Chapter 2: The Research Enterprise in Psychology
Looking for Laws: 
The Scientific Approach to Behavior

• Basic assumption: events are governed by some ________________

• Goals:
  – ________________
  – ________________
  – ________________
  – ________________
Why Do Research?
Common sense is the collection of prejudices acquired by age eighteen. Albert Einstein

- Is not enough
- ________________ bias
  - Tendency to believe, after learning an outcome, that one would have ________________ it
  - Example: effects of absence on love
- ________________
  - We tend to think ________________ than we do
  - Prediction of our own behavior
Examples of overconfidence

• Word search
  – In reality, most participants took 3+ minutes
• Prediction of social behavior (Vallone, 1990)
  – Students who felt that they could predict their behavior with 84% confidence were correct only 71% of the time
• Prediction of your behavior…
  – ________________ is the only way to really know!!!
Features of Psychology Research
Research questions based on ________, with specific, refutable ________(more on this later)
- ________
  - System of ________ used to explain a series of observations
- ________
  - Specifies relationships among ________, and are ________
- ________ definitions
  - define terms in hypotheses by specifying the ________ for observing and measuring the process or phenomenon.
  - Clarifies exactly what is being studied.
Problem with Precision

• Often, very difficult to achieve!
  – Especially with “applied” research
  – Lots of extraneous variables that are difficult to control
• Example
  – _______________ :
    • Positive interactions with peer improves self-esteem
  – Potential _______________
• Scientists do not accept ideas on faith or authority.
• _____________ means treating conclusions, both old and new with caution.
• Example
  – Claim: People emit auras, which can be seen by those trained to do so.
  – Test:???
Skepticism: Science v.

__________________

• _________________ = “false science”

• Characteristics:
  – associates itself with _________________
  – relies on and accepts _________________
  – sidesteps _________________
    • Does not make refutable, testable predictions
  – dangerously reduces complexity to
    _________________(to a consumer society)
Critical Thinking: Zodiac Signs

- Astrologers say that behavior can be predicted by zodiac sign
- Testable hypotheses?
- Zodiac Personality Characteristics
- Correspondence?
Reliance on ______________ evidence

• A scientist relies on ______________ evidence to determine whether a ______________ is true.

• Evidence is evaluated based on accepted standards.
  – ______________
  – ______________
  – ______________
Willingness to make “risky” 

• Principle of ___________________.
  – A scientific theory must make predictions 
    ____________________ enough to confirm and or disconfirm the theory; that is,
  – the theory must predict not only what will happen, 
    but also ___________________.

• ____________________ bias.
  – Tendency to look for or pay attention only to information that _______________.

“like”
(a) Hypothesis: “Misery loves company.”
Falsifiable (“Risky”) Prediction: When people are anxious, they’re more likely to want to be with others in the same situation.
Possible Outcomes:
- Anxious people are more likely to wait with others in the same situation.
- Anxious people are more likely to want to be alone.
- Anxiety has no effect on behavior.
Conclusion: Supports hypothesis.

(b) Hypothesis: “Dowsing reveals subterranean water.”
Nonfalsifiable Prediction: Dowsers will reliably find water—unless the planets are misaligned, observers give off bad vibes, etc.
Possible Outcomes:
- Dowsers find water.
- Dowsers do not find water.
Conclusion: Supports hypothesis. Dowsers conclude that results support hypothesis anyway.
• Scientists must be willing to tell others where they got their ideas, how they tested them and what the results were.
• Peer review, publishing and replicating research gives science a built in system of _________________.
• Be willing to let go of a ________________ that you have worked very hard on when it is ________________ by empirical evidence.
General Research Process

• Find a topic of interest
• Review _______________
  – Allows generation of better hypotheses
  – Make sure no one has done what you’re interested in
• Develop your _______________ and procedures
  – Formulate _______________
  – Design the study
• Undergo _______________
  – Human – Institutional Review Board (IRB)
  – Animal – Institutional Animal Care and Use Committees
• Collect and analyze _______________
• Write ________________, submit, & publish
Scientific Method in Psychology

• Careful __________________ of behavior

• __________________
  – Can’t observe everybody (whole ______________)
  – Select an unbiased ________________

• Conduct __________________
  – Ask everybody the same questions…
  – Same experiment, etc.

