

# Lecture 10: Experimental studies

Wednesday, September 27, 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

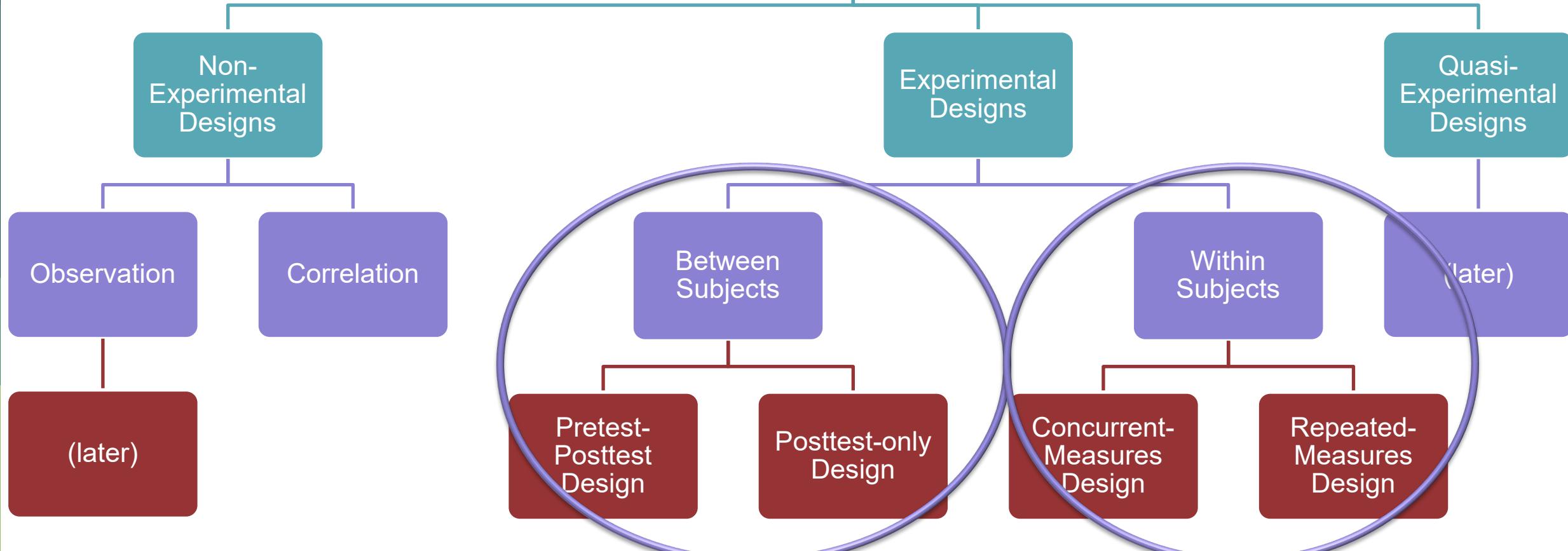
## Exam prep

- Document posted on Canvas (Misc. course content) – tips, and practice questions
- Watch Zoom recording
- Talk to your groups to get started!

## Learning Objectives

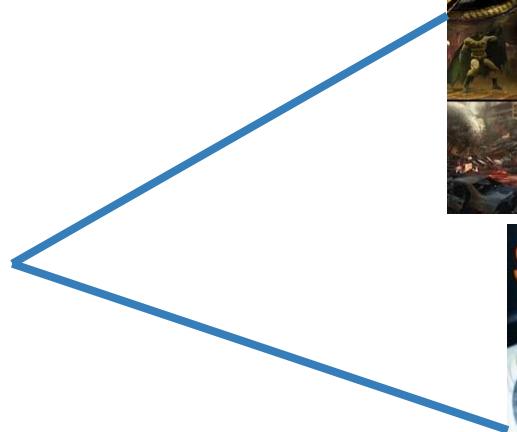
- By the end of this class, you will be able to:
  - Understand the advantages and disadvantages associated with within-subjects designs
  - Manage disadvantages of within-subjects designs
  - Identify different sources of error in measuring DV
  - Describe the relationship between strength of IV/sensitivity of DV and different experimental designs

# Types of Studies



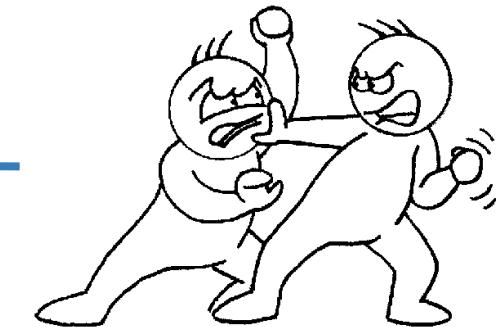
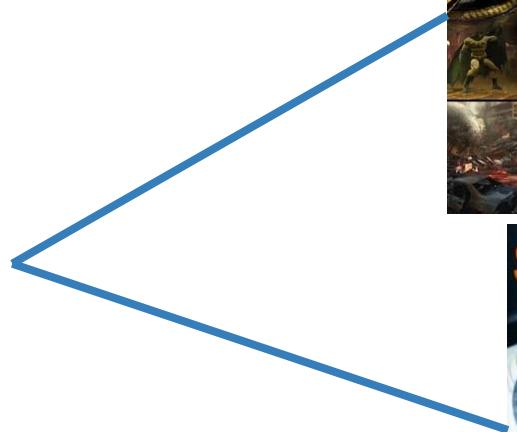
## Between-Subjects Design

- Recall studies we've looked at previously



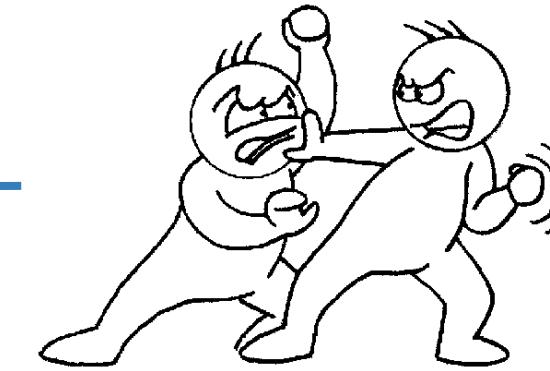
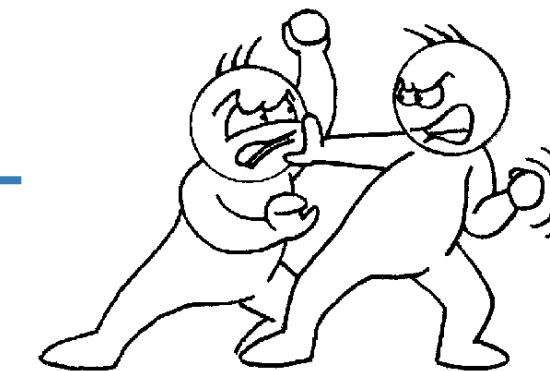
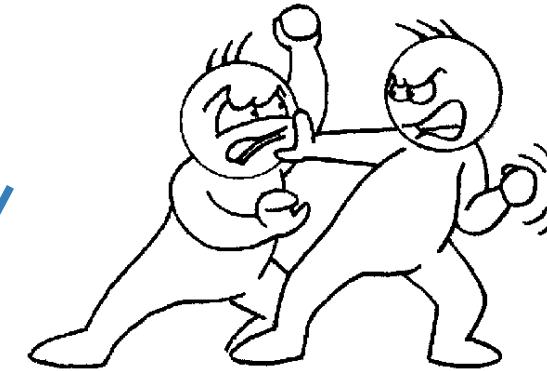
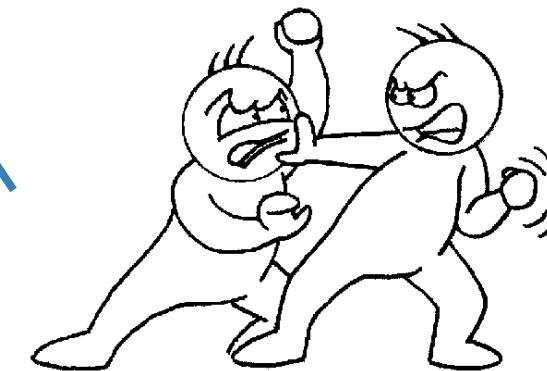
# Between-Subjects Design

