

Chapter 8

Experiments

Chapter Outline and Key Terms

<u>Outline:</u>	<u>Key Terms:</u>
<ul style="list-style-type: none">• Introduction• Topics Appropriate to Experiments• The Classical Experiment• Selecting Subjects• Variations on Experimental Designs• An Illustration of Experimentation	<ul style="list-style-type: none">• control group• double-blind experiment• experimental group• external invalidity• field experiment• internal invalidity• matching• posttesting• pretesting• randomization

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- ### Experiments
- Experiments involve
 1. Taking action.
 2. Observing the consequences of that action.
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- ### Topics Appropriate to Experiments
- Projects with limited and well-defined concepts.
 - Projects that are exploratory rather than descriptive.
 - Studies of small group interaction.
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What is Experiment?

Experiment is a procedure in which subjects are first *randomly assigned* to experimental and control conditions/groups, with those under *experimental condition(s)* given exposure to certain *stimulus* or *treatment* whereas those under *control condition* given no exposure, in order to assess the *effects* of the treatment/stimulus.

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- ### Components of Experiments
- Independent and dependent variables
 - Pretesting and posttesting
 - Experimental and control groups
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Subjects

- **Experimental group** - A group of subjects to whom an experimental stimulus is administered.
- **Control group** - A group of subjects to whom no experimental stimulus is administered and who resemble the experimental group in all other respects.
- The two groups must be as similar as possible.
- Control group represents what the experimental group would have been like had it not been exposed to the stimulus.

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Control Group Consideration

- Control Group Consideration
 - May get something different than the experimental treatment.
 - New Drug VS. Placebo
 - May be different levels of the experimental treatment.
 - Influence of Violence in Movies on adolescents
 - High vs. Middle vs. Low

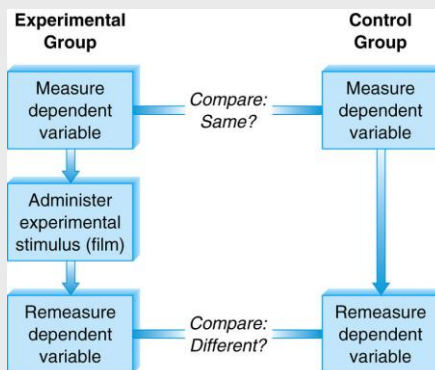
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Double-blind Experiment

- An experimental design in which neither the subjects nor the experimenters know which is the experimental group and which is the control.

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Basic Experimental Design



Selecting Subjects

- **Probability sampling:** the same as in survey sampling (Ch 7 and Ch 9)
- **Randomization:** a technique for assigning experimental subjects to experimental and control groups randomly.
- **Matching:** pairs of subjects are matched on the basis of their similarities on one or more variables, with one member being assigned to the experimental group and the other to the control group.

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Random Sampling vs. Randomization

	Random Sampling	Randomization
Used for	Survey	Experiment
Representation of Population	As much as possible	Not a concern
Group Difference	As large as possible	As small as possible
Validity Related	External Validity	Internal Validity

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Illustration of Quota Matrix

	Men		Women	
	African American	White	African American	White
Under 30 years	8	12	10	16
30 to 50 years	18	30	14	28
Over 50 years	12	20	12	22

Experimental group Control group

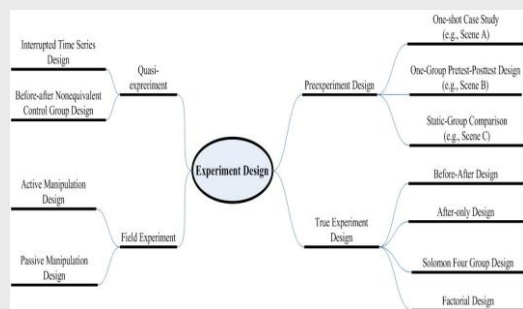
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etc. etc.

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Randomization vs. Matching

- May not know which variables will be relevant for matching process.
- Most statistics used to analyze results assume randomization.
- Randomization only makes sense if you have a large pool of subjects.

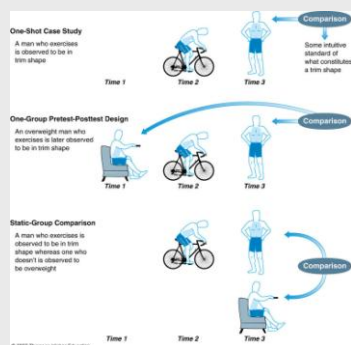
Basic Experiment Design



Preexperimental Designs

- **One-shot case study** - single group of subjects is measured on a variable following experimental stimulus.
- **One-group pretest-posttest design** - adds a pre-test for the group, but lacks a control group.
- **Static-group comparison** - includes experimental and control group, but no pre-test.

Three Preexperimental Designs



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Sources of Internal Invalidity

- Historical events may occur during the course of the experiment.
- Maturation of the subjects.
- Testing and retesting can influence behavior.
- Instrumentation
- Statistical regression of subjects starting out in extreme positions.
- Selection biases.
- Experimental mortality - subjects drop out of the study before it's completed.
- Demoralized control group subjects.



