Lecture 7: Experimental Control

Wednesday, September 20, 2023

Your Teaching Fellows:

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010:	Thalia Lang	Malina Lemmons
	Ruoning Li	Irene Wen

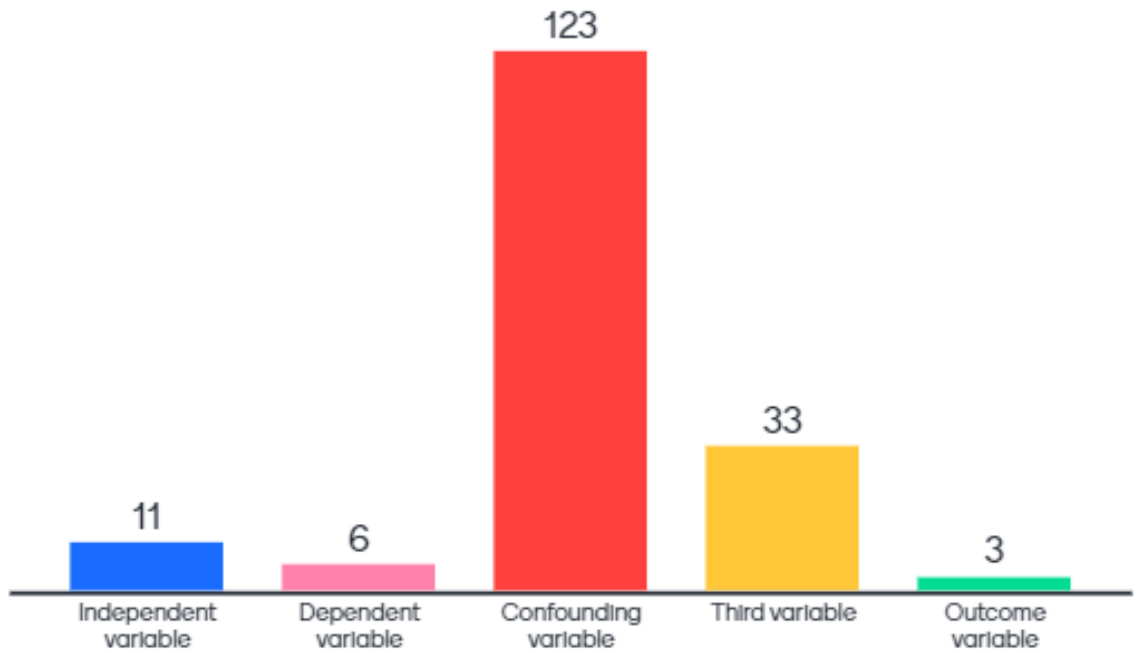
Lectures: MWF 12:00 PM – 1:00 PM (003); 1:00 PM – 2:00 PM (004); 2:00 PM – 3:00 PM (010)
Office hours: Tuesdays 2:00 PM – 4:00 PM

Increasing internal validity: Random Assignment

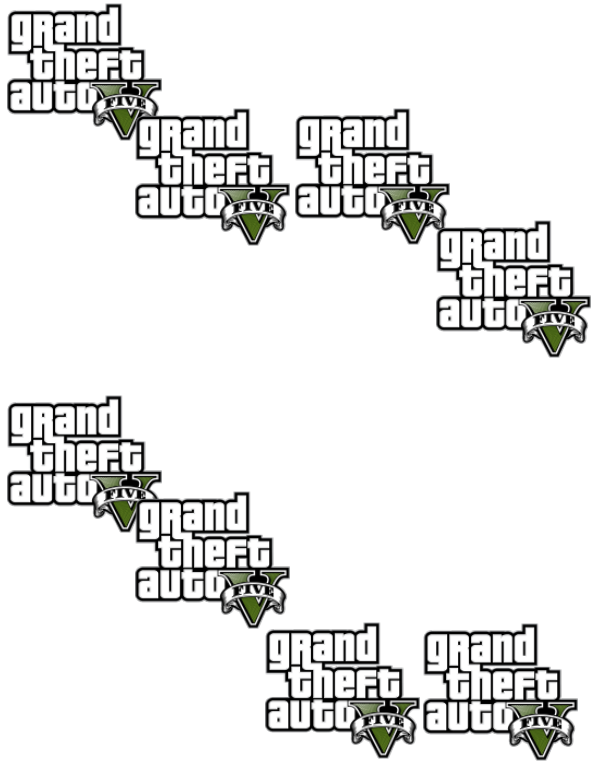
- Allows researchers to balance out random variables across different conditions…on average

