Lecture 11: Special Research Designs

Wednesday, October 4, 2023

Your Teaching Fellows:

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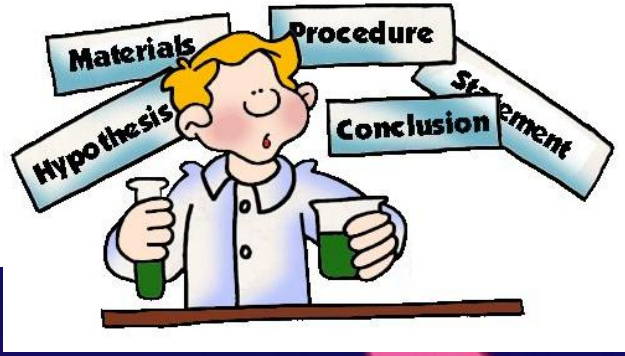
Lectures: MWF 12:00 PM – 1:00 PM (003); 1:00 PM – 2:00 PM (004); 2:00 PM – 3:00 PM (010)
Office hours: Tuesdays 2:00 PM – 4:00 PM

Learning Objectives

- By the ends of this lesson, you will be able to:
  - Identify different special designs that are neither experimental nor correlational
  - Compare and contrast quasi-experimental and correlational designs
  - Explain how 5 threats to internal validity affect interpretation of results
  - Recognise and explain examples of threats to internal validity
  - Compare and contrast different special designs in terms of threats to internal validity


Materials
Procedure
Hypothesis
Conclusion


ER UP
RGY DRINK


FEEL
PANIC
AND
GIVE
UP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Special designs

Single case

- ABA Reversal design
- ABAB Reversal design
- Multiple baseline design

Quasi-experiments

- One-group posttest only
- One-group pretest-posttest
- Nonequivalent control group
- Nonequivalent control group pretest-posttest

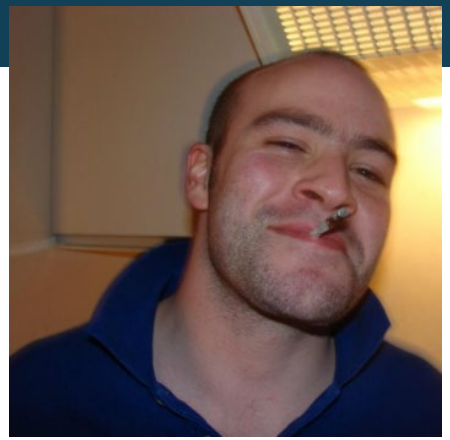
Developmental

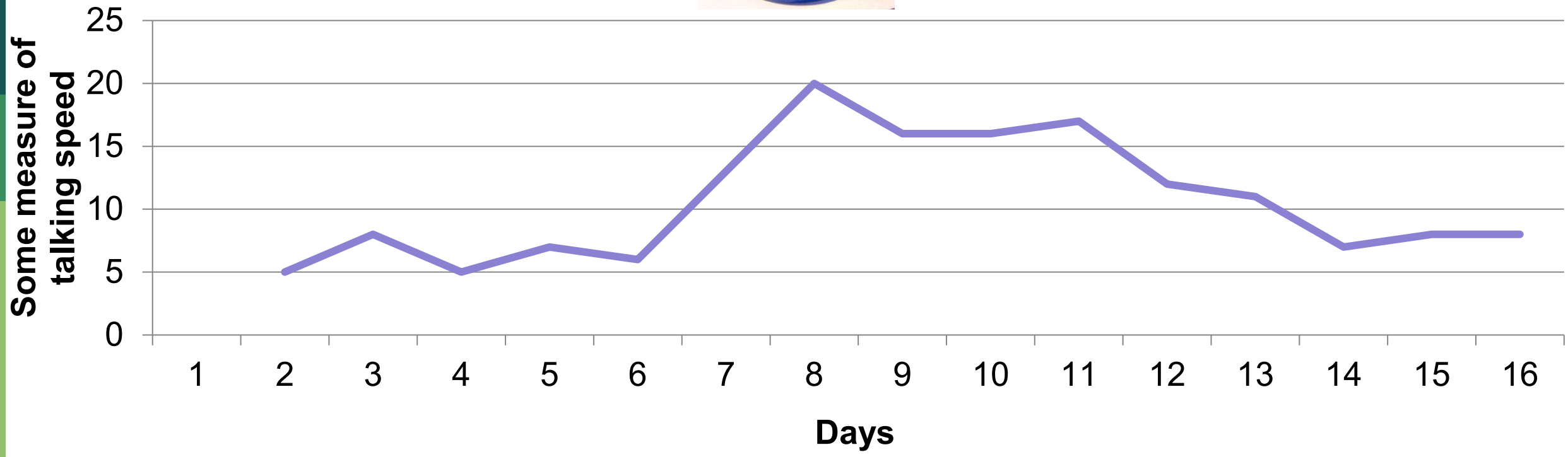
- Cross-sectional
- Longitudinal
- Sequential

