Research Design Basics

A plan of attack, a formal strategy for collecting information to test our hypotheses

Two critical dimensions:

1. **Control over subjects and independent variables**

2. **Time**

Experimental Notation

X Experimental Condition
(aka “The Treatment”)

O Measure of the Dependent Variable
(Preferred notation in many books)

or

Y Measure of the Dependent Variable
(Consistent with our symbol for a dependent variable.)

Experimental Designs

"Bad" Designs

1. One- Shot Case Study

X Y_{post}

2. One-Group Pretest-Posttest Design

Y_{pre} X Y_{post}

3. Static Group Comparison

Group 1 (Exp): X Y_{post}
Group 2 (Con): Y_{post}

“Better Designs”

(Random Assignment to Groups)

4. Simple Experimental Design

Group 1 (Exp):		X	Y_{post}
Group 2 (Con):			Y_{post}

5. Classical Experiment

Group 1 (Exp):	Y_{pre}	X	Y_{post}
Group 2 (Con):	Y_{pre}		Y_{post}

6. Solomon 4- Group Design

Group 1:	Y_{pre}	X	Y_{post}
Group 2:	Y_{pre}		Y_{post}
Group 3:		X	Y_{post}
Group 4:			Y_{post}

Threats to Validity

Sources of Internal Invalidity
(Should We Believe the Experimental Results?)

1. History
2. Maturation
3. Testing
4. Instrumentation
5. Statistical Regression
6. Selection Bias
7. Experimental Mortality

Sources of External Invalidity
(Can the Findings be Generalized?)

1. Reactivity of Instrumentation
2. Reactivity of Experiment
3. Invalidity of Instruments
4. Confounding Characteristics of Sample
5. Multiple Treatment Interference