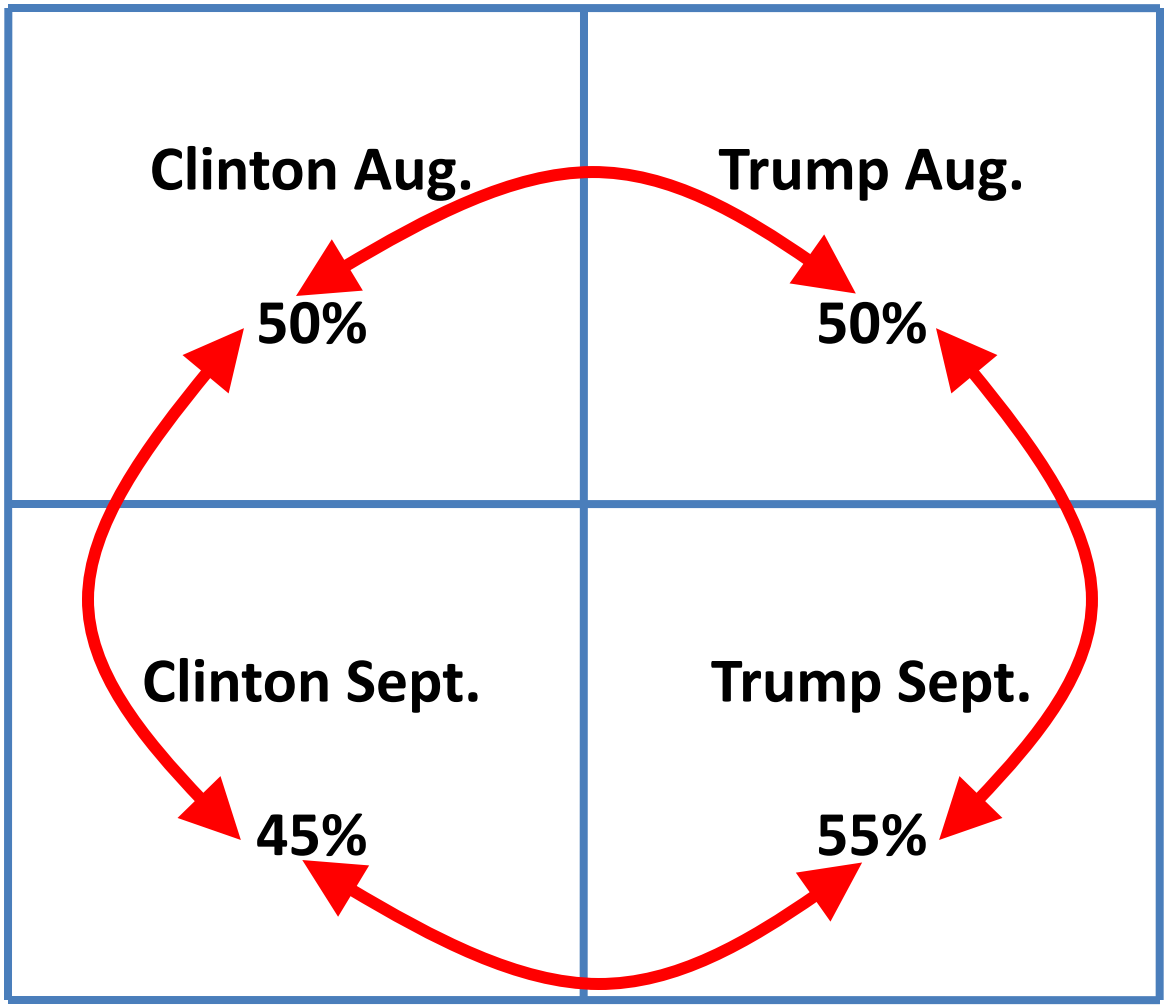


Longitudinal (Repeated Cross-sectional)

- Select different samples over time
- Compare them to detect changes in the population.



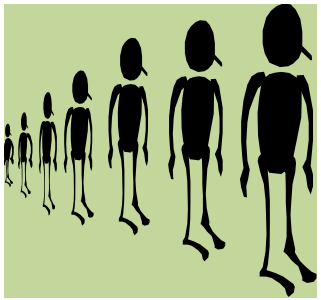
Repeated Cross-sectional Study



Longitudinal (Panel)

- Examine the same set of units over time.
- Detect processes of change at work.

