EXPERIMENTAL AND NON-EXPERIMENTAL RESEARCH IN BEHAVIORAL SCIENCES: IMPLICATIONS FOR PRACTICE

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Research designs are a structure of temporal-spatial arrangements within which the selected variables are controlled, manipulated, and measured (Hegde, 2003).

Research designs help reveal relationships between and among variables:

- Independent: not related
- Cause-effect relationships
- Correlative relationships
- Interactive relationships: multiple variables combine together to produce an effect; the total outcome is typically greater than the mere additive effects
NON-EXPERIMENTAL RESEARCH

- Lack of control over extraneous and/or assigned independent variables (IVs)
- Independent variables are not introduced, withdrawn, or manipulated
- Relationship between cause and effect cannot be established
EX-POST FACTO RESEARCH

THE PEOPLE OF KRATOVILA HAVE LOW RATES OF CANCER. IT MUST BE ALL THE SARSAPARILLA THEY DRINK...

...UNLESS IT’S ALL THE PICKLES THEY EAT...

...UNLESS IT’S THE MAYONNAISE THEY PUT ON THE PICKLES...

...UNLESS IT’S THE CHOCOLATE THEY DIP THE PICKLES IN...

...UNLESS IT’S THE COCOA BEANS THE CHOCOLATE COMES FROM...

...UNLESS IT’S...
EX-POST FACTO

- Ex-Post Facto Research (after the fact, “retrospective search”)
  - Independent variables have occurred in the past - one is studying the dependent variable (DV)
  - Unable to deduce cause-effect relationships because independent variables cannot be manipulated
  - Case history method
EX-POST FACTO

- Weaknesses
  - It is not experimental because IVs are not manipulated
  - Lacks control because extraneous IVs are not ruled out (internal validity concerns)
  - Cannot support theory
  - Statistical correlations
EX-POST FACTO

Advantages

- Uncovers important variables
- Exploratory science
- Social vs. scientific viewpoint
NORMATIVE RESEARCH

FOR A FAIR SELECTION EVERYBODY HAS TO TAKE THE SAME EXAM! PLEASE CLIMB THAT TREE.
NORMATIVE RESEARCH

- Also called developmental or descriptive research
- Distribution of selected dependent variables across different age groups is observed and recorded
- Helps differentiate typical from atypical (standardized tests)
- Helps guide clinical intervention
- Not able to manipulate Independent variables and thus cannot draw cause-effect relationship
NORMATIVE RESEARCH

How to conduct:

- Identify population
- Draw a representative sample (i.e., all participants have an equal chance of participating in this study)
- Sample the behavior of selected participants
- Generalize results to the population
NORMATIVE RESEARCH

- Weaknesses
  - Difficulty obtaining true random samples
  - Inadequate (brief) sampling of responses
  - Does not support a theory

- Two Types
  - Cross Sectional research
  - Longitudinal research
STANDARD-GROUP COMPARISONS

AND SOMETIMES, THAT EXPLANATION IS SCIENCE FICTION.
STANDARD-GROUP COMPARISON

- Extension of normative research
- Groups are formed on the basis of one DV and are then compared on the basis of the same or another DV
- Two strategies to perform Standard-Group Comparison:
  1. Criterion and comparison measures are the same
  2. Criterion and comparison measures are different
STANDARD-GROUP COMPARISON

▶ **Strengths:**
  ▶ Can describe differences
  ▶ Helps distinguish clinical groups

▶ **Weaknesses:**
  ▶ Cannot assign cause/effect relationships
  ▶ Cannot manipulate IV

▶ **Cohort Studies and Case-control studies are variations of Standard-group comparison research**
SURVEY RESEARCH

- Assess some features of a group of people or a particular society
- Distribution of DV in the population is determined (+ or -) 4-6% range of error
- Error rate depends upon the representative nature of the sample
- Real thoughts and actions may not be the same as opinions and attitudes
“Well, I guess we’re the control group.”
EXPERIMENTAL RESEARCH

- Controlled arrangement in which one or more IVs are manipulated and the effects of such manipulation on the DVs are measured
  - Can isolate cause/effect relationship (seeks to explain an event by discovering its causal variables)
  - Control-can rule out competing hypothesis
  - Can explain phenomena and support theories
EXPERIMENTAL RESEARCH

- Two varieties: Basic and Applied Research
  - **Clinical**: used to describe research that is in some way connected with diseases and disorders; research aimed at understanding and treating various disorders of communication is clinical
  - **Applied**: non-clinical as in building better bridges or safer highways
Basic Research: Gives us insights to do applied research-very important
- Often theoretical
EXPERIMENTAL RESEARCH

- Two strategies to rule out extraneous variables
  - a) Group strategy
  - b) Single subject strategy
EXPERIMENTAL RESEARCH
-BETWEEN GROUP STRATEGY

- In group designs, you compare means and standard deviations of 2 or more groups on dependent variables of interest (e.g., randomized control trials)
- Use inferential statistics to see if the differences across the groups are significant.
- Take the average performance and compare across groups, then determine if the groups are different.
EXPERIMENTAL RESEARCH
-BETWEEN GROUP STRATEGY

- **Randomization**: random selection and assignment

- **Matching**:
  - Matching pairs of participants
  - Equivalent frequency distribution-matched on a statistical basis
  - Groups are equal on assigned variables except on the IV that one is manipulated
EXPERIMENTAL RESEARCH
-BETWEEN GROUP STRATEGY

- Well controlled group designs have at least two groups (one control and one experimental)
- Majority of group designs measure pre/post test differences
- Group designs have inferential generality (sample to the population), not logical generality
EXPERIMENTAL RESEARCH
-BETWEEN GROUP STRATEGY

- Types of group designs:
  - Pre-Experimental Designs
  - True Experimental Designs
  - Quasi-experimental designs
  - Correlational Designs
TREATMENT RESEARCH

- **Uncontrolled treatment research** (e.g., case studies)
- **Controlled treatment research** - establish a cause/effect relationship between treatment technique and the DV (i.e., positive changes in the patients who receive it)
- **Directly replicated treatment research** - same investigators, original setting, different subjects (same methodology)
- **Systematically replicated treatment research** - other clinicians in other settings
EVIDENCE HIERARCHY

- Systematic reviews and meta analyses
- Randomised controlled trials
- Cohort studies
- Case-control studies
- Cross-sectional surveys
- Ecological studies
- Case series and case reports
- Ideas, editorials and opinions
“I can prove it or disprove it! What do you want me to do?”