

Psych 10: Intro to Statistics

Lecture 1 · What is statistics? Overview of the course · Wed
Sep 23, 2026

Prof. Judith Fan · Fall 2026

Today

Lecture 1: What is statistics? Overview of the course

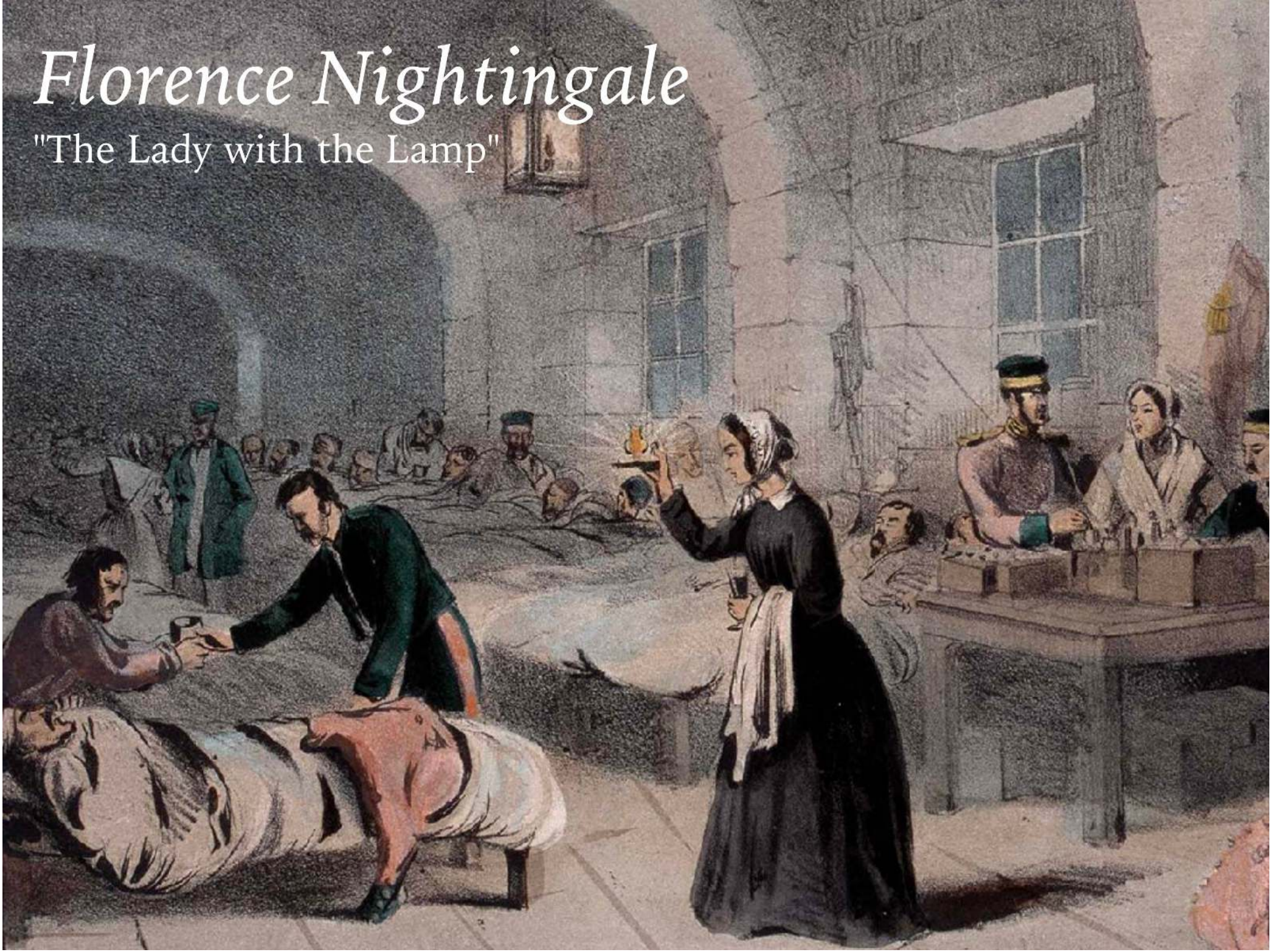
1. Why learn statistics?
2. How this course will work
3. Tell us about yourself: the student background survey

You'll fill in a worksheet as we go, and we'll spend the end of class on the survey.

