Ways to approach Research

Cross-Sectional Studies

- Participants of different ages studied at the **same time**.

Longitudinal Studies

- One group of people studied over a period of time.

Cross-sectional	Longitudinal
One point in time	Several points in time
Different samples	Same sample
Snapshot of a given point in time, change at a societal level	Change at the individual level

Benefits
- Relatively inexpensive
- Can be done quickly
- Keep same subjects

Drawbacks
- Cannot prove cause & effect
- Cohort effect (On next slide)

Benefits
- Highly reliable
- May support cause & effect

Drawbacks
- Subject attrition (losing subjects over time)
- Expensive
- Takes a long time

A confounding variable that can affect different forms of research is **Cohort Effects**.

A **cohort** generally means a group of people who share a common identity.

> **For example**: Seniors in HS were exposed to the same historical cultural events, traditions, social situations, and trends as each other. This shared uniqueness might play a role in research findings.

In an experiment in which participants use a computer to perform a cognitive task. The results might show that participants in their 20s did vastly better on the cognitive test that participants in their 60s.

Does that mean that people in their 20s are cognitively superior to the 60-year old counterparts? Maybe not. What could account for the results?

A possible result of many descriptive studies:

*discovering a **correlation***

Correlation

General Definition: a*n observation that two traits or attributes are related to each other* (thus, they are "co"-related)

Scientific definition: a *measure of how closely two factors vary together*, or how well you can predict a change in one from observing a change in the other

In a case study: The fewer hours the boy was allowed to sleep, the more episodes of aggression he displayed.

In a naturalistic observation: Children in a classroom who were dressed in heavier clothes were more likely to fall asleep than those wearing lighter clothes.

In a survey: The greater the number of Facebook friends, the less time was spent studying.

"Keeping Up With the Kardashians is a good TV show."

- Do you agree with this statement?
  - Yes or no?
  - Estimate how many others in this class will agree with your prediction.

- False consensus effect
  - A tendency to overestimate others' agreement with us.

Some problems with assuming

- Anyone know the saying about what happens when you assume?
  - ASSuME

- Vegetarians will think more people are vegetarians than will meat eaters.

- Liberals will perceive more support for liberal views than will conservatives.

Summary of the types of Research

Comparing Research Methods				
Research Method	**Basic Purpose**	**How Conducted**	**What is Manipulated**	**Weaknesses**
Descriptive	To observe and record behavior	Perform case studies, surveys, or naturalistic observations	Nothing	No control of variables; single cases may be misleading
Correlational	To detect naturally occurring relationships; to assess how well one variable predicts another	Compute statistical association, sometimes among survey responses	Nothing	Does not specify cause-effect; one variable predicts another but this does not mean one causes the other
Experimental	To explore cause-effect	Manipulate one or more factors; randomly assign some to control group	The independent variable(s)	Sometimes not possible for practical or ethical reasons; results may not generalize to other contexts

Statistics

- Recording the results from our studies.

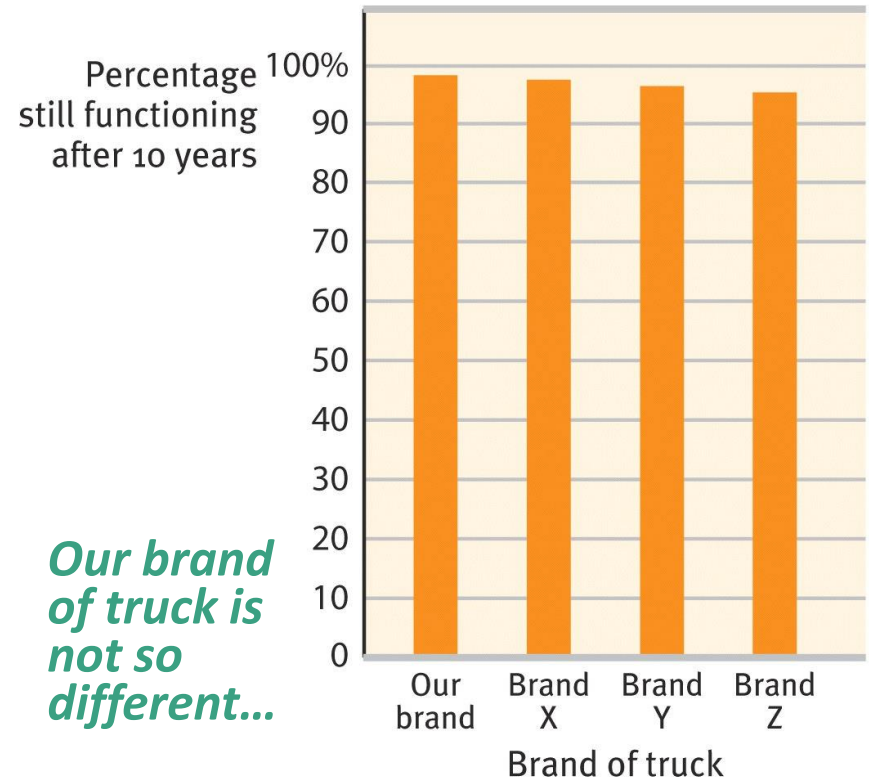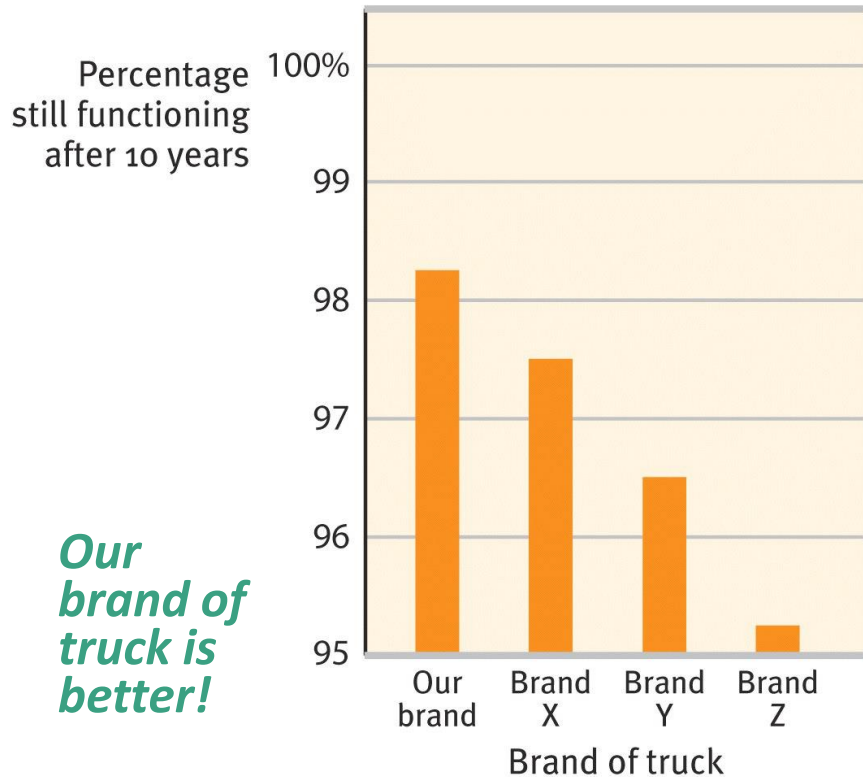- Must use a common language so we all know what we are talking about.
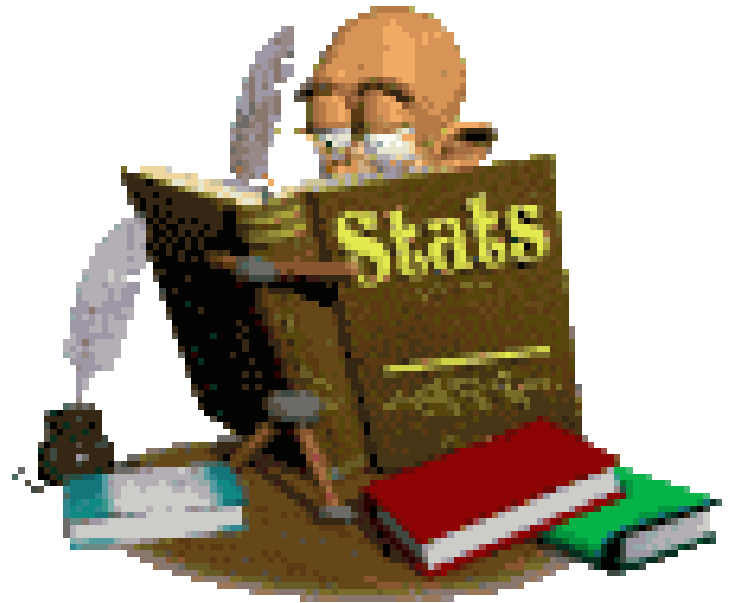
Descriptive Statistics

- Just describes sets of data.
- You might create a frequency distribution.
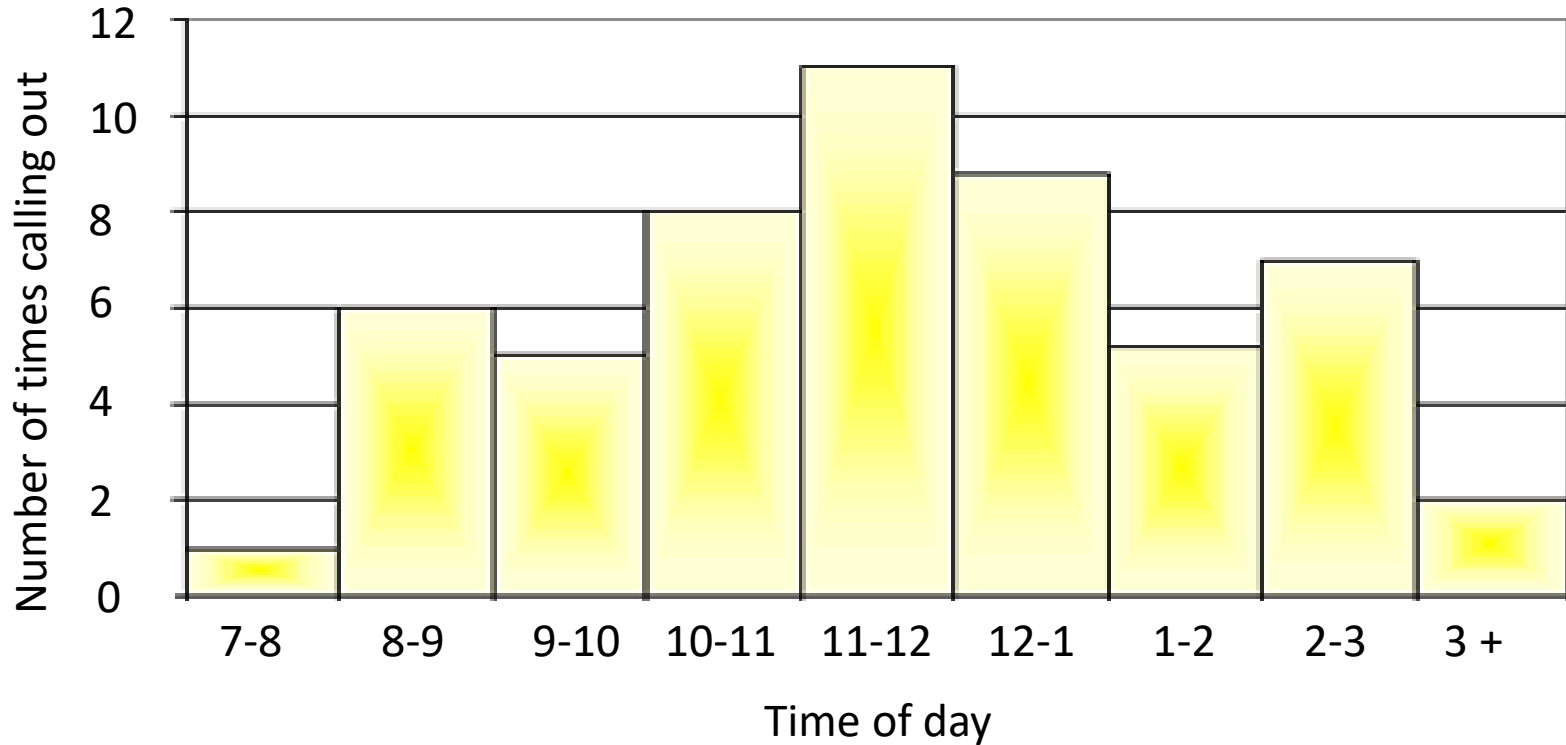- Bargraphs or histograms.

