Clinical Research Methods

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Tonight's topic: What is reality?

I think reality is just a good guess.
Research Principles

• Objectivity
• Tasks of Research
  – Hypothesis: “if-then”
  – Experimental Group
  – Control Group
• Group Differences
• Experimental Confounds
Research Principles

• Key Concepts Underlying Methodology
  – Parsimony
  – Plausible rival hypotheses
  – Conclusions
Lack of attention to multicultural issues in psychology

- Most psychological research involves European Americans
- Belief that culture contributes little to the understanding of basic processes
- "Color-blind" approach
Lack of attention to multicultural issues in psychology

- Factors that lead to the neglect of cultural variables
  - Lack of experience
  - Desire for parsimony
  - Fears of stereotyping others
  - Ethnocentric bias
  - Equating diversity with elitism
Unity/Disunity of Psychology

• Is psychology a single field that can encompass subfields? (Kimble, 1989)

• What are commonalities across subfields?
  – Sciences of behavior
  – Genetic and environmental influences
  – Concepts are observable and analyzable
  – Laws are idiographic and nomothetic

• Is psychology splintering into various incompatible subfields?
Unified Psychology
(Sternberg & Grigorenko, 2001)

• Unified psychology – the multiparadigmatic, multidisciplinary, and integrated study of psychological phenomena through converging operations
Bad Habits
(Sternberg & Grigorenko, 2001)

• Exclusive or almost exclusive reliance on a single methodology (e.g., response-time, fMRI)
  – Rather than multiple converging methodologies for studying psychological phenomena

• Identification of scholars in psychology in terms of psychological subdisciplines (e.g., social, clinical, developmental)
  – Rather than in terms of the psychological phenomena they study (e.g., emotion, aggression, cognition, culture)

• Adherence to single underlying paradigms for the investigation of psychological phenomena (e.g., behaviorism, cognitivism, psychoanalysis)
Hedgehogs and Foxes
(Sternberg & Grigorenko, 2001)

**Hedgehogs** try to relate everything to a single system
- “The fox knows many things, but the hedgehog knows one big thing” - Archilocus

**Foxes** pursue many different paths without trying to fit them together
- Foxes who think they are hedgehogs
Is Disunity in Psychology a Sign of Psychology’s Health? (McNally, 1992)
Unified Psychology
(Sternberg & Grigorenko, 2001)

- Converging operations
  - Use of multiple methodologies for studying a single psychological phenomenon or problem

- Why do psychologists rely largely or exclusively on a single method?
  - Training
  - Panaceas
  - Norms
Reasons to Change (Sternberg & Grigorenko, 2001)

- The field could be organized better to understand psychological phenomena
- Organizing by subfields can isolate individuals who study the same phenomena
- The current organization may create false oppositions between individuals or groups studying phenomena from different vantage points
Reasons to Change (Sternberg & Grigorenko, 2001)

• The current system tends to marginalize psychological phenomena that fall outside the boundaries of a specific field (e.g., emotion, culture)

• Research may tilt toward issues to which a limited set of tools may be applied

• The current system can discourage new ways of studying problems
Reasons to Change
(Sternberg & Grigorenko, 2001)

• Aspects of phenomena may be confused with the phenomena as a whole
  – IQ test or brain function = intelligence
  – Membership in an ethnic group = culture
Internal Validity

- The degree to which your design tests what it was intended to test.

- In an experiment, *internal validity* means showing that variation in the dependent variable is caused only by variation in the independent variable.

- In correlational research, *internal validity* means that changes in the value of the criterion variable are solely due to changes in the value of the predictor variable.
Threats to Internal Validity

Sampling
Selection bias
Attrition
% Dropout After One Therapy Session (Sue et al., 1991)
Mean Number of Sessions in Therapy (Sue et al., 1991)
Threats to Internal Validity

Social context
- History – external events
- Maturation – internal events

Research context
- Familiarity
- Repeated assessments
- Treatment integrity
- Awareness of being in the control group
Threats to Internal Validity: Statistical regression

![Graph showing pretest and posttest scores for Beck Depression Inventory for Control and Experimental groups. The graph illustrates a decrease in depression scores from pretest to posttest for both groups, with a steeper decrease in the Experimental group compared to the Control group.](image)
External Validity

• The degree to which results generalize beyond your sample and research setting
• Increasing internal validity may decrease external validity, and vice versa
• Internal validity may be more important in basic research, external validity in applied research
  – Efficacy vs. effectiveness research
Threats to External Validity

Threats to external validity
- Sample characteristics
- Stimulus, setting characteristics
- Reactivity to experiment
- Test sensitization
- Timing of measurement

Internal vs. external validity (Sue, 1999)
Construct Validity – Causal basis of an effect

Construct = interpretation or explanation
e.g., CBT reduces depression

Threats to construct validity
Attention and contact with clients
Therapist characteristics
Experimenter expectancies
Participant expectancies
Statistical Conclusion Validity

- Accurate quantitative evaluation
- Error
  - Type I (alpha bias)
  - Type II (beta bias)
Statistical Errors

<table>
<thead>
<tr>
<th>True State of Affairs</th>
<th>H₀ True</th>
<th>H₀ False</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decision</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reject H₀</td>
<td>Type I Error</td>
<td>Correct Decision</td>
</tr>
<tr>
<td>Do Not Reject H₀</td>
<td>Correct Decision</td>
<td>Type II Error</td>
</tr>
</tbody>
</table>
Statistical Conclusion Validity