1 Why learn statistics?

Florence Nightingale

"The Lady with the Lamp"



“

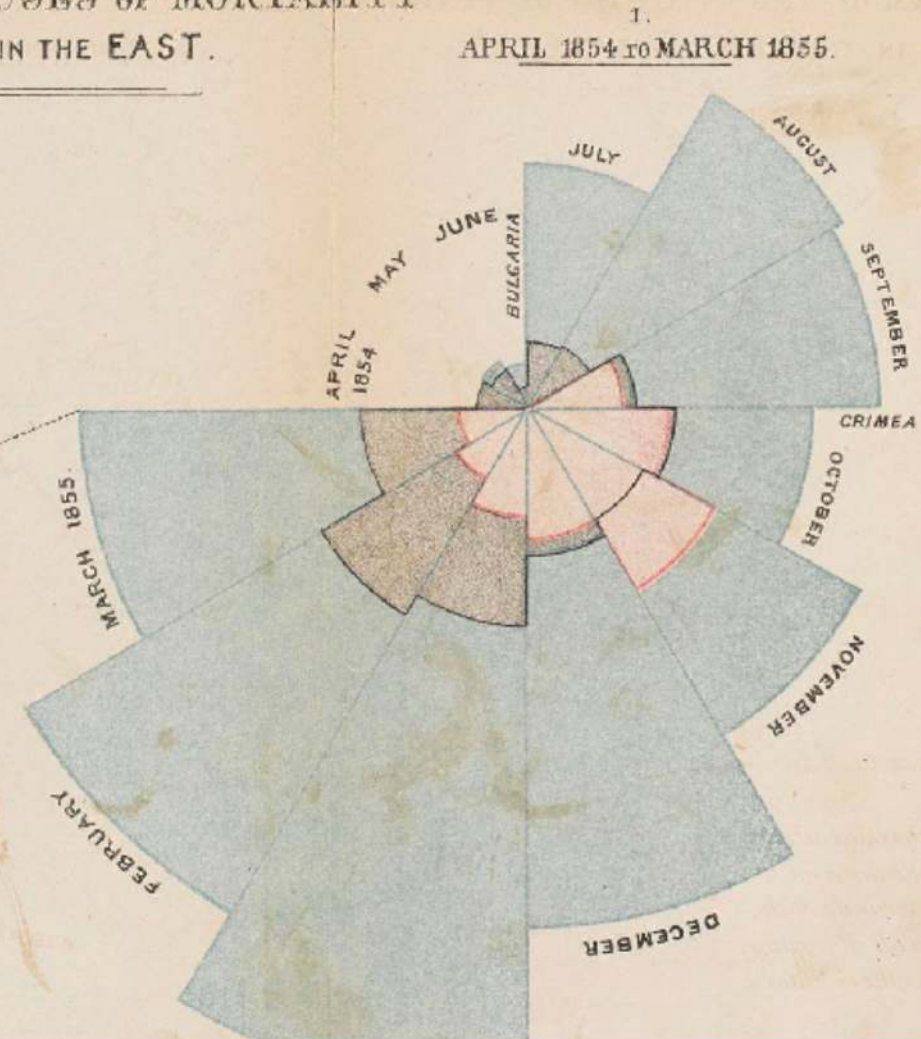
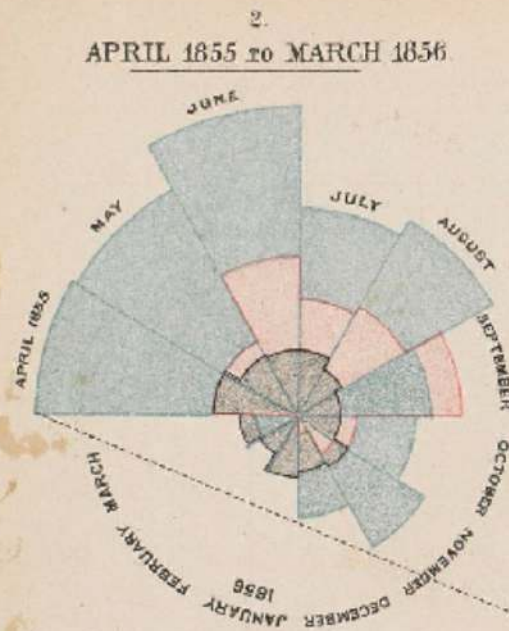
'All were swarming with vermin, huge lice crawling all about their persons and clothes. Many were grimed with mud, dirt, blood and gunpowder stains. Several were completely prostrated by fever and dysentery. The sight was a pitiable one and such as I had never before witnessed... 'There has been somehow unaccountable neglect in the arrangements for this hospital. Until some hours after the arrival of the men there were neither stores, attendants nor the necessary refreshments on the spot. During this afternoon I attended single handed to the wounds and wants of 74 helpless men.'

Assistant Surgeon Henry Bellew describing Scutari hospital - January 1855

Florence Nightingale

Pioneering data scientist

DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.



The Areas of the blue, red, & black wedges are each measured from the centre as the common vertex.
The blue wedges measured from the centre of the circle represent area for area the deaths from preventable or mitigable zymotic diseases, the red wedges measured from the centre the deaths from wounds, & the black wedges measured from the centre the deaths from all other causes.
The black line across the red triangle in Novr 1854 marks the boundary of the deaths from all other causes during the month.

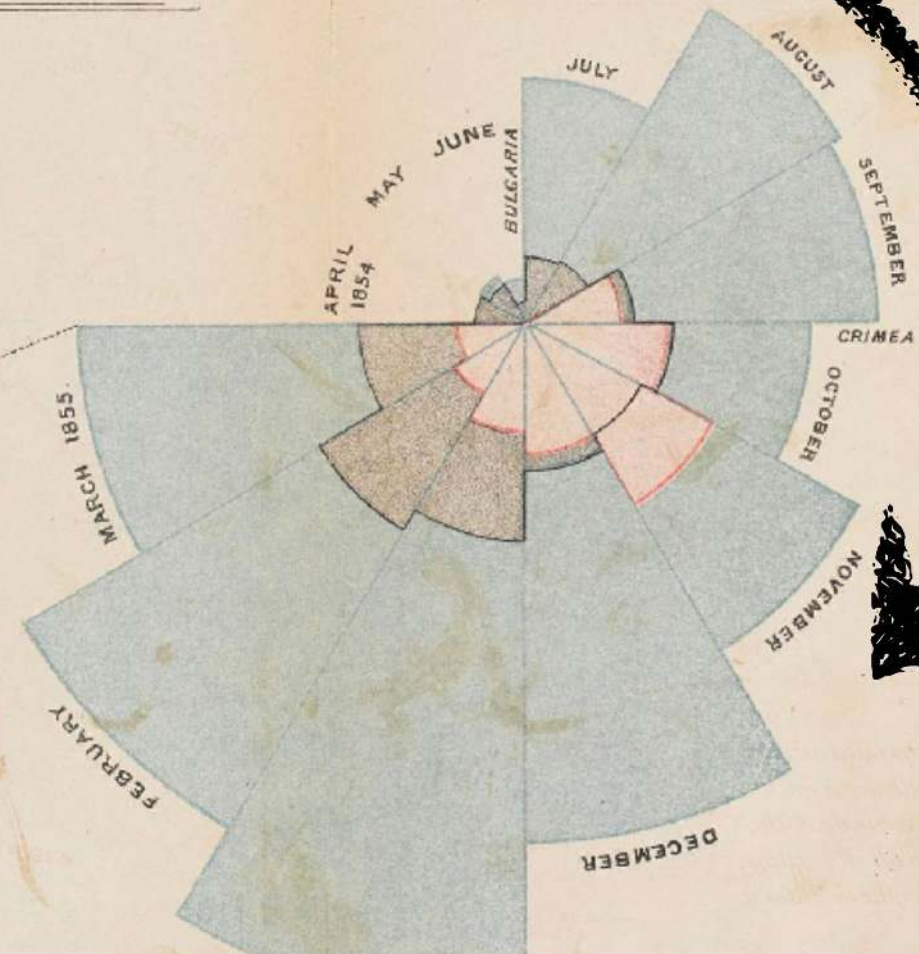
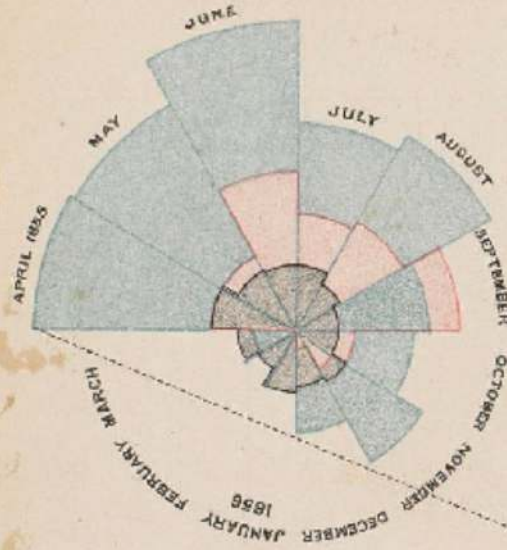
Florence Nightingale

Pioneering data scientist

passage of time

2.
APRIL 1855 to MARCH 1856

DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.



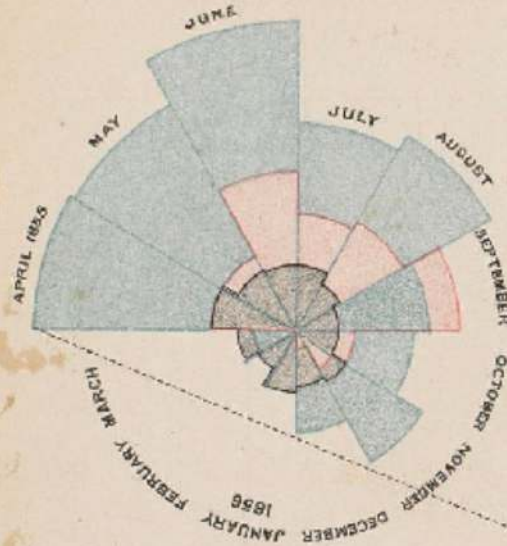
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Florence Nightingale

