

Experimental Research

- Focuses on identifying causes of behavior
- Based on the ideas of
 - Comparison
 - Control
 - Manipulation

Comparison

- Compare data patterns under different conditions
 - Hypothesis testing
 - Rule out explanations
 - Confirm explanations
- Control experimental situation
 - Manipulate hypothesized causal variable

Systematic Research Study

- Variables of interest are manipulated
 - Independent variables
 - Must have at least two levels
- All other variables held constant
 - Extraneous variables
- Effects of manipulation are observed
 - Dependent variables

Systematic Research Study

- Independent variable
 - Exposure to violent videogames
 - Violent versus nonviolent
- Dependent variable
 - School shooting
- Extraneous variables
 - Age, personalities, access to guns, social skills, home life.....

Prying Variables Apart

- Occurrence of an event correlated with many factors
 - Difficult to determine cause
- Create special situations
 - Isolate the influence of a single variable
 - Determine causation

Confound

- Extraneous variables held constant
 - Changes in DV result from changes in IV
- Extraneous variables allowed to covary with IV
 - Can influence behavior systematically
 - Effects of extraneous variable can not be separated from effects of IV

Spot the Confound (1)

- Coaching technique that will lead to better teams
 - Team 1 receives special coaching technique
 - Team 2 receives standard coaching
- Teams play each other
 - Team receiving special coaching (team 1) should perform better

Spot the Confound (2)



- Does new type of driver (club 1) drive a golf ball greater distances than competing brands?
 - 20 male golf pros recruited
 - Starting with club 1, hit 50 balls with each club.
- Average the distance driven with each club across the 50 trials

Spot the Confound (3)

- Students who cram for a test don't do as well as student who study over several days.
- 3 equivalent groups of students are selected
- Learn 5 chapters in a general psychology text



Spot the Confound (3)

	Mon.	Tues.	Wed.	Thur.	Fri.
Group1	3				Exam
Group2	3	3			Exam
Group3	3	3	3		Exam

- Group 1 studies 3 hours on Monday
- Group 2 studies 3 hours on Monday & Tuesday
- Group 2 studies 3 hours on Monday, Tuesday & Wednesday
- All tested on Friday

Control

- Subject variables
 - Characteristics of the subjects in the study
 - Subject related artifacts
- Experimental variables
 - Experiment design
 - Experimenter expectancy

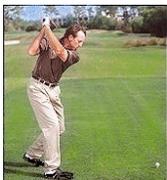
Subject Variables

- Evenly distributed across treatment conditions
- Accomplished through random assignment
- Every Ss has an equal chance of being placed in each of the groups



Order Effects

- **Practice effects**
 - Performance improves across conditions
- **Fatigue effects**
 - Performance declines across conditions
- **Carryover effects**
 - Treatment in one condition "carries over" or affects performance in next condition



Latin Square Design

	Order of Administration			
	1	2	3	4
Sequence 1	A	B	C	D
Sequence 2	B	C	D	A
Sequence 3	C	D	A	B
Sequence 4	D	A	B	C

Between-subjects or Within-subjects?

1. A neuroscientist hypothesizes that damage to the primary visual cortex is permanent in older animals
2. A sensory psychologist predicts that it is easier to distinguish slightly different shades of gray under daylight than under fluorescent light.
3. A social psychologist believes people will solve problems more creatively in groups than when alone.
4. A developmental psychologist predicts cultural differences in moral development.
5. A clinical psychologist thinks that phobias are best cured by repeatedly exposing the person to the feared object and not allowing the person to escape until they realize the object is really harmless.

