

## Threats to Internal Validity

Did the IV really cause the difference?

- Maturation
  - History
  - Regression
  - Attrition (Mortality)
  - Testing
  - Instrumentation
- Especially applicable in one-group pretest/posttest designs
- Observer bias
  - Demand characteristics
  - Placebo effects
- Applicable in any experiment

## Pretest/Posttest design

Pretest	Treatment	Posttest
Headache (rate pain)	Take Advil	Headache reduced? (rate pain again)
Poor reading (measure reading speed)	Special training in reading	Better reading? (measure reading speed again)

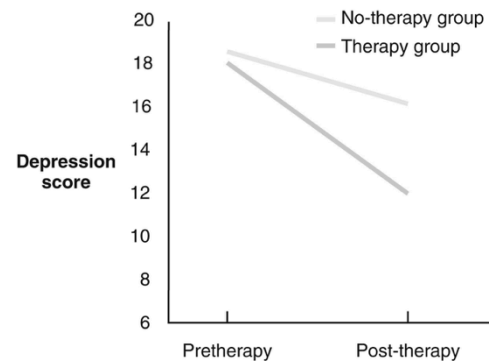
Compare pretest and posttest scores to see if the treatment is effective

## Maturation threat

- Participants change (mature) between pre and post tests
- Effects can be countered using control group

Experimental group    pretest → experimental treatment → posttest

Control group        pretest → placebo treatment → posttest



## History Threat

- Something else changes between pre and post tests
- NOT a difference in backgrounds!
- Again, use a control group to counteract

Experimental group    pretest → experimental treatment → posttest

Control group        pretest → placebo treatment → posttest

## Regression to the Mean Threat

- Extreme scores (either high or low) become less extreme on subsequent testing
- Performance = ability + luck/chance
  - Ability is constant
  - Luck can change
- Counteract with a control group matched for pretest scores

### Mortality/Attrition Threat

- Some participants drop out of the study
  - Those who remain could be 'different'
  - More might drop out from one condition than the other
- If people drop out, exclude their scores from the analysis

### Testing Threat

- Perform better the second time
  - Learn strategies
  - Attitude polarization
- Avoid by using control group

### Instrumentation Threat

- The way a variable is measured changes during the study
- Counteract instrumentation
  - Make sure observers are well trained
  - Calibrate instruments to ensure they give the same results
  - Counterbalance order of tests

### Additional Threats

- Observer bias: Researcher's expectations influence how the participants behave and/or how the results are interpreted
- Demand characteristics: Participants behave in accordance with their expectations about the experiment
- Placebo effects: Patient's symptoms alleviated by an otherwise ineffective treatment because the patient believes that it will work

### Counteracting these threats

- Use a double-blind (double-masked) experiment
  - Neither the participants nor the experimenter knows who is in which condition