Pioneering data scientist

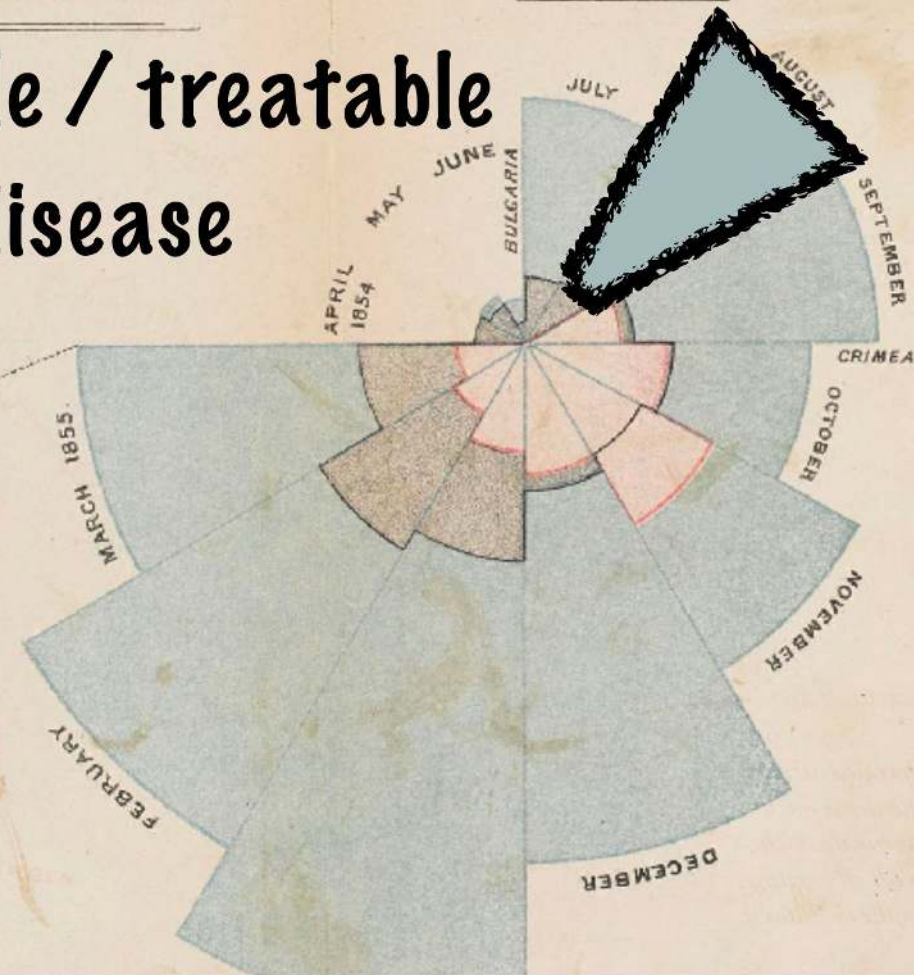
DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.

2.
APRIL 1855 to MARCH 1856.



**preventable / treatable
infection disease**

1.
APRIL 1854 to MARCH 1855.



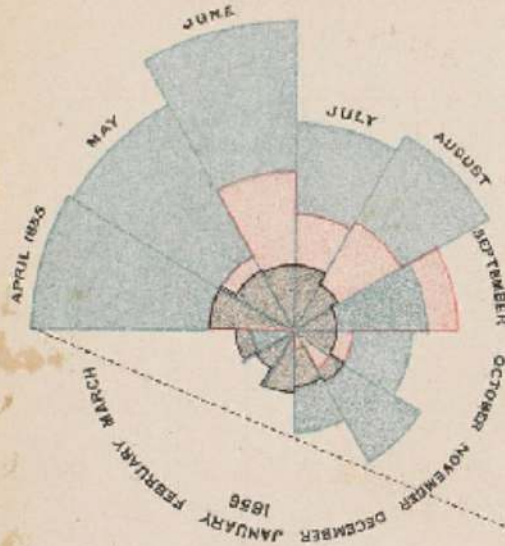
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Florence Nightingale

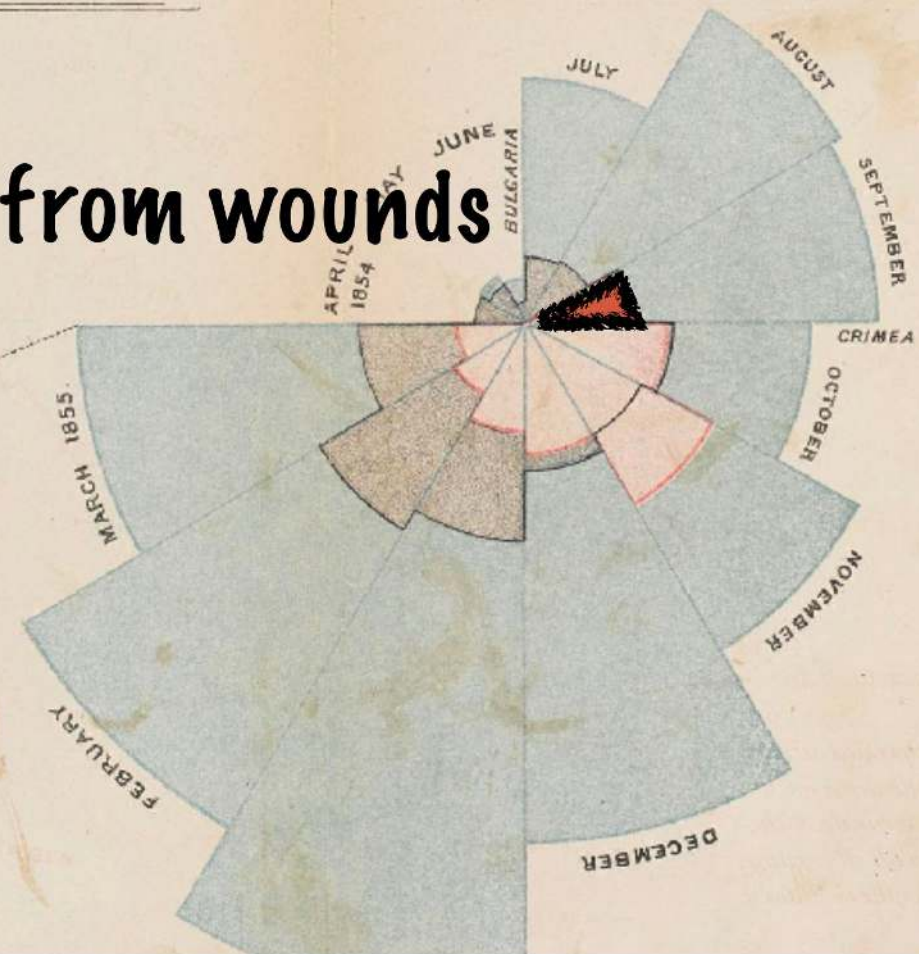
Pioneering data scientist

DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.

2.
APRIL 1855 to MARCH 1856.



1.
APRIL 1854 to MARCH 1855.



deaths from wounds

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Big idea #1

Statistics gives us a way of making the invisible visible.

You couldn't have seen this pattern by walking through the hospital. To see it, Nightingale had to:

1. **count** every death and record its cause,
2. **aggregate** the counts by month, and
3. **visualize** the totals.

Question 1

What share of the world's population lives in megacities (cities with at least 10 million people)?

- A) Around 8%
- B) Around 28%
- C) Around 48%



Question 1

What share of the world's population lives in megacities (cities with at least 10 million people)?

A) Around 8% ✓

B) Around 28%

C) Around 48%

Only about 1 person in 12 lives in a city that big.



Question 2

In low-income countries across the world, what share of girls went to school until at least age 11? (Before the pandemic.)

- A) Around 20%
- B) Around 40%
- C) Around 60%



Question 2

In low-income countries across the world, what share of girls went to school until at least age 11? (Before the pandemic.)

A) Around 20%

B) Around 40%

C) Around 60% ✓

In low-income countries, most girls go to school until at least age 11.



Surprised?

- With three options, guessing would get about a third of us to the right answer. How did we do?
- Hans Rosling asked questions like these of thousands of people in many countries. On most of them, fewer than a third picked the right answer.
- Look at which wrong answers we picked. What do they have in common?

WHAT I CAN SEE



WHAT I CAN SEE



BIGGER PICTURE



WHAT I CAN SEE



BIGGER PICTURE



STATISTICS & SCIENCE



A tale of two (or three) worlds?



Source: gapminder.org/dollar-street

A tale of two (or three) worlds?



"POOR" NATIONS

aka "low-income" / "developing" / "third-world"



"RICH" NATIONS

aka "high-income" / "developed"

Source: gapminder.org/dollar-street

HOW WE TALK



VS.



"POOR"

"RICH"

HOW WE TALK

REALITY



VS.



"POOR"

"RICH"

???



Hans Rosling (1948-2017)

How Many Are Rich and
How Many Are Poor?

