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# **Week 13 Lecture - Quasi-experiments & Small-n Designs**

Undergraduate Research Methods in Psychology

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# 1 Learning Objectives

## 1.1 Textbook Objectives

- Articulate how quasi-experiments differ from true experiments.
- Use the design and results of quasi-experiments to evaluate the support they provide for causal claims.
- Explain the major differences between small-N designs and large-N designs.
- Use the design and results of small-N experiments to evaluate the support they provide for causal claims.

## 1.2 Professor's Objectives

- Understand the natural limitations and appropriate situations for quasi-experiments and small-n designs

# 2 Chapter Overview

## 2.1 Chapter Overview

- For practical and \_\_\_\_\_ reasons, we may find our hypotheses to be difficult to investigate causal relationships with experiments and large-scale studies
- But, we may still want to establish \_\_\_\_\_ validity in our relationships and/or still present results among small groups of individuals
- In this scenario we will fall back on other methods, which we call \_\_\_\_\_ - experimental and small-n designs
  - You can think of these as the \_\_\_\_\_ designs for when we have especially limited resources or difficulty in manipulating a variable

# 3 Quasi-Experiments

- Unlike with \_\_\_\_\_ experiments, like we've discussed so far, quasi-experiments do not have full control of the IV
    - E.g., assignment to different classrooms or different school programs by administrators, not researchers
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- Because we lack control, it is better to refer to these as quasi-\_\_\_\_\_ variables.

### 3.1 Types

#### Non-equivalent Control Group Posttest-only Design

- Similar to our previous \_\_\_\_\_ groups posttest-only design, this design will have a control group and a treatment group, both measured on an outcome
- However, they are still only tested \_\_\_\_\_ the “intervention” occurs
- In the “Quasi” version, the researchers \_\_\_\_\_ have the ability to randomly assign who goes in the experimