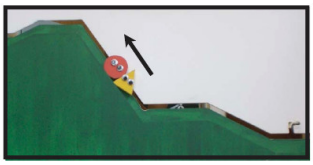
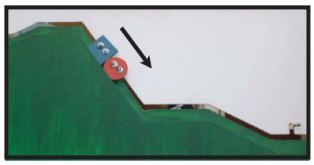
Preliminaries

Jumping right in:

Exploring Infant Behavior

Infants and Social Cues





- 16 10 month old infants
- Shown a series of puppet scenes:
  - (2x) climber (red circle) trying to climb the hill and failing
  - helper or hinderer scenario (shown in the picture above)
- The sequence of scenes was repeated until the infant got bored (habituation)
- The infants were then asked to pick one of the two puppets: the helper or the hinderer
- 14 of the 16 infants chose the helper (yellow triangle)

Simulation

We can simulate this experiment if we use a **null model** that assumes that infants are equally likely to choose the helper or hinderer puppet.

Let heads = selecting the helper puppet, and flip a coin 16 times.

The **test statistic** is the number of infants selecting the helper puppet (the number of heads)

If infants are equally likely to select either puppet, this replicates the original experiment (16 infants)

By combining multiple simulated trials, we can see what the **distribution** of the test statistic would be under the null model.

Class Discussion

- What does each dot on the plot represent?
- Why didn't every group get the same value?
- If you truly don't have any preference, how many times would you have chosen the helper toy by chance?
- What would a dot in the right tail of the dot plot mean? The left tail?
- If we want lots of points, we need to collect lots more data. How could we do this?

P.1: Introduction to the Six-Step Method

Steps of Statistical Investigation

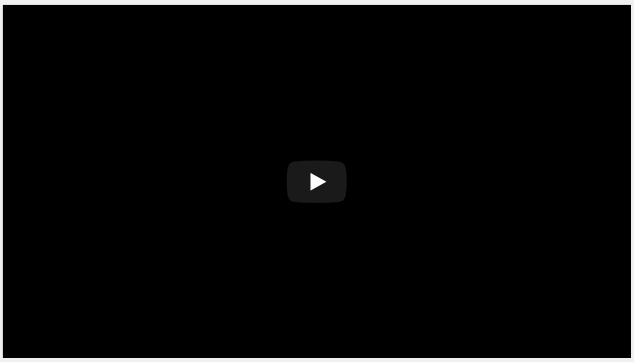
1. Ask a research question (that can be addressed by collecting data)
2. Design a study and collect data
3. Explore the data (charts and graphs)
4. Draw inferences beyond the data
5. Formulate conclusions (using step 4)
6. Look back (limitations) and look ahead (new questions)

Group Discussion

How do the six steps apply to the Helper vs. Hinderer experiment?

P.2: Exploring Data

Example: Old Faithful

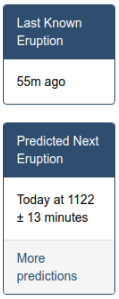


Livestream

Example: Old Faithful

- Erupts every 35-120 minutes
- Park Rangers (and others) make predictions on next eruption time

Read more about Old Faithful eruptions here

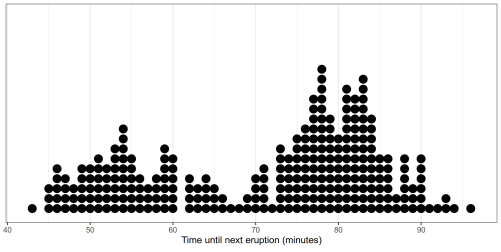


Example: Old Faithful

1. Ask a research question
    - How long between eruptions?
    - How high will the eruption be?
    - ??
2. Design a study and collect data
    - Measure time between eruptions, eruption length

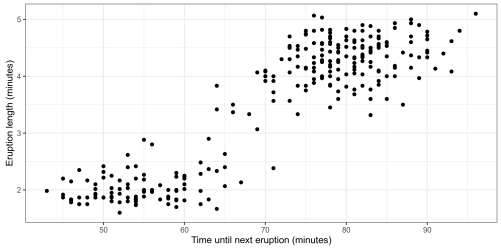
Example: Old Faithful

1. Ask a research question
2. Design a study and collect data
3. Explore the data



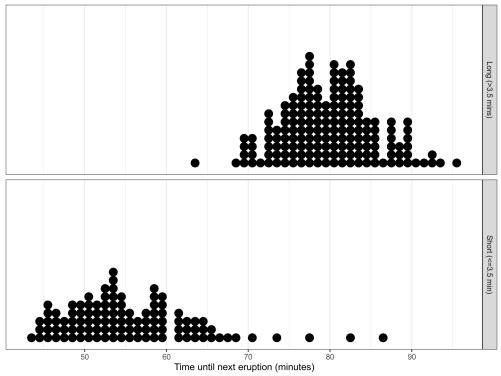
Example: Old Faithful

1. Ask a research question
2. Design a study and collect data
3. Explore the data



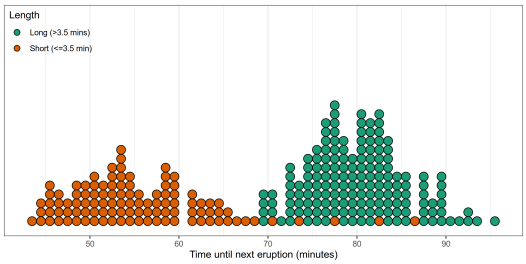
Example: Old Faithful

1. Ask a research question
2. Design a study and collect data
3. Explore the data



Distributions

- Center - what is the most likely value?
  - mean (average), median (middle value), mode (most common value)
- Shape - how many "peaks" does the distribution have? Is it symmetric?
- Variability - how spread out is the distribution?
  - standard deviation - typical distance between the data values and the mean of the distribution

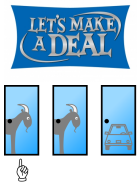


P.3: Exploring Random Processes

Cars or Goats

- TV Show from the 1960s and 1970s
- 3 doors containing prizes:
  - a new car
  - 2 goats

What is the probability of picking the car?



Cars or Goats

Work through Exploration P.3.

Plot your results for questions 6 and 8 in a chart, with number of games on the x axis and proportion of wins on the y axis (see Fig. P.6 for an example).
Upload the graph to Canvas.