- Posttest-only Design



# Between-Subjects Design

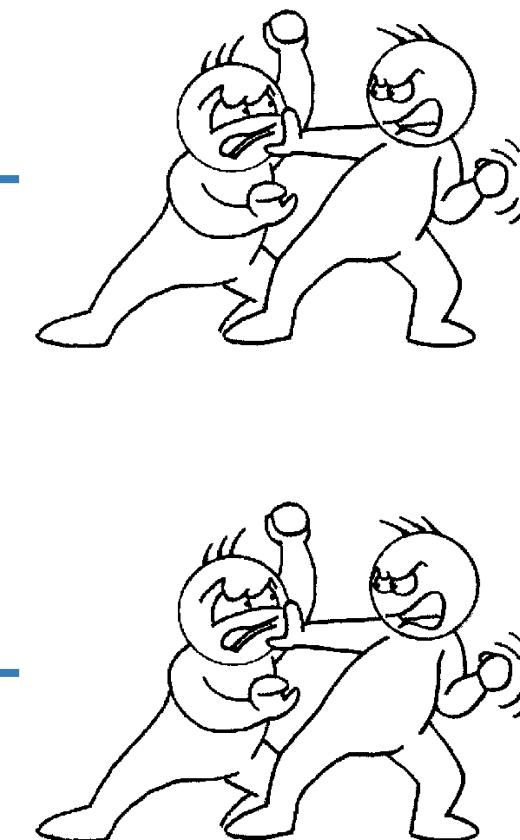
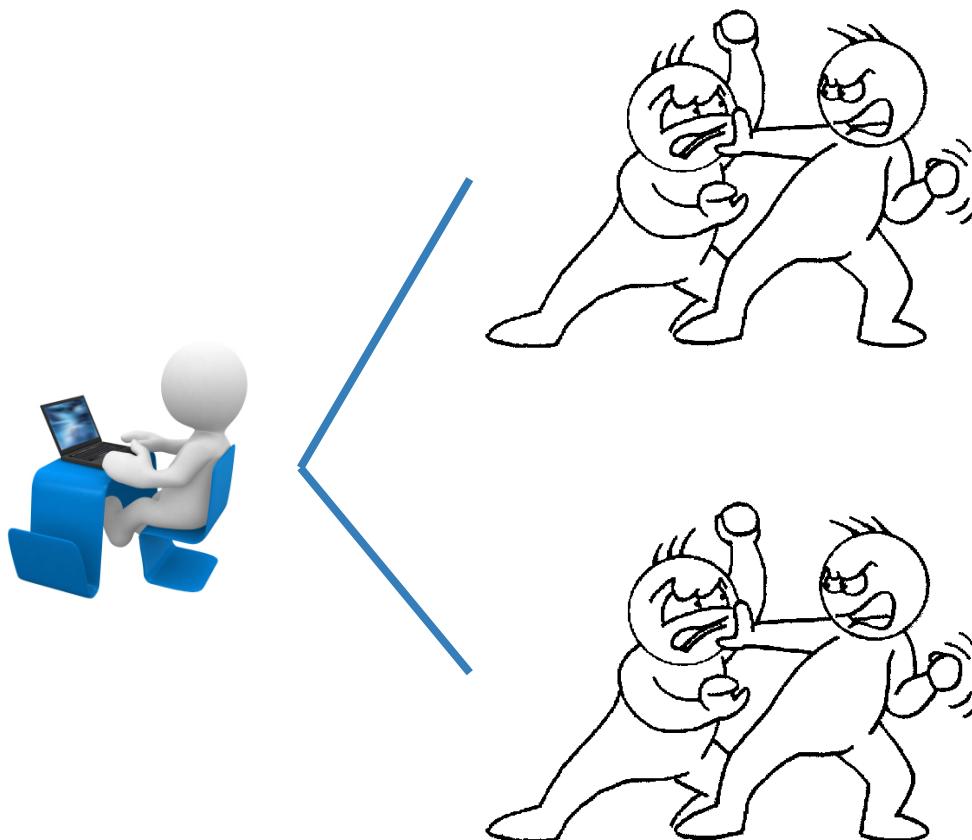
- Pretest-Posttest Design



## Between-Subjects Design

- Framework:
  - Playing violent video games leads people to become more aggressive
    - Builds on previous research
- Hypothesis:
  - After playing violent games rather than observing someone play violent games, one will be more aggressive