Tools for Describing Data

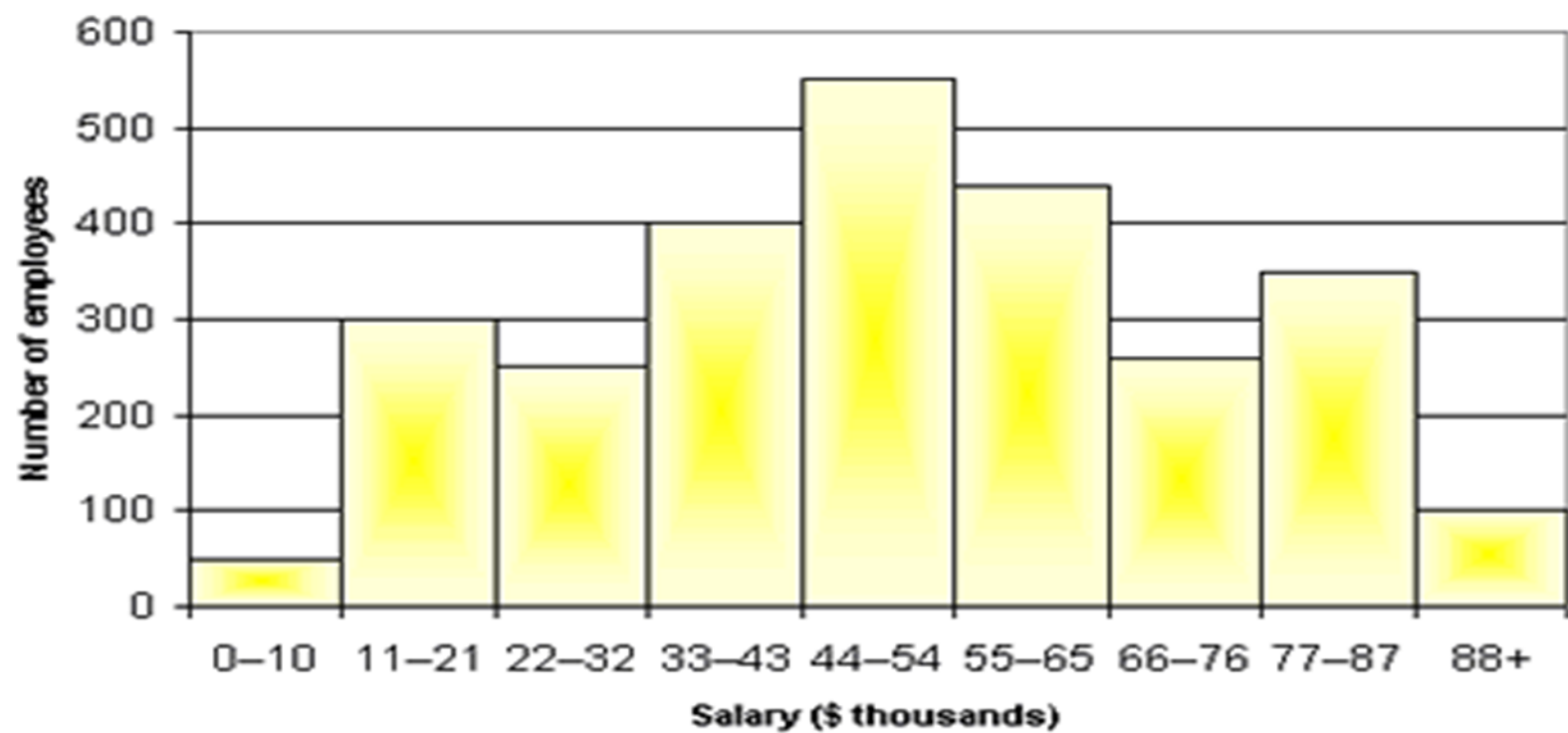The bar graph is one simple display method but even this tool can be manipulated.

Why is there a difference in the apparent result?

Frequency distribution and histograms

• **Histogram**: A graph that consists of a series of columns, each having a class interval as its base and frequency of occurrence as its height.

Histograms vs. bar graphs

- "Histograms look a lot like bar graphs."
- Think of histograms as "sorting bins." You have one variable, and you sort data by this variable by placing them into "bins."
- Then you count how many pieces of data are in each bin. The height of the rectangle you draw on top of each bin is proportional to the number of pieces in that bin.

Bar graph or Histogram? (Both allow you to compare groups.)

We want to compare total revenues of five different companies.
Key question: What is the revenue for _**each**_ company?
Bar graph

We want to compare heights of ten oak trees in a city park.
Key question: What is the height of _**each**_ tree?
Bar graph

We have measured revenues of several companies. We want to compare numbers of companies that make from 0 to 10,000; from 10,000 to 20,000; from 20,000 to 30,000 and so on.
Key question: How many companies are there in _**each class**_ of revenues?
Histogram

We have measured several trees in a city park. We want to compare numbers of trees that are from 0 to 5 meters high; from 5 to 10; from 10 to 15 and so on.
Key question: How many trees are there in _**each class**_ of heights?
Histogram