I. INTRODUCTION
A. Experimental vs. Correlational research

- For the most part we have been discussing Experimental Designs

- Characteristics of experimental designs?
  - Experimental control over distribution of IV
  - Experimental control over EV
  - Control over initial differences between participants
    - Random assignment
    - Within subjects design

- The idea is to see if groups who are initially equal can be made to be different.

- Sometimes you cannot exert experimental control over initial differences
  - 1. You can study a certain group of people without comparison to others (Non-experimental research).
    - Only 1 level of an IV. How does a creative person work?
  - 2. Compare groups who had different experiences but can’t be sure that they were initially the same (Quasi-experimental research)
    - Kids who go or do not go to day care

- 3. Compare groups who initially differ and see whether their initial difference is also differentially associated with other characteristics (Correlational Research)
  - Do creative people differ from non creative people?

- 4. Assess developmental changes in a group of people (Developmental designs)
  - Are there developmental changes in creativity?
I. INTRODUCTION
   B. Creative Inferencing and Beyond
   - Because such research designs lack control, drawing conclusions from data require creative inferences.
   - There are assumptions that allow you to draw conclusions.
     * Most of the assumptions bear on triangulating on a defensible claim.
     * Comparing results of different studies
     * Strong argumentation dismissing other factors.
   - Consider how you would test the value of a Weber State University education?

II Designs
   A. Non-experimental
   2. Archival Research
   - Sometimes you want to examine behavior which has been expressed, but obviously you can not control the conditions under which it was produced.
   - 1. Case History
     * Case studies: A single subject provided a basis for demonstrating psychoanalytic theory.
     * Freud used case studies as a primary form of evidence
     * T1 \( \rightarrow \) D.
     * But Perhaps T2 \( \rightarrow \) D.
   - 3. Content Analysis
     * Sometimes you might want to analyze the artifacts (written or spoken record) of a person after the fact.
     * Research on gender and language is an example.
     * The coding of the artifacts must be:
       1. Objective (rules for analysis)
       2. Systematic (included all relevant information)
       3. Generality (your results should fit within a theoretical model which allows for its generality)
II Designs
A. Non-experimental

4. Limits of Non-experimental Research
- These designs are all non experimental because there may be no comparison groups at all.
- As there is no comparison group, there is no experimental control
- As a result no causal inferences can be made from data in any of these design.

II Designs
B. Observational

Quantifying behavior: We can code behavior (time working on a project) in three ways
- Frequency: Code particular types of behavior for how frequently they occur.
  - Frequency of look away behavior. (frequency)
- Duration: Code the length of time a behavior lasts.
  - Time on task. (temporal measure)
- Intervals: You sample specific behaviors in discrete time periods.
  - Time spent working on a topic, in each 10 sec. interval (rate = frequency/intervals)

In another style of research you can examine ongoing behavior by observing it.
- Observation is a research technique which can be used with experimental or non-experimental designs.
- BEHAVIORAL CATEGORIES are developed by which the “behavioral stream” is coded.
- The behavioral categories tells you what to code and how to code it.

An alternative is to analyze behavioral sequences which examines behavioral interactions between people
- Interactions between child and teacher
- Parent-child interactions in assessing the growth of pragmatics.
- Better to record behavioral sequences than just isolated behavioral events
II Designs
B. Observational

- Once you decide what behavior to sample, you have to decide how to sample the behavior
- To do so you must decide when to sample behavior
  - Time sampling: Observe group for a specific period of time. Observe/Record. Good for continuous behavior.
  - Individual sampling: Observe particular individual (study whole context of behavior)
  - Event sampling: Observe only a particular behavior of interest

II Designs
B. Observational

- Observational Techniques
  - Naturalistic observation
    - Non-participant observers assess participants in their natural context.
    - Used in in many different research contexts
      - Child and Family
      - Psychology
      - Biology: Ethology
  - Unobtrusive observations: Observations which do not alter the behavior in the natural context.
  - Techniques to promote unobtrusive observations:
    - Video
    - One-way mirrors.
    - Habituating participants to observers

II Designs
B. Observational

- Ethnography and Participant Observation
  - The observer becomes part of the natural environment to better record behavior:
  - The researcher can be “Surreptitious Participant” who is “under cover”
  - Studies of ‘high school” by researchers who went under cover. My be ethically questionable
  - The researcher can be “Non-surreptitious participant” by making clear her role.
    - Anthropologist
    - Ethologist: Jane Goodall.
II Designs
B. Observational

3. Sociometric Techniques
Sociometric techniques are used to study interpersonal relations within a group.
- One technique is to assess friendship patterns: List two people you want (do not want) to play with.