Multiple repeated measures

- Interrupted time series
- Control series

Reversal Designs



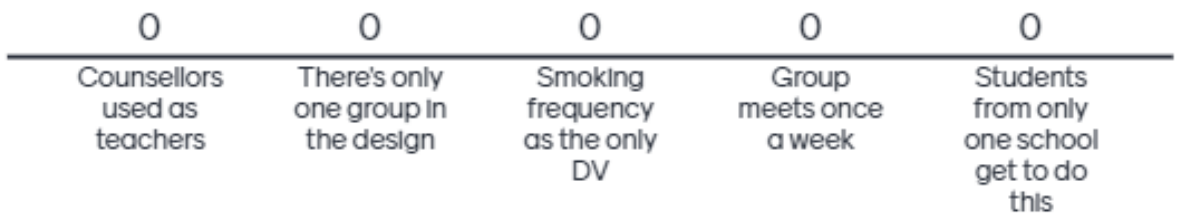


Reversal Designs

- A single reversal (ABA) design is susceptible to one important problem
- How can we solve this problem?
- Multiple reversals (e.g. ABA, ABABA) minimise the chance of this problem affecting your results
- Single case designs, in general, suffer from lack of generalisability

Think...

What characteristic makes it impossible to use a true experimental design?



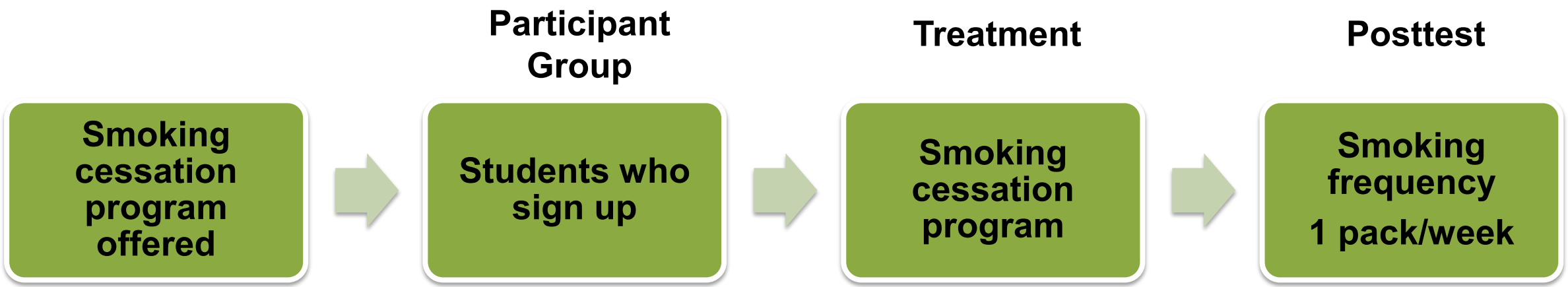
Results are hidden

Quasi-Experimental Designs

- No randomisation
- Uses pre-existing groups (or allows participants to sort themselves into groups)
- Randomisation is not possible or realistic

Quasi-Experimental Designs

- One-group posttest only design



The program might have had an effect.

