

Experimental Research Designs

Chapter 9, pt 2



Quasi-Experimental Designs

- Types
- Non-equivalent pretest-posttest, experimental control groups
 - A O X O
 - B O O
- Non-equivalent pretest-posttest, multiple treatment groups
 - A O X1 O
 - B O X2 O
- Useful when participants are in pre-existing groups (e.g., classes, schools, teams, etc.)



Quasi-Experimental Designs

- Threats to internal validity
 - Selection is the major concern
 - Controls for statistical regression
 - Likely to control for most other threats provided the groups are not significantly different from one another
 - See Table 9.3 for specific threats related to each design



True Experimental Designs

- Important terminology
- Random assignment
 - Participants are placed into groups using a random procedure
 - This ensures equivalency of the groups
- Random selection of subjects
 - Participants are chosen from a population using random procedures
 - This ensures generalizability to the population from which the participants were selected (i.e., external validity)



True Experimental Designs

- Types
- Randomized posttest only experimental control groups
 - R A X O
 - R B O
- Randomized posttest only multiple treatment groups
 - R A X1 O
 - R B X2 O
- Randomized pretest-posttest experimental control groups
 - R A O X O
 - R B O O



True Experimental Designs

- Types (continued)
 - Randomized pretest-posttest multiple treatment groups
 - R A O X1 O
 - R B O X2 O
- Threats to internal validity
 - Controls for selection, maturation, and statistical regression
 - Likely to control for most other threats
 - See Table 9.3 for specific threats related to each design



Factorial Designs

- Research designs containing two or more independent variables
- A study of the effects of two instructional strategies on male and female students' math achievement
- A study of two counseling approaches on middle and secondary students' self-esteem



Factorial Designs

- Types of effects
- Main effects
 - There is a main effect for each independent variable
 - A study of the effects of two instructional strategies on male and female students' math achievement
 - There is one main effect for instructional strategy and one main effect for gender
 - A study of two counseling approaches on middle and secondary students' self-esteem
 - There is one main effect for counseling approach and one main effect for school level



Factorial Designs

- Types of effects (continued)
- Interaction effect
 - A different effect for the level of the first independent variable across the levels of the second independent variable
 - A study of the effects of two instructional strategies on male and female students' math achievement
 - The first instructional strategy could be effective for males but not females, whereas the second instructional strategy could be effective for females but not males



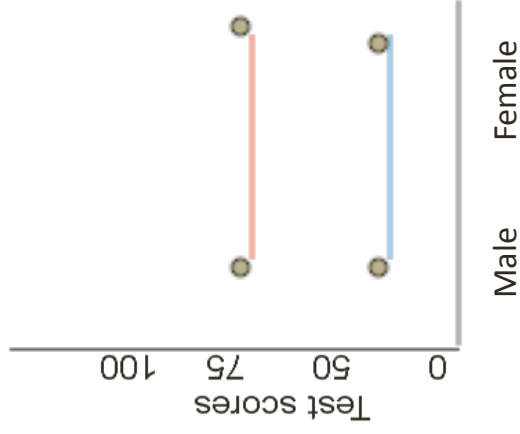
Factorial Designs

- Interaction effect (continued)
- A study of two counseling approaches on middle and secondary students' self-esteem
- The first counseling approach could be effective for secondary students but not so for middle school students, while the second strategy could be effective for middle school students but not so for secondary students
- In both examples one cannot state the effectiveness of the instructional strategy or counseling method without qualifying it relative to the gender or school level respectively

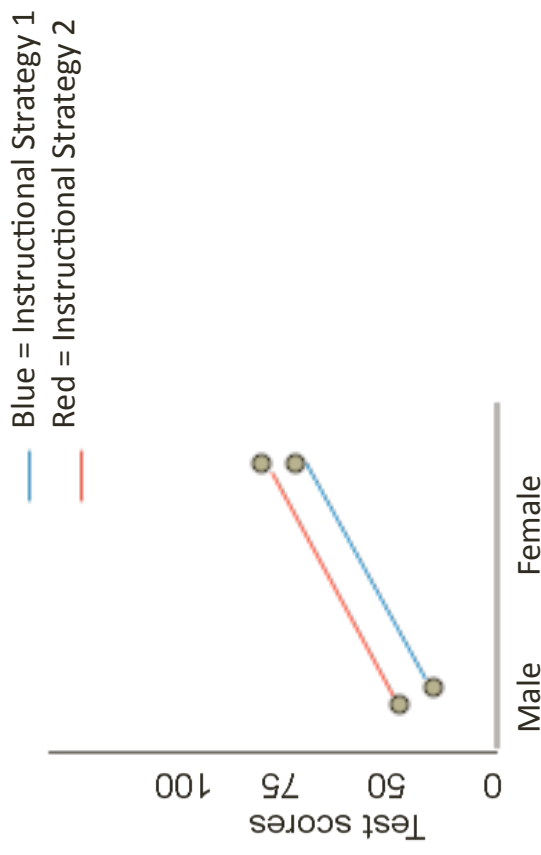


Factorial Diagrams - Main Effect

Two instructional strategies on male and female students' math



Main effect for instructional strategy – Strategy 2 better for both males and females