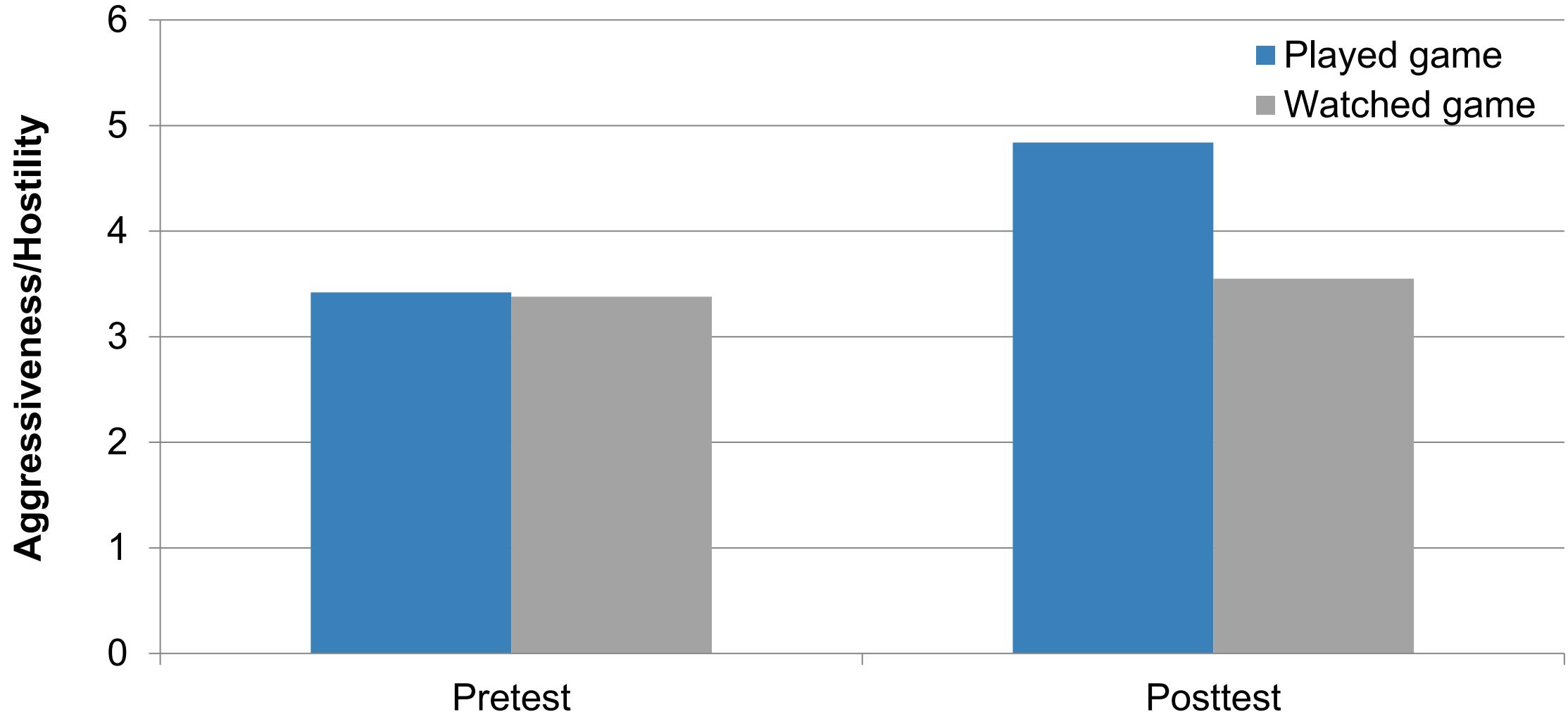
# Between-Subjects Design



## Between-Subjects Design

- Basic study design
  - Dependent measure: Aggressive/hostile thoughts and feelings
    - Scores on “Multiple Affective Adjective Check List” (Bushman & Geen, 1990)
- Prediction
  - Those who played the violent game would have higher aggressiveness/hostility scores than those who watched others play the violent game

# Between-Subjects Design



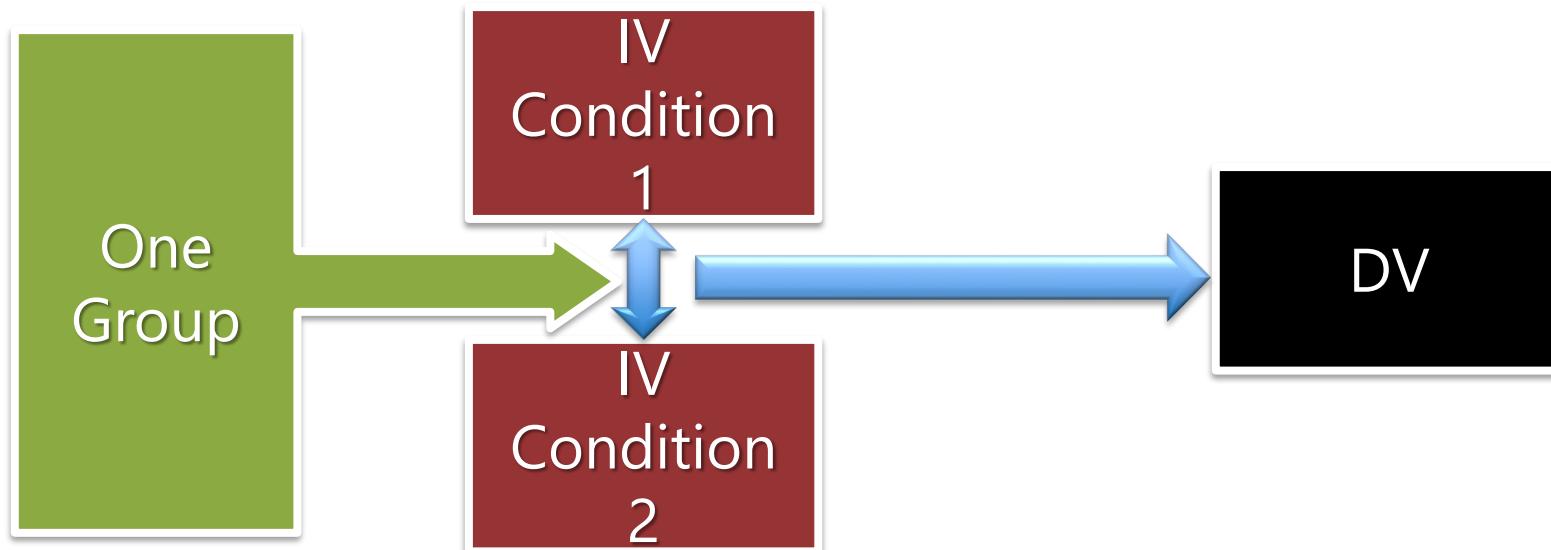
Adapted from Calvert & Tan, 1994

## Between-Subjects Design

- Pretest-Posttest design allows researchers to see *changes* in scores due to IV
- Showing equivalence of groups in pretesting = more evidence to support claim that IV → DV

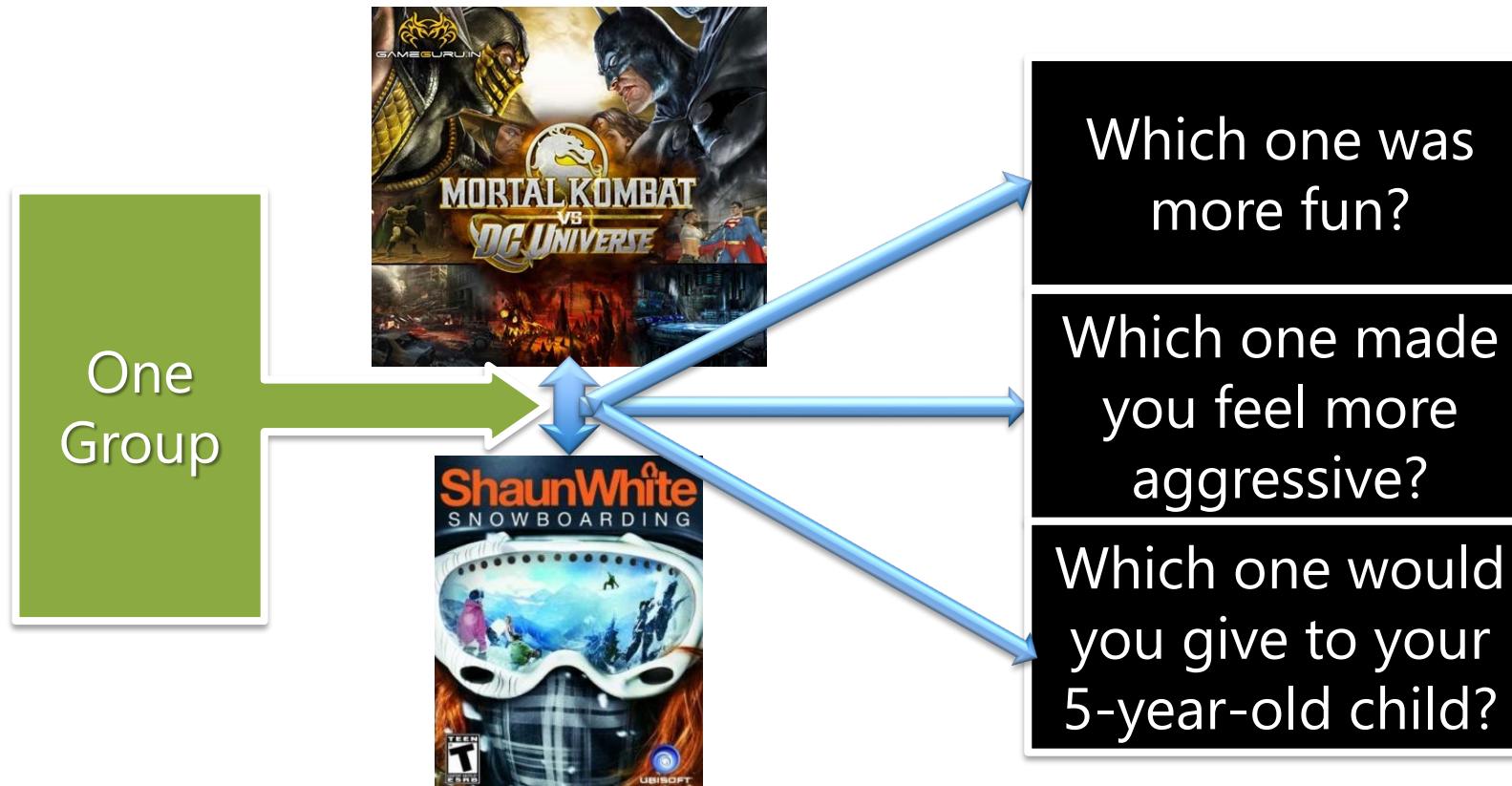
## Within-Subjects Design

- **Concurrent-Measures Design**
  - Participants exposed to both conditions almost at the same time
  - Associated with single attitudinal or behavioural preference as DV

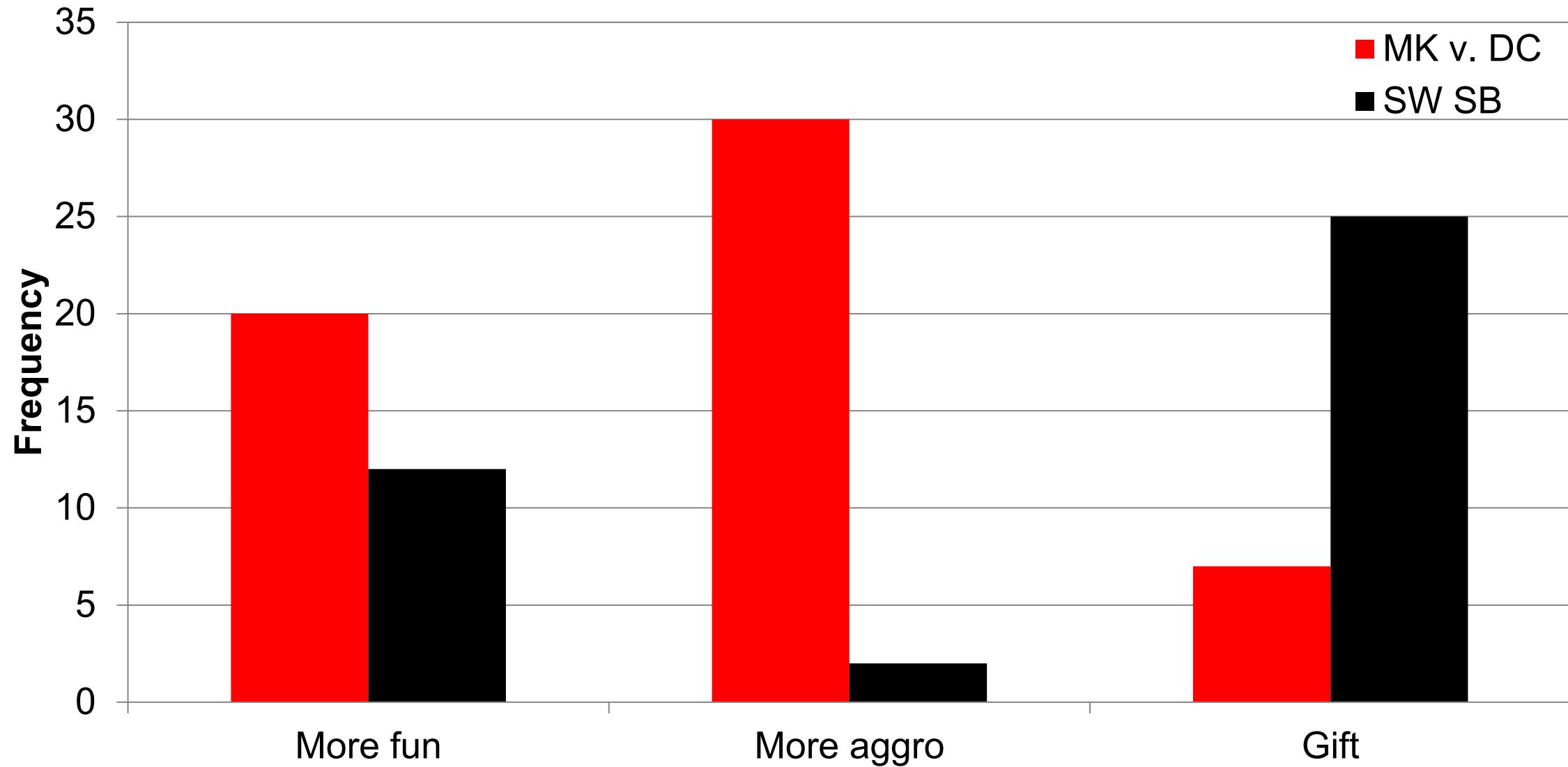


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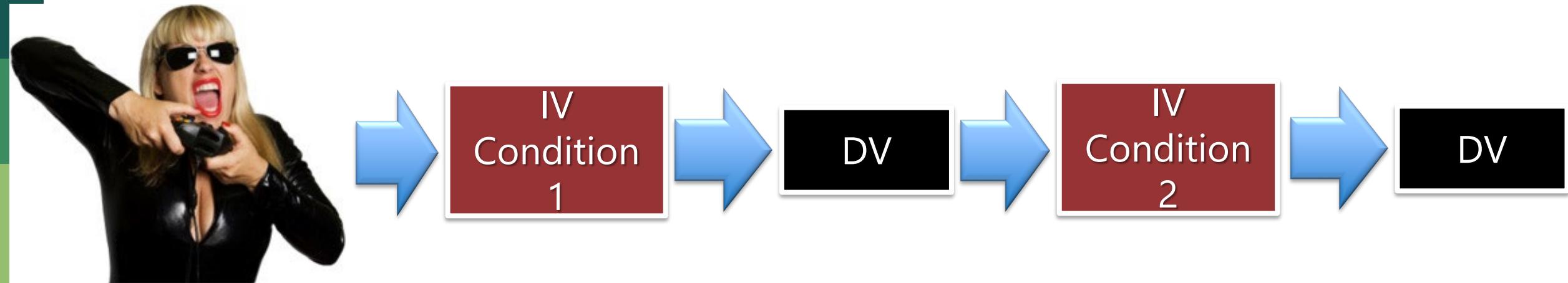


## Within-Subjects Design



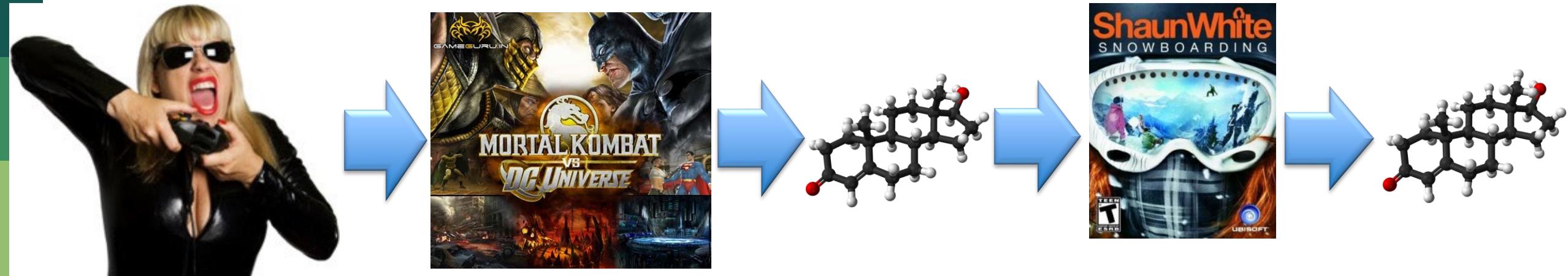
## Within-Subjects Design

- Repeated-Measures Design
  - Participants are exposed to all experimental conditions
  - DV measured after each exposure

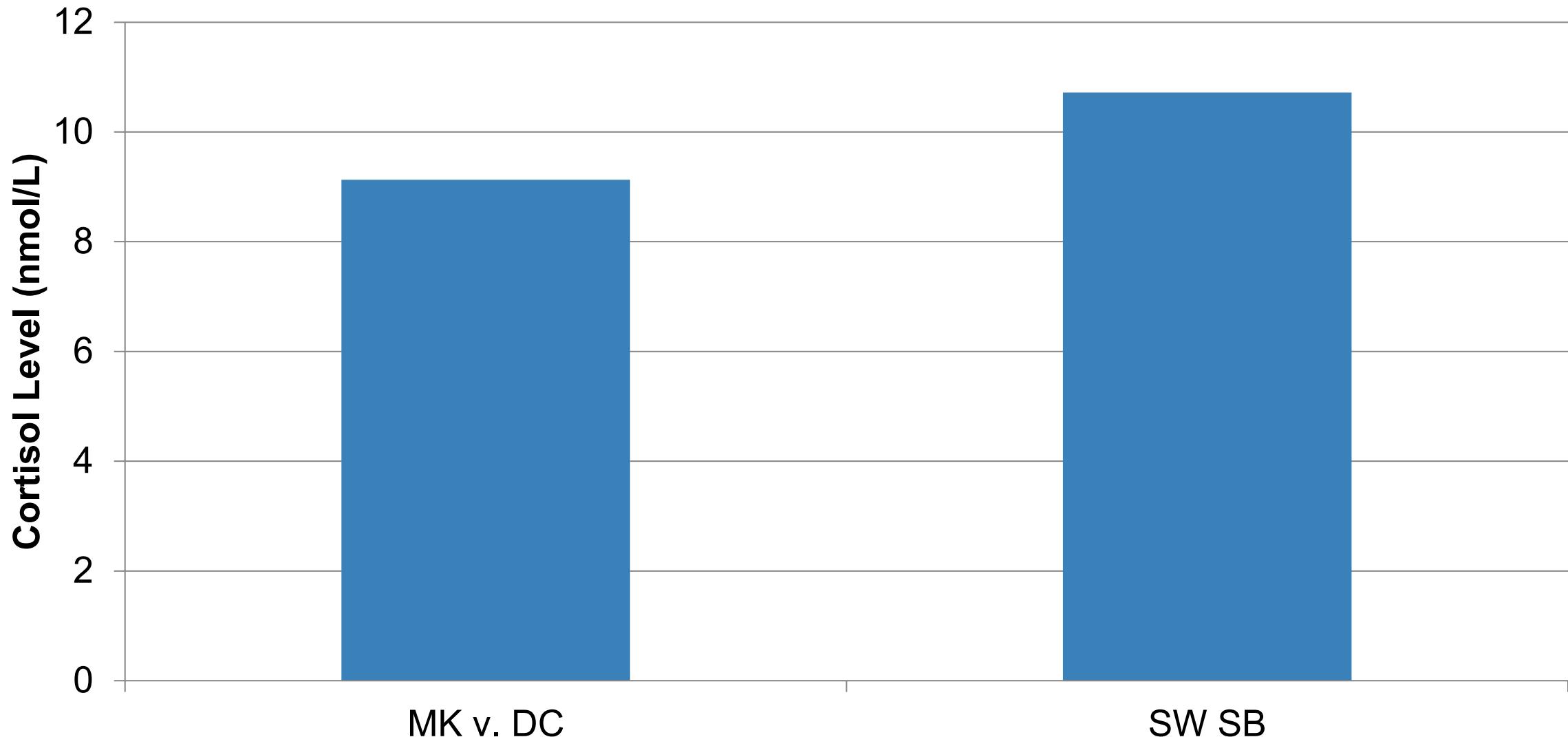


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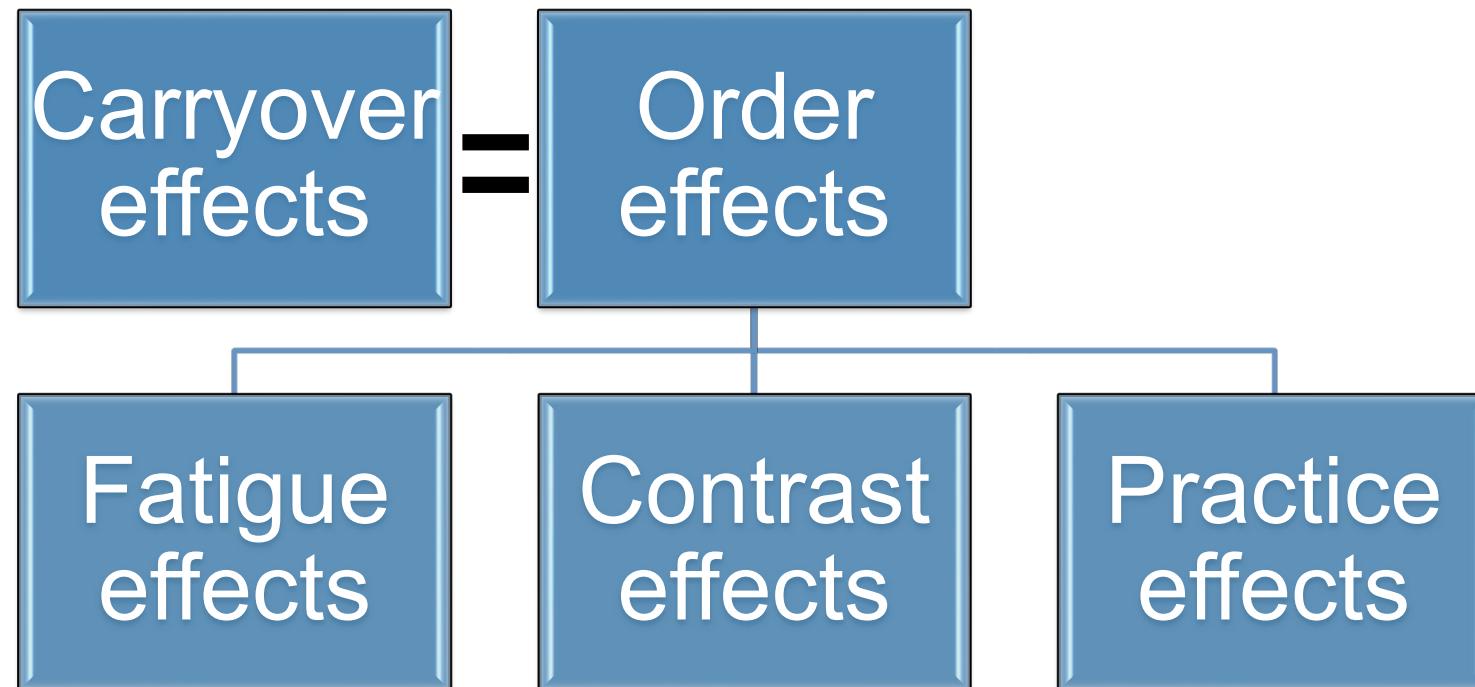


## Within-Subjects Design



## Between- vs. Within-Subjects Design

- Problems with concurrent-measures designs
  - Severe restriction of research questions and DVs
  - Strong demand characteristics
- Problems with repeated-measures designs (on top of demand characteristics)



# Between- vs. Within- Subjects Design

- Order (aka: carryover) effects
  - Participant's response in one condition is affected by having been in other conditions
  - The effects of one condition carry over to others
- Types of Order effects
  - Fatigue
  - Practice
  - Contrast



## Between- vs. Within-Subjects Design

Also: Latin squares!

- Many ways to get around these issues (e.g. counterbalancing)
  - Counterbalancing switches up order of conditions

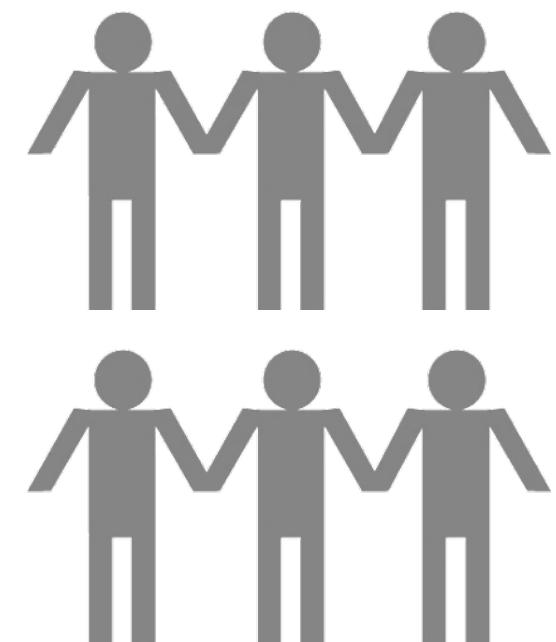


## Between- vs. Within-Subjects Design

- Advantages of concurrent-measures designs
  - Very simple to administer
  - Very quick to run
- Advantages of repeated-measures designs
  - Serve as own control
  - Require fewer participants



vs

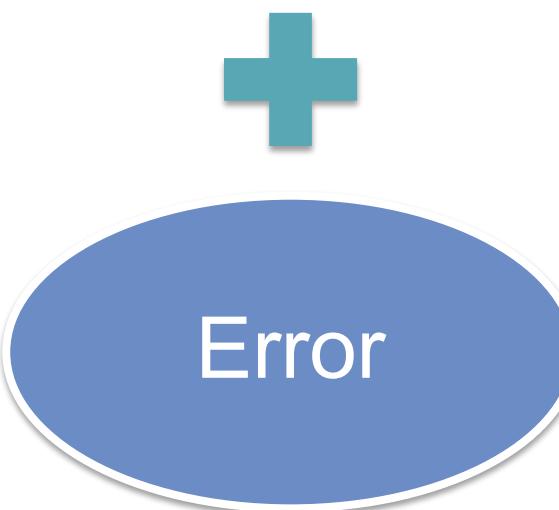


## Sources of Variability in DV

- The Ratio:
  - What proportion of variability in DV is attributable to IV vs. “error”?
  - The more random variability in DV, the harder it is to detect effect of IV