• Critical thinking
Focus of Studies:

• Measurable conditions, events, characteristics, or behaviors;
• Manipulated and assessed in scientific studies
  – Question:
    • What is the effect of _______________ on _______________?
<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct observation</td>
<td>Observers are trained to watch and record behavior as objectively and precisely as possible. They may use some instrumentation, such as a stopwatch or video recorder.</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Subjects are administered a series of written questions designed to obtain information about attitudes, opinions, and specific aspects of their behavior.</td>
</tr>
<tr>
<td>Interview</td>
<td>A face-to-face dialogue is conducted to obtain information about specific aspects of a subject’s behavior.</td>
</tr>
<tr>
<td>Psychological test</td>
<td>Subjects are administered a standardized measure to obtain a sample of their behavior. Tests are usually used to assess mental abilities or personality traits.</td>
</tr>
<tr>
<td>Physiological recording</td>
<td>An instrument is used to monitor and record a specific physiological process in a subject. Examples include measures of blood pressure, heart rate, muscle tension, and brain activity.</td>
</tr>
<tr>
<td>Examination of archival records</td>
<td>The researcher analyzes existing institutional records (the archives), such as census, economic, medical, legal, educational, and business records.</td>
</tr>
</tbody>
</table>
Looking for Causes: ____________________
Research

• _______________ = manipulation of one _______________ under _______________ conditions so that resulting changes in another _______________ can be observed
  – Detection of _______________

• _______________ = variable manipulated

• _______________ = variable affected by manipulation
  – How does X affect Y?
  – X = _______________ Variable, and Y = _______________ Variable
Identifying IVs & DVs

• Which is the best method of treatment for depression: cognitive-behavioral therapy, drug treatment, or no treatment control?
• Is it better to “cram” for a test (massed practice) or better to “space-out” our studying (distributed practice) when trying to remember information for an exam?
• Does the number of people present affect the likelihood that someone will help another person in need?
• Is overall health influenced by one’s deepest thoughts, feelings, and attitudes about coming to college?
Quick Quiz

Professor Zappy wants to study the effects of shock on student learning. The dependent variable is:
A. Shock
B. Student learning
C. Professor Zappy
D. None of the above
Experimental and Control Groups: The Logic of the Scientific Method

- _______________ group
- _______________ group
  - _______________ assignment
  - Manipulate _______________ variable for one group only
  - Resulting differences in the two groups must be due to the independent variable
- _______________ and _______________ variables
Figure 2.4 The basic elements of an experiment

**Hypothesis:**
Anxiety increases desire to affiliate

Subjects randomly assigned to experimental and control groups

**Experimental group**
“Shocks will be very painful” (high anxiety)

**Control group**
“Shocks will be mild and painless” (low anxiety)

High-anxiety group indicated a desire to wait with others more than did low-anxiety group

**Conclusion:**
Anxiety does increase desire to affiliate
Experimental Designs: _______________

• Expose a ________________ group to two ________________ conditions
  – Reduces ________________ variables
• Manipulate more than one ________________ variable
  - Allows for study of interactions between variables
• Use more than one ________________ variable
  - Obtains a more complete picture of effect of the independent variable
Strengths and Weaknesses of Experimental Research

• ________________ :
  – conclusions about ________________ can be drawn

• ________________ :
  – ________________ nature of experiments
  – ________________ and ________________ issues
The Concept of Correlation

• _______________ of relationship
• _______________ of relationship
  – Correlation _______________
• Correlation and _______________
• Correlation and _______________
Figure 2.6 Positive and negative correlation

Positive correlation
High scores on X are associated with high scores on Y, and low scores on X are associated with low scores on Y.

Negative correlation
High scores on X are associated with low scores on Y, and low scores on X are associated with high scores on Y.
Correlation and Causation

• Correlation shows the strength of the _______________ between two variables.
  – A correlation between two variables does not imply that one variable _______________ the other.

• Correlation _______________ mean causation!
Correlation Coefficient

SAT Score

Positive Correlation

First Semester GPA

\( r = +.70 \)
Correlation Coefficient

Amount of alcohol consumed during finals week

First Semester GPA

r = -.60

Negative Correlation
Correlational Research

# Hours of Violent TV

# Hits at Recess
**Violent behavior and TV viewing**

Researchers at Columbia University and the New York State Psychiatric Institute tracked more than 700 boys and girls over 17 years. The following shows daily number of television viewing at mean age 14 and the percentage of aggressive acts then committed at mean age 16 or 22.