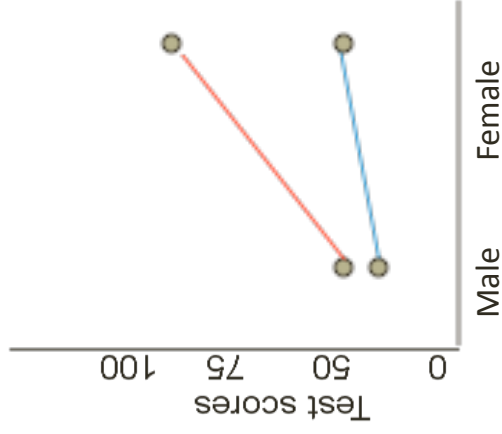


Main effect for gender – both strategies better for females

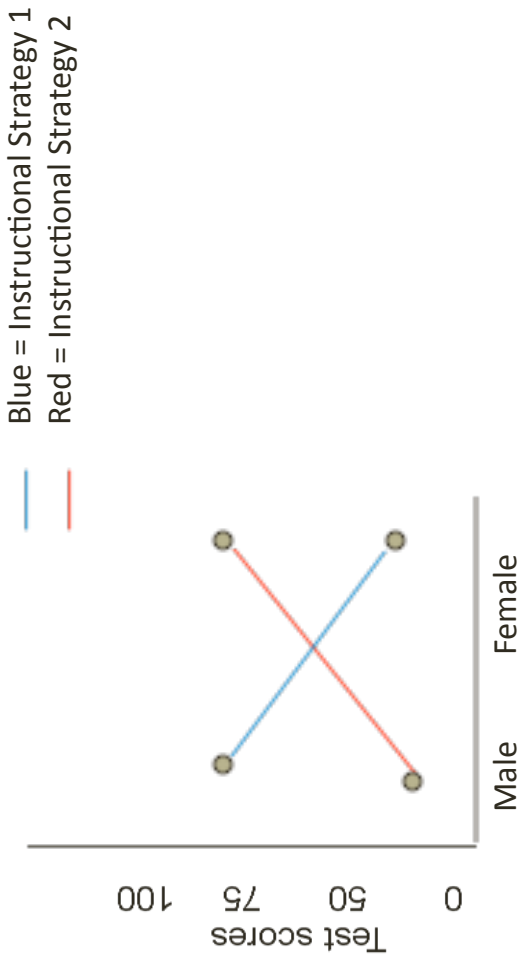


Interaction Effects

Two instructional strategies on male and female students' math



Interaction effect – one strategy (#2) is better for one gender (female)



Interaction effect – one strategy is better for females while one strategy (#2) is better for males (#1)



Single Subject Designs

- AKA single case designs
- Designs in which the effect of an experimental treatment is studied for one participant
 - Repeated measurement of the dependent variable before, during, and after implementing treatment
 - Not restricted to one (1) participant, but rarely involves more than three (3) participants
 - Need at least 3 replications across participants, materials, settings
- Used extensively in studies involving exceptional children or counseling



Single Subject Designs

- Characteristics
 - Reliable measurement
 - Repeated measurement
 - Clear description of the conditions
 - Baseline and treatment conditions
 - One variable investigated
- Notation
 - **A** indicates a baseline condition without treatment
 - **B** indicates a treatment condition



Single Subject Designs

- Two specific designs

- **A B A**

- Multiple observations are made during initial baseline time frame; multiple observations during treatment implementation time frame; treatment withdrawn and multiple observations during the second baseline time frame

- Variations on this design include **A B A B** (i.e., including a second treatment phase)

- Limitations

- Limited statistical analysis of the data (visual, PNDs)

- New Method involving regression analysis of trend line being investigated by IES (Institute for Educational Sciences)

- Interpretation of specific outcomes (e.g., a lasting effect of treatment that does not diminish in the second baseline observations)



Single Subject Designs

- Two specific designs (continued)
 - Variation of ABA design is called Alternating Treatment
 - Instead of withdrawal of a treatment, implement a second or third treatment noted as **A B C**...
 - Multiple baseline designs
 - Extension of the **A B A** design to include more than one subject, behavior, or setting in a staggered fashion
 - These designs enhance the generalizability of the results



Description of Example of Single Subject Chart

- See pdf example of single subject graph
- Staggered baseline with 3 phases & 3 students
 - Jason & Cary have extra baseline points while Yuri receives treatment
- Line separates Phases
 - baseline from intervention from maintenance
- Compare baseline to intervention
 - Level where do the points fall on the scale?
 - Trend is the data going up, down?