Design and Control

- Order effects
 - Use counterbalancing
 - Use between-subjects design
- Subject variables
 - Use random assignment to conditions
 - Use within-subjects design

Deciding on Design

- Depends upon the study
- Within-subjects
 - If counterbalancing is an option
 - Economical
 - No subject effects
- Between-subjects
 - If counterbalancing is not an option
 - “A neuroscientist hypothesizes that damage to the primary visual cortex is permanent in older animals”

Control

- Subject variables
 - Characteristics of the subjects in the study
 - Subject related artifacts
- Experimental variables
 - Experiment design
 - Experimenter expectancy

Subject-related Artifacts

- Research participants aware of experimental participation
- Susceptible to demand characteristics
 - Cues that provide information about “expected” behavior
- May not consciously be aware of cue’s influence on their behavior

Clever Hans

- Purchase in 1900
 - Wilhelm von Osten
- Von Osten convinced of animal intelligence
- Tried to teach animals simple arithmetic



Clever Hans

- Training Hans
 - Number recognition
 - Numbers on chalkboard
 - Sums on chalkboard
- Hans tapped correct answer with hoof
- Reached ability of 14 year old school boy



Clever Hans

- Testing
 - Not the result of conscious trickery
 - Horse performed when von Osten was absent
 - Incorrect answers when experimenter didn't know answer
- Responding to subtle physical cues



The "Good" Subject

- Research volunteers want to contribute to science
 - Comply to what they believe are the demand characteristics
 - Find meaning in even meaningless cues



Controlling Demand Characteristics (Pilot Testing)

- Run through experiment yourself
 - On paper
 - In your mind
- Pilot testing
 - Ask subjects about experiment
 - Correct inferences about hypothesis
 - Incorrect inferences about hypothesis
- Revise methods and procedure

Controlling Demand Characteristics (Deception)

- Hide important facts from research participants
 - Not telling the whole truth
- Leading participants to believe you are studying a phony topic
 - Lying

Example: Darley & Latane (1968)

- True purpose
 - Bystander intervention
- Deception
 - Problems with university life



Ethical Considerations

- Deception can be unethical
 - Need to follow strict APA guidelines
 - Need to find other method
- Can count knowledge of manipulation as an independent variable
 - Control for knowledge in statistical analysis of data

Subject Bias

- Research participants have many expectations and worries about experiment
 - May bias or alter results of experiment
- Easy for experimenter to forget social characteristics of experiment
 - Concerned with getting the job done
 - Forget what it is like to be a research participant

Subject Bias

- Demand characteristics may allow Ss to guess hypothesis
 - Can cause subject bias
- Types of subject bias
 - Social desirability bias
 - Placebo effects



Social Desirability Bias

- Behaving in ways believed to be desired by others.
- May misunderstand motive of experimenter
 - View experiment as public achievement test
 - Experimenter want NORMAL behavior
- Extremely difficult to control
 - Look for effects in data

Placebo Effects

- Belief in treatment effect causes effect
- Strong effect
- Seen in many different settings
 - Medical research
 - Behavioral research



Placebo Effects

- "Alcohol and sexual stimulation"
- Abrams & Wilson (1983)
 - Alcoholic or nonalcoholic drink
 - Shown erotic movie clip
 - Reported sexual fantasies and guilt

Controlling Placebo Effects

- Adding placebo control group
 - Receive what they believe is treatment
- Performance compared to Ss actually receiving treatment
 - Determine effects of treatment from belief in treatment

Experimenter Artifacts

- Source of bias
 - Result from intentions and actions of experimenter
- Experimenter-expectancy effects
 - “Self-fulfilling prophecies”
 - Expectations can influence experiment results

Rat Intelligence

- Rosenthal & Jacobson (1968)
 - “Maze Bright” rats
 - “Maze Dull” rats
- “Maze Bright” rats performed better than “Maze Dull” rats



Controlling Experimenter Bias

- Bias usually unintentional
 - Difficult to control
- Techniques for controlling experimenter bias
 - Automation
 - Blind testing

Automation

- Use automatic devices that remove “personal touch” of experimenter
- Examples
 - Tape-recording instructions
 - Videotaping behavior
 - Using computer to present stimuli
- Drawbacks
 - Removing “personal touch” may adversely affect participants

Controlling Expectancy Effects

- Using “blind” experimenters and/or subjects
- Do not know who received experimental treatment and who received control

Single Blind Experiment

Experimenter does know Subject does NOT know	Which treatment group a subject belongs to
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Double Blind Experiment

Experimenter does NOT know Subject does NOT know	Which treatment group a subject belongs to
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