Short answer — Most are in between



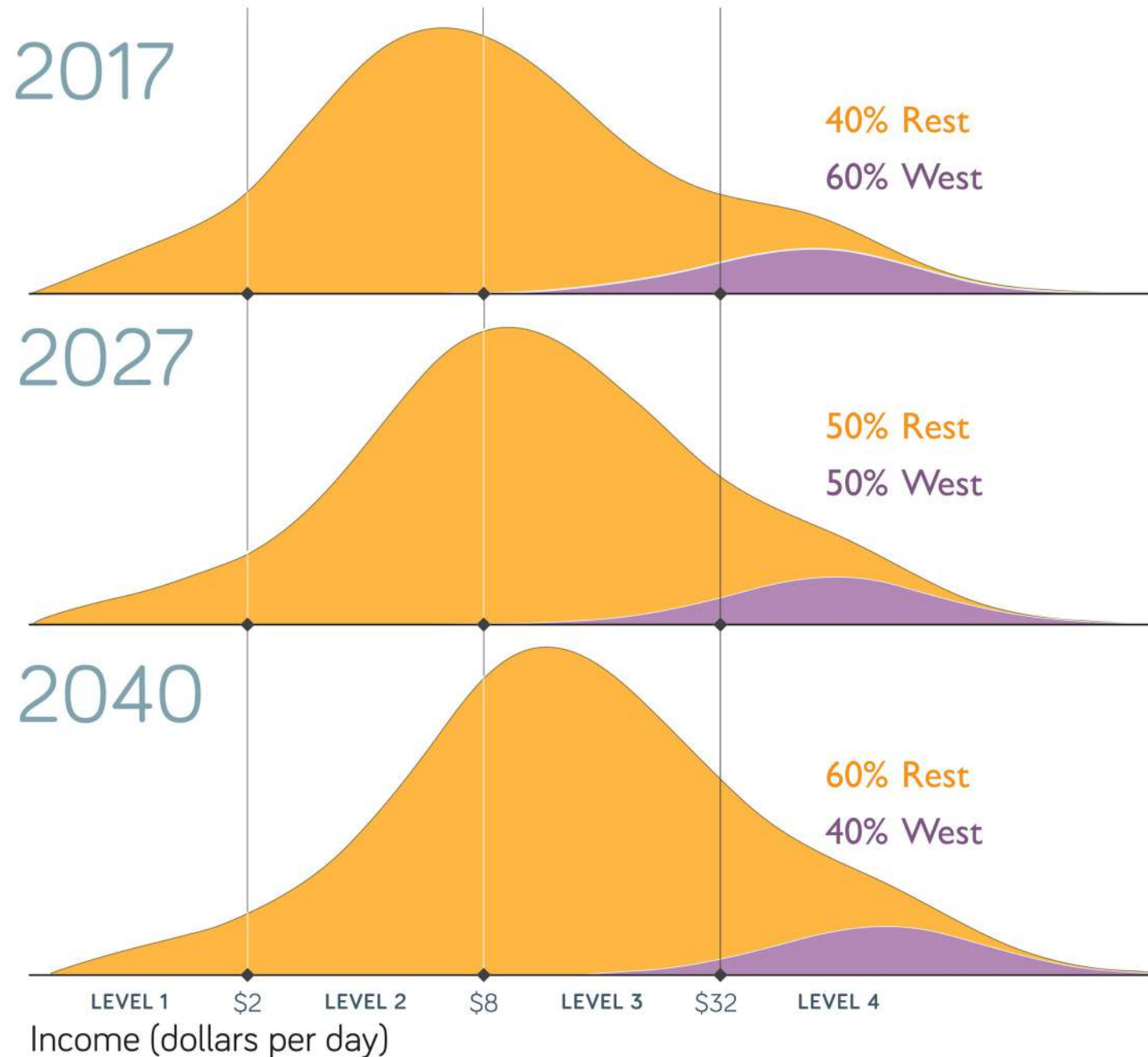
Gapminder® Answers

▶ 0:00 / 2:06



SOON, MOST RICH CONSUMERS WILL BE NON-WESTERNERS

The world population on different income, divided into West and Rest.



Dollars are adjusted for price differences and inflation. Sources: Gapminder based on PovcalNet, World Bank and IMF. See: gapm.io/incm

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Worksheet - Part 1

What is one thing about life at Stanford that you can't see by looking around, but could find out by counting? Say what you would count.



Big idea #2

Statistics uses math to paint a nuanced picture of a complex world.

Not “poor vs. rich” — a whole distribution. And this quarter we’ll keep asking one more question about every distribution we see: what process produced it?

Worksheet - Part 2

Earlier we asked two questions: one about megacities, and one about gender disparities in school attendance around the world. Think about the one you got wrong, or were less sure about. What reasons or evidence did you use to make your guess? Try to name something specific, such as a class you took, a news story or video, or a place you've been.



In the news last week

Stateline

HEALTH DEMOCRACY ECONOMY ENVIRONMENT SOCIETY CRIMINAL JUSTICE

AFFORDABILITY ECONOMY LABOR

Census data shows US poverty rate drops to lowest on record, but experts are cautious

Some experts say the data doesn't capture latest policy shifts that harm individual outcomes.

BY SHALINA CHATLANI - SEPTEMBER 15, 2026 5:07 PM



Stateline, Sep 15, 2026. The number in the story: the U.S. poverty rate was **10.2%** in 2025.

Worksheet - Part 3

"The U.S. poverty rate fell to 10.2% in 2025."

What is one thing you would want to know before you believed this number?



Where did 10.2% come from?

1. The news article
2. The Census Bureau's press release, Sep 15
3. The report: *Poverty in the United States: 2025*
4. The survey behind the report: the Current Population Survey's Annual Social and Economic Supplement
5. The data file itself, which anyone can download

What was counted?