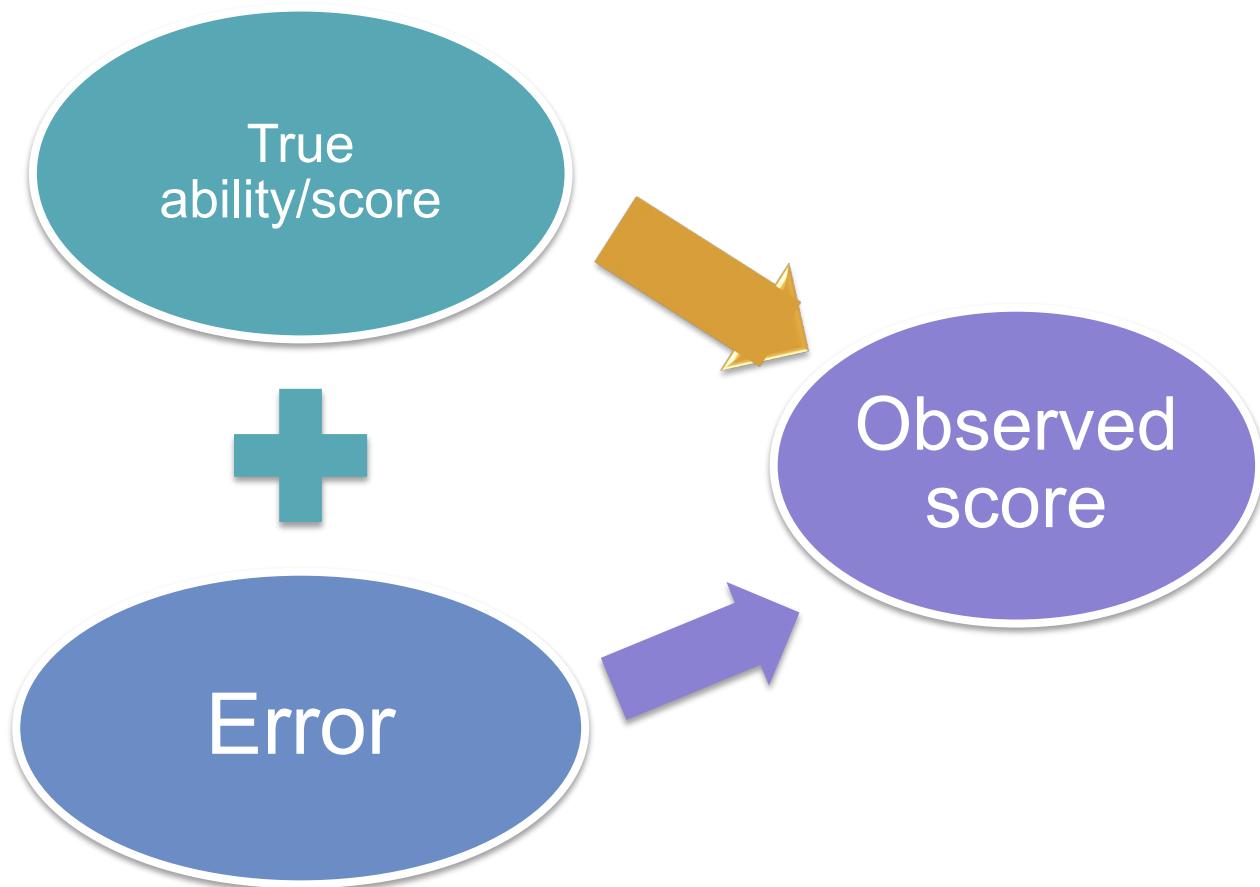
# True Score Theory

- Theory in measurement



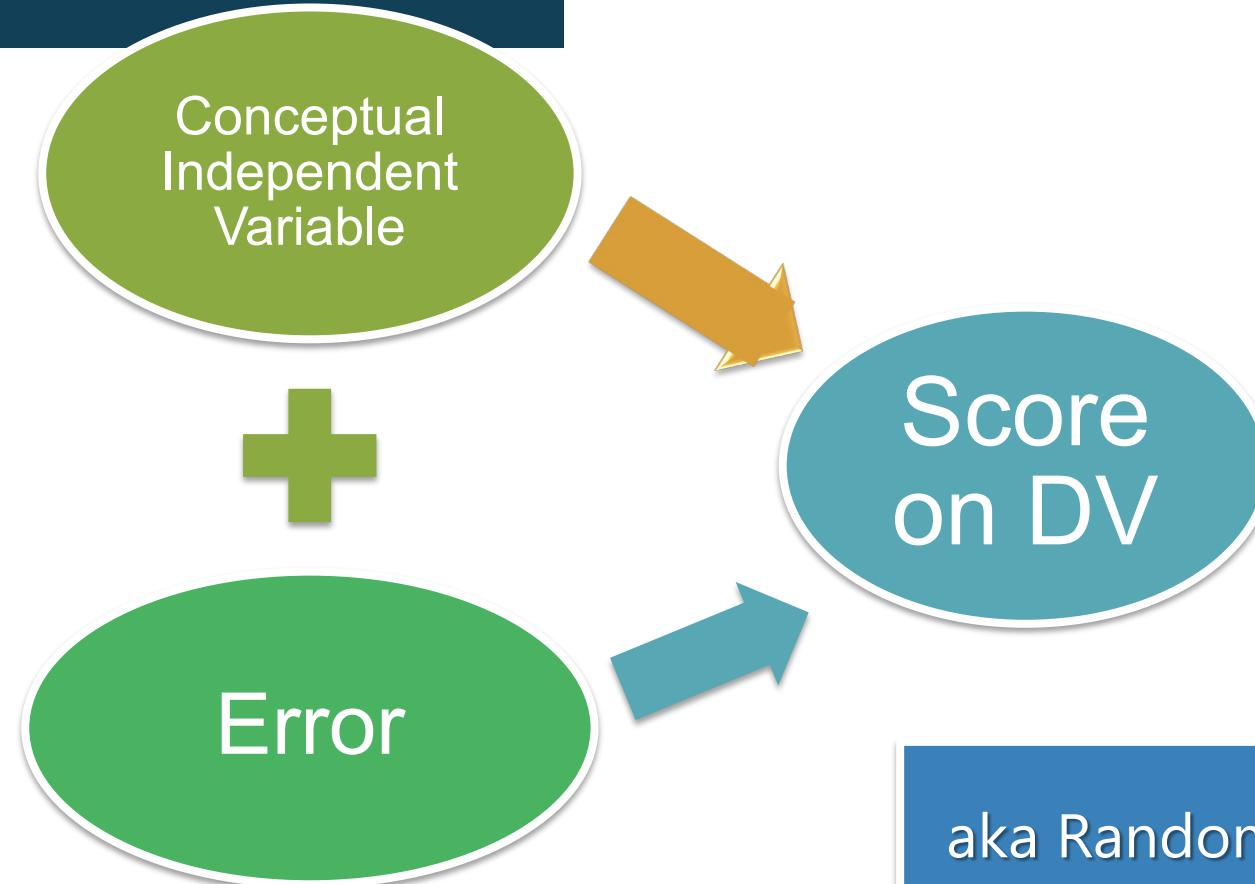
# True Score Theory

- Theory in measurement



# Sources/Components of Variability in DV

**“Error”**  
Sources of variability in your measure caused by things other than your conceptual independent variable.

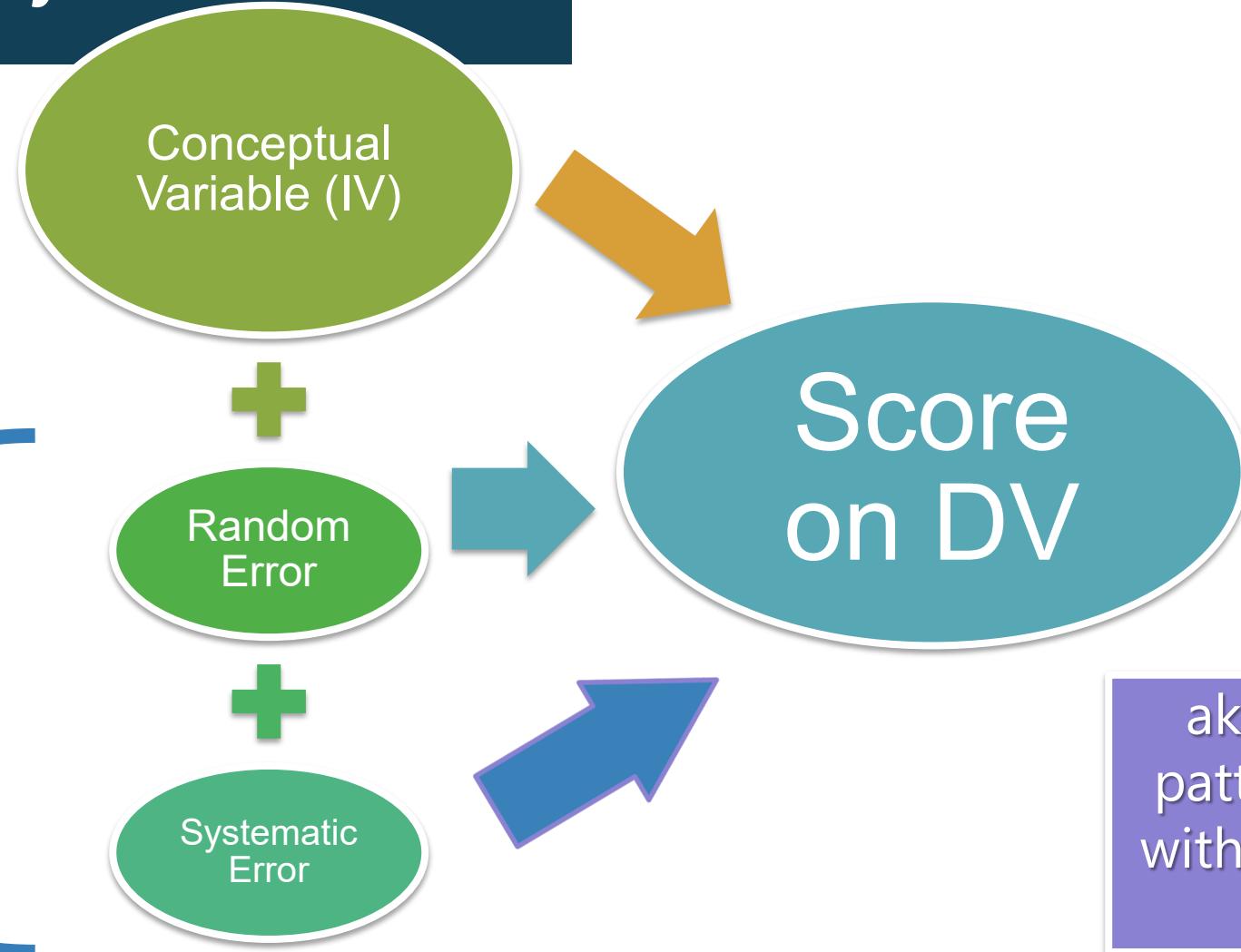


aka Random crap that messes with our ability to detect effect of IV

# Sources/Components of Variability in DV

aka REALLY random crap that's messing with us

**“Error”**  
Can be divided into Random and Systematic sources.



