Experimental Research I

Outline

- **Independent & dependent variable**
- **Confounds**
- **Internal validity, External validity, & Statistical conclusion validity**
- **Between subject design**
- **Within subject design**

Experimental Research –

-Overview and Major Features
-Types of Independent Variables (IV):
  -manipulated
  -subject
-Dependent Variable
-Requirements For Causal Inferences
-Extraneous Variables vs. Confounding Variables

Control Techniques

- **Elimination**
- **Holding Conditions Constant**
- **Balancing**

Bias As a Confounding Factor

- Participant Bias
- Experimenter Bias

Evaluating the Experiment

- Internal Validity
- External Validity
- Statistical conclusion validity

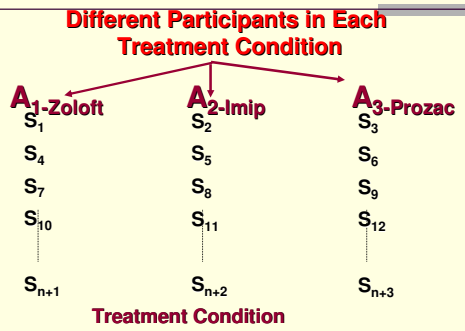
Threats to Internal Validity

- **History**
- **Maturation**
- **Instrumentation**
- **Statistical Regression**
- **Selection**
- **Mortality**
- **Testing**

Basic Types of Experimental Design

- Between Subjects Design
  - Different groups of participants participate in each condition
- Within Subjects Design
  - A single group of participants is exposed to ALL levels of your IV

Between Subjects Designs

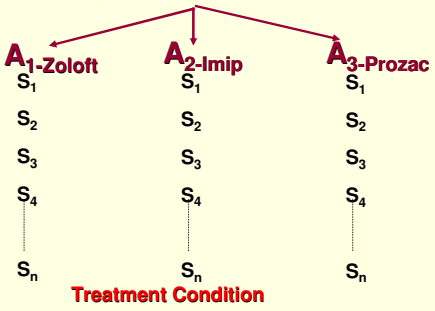


Methods for Ensuring Equivalent Groups

- **Random Assignment**
- **Matching**

Within Subjects Designs

Same Participants Across Treatment Conditions



Sources of Carryover Effects

- Learning
- Fatigue
- Habituation
- Sensitization

Dealing with Carryover Effects

- Counterbalancing
- Latin Square

Complete Counterbalancing

	Treatments		
Subjects	T_1	T_2	T_3
S_1	1	2	3
S_2	1	3	2
S_3	2	1	3
S_4	2	3	1
S_5	3	1	2
S_6	3	2	1

Complete Counterbalancing

	Treatments		
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S_6	3	2	1

Partial Counterbalancing

- Includes only some of the possible treatment orders
- Assume that randomly chosen orders will randomly distribute carryover effects among the treatments

Latin Square

- Ensures that every condition of the study occurs equally often in every sequential position
- Every condition precedes and follows every other conditions exactly once

Procedure for Latin Square

- **To generate the first order of conditions, use the rule:**

  A, B, "x", C

  First row = A B D C

- **Directly below each letter of row 1, place in row 2 the letter that is next in the alphabet. Except for D, return to the first of the 3 letters (A): Thus, the second row would be: B C A D**
- **Build the remaining rows following the step above. Thus the final 4 X 4 would be:**

  A B D C
  B C A D
  C D B A
  D A C B