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Less than 1 hour</th>
<th>1 to 3 hours</th>
<th>3-plus hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ASSAULT OR PHYSICAL FIGHTS RESULTING IN INJURY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>8.9 %</td>
<td>27.5 %</td>
<td>41.7 %</td>
</tr>
<tr>
<td>Females</td>
<td>2.3 %</td>
<td>8.6 %</td>
<td>9.3 %</td>
</tr>
<tr>
<td>Total</td>
<td>5.7 %</td>
<td>18.4 %</td>
<td>25.3 %</td>
</tr>
<tr>
<td><strong>ROBBERY, THREATS TO INJURE ANOTHER OR WEAPON USED TO COMMIT CRIME</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>6.7 %</td>
<td>14.0 %</td>
<td>20.9 %</td>
</tr>
<tr>
<td>Females</td>
<td>0 %</td>
<td>4.8 %</td>
<td>8.5 %</td>
</tr>
<tr>
<td>Total</td>
<td>3.4 %</td>
<td>9.6 %</td>
<td>14.6 %</td>
</tr>
<tr>
<td><strong>ANY AGGRESSIVE ACT AGAINST OTHERS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>8.9 %</td>
<td>32.5 %</td>
<td>45.2 %</td>
</tr>
<tr>
<td>Females</td>
<td>2.3 %</td>
<td>11.8 %</td>
<td>12.7 %</td>
</tr>
<tr>
<td>Total</td>
<td>5.7 %</td>
<td>22.5 %</td>
<td>28.8 %</td>
</tr>
</tbody>
</table>

Source: Science Magazine
What was that study?

Table 4
Correlations between media habits and parental limits and outcomes (n = 399–586)

<table>
<thead>
<tr>
<th></th>
<th>Trait hostility</th>
<th>Arguments with teachers</th>
<th>Physical fights</th>
<th>Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amount variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of video game play</td>
<td>0.20***</td>
<td>0.12*</td>
<td>0.21***</td>
<td>-0.25***</td>
</tr>
<tr>
<td>Amount of time watching TV</td>
<td>0.20***</td>
<td>0.10*</td>
<td>0.12***</td>
<td>-0.20***</td>
</tr>
<tr>
<td>Amount of reading for pleasure</td>
<td>-0.08†</td>
<td>-0.17***</td>
<td>-0.07</td>
<td>0.07†</td>
</tr>
<tr>
<td><strong>Violent content variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Violent game exposure</td>
<td>0.21***</td>
<td>0.20***</td>
<td>0.32***</td>
<td>-0.23***</td>
</tr>
<tr>
<td>Preferred violence in video games</td>
<td>0.31***</td>
<td>0.25***</td>
<td>0.36***</td>
<td>-0.34***</td>
</tr>
<tr>
<td>Preferred violence compared to 2 or 3 years ago</td>
<td>0.23***</td>
<td>0.16**</td>
<td>0.19***</td>
<td>-0.14**</td>
</tr>
<tr>
<td>Parental involvement scale</td>
<td>-0.14**</td>
<td>-0.27***</td>
<td>-0.18***</td>
<td>0.27***</td>
</tr>
</tbody>
</table>

†p<0.09; *p<0.05; **p<0.01; ***p<0.001.
But yet…
Correlation and Causation
Correlations

• The perception of a relationship where
• Examples
  – Sugar makes children hyperactive
  – Getting cold & wet will make you sick
• Related to perception of _______________ in _______________
  – What are the odds of being dealt:
    • J (hearts), Q (hearts), A (hearts), K (hearts), 10 (hearts)
    • 9 (spades), 3 (diamonds), 5 (clubs), 8 (clubs), 6 (hearts)
• One reason why we can’t rely on anecdotal evidence!
Methods

- Methods used when a researcher cannot __________ the variables under study
- __________ observation
- __________
- __________
- __________