- More effective as number of participants increases

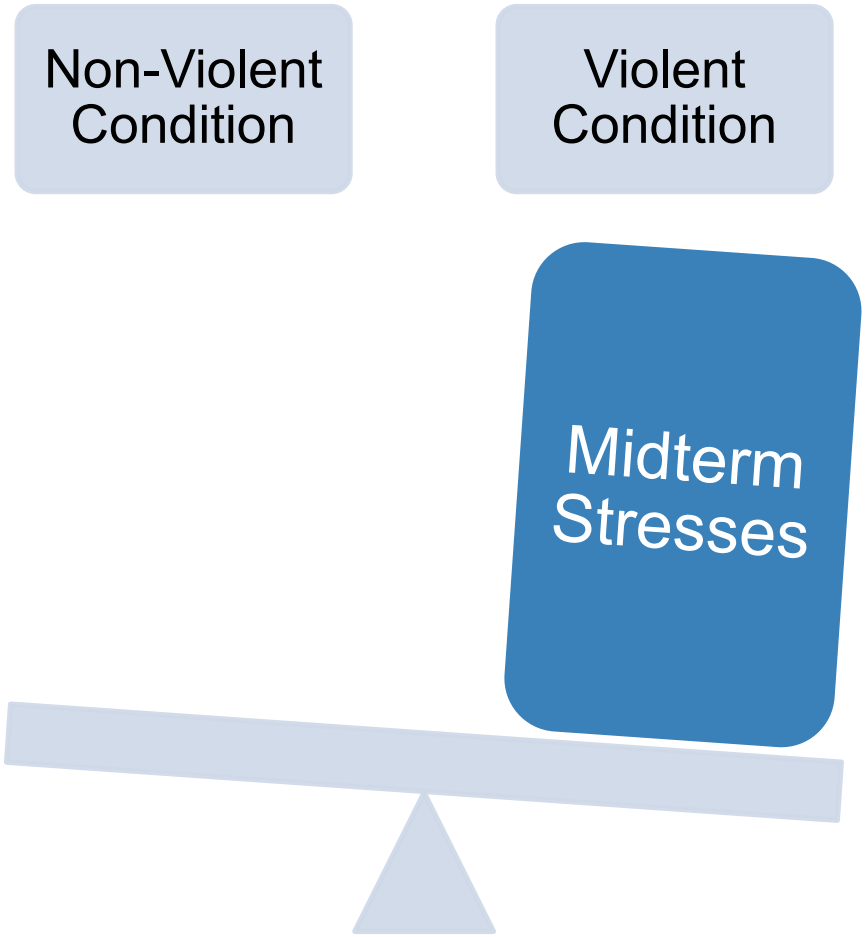
In this example, presence of midterms is the...