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Limiting External Invalidity

- Solomon four-group design
- Posttest-only control group design

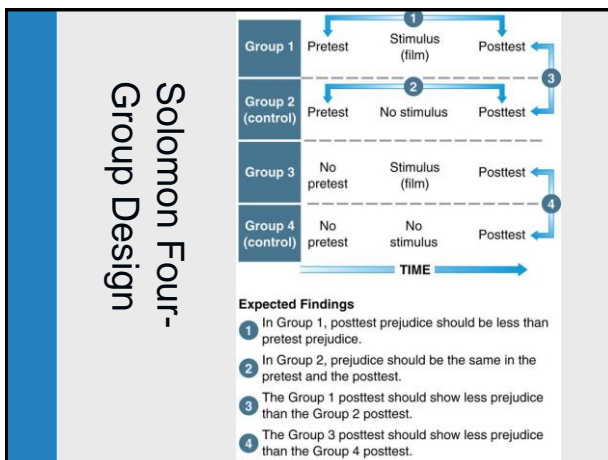
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Solomon Four-group Design

Four groups of subjects, assigned randomly:

- Groups 1 and 2 are the control and experimental group.
- Group 3 does not have the pre-test.
- Group 4 is only posttested.

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How to Analyze the Solomon Four-group Design?

- Group 1 - posttest prejudice should be less than pretest prejudice.
- Group 2 - prejudice should be the same.
- Group 1 posttest should show less prejudice than Group 2 posttest.
- Group 3 posttest should show less prejudice than Group 4 posttest.

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Posttest-only Control Group Design

- Includes Groups 3 and 4 of the Solomon design.
- With proper randomization, only these groups are needed to control problems of internal invalidity and the interaction between testing and stimulus.

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Quasi-Experiment

- Before-After Nonequivalent Design (no randomization):

$$\begin{array}{ccc} O_{11} & X & O_{12} \\ O_{21} & & O_{22} \end{array}$$
- Interrupted Time Series Design (repeated measures on one group):

$$O_1 O_2 O_3 O_4 X O_5 O_6 O_7 O_8$$

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Natural Experiments

- Important social scientific experiments occur outside controlled settings and in the course of normal social events.
- Raise validity issues because researcher must take things as they occur.
- Example:
 - Test market



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Web-based Experiments

- Increasingly, researchers are using the World Wide Web to conduct experiments.
- Because representative samples are not essential in most experiments, researchers use volunteers who respond to invitations online.

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Strengths & Weaknesses of Experimental Method

Strengths:

- Isolation of the experimental variable over time.
- Experiments can be replicated several times using different groups of subjects.

Weaknesses:

- Artificiality of laboratory setting.
- Social processes that occur in a lab might not occur in a more natural social setting.

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Internal vs. External Validity

- Internal Validity
 - the extent to which the requirements for causal inference are met (i.e., time order and confounding effects are controlled);
- External Validity
 - the extent to which the experimental results can be generalized to the study population (i.e., the subjects and the setting are generalizable).
- Internal validity is a prerequisite for external validity.

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Ethics and Experiments

- Experiments almost always involve deception.
- It is important to determine:
 - whether a deception is essential to the experiment
 - whether the value of what may be learned from the experiment justifies the ethical violation.
- Experiments are typically intrusive in the lives of the subjects.
- We commonly put them in unusual situations and ask them to undergo unusual experiences.

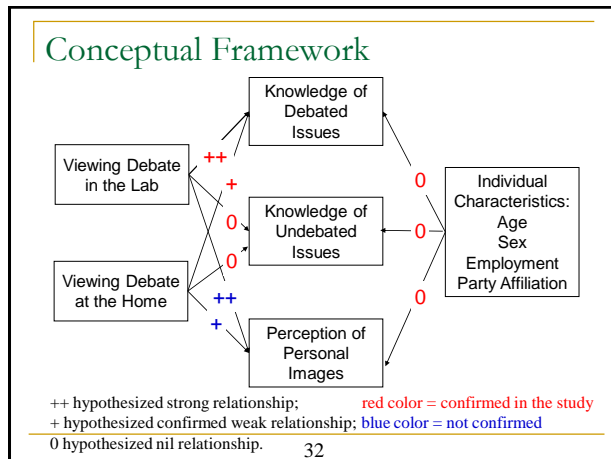
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A Case Study

Do Televised Debates Affect Image Perception More Than Issue Knowledge? A Study of the First 1992 Presidential Debate

**J. H. Zhu, J. R. Milavsky, & R. Biswas (1994),
*Human Communication Research, 20, 320-333***

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Experimental Design

R	O_{c1}		O_{c2}	(n=21)
R	O_{etv1}	X_{tv}	O_{etv2}	(n=53)
R	O_{ntv1}	X_{tv}	O_{ntv2}	(n=65)
R	O_{npp1}	X_{npp}	O_{npp2}	(n=46)
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Randomization (R)

- To randomly assign the subjects into the four conditions to ensure no systematic differences among the groups
- Check the equivalence (Table 2)

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Experimental Stimulus (X)

- A 90-minute debate among three presidential candidates, as televised live on three national networks:
 - Bill Clinton of Democratic Party
 - George Bush of Republic Party
 - Ross Perot of Independent
- Unlike most other controlled experimental studies, no manipulation was applied to the stimulus. This “natural” stimulus involves a high risk in the sense that there was no guarantee for the presence of the intended elements of the independent variable (e.g., tested issues).

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Observations (O)

- Issue Knowledge
 - 21 questions about issue positions for each candidate (i.e., 63 questions in total) before the debate
 - 21 questions about issue positions for each candidate (i.e., 63 questions in total) after the debate
- Image Perception
 - 15 questions about competence, potency, integrity, charisma and communication style for each candidate (i.e., 45 questions in total) before the debate
 - 15 questions about competence, potency, integrity, charisma and communication style for each candidate (i.e., 45 questions in total) after the debate

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