- A family is counted as “in poverty” if its pretax money income is below a threshold that depends on the size of the family.
- The report’s own example: a family of five (two children, their mother, their father, and their great-aunt) has a threshold of **\$39,384**. Their income adds up to \$40,500, so none of them are counted.
- The thresholds are the same everywhere in the country.
- The same report has a second measure that also counts benefits, taxes, medical and work expenses, and local housing costs. By that measure the rate was **13.1%**, and it didn’t fall.

Who was included?

- About **88,000 addresses**, interviewed by phone and in person between February and April. 61.3% of them responded.
- Not included: people in prisons and nursing homes, people who are homeless and not living in a shelter, and most of the armed forces.
- You, maybe: "Students living in dormitories are included in the estimates only if information about them is reported in an interview at their parents' home."
- It's a sample, so the estimate comes with a margin of error: 10.2%, give or take 0.3.

Worksheet - Part 3, continued

Do you trust the number more or less than you did a few minutes ago? Why?



When can you trust statistics?

Tim Harford, BBC, 4:41 · [bbc.com/videos/cwy77k4013vo](https://www.bbc.com/videos/cwy77k4013vo)

While it plays: which of his tips did we just use on the poverty number?

Takeaway

Statistics can show us things we can't see any other way.

But a number is a measurement someone made. Before you trust it, ask what was counted and who was included. We'll ask that about every dataset this quarter.

2 How this course will work

What I want you to leave with

- **Statistical literacy:** you can make sense of a statistical claim, in a paper or in the news.
- **Statistical ability:** you can analyze real data yourself.
- **Statistical curiosity:** you want to keep learning this, and you know that you can.

How I teach this course

1. Understanding over memorizing.
2. Thinking hard over getting the right answer. Most of your grade is for good-faith effort.
3. You're still accountable for the core concepts. That's what the exam is for.
4. Doing things over listening to me talk.
5. Real tools that working scientists use, AI tools included.
6. The course keeps improving, so tell us what would make it better.

What we expect from you

- **Show up:** lectures, sections, Friday tutorials, and the project showcase.
- **Try,** especially when it's hard. Have a go on your own before you ask.
- **Ask for help when you need it,** and tell us what you've already tried.
- **Be professional** with each other and with the teaching team.

Lectures, sections, and tutorials are not recorded. What we cover in lecture, section, tutorial, and in CourseKata is fair game for the comprehensive exam in Week 9.

A typical week

	What happens	Bring
Mon / Wed	Lecture, with a paper worksheet that you work on with the people next to you	a pen
Fri	One 20-minute small-group tutorial / problem-solving session with a discussion leader	a pen
Section	50 minutes of project work with your group, your TA on hand	laptop
CourseKata	Budget 6–8 hours a week. This week: Chapters 1–2.	

Getting help

- Start with your TA: in section, at your Friday tutorial, or on Slack.
- My office hours: Mondays 3–4pm in 420-300, and Fridays 1:30–2:50pm. There are no TA office hours.
- We use Slack, not email or Canvas messages.
- To join the course Slack: open Canvas, click **Slack** in the left sidebar, and open Slack from there. Then find your discussion section's channel.

Academic accommodations

- If you need an accommodation, register with the Office of Accessible Education (OAE).
- Already have a letter? Share it with me through the form on the syllabus, as early as you can.
- Athletes: upload your travel letter, and tell us which classes you'll miss, using the [Google Form on the syllabus](#). Do it as soon as you have your letter.

You need a laptop

- Every week in section, and for your project. We use R and RStudio, both free, and your first section is an install clinic.
- If you don't have a laptop, Stanford can help: financial aid covers up to \$3,000 toward one, and Lathrop and the Diversity & First-Gen Office lend them.

One exam

- **Wednesday, November 18**, in class. Closed-book, on paper, 35% of your grade.
- It covers CourseKata Chapters 1–12 and what we cover in lecture, section, and tutorial.
- A practice exam on **Monday, November 9**: same format, not graded, worth 1% extra credit. You go over it with your discussion leader that Friday.

Final project

- Groups of 3, formed in your section.
- Pick a claim about people that rests on a number, one you doubt or are curious about. Find or collect data, analyze it in R, and report what you found.
- A milestone every week in section, then a report and a 5-minute talk with a poster.
- No final exam. The showcase is **Wednesday, December 9, 3:30–6:30pm**, and attendance is mandatory.

AI tools

- In section and on your project: we encourage you to use them and we will try to help you learn how to use them effectively. Many social scientists use them daily in our research, and Stanford gives you access to several high-performing tools for free.
- In lecture and on Fridays, AI tools will be less relevant. The focus will be on working with the people around you.
- Either way, you have to be able to explain every part of your work. In your final project, every member of your team is accountable for understanding data analysis choices you've made, and how to interpret your findings (without real-time support from AI).