4. Reliability Issues
Reliability: Does the measurement device produce similar results when repeated measurements are made under identical conditions.
- A measurement is reliable if it is consistent measurements stay the same across experimenters and/or over time.
- Reliability over raters or over time

Multiple Observers: Measure inter-rater reliability:

1. Percentage agreement: What percentage of time did raters agree?

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Agreements/observation x 100 = 80%

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Agreements/observation x 100 = 98%
II Designs
B. Observational

2. **Cohen Kappa**: What percentage of time did raters agree, independent of the likelihood of chance agreement

\[
K = \frac{P(o) - P(c)}{1 - P(c)}
\]

- \( P(o) \) = proportion of actual agreement = .8
- \( P(c) \) = chance proportion of actual agreement = .58

\[
S1 \quad P(c) = \text{Chance proportion of actual agreement} = .58
\]

\[
K = (0.8 - 0.58)/(1 - 0.58) = .22/.42 = .52
\]

3. **Pearson Correlation**: Assess reliability by computing correlation between two observers.

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The \( r^2 = 1.00 \), which seems problematic as there is no agreement!

- Very weak method

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II Designs
B. Observational

- At least for inter-rater reliability there seems to be a ordering of techniques:
  1. Most conservative: Cohen’s Kappa
  2. Inter-rater Reliability
  3. Least conservative: Person Correlation

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II Designs
B. Observational

- **Extraneous Variables**
  - Observer bias:
    - observations are influenced by knowledge of hypothesis
    - Keep the observer masked or blind to the hypothesis
  - Interpretation vs. observation
    - Describing behavior without making reference to intentions is difficult
II Designs

C. Exerting quasi-experimental control

- In many studies, there seems to be experimental control but there really is not.
  - The effects of daycare: No random assignment of subject to groups
  - Rather, there is a subject assignment to treatment even if those on waiting lists are used.
- Quasi-experimental designs are ones which seem like experimental designs since there appears to be experimental control over distribution of IV.

II Designs

C. Exerting quasi-experimental control

1. Time Series
   O1 O2 Treatment O3 O4
   - The treatment can be assessed by the difference in scores at O1 and O2 compared to O3 and O4. But without a control group, it is hard to make valid conclusions.

2. Interrupted time series
   O1 O2 Treatment O3 O4
   - Where treatment is a natural occurrence (like an earthquake)

III Designs

D. Developmental Designs

Assumptions of Developmental Designs

- Usually developmental research involves comparisons between children of different ages on some DV.
- What kind of IV is age?
- True IV?
  - No, age is not manipulated and there is no random assignment of subjects to groups.
  - Anyway age does not cause change in behavior.
  - Age indexes an interrelated set biological, social, cognitive variables
Age Comparisons as a subject IV

- But is age a subject IV— a characteristic or trait that varies consistently across subjects?
- Age is a special type of subject IV. Compare Age and Sex.
  - Similarity: Properties of participants which are associated with other variables.
  - Difference: Only with age do you assume that variable level 1 has been will be the same as participants in variable level 2.

Age comparison involves examining INTRA-INDIVIDUAL CHANGES rather than INTER-INDIVIDUAL DIFFERENCES

- Intra-individual Changes: Changes within a person
- Inter-individual Differences: Differences between people.

Age-comparisons are neither:
- causal relations between a true IV (age) and a DV
- correlations between a stable subject variable IV (age) and DV.

Make two assumptions

- Assume that subjects of older age has had characteristics of younger subjects
- Assume that subjects of younger age will have characteristics of older subjects and vise-versa.
  - What is interesting about differences between 3- and 7-year-olds is that the 3s will look like the 7s in 4 years and 4 years ago, the 7 looked like the 3s.
  - NO SUCH ASSUMPTION WITH SEX: Females will never assumed to look like males and males never assumed to look like females.
II Designs
D. Developmental Designs

- **B. Longitudinal Design:** Comparison of the same participants over time

- **Problems**
  1. Repeated testing
  2. Changing instrumentation or fidelity over time
  3. Reactivity of being in a study
  4. Selective mortality
  5. Confounded w/ time of testing: Dangers in generalizing to those in other epochs.

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