May



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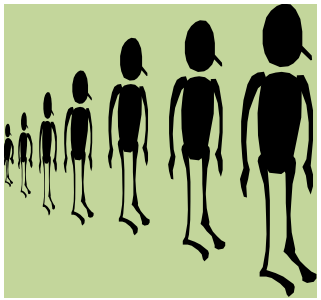
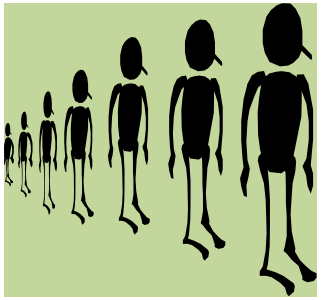
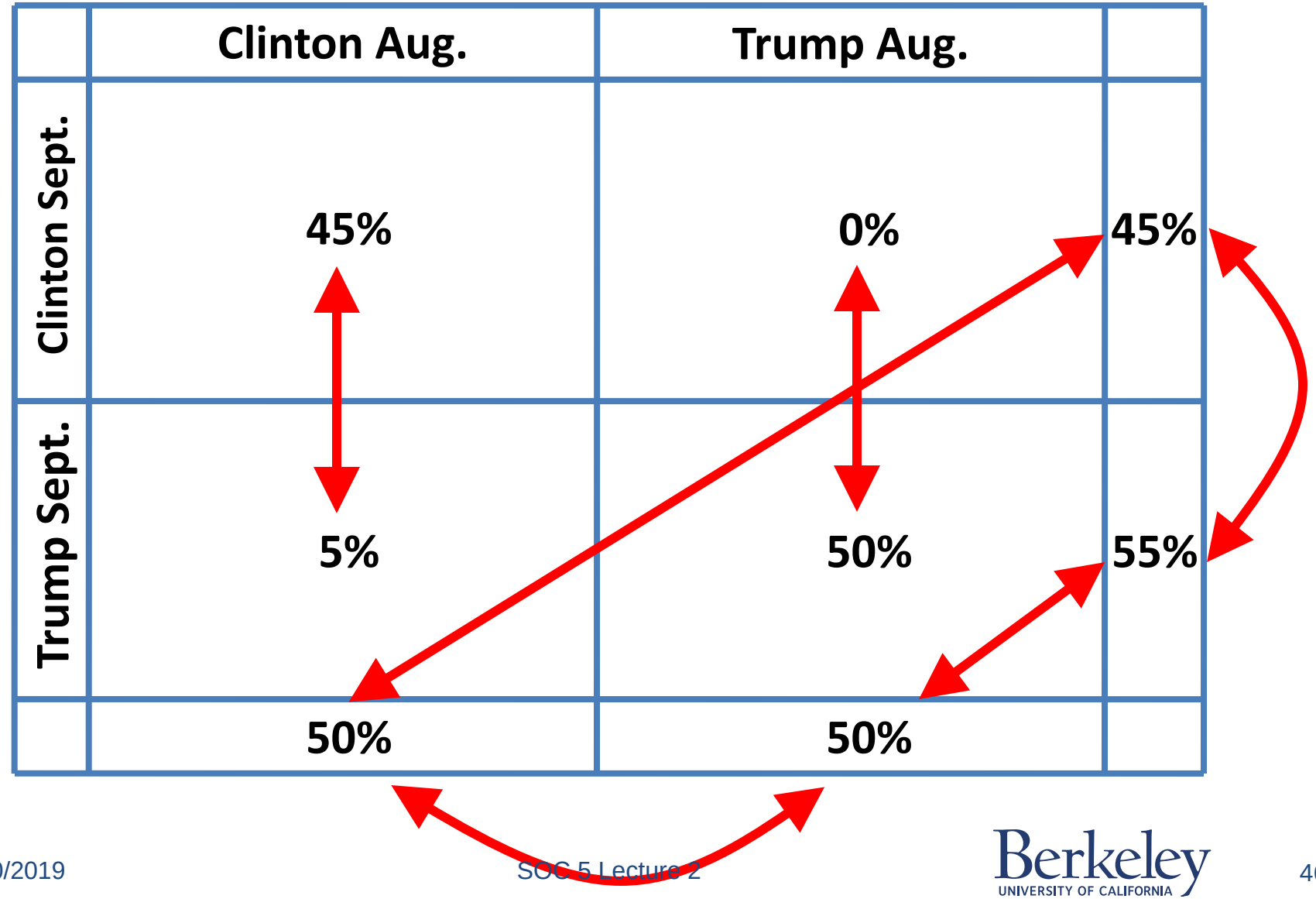