Grading

CourseKata modules (good-faith attempts)	20%
Comprehensive exam (Wed Nov 18)	35%
Final project (includes section attendance)	30%
Lecture and tutorial worksheets (not graded for correctness)	15%
Extra credit: practice exam (1%), background survey (0.5%)	+1.5%

There are 27 worksheets and the best 23 count, so you can miss four, no questions asked. Other absences are excused through OAE accommodations, an athletics travel letter, or approval after reviewing an “absence narrative” at the end of the quarter.

Psych 10 Teaching Team



**Nastasia
Klevak**
Head TA · Thu
9:30



**Sean
Anderson**
Mon 9:30



**Monisha
Dhingra**
Mon 10:30



Xiaoran Chen
Mon 11:30



Etaash Katiyar
Mon 3:30



**Qizhong
Zhang**
Tue 9:30



Linas Nasvytis
Tue 10:30



Anna Kelley
Wed 9:30



Bryan Park
Wed 10:30



**Morgan
Tompkins**
Wed 11:30



**Michael
Salerno**
Wed 3:30



**Jane
Stephenson**
Thu 10:30



Peggy Yin
Fri 9:30



Marti Lane
Course design

Your discussion leader is the person you'll see most: in section, on Fridays, and on Slack.

Enrollment and switching sections

Not enrolled yet, or on the waitlist?

- I know the enrollment system has been frustrating. I'm sorry about that!
- I make exceptions to the usual enrollment process very rarely. Declared Psychology majors have priority
- Come talk to me after class OR next Monday's office hours about your situation if you would like.

Want to switch sections?

- Message both me and Nastasia Klevak (Head TA) on Slack.
- Tell us ALL the sections you could switch to, not only your first choice.

Meet Lexi Baczynski

- Lexi Baczynski is the academic accommodations coordinator for this course.
- If you have logistical questions about your accommodations in PSYCH 10, please reach out to her via email: **abaczyns@stanford.edu**.

Questions?

Spend the next few minutes reading the syllabus at **psych10.github.io** and discussing any questions you have with your neighbors.

Flag a member of the teaching team down if you have questions, share them in the background survey at the end of class, or ask on Slack.

3 Tell us about yourself.

Student Background Survey

The primary purpose of this survey is for the teaching team to get to know you, how you think about learning, and relevant aspects of your circumstances that may affect your learning experience in this course. It's the same survey as last year.

The second purpose is to contribute to educational research on how people learn statistics and programming. Before you decide to participate, you should know why the research is being done, how your data will be used, and what your options are.

You are being invited to participate in a research study

to understand how people learn statistics / computer programming.

A researcher in the Psychology department who is not involved with this course will tell you more about this study and your options for participating.

The research study

In this course, we will administer various surveys and/or assignments to gain insight into your learning experience in this course, as well as what you are learning. By consenting to participate in this study, insights gained from the information you provide in these surveys/assignments might be used to improve your learning experience as well as that of students in similar courses. We are only recruiting students 18 years of age or older to participate in this study.



info sheet

Time Involvement: This academic quarter; your participation will **not** involve any additional work beyond what is expected to be completed as part of your enrollment in this introductory statistics course.

Payments: There is no monetary compensation for participating in the study.

Risks, benefits, and your rights

Risks and Benefits: Your participation is completely voluntary. There are neither specific benefits nor anticipated risks associated with participation in this study. You can withdraw at any time by completing the opt-out form (on next slide).

Data will be securely stored and de-identified. We cannot and do not guarantee or promise that you will receive any benefits from this study. While there is no direct benefit to you for participating in the study, the surveys and other learning materials that are being used as part of this study were designed with benefits to your learning experience in mind. Based on the results of this study, the principal investigator may learn more about how to improve student learning, and society may benefit from this knowledge.

Participant's Rights: Your decision whether or not to participate in this study will **not** affect your experience or grade in this class (the professor/teaching team will **not** know who is or is not participating in the study until *after* final grades are assigned).

Opting out

If you agree to participate in this research, no action is needed. If you DO NOT consent to participate in this study, or you choose to opt out at any time during the quarter, please submit this form online (QR code or <https://tinyurl.com/p10optout>).

Again, your instructor(s) will not have access to the list of students who have opted out until after final grades are posted.



opt-out form

Before Friday

- Tonight: student background survey (on a laptop, please).
- CourseKata: do the modules that come *before* Chapter 1 (there's another survey in there!), then Chapters 1-2 by Friday.
- Section this week (Monday sections: next Monday): the install clinic. Bring your laptop, charged, with the R and RStudio installers already downloaded (links at psych10.github.io).
- Friday: your first tutorial, *Orientation Day*. No laptop needed, but bring a device that can connect to the internet.
- Join the course Slack via Canvas and find your section's channel.

Now: the survey

Laptops and phones open. The link is on Canvas and at **psych10.github.io**.

Hand in your worksheet before you leave the lecture hall.

Before Friday, watch your discussion section's Slack channel: your tutorial slot will be announced there (early, middle, or late in the 1:30–2:50 lecture time).