- Allow researchers to describe patterns of behavior and discover links or associations between variables but __________ causation
<table>
<thead>
<tr>
<th>Research method</th>
<th>Description</th>
<th>Example</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experiment</strong></td>
<td>Manipulation of an independent variable under carefully controlled conditions to see whether any changes occur in a dependent variable</td>
<td>Youngsters are randomly assigned to watch a violent or nonviolent film, and their aggression is measured in a laboratory situation</td>
<td>Precise control over variables; ability to draw conclusions about cause-and-effect relationships</td>
<td>Contrived situations often artificial; ethical concerns and practical realities preclude experiments on many important questions</td>
</tr>
<tr>
<td><strong>Naturalistic observation</strong></td>
<td>Careful, usually prolonged observation of behavior without direct intervention</td>
<td>Youngsters’ spontaneous acts of aggression during recreational activities are observed unobtrusively and recorded</td>
<td>Minimizes artificiality; can be good place to start when little is known about phenomena under study</td>
<td>Often difficult to remain unobtrusive; can’t explain why certain patterns of behavior were observed</td>
</tr>
<tr>
<td><strong>Case studies</strong></td>
<td>In-depth investigation of a single participant using direct interview, direct observation, and other data collection techniques</td>
<td>Detailed case histories are worked up for youngsters referred to counselling because of excessive aggressive behavior</td>
<td>Well-suited for study of certain phenomena; can provide compelling illustrations to support a theory</td>
<td>Subjectivity makes it easy to see what one expects to see based on one’s theoretical slant; clinical samples often unrepresentative</td>
</tr>
<tr>
<td><strong>Surveys</strong></td>
<td>Use of questionnaires or interviews to gather information about specific aspects of participants’ behavior</td>
<td>Youngsters are given questionnaire that describes hypothetical scenarios and are asked about the likelihood of aggressive behavior</td>
<td>Can gather data on difficult-to-observe aspects of behavior; relatively easy to collect data from large samples</td>
<td>Self-report data often unreliable, due to intentional deception, social desirability bias, response sets, memory lapses, and wishful thinking</td>
</tr>
</tbody>
</table>
Evaluating Research: Methodological Pitfalls

• _______________ bias
• _______________ effects
• Distortions in _______________ data:
  – Social _______________ bias
  – _______________ set
• _______________ bias
  – the _______________ solution
Ethics of Research
The Ethics of Studying Humans

• ________________ consent.
• Freedom to ________________ at any time.
• Minimize ________________.
• Keep data ________________.
• If ________________ is necessary, debriefing must occur.
APA Ethical Guidelines for Research

1. A subject's participation in research should be voluntary and based on informed consent. Subjects should never be coerced into participating in research. They should be informed in advance about any aspects of the study that might be expected to influence their willingness to cooperate. Furthermore, they should be permitted to withdraw from a study at any time if they so desire.

2. Participants should not be exposed to harmful or dangerous research procedures. This guideline is intended to protect subjects from psychological as well as physical harm. Thus, even stressful procedures that might cause emotional discomfort are largely prohibited. However, procedures that carry a modest risk of moderate mental discomfort may be acceptable.

3. If an investigation requires some deception of participants (about matters that do not involve risks), the researcher is required to explain and correct any misunderstandings as soon as possible. The deception must be disclosed to subjects in “debriefing” sessions as soon as it is practical to do so without compromising the goals of the study.

4. Subjects’ rights to privacy should never be violated. Information about a subject that might be acquired during a study must be treated as highly confidential and should never be made available to others without the consent of the participant.

5. Harmful or painful procedures imposed upon animals must be thoroughly justified in terms of the knowledge to be gained from the study. Furthermore, laboratory animals are entitled to decent living conditions that are spelled out in detailed rules that relate to their housing, cleaning, feeding, and so forth.

6. Prior to conducting studies, approval should be obtained from host institutions and their research review committees. Research results should be reported fully and accurately, and raw data should be promptly shared with other professionals who seek to verify substantive claims. Retractions should be made if significant errors are found in a study subsequent to its publication.
The Ethics of Studying

• _______________ have always been used in a small percentage of psychological studies.
  – To conduct basic research on particular species.
  – To discover practical _______________.
  – To study issues that cannot be studied experimentally with _______________.
  – To clarify ________________ questions.
  – To improve ________________.
Ethics of Studying ________________

- IACUC
  - ________________
  - Reviews all procedures to be conducted with animals
  - Must use the “______________” animal species possible
    - Cell cultures
    - ________________
    - ________________
      - Rodents & birds
      - Larger mammals (dogs & cats → apes)
Ethics in Psychological Research: Do the Ends Justify the Means?

• The question of ________________
• The question of ________________
  – Controversy among psychologists and the public
• Ethical standards for research: the American Psychological Association
  – Ensures both human and animal subjects are treated with dignity