• Statistical power
  – Likelihood of detecting differences between conditions when differences actually exist
  – Larger $N =$ Greater power
    • Large N may produce statistically significant differences that are trivial
Statistical Conclusion Validity

- Effect size = \( \frac{m1 - m2}{SD} \)
- Effect size from a correlational perspective (Cohen, 1992)
  - \( r = .1 \) = small effect size
  - \( r = .3 \) = medium effect size
  - \( r = .5 \) = large effect size
Statistical Conclusion Validity

Threats to statistical conclusion validity

- Variability in the procedures
- Participant heterogeneity
- Unreliability of measures
- Multiple comparisons and error rates
  - The more tests performed, the more likely a chance difference will be found (Type I error)
Methodology Case Study
Asian American Client Beliefs: Biological Etiology
Asian American Client Beliefs: Biological Etiology

- Asian traditions – Mind and body as unitary
- Somatization (Takeuchi et al., 1998)
  - Among Chinese Americans: 6.4% neurasthenia, 6.9% major depression
- Somatization not associated with acculturation
- Biological/medical solution maybe viewed as appropriate
Asian American Client Beliefs: Environmental Etiology
Asian American Client Beliefs: Environmental Etiology

- Failure to fit into the social environment is viewed as the cause of problems
- Solution in the social environment may be viewed as appropriate
  - Wisdom of elders as a solution to problems
- Directiveness and structure may be valued
  - Asian Americans view cognitive therapy as a credible treatment for depression (Wong et al., 2003)
  - Not a function of acculturation
Cognitive-Behavioral Therapy

• Treatment that has much empirical support
• Model:

Stress → Dysfunctional Beliefs → Depression
Methodology Case Study

• Hypothesis
  – Matching patient etiological beliefs with relevant treatments will result in better outcomes than situations in which patient etiological beliefs and treatments are mismatched
Methodology Case Study

• Depressed Asian Americans recruited from:
  – Outpatient community mental health centers
  – Newspaper, radio, TV announcements
  – Referrals from physicians
  – Mental health services providers
Methodology Case Study

• 180 Asian Americans who are depressed and have strong beliefs that depression is caused by: (1) biological factors; or (2) social factors are randomly assigned to:
  – 12 weeks of pharmacotherapy (Prozac)
  – 12 weeks of cognitive-behavioral therapy
Methodology Case Study

• Methodological issues
  – Attrition
    • All therapists are Asian Americans
    • Patients paid $10 per completed session
  – Control groups
    • Should there be a non-Asian control group?
    • Should there be a no treatment control group?
Dependent Measure: Beck Depression Inventory

- 0 I do not feel sad.
- 1 I feel sad.
- 2 I am sad all the time and can’t snap out of it.
- 3 I am so sad or unhappy that I can’t stand it.
Dependent Measure: Beck Depression Inventory

• 0  I don’t feel I am worse than anybody else.
• 1  I am critical of myself for my weaknesses or mistakes.
• 2  I blame myself all the time for my faults.
• 3  I blame myself for everything bad that happens.
Dependent Measure: Beck Depression Inventory

• 0 I don’t have any thoughts of killing myself.
• 1 I have thoughts of killing myself, but I would not carry them out.
• 2 I would like to kill myself.
• 3 I would kill myself if I had the chance.
Possible Results

- Match/Receive drug
- Mismatch/Receive CT
- Match/Receive CT
- Mismatch/Receive drug

BDI Depression

Pretreatment Posttreatment
Possible Results

BDI Depression

Pretreatment Posttreatment

- Match/Receive drug
- Mismatch/Receive CT
- Match/Receive CT
- Mismatch/Receive drug
Possible Results

Graph showing possible results for BDI Depression levels pre- and post-treatment for different conditions:

- Match/Receive drug
- Mismatch/Receive CT
- Match/Receive CT
- Mismatch/Receive drug

The graph indicates a downward trend in BDI Depression levels from pretreatment to posttreatment across all conditions.
Methodology Case Study

• If depressed participants who receive a treatment improve, can we conclude that treatment is effective?
• If etiological beliefs/treatment matches improve more than mismatches, can we conclude that match enhances treatment effectiveness?
The Goals of Psychological Science:

1. **Description** of behavior and of the mind
2. **Prediction** of behavior and thought
3. **Explanation** or formulation of models of the mind

**Scientific theory:** A set of statements that *summarizes and organizes* existing information about some phenomenon, *provides an explanation* for the phenomenon, and serves as a basis for *making predictions* to be *tested empirically*. 
Characteristics of a Good Theory

• **Ability to Account for Data**
  – Theory must account for existing data and well-established facts within its domain

• **Explanatory Relevance**
  – Theoretical explanation must offer good grounds for believing that the phenomenon would occur under specified conditions

• **Testability**
  – A theory must be capable of being put to empirical test
Characteristics of a Good Theory

- **Prediction of Novel Events**
  - A theory should predict phenomena the theory was not specifically designed to account for, but which are within its domain

- **Parsimony**
  - A theory should explain phenomena within its domain with the fewest possible assumptions
Cognitive Theory of Depression

Stress $\rightarrow$ Dysfunctional Beliefs $\rightarrow$ Depression
Ethnic Identity as a Buffer Against Discrimination

- Ethnic Identity
  - Discrimination
  - Stress
Homework: Develop with a partner a theory of some aspect of human behavior