aka Systematic pattern identified within the random crap

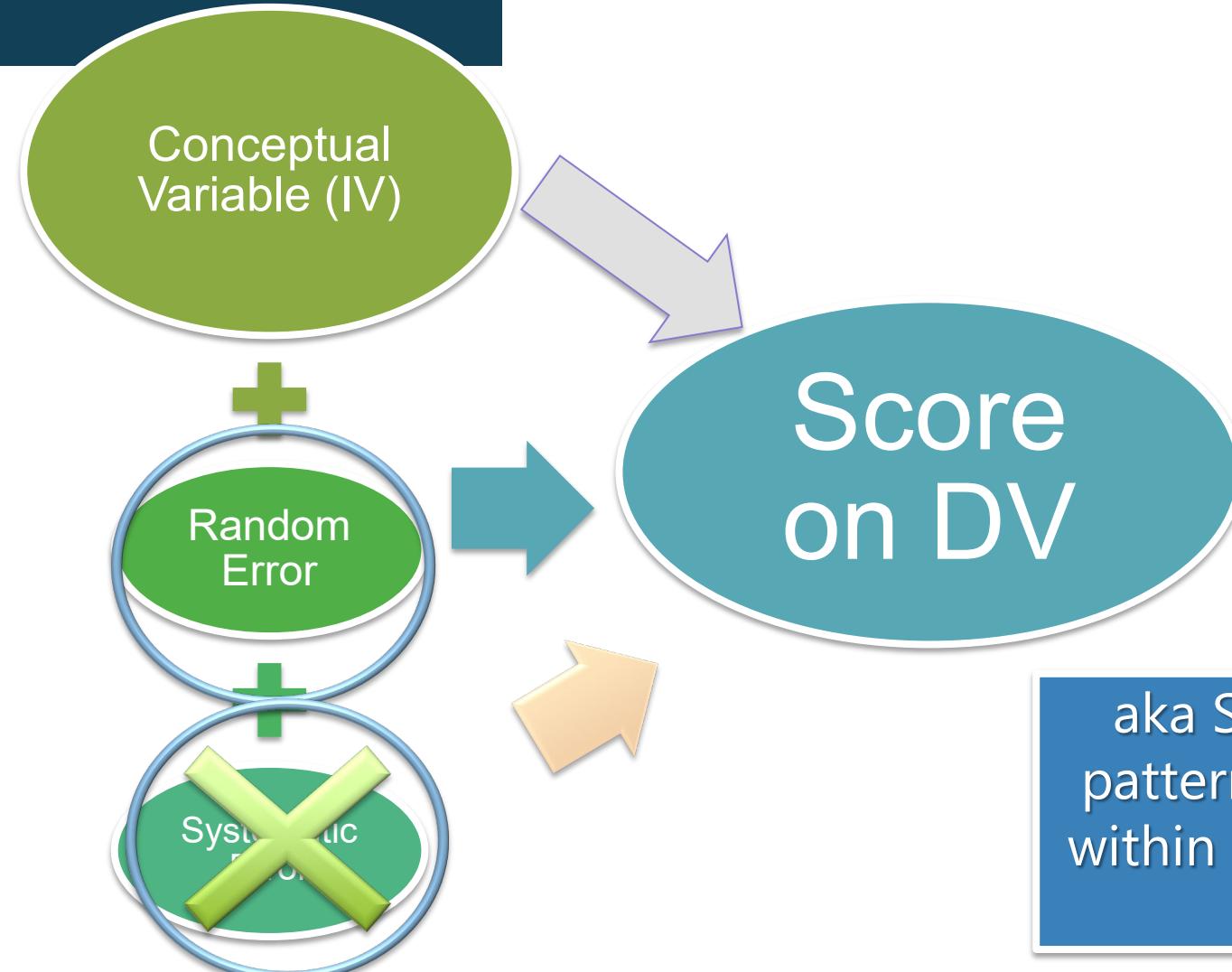
***We can measure and separate Systematic Error only with Repeated Measures designs.***



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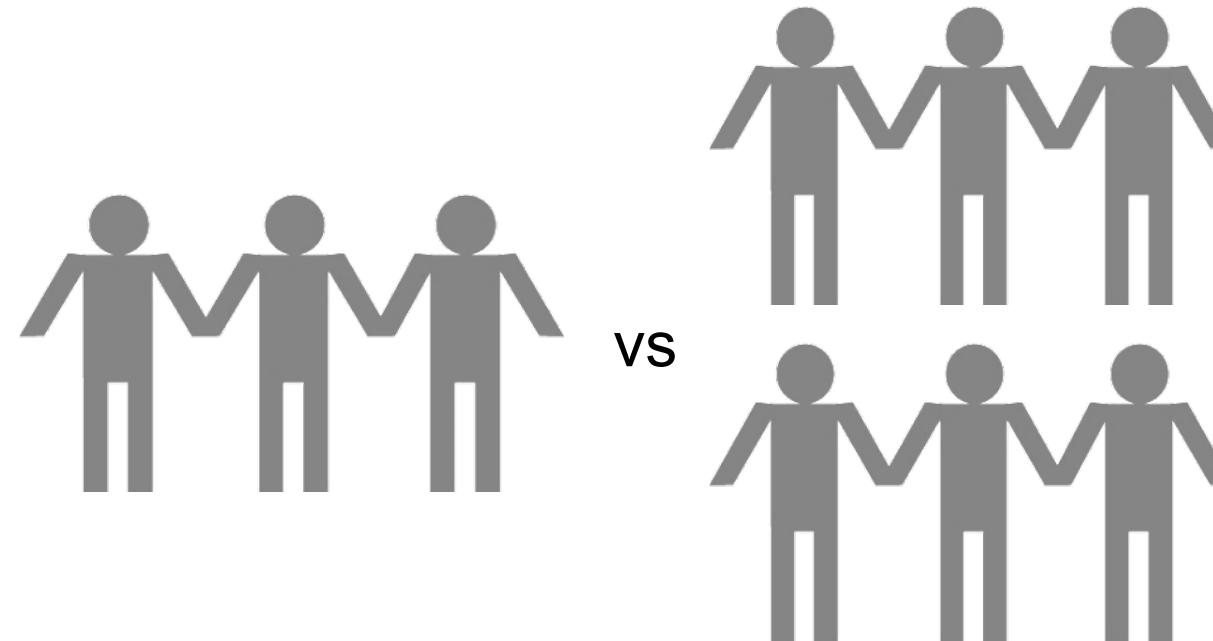


***We can measure and separate Systematic Error only with Repeated Measures designs.***

aka Systematic pattern identified within the random crap

## Between- vs. Within- Subjects Design

- By identifying some random error as systematic error (and removing it)...



**Enjoy Lab 1, and happy studying!**