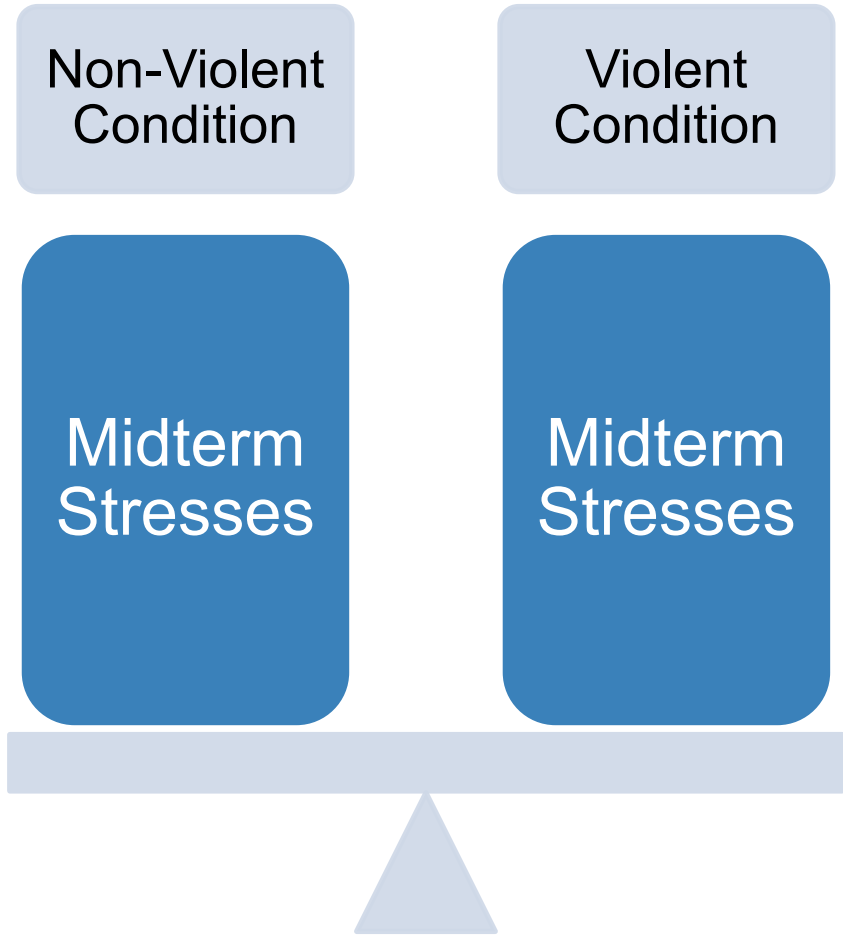
Increasing internal validity: Random Assignment

Time of Semester	Violent Condition	Non-violent Condition
Midterms!		

Increasing internal validity: Random Assignment

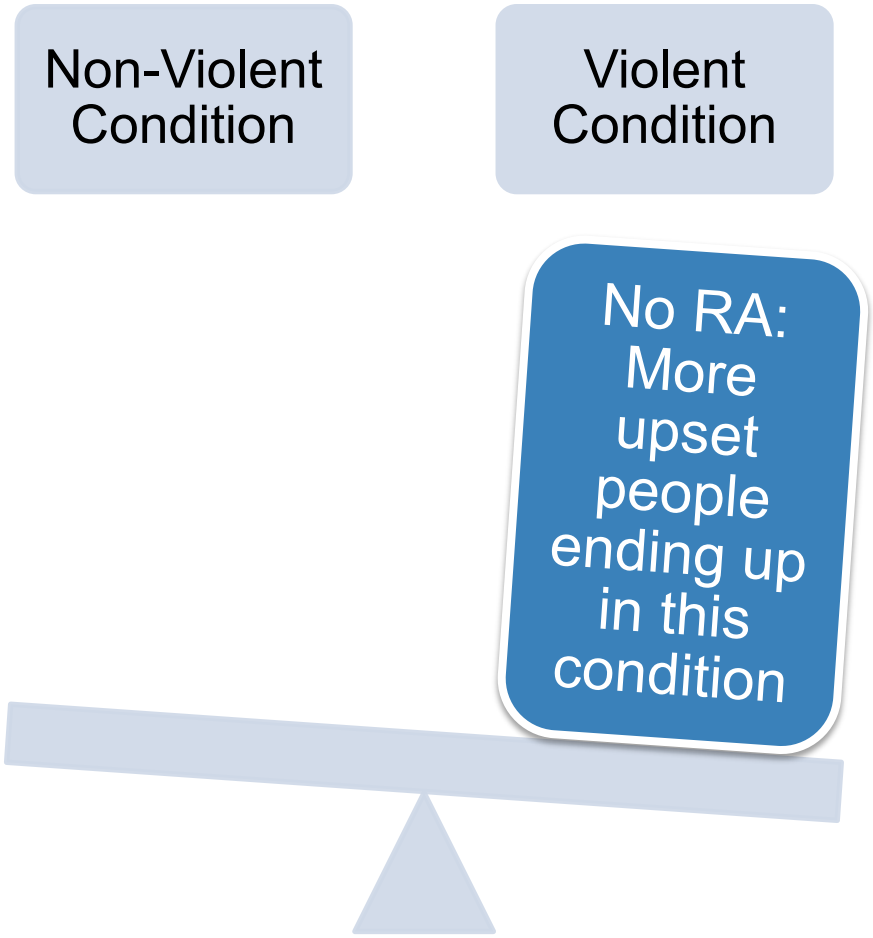


Influence on “Aggressiveness”