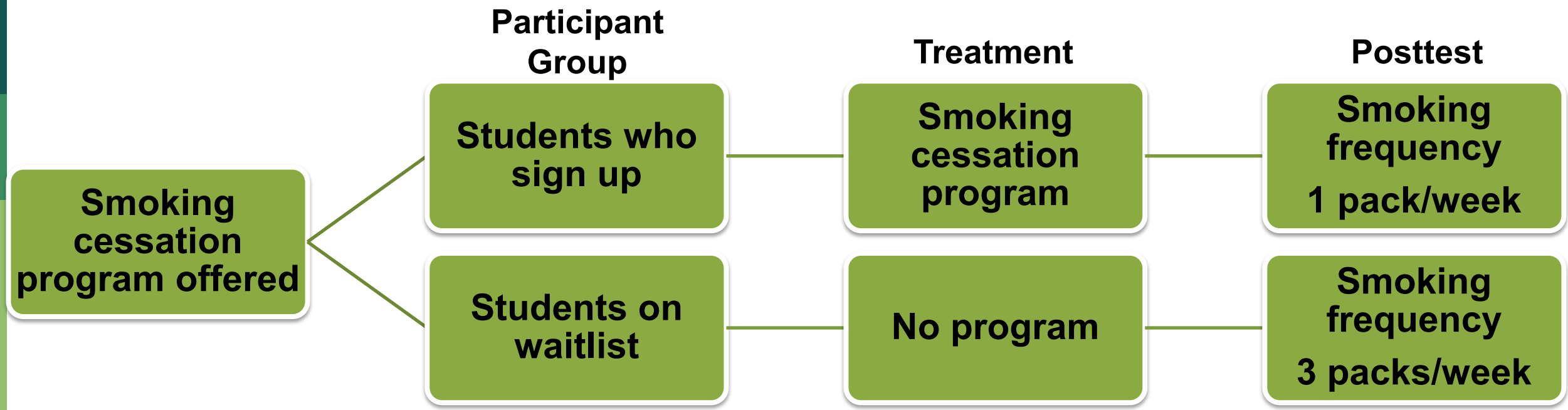
Quasi-Experimental Designs

- One-group pretest-posttest design

The program might have had an effect.

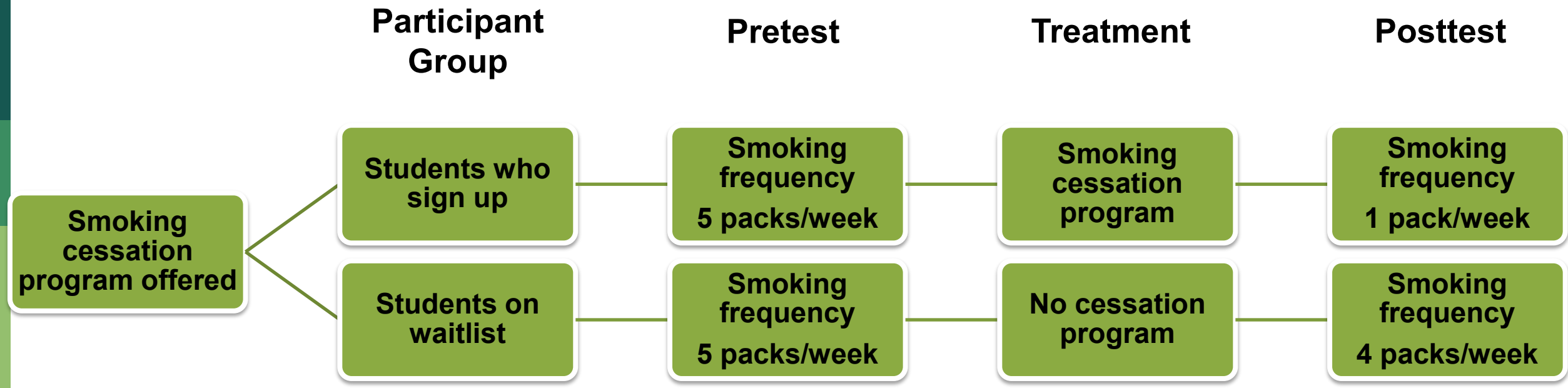
Quasi-Experimental Designs

- Non-equivalent group designs
  - Non-equivalent control group design



Quasi-Experimental Designs

- Non-equivalent group designs
  - Non-equivalent control group pretest-posttest design



Quasi-experiment and Correlations

- How are they similar, how are they different?