July



Time

Panel Study (I)



Panel Study (I)

	Clinton Aug.	Trump Aug.	
Clinton Sept.	45%	0%	45%
Trump Sept.	5%	50%	55%
	50%	50%	

Panel Study (II)

	Clinton Aug.	Trump Aug.	
Clinton Sept.	44%	1%	45%
Trump Sept.	6%	49%	55%
	50%	50%	

Panel Study (III)

	Clinton Aug.	Trump Aug.	
Clinton Sept.	42%	3%	45%
Trump Sept.	8%	47%	55%
	50%	50%	

Longitudinal (Cohort)

- Select one cohort (e.g., age group, matriculation group).
- Follow its members over time to detect changes (e.g., maturation).

Comparing Temporal Research Designs

1. Observe units of analysis at 1 point in time?
   a) Yes → Cross-sectional study
   b) No → Longitudinal study
2. Longitudinal study: observe different samples over time?
   a) Yes → Repeated cross-sectional study
   b) No (same sample over time) → Panel study
3. Longitudinal study: observe a single cohort over time?
   a) Yes → Cohort study
      - Repeated cross-sectional cohort study – observe different samples over time (common)
      - Panel cohort study – observe same sample over time (rare)

Types of Longitudinal Studies

	Observe different samples at different points in time	Observe the same sample at different points in time
Sample from multiple cohorts	**Repeated Cross-sectional Studies**	**Panel Studies**
Sample from a single cohort	**Repeated Cross-sectional Cohort Studies**	**Panel Cohort Studies**

Approximating Longitudinal

- Compare people of different ages at one point in time.
- Infer that their differences are a result of aging.
- Compare: 1st, 2nd, 3rd, 4th year undergraduates

Match the Research Question to the Research Design

1. How much time did Berkeley students spend working for pay this week?

2. How has the time Berkeley students spend working for pay changed since the Great Recession?

3. How does the time Berkeley students spend working for pay change as they advance from their 1st year to their 4th year?

A. Panel
B. Cross-sectional
C. Repeated cross-sectional
D. Repeated cross-sectional cohort
E. Panel cohort

Note: Multiple correct answers may be possible.

Check your answers here: **tinyurl.com/y65mv6cj**

What about if we wanted to know how the change from first year to senior year changed since the Great Recession?

We would need to compare the trends across multiple cohorts, some of whom attended before the Great Recession and some of whom attended afterwards

Reading for Next Class

- Collins, Harry, and Trevor Pinch. 1993. *The Golem: What Everyone Should Know about Science*. Cambridge: Cambridge University Press. Chapter 6 ("The sex life of the whiptail lizard," pp. 109-119).
- Textbook. Chapter 2. Research foundations: Linking sociological theory to research, p. 32-40, 45-52.
  - For those of you on the waitlist, these are up on bcourses. They can be viewed by anyone, not just enrolled students.

More Practice: Identifying the Units of Analysis

You should be able to identify the unit of analysis in any analytic assertion.

#	Statement	Unit of Analysis
1	50% of the students in this class are women.	
2	10% of classes give take-home exams.	
3	30% of American households have at least 2 TVs.	
4	More voters prefer Obama to McCain.	
5	The percentage of mixed marriages increases with education.	
6	Democrats are more likely to favor the minimum wage than Republicans.	
7	Democracy is more common in rich countries than in poor ones.	
8	Freshmen are younger than seniors.	
9	The average income among American workers is $35,000.	
10	French popular songs are more romantic than German ones.	
11	Sociology courses are more interesting than economics courses.	
12	Canadians eat more donuts than Americans, on a per-capita basis.	

More Practice: Identifying the Units of Analysis

You should be able to identify the unit of analysis in any analytic assertion.

#	Statement	Unit of Analysis
1	50% of the students in this class are women.	The individual
2	10% of classes give take-home exams.	The group (class)
3	30% of American households have at least 2 TVs.	The group (household)
4	More voters prefer Obama to McCain.	The individual
5	The percentage of mixed marriages increases with education.	The group (marriage)
6	Democrats are more likely to favor the minimum wage than Republicans.	The individual (voter)
7	Democracy is more common in rich countries than in poor ones.	The country
8	Freshmen are younger than seniors.	The individual
9	The average income among American workers is $35,000.	The individual
10	French popular songs are more romantic than German ones.	The song
11	Sociology courses are more interesting than economics courses.	The group (course)
12	Canadians eat more donuts than Americans, on a per-capita basis.	The individual

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