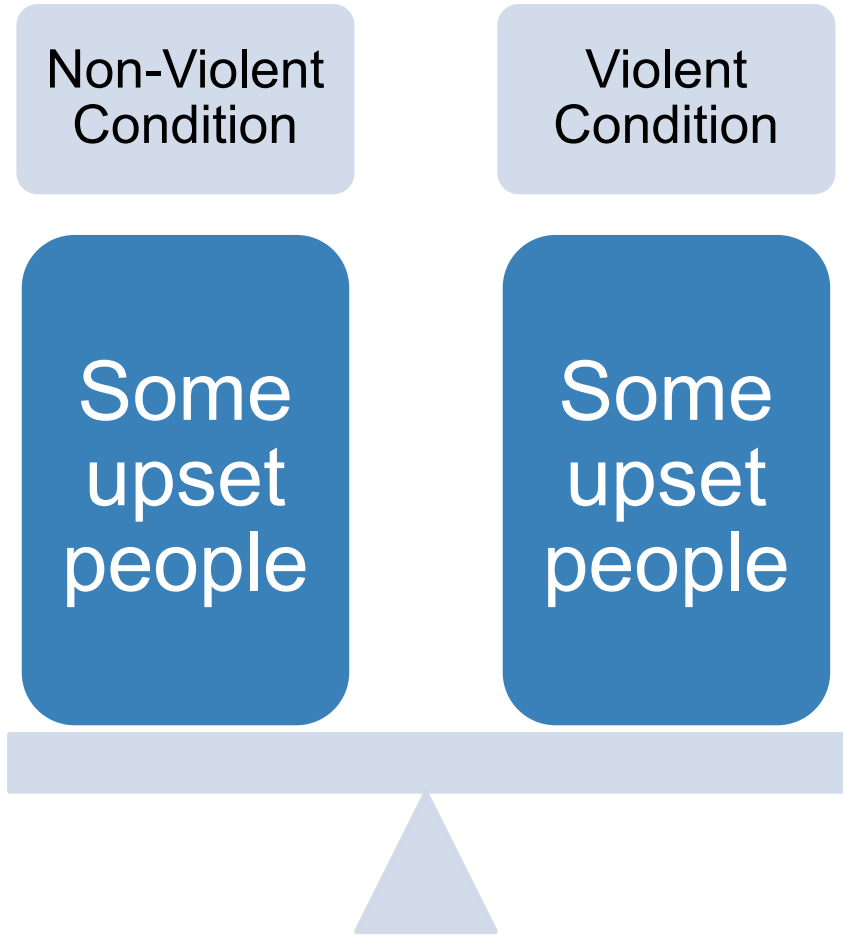


Influence on “Aggressiveness”

Increasing internal validity: Random Assignment



Influence on “Aggressiveness”



Influence on “Aggressiveness”

Key Features of Experiments

- Can the difference in the DV be attributed only to the manipulation of the IV?
- Achieving internal validity
  - Experimental Control
    - Covariation between variables
    - IV precedes DV
    - No confounds
  - Random Assignment of people to condition
    - Balances influence of random effects across the conditions
    - Especially as sample size increases

Activity

- Go to bit.ly/217Experiment, read the first page, and then DON’T GO TO THE NEXT PAGE

What made this an experiment?

- Independent variable (map)
- Dependent variable (brick task)
- Random assignment

How did this experiment strive for internal validity?

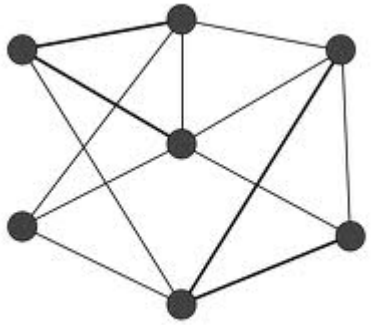
- Random assignment
- Temporal precedence
- no confounds

How did this experiment not achieve internal validity?

-

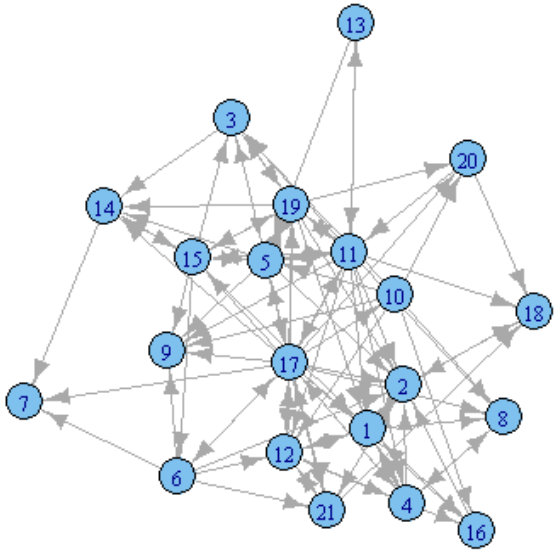
Attentional Focus and Creativity

- Theory & Hypothesis
  - Cognitive research:



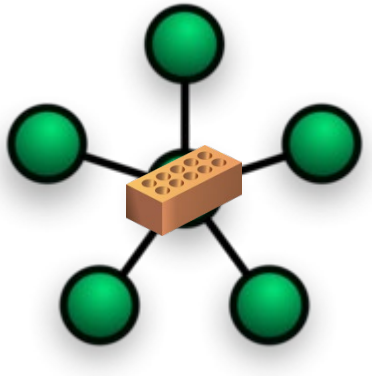
  - Creativity research:

Attentional Focus and Creativity

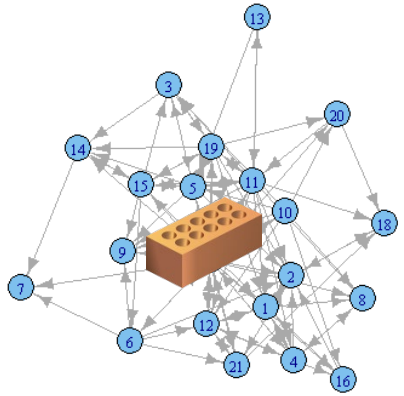


Attentional Focus & Creativity

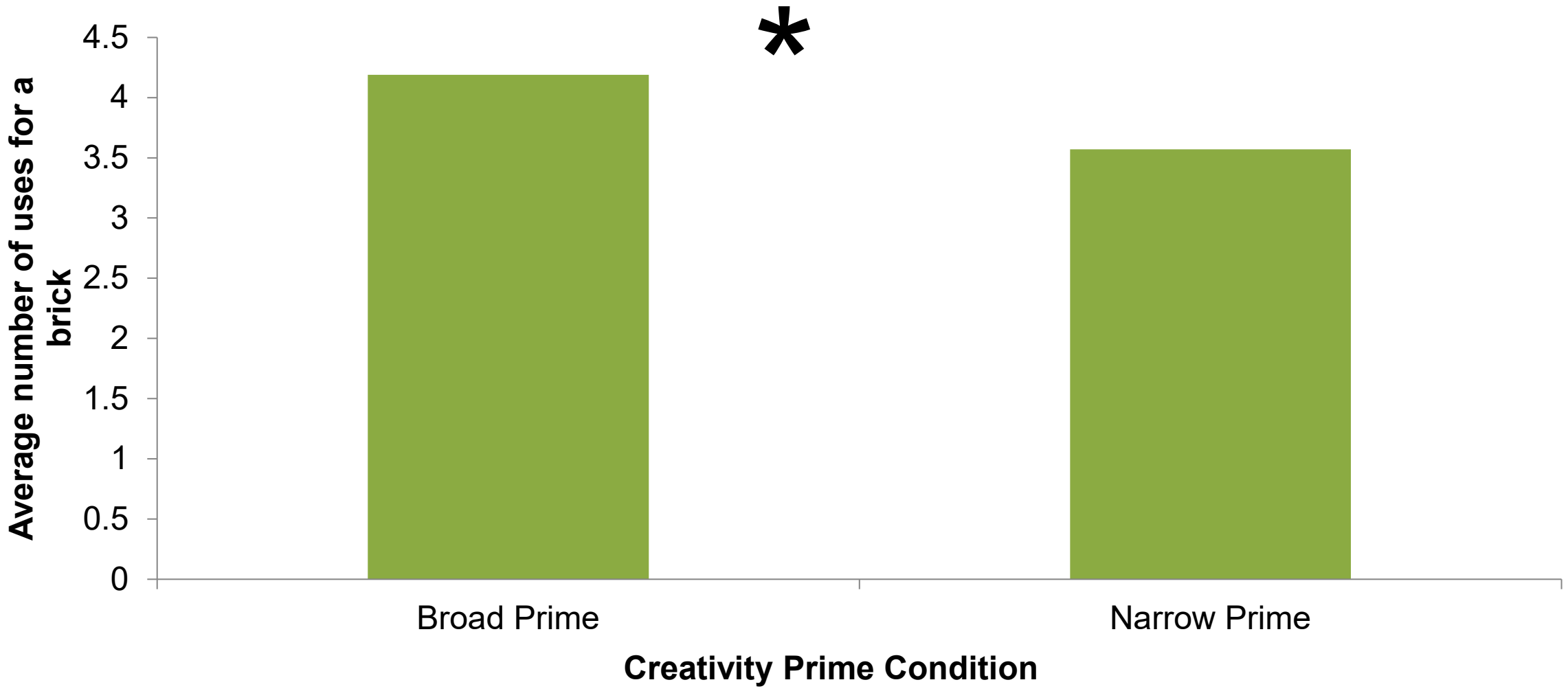
- Think of the manipulation like priming a creative versus noncreative way of thinking



- Prediction



Actual data (Study 1)



Actual data (Study 1)

- Conclusion from Study 1
  - “as predicted, broad, compared to narrow focusing of perceptual attention during visual search subsequently led to generation of more original uses for a brick” (p. 284)

Friedman, R. S., Fishbach, A., Förster, J., & Werth, L. (2003). Attentional priming effects on creativity. *Creativity Research Journal, 15*, 277-286. doi: 10.1080/10400419.2003.9651420

Concepts illustrated

- Attempted replication of published study
- Study that can be completed in ~5 minutes
- Operational definition of IV
- Experimental control via the manipulation
- Operational definition of DV
- Importance of accuracy, consistency
- Random assignment to condition
- Importance of controlled environment

Practical Considerations

- How do we design the study to maximize the chances that we'll be able to…
  - Conclude that the IV caused changes in the DV?
  - Detect an effect if it's there?

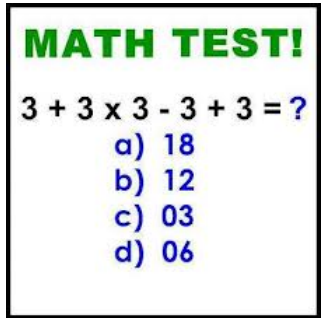
Practical Considerations

- Experimental control
  - Ensuring only the IV changes across conditions
  - Avoiding alternative explanations, such as demand characteristics, experimenter expectancy effects

- Optimizing our operational definitions of the IV and the DV
  - Avoiding ceiling and floor effects
  - Appropriately pairing IV and DV

Demand Characteristics

- "Any feature of an experiment that might inform participants of the purpose of the study." – Cozby, Mar, & Rawn
  - Threat to internal validity
- Participants might try to help/hurt hypothesis
  - Participant reactance
  - Evaluation apprehension
- Example:



Options for Avoiding Demand Characteristics

- Options?

Single-blind study

Keep the participant blind to the hypothesis of the study

Distractor/Filler items

Questions/items in a study that have little to do with the actual

Experimenter Expectancy Effects