Quasi-experiments	Correlational studies

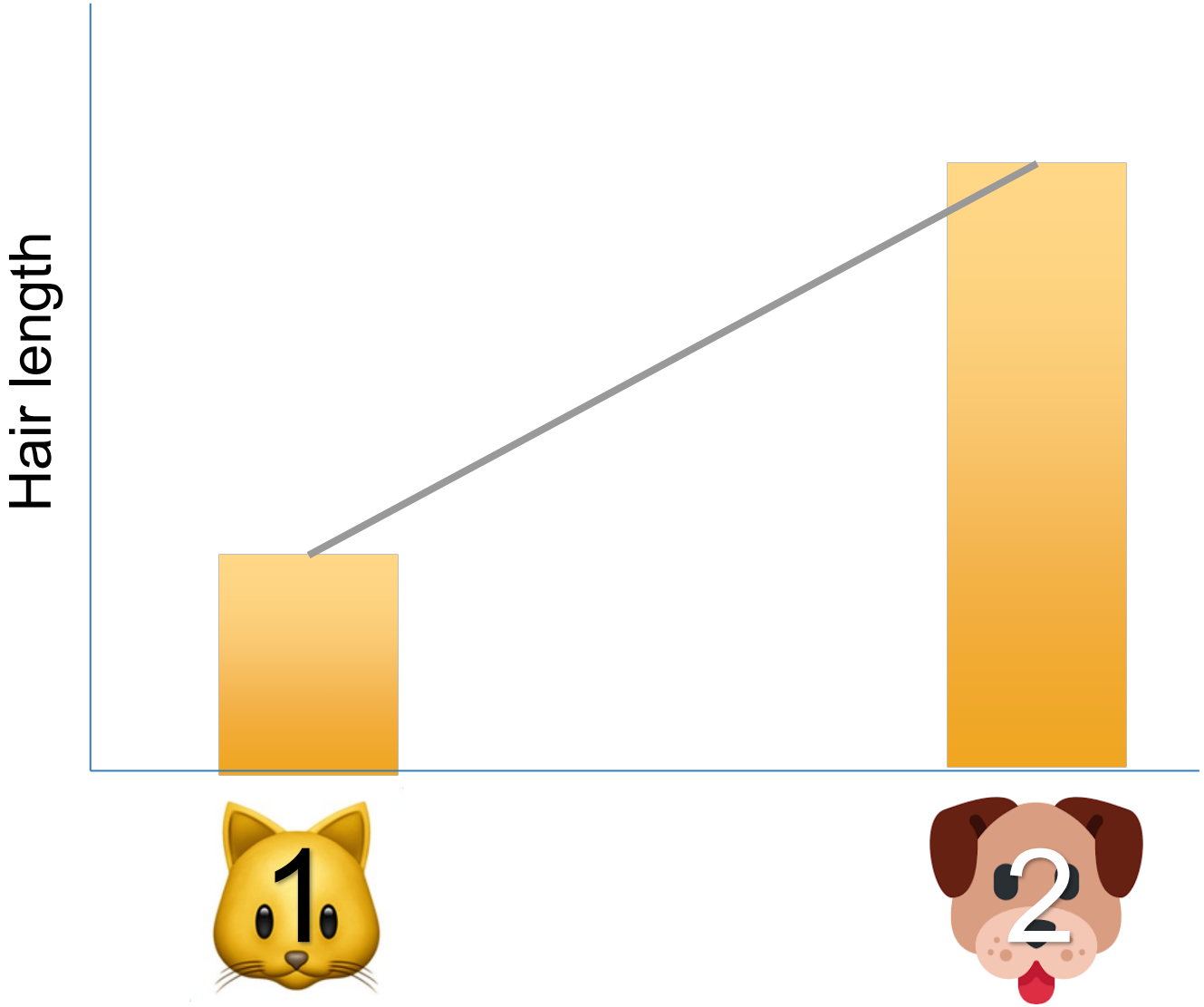
No randomisation

Outcome variables are measured

Regarding group-based data:

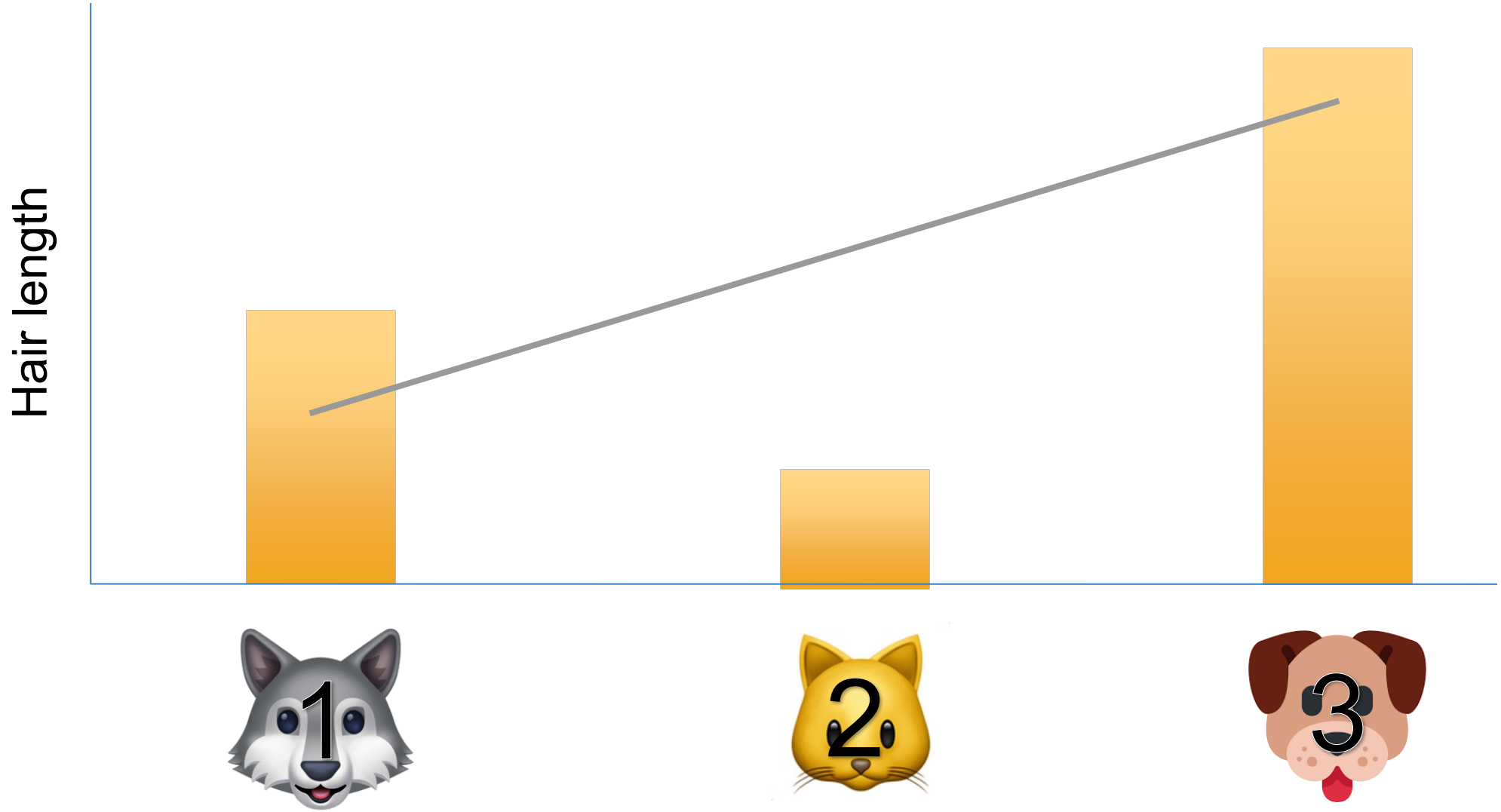
Can deal with multiple discrete groups without inherent order	Can deal with only two discrete groups without inherent order

Quasi-experiment and Correlations



Both correlation & Quasi-experiment

Quasi-experiment and Correlations



Internal validity is…

How do I lack internal validity? Let me count the ways…

	Non-Violent Condition ☺	Violent Condition ☹
Midterms!		

Threats to Internal Validity

- History : Any external event happening that affected participants (especially between first and second measurements)

Threats to Internal Validity

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- History : Any external event happening that affected participants (especially between first and second measurements)
- Maturation : People change over time (fatigue effect, get hungrier, more mature, etc.), independent of manipulation

Threats to Internal Validity

Threats to Internal Validity

- History : Any external event happening that affected participants (especially between first and second measurements)
- Maturation : People change over time, independent of conditions
- Testing : Taking a pretest is enough to change a participant’s posttest (e.g. practise effect)

Threats to Internal Validity

26. If n is the average (arithmetic mean) of the three numbers 6, 9, and k, what is the value of k in terms of n?

(A) $3n - 15$

(B) $n - 5$

(C) $n - 15$

(D) $\frac{n - 15}{3}$

(E) $\frac{n + 15}{3}$

For each set of ratios, find the two that are proportional.

1) $\frac{14}{7}, \frac{10}{6}, \frac{8}{4}$

2) $\frac{.5}{20}, \frac{.4}{15}, \frac{.2}{8}$

Threats to Internal Validity

- History : Any external event happening that affected participants (especially between first and second measurements)
- Maturation : People change over time, independent of conditions
- Testing : Taking a pretest is enough to change a participant's behaviour
- Instrument decay : Characteristics of a measure, or people's use of a measure, changes over time

Threats to Internal Validity

- Think about midterm scores
  - Imagine you got 1%
    - What are the chances that, on your next midterm, you will get a score ≤ 1 vs. higher than 1?
  - OR imagine you got 99%
    - What are the chances that, on your next midterm, you will get a score >= 99 vs. lower than 99?

Threats to Internal Validity

- History : Any external event happening that affected participants (especially between first and second measurements)
- Maturation : People change over time, independent of conditions
- Testing : Taking a pretest is enough to change a participant's behaviour
- Instrument decay : Characteristics of a measure, or people's use of a measure, changes over time
- Regression toward the mean : Participants, who are selected because of their extreme scores, tend to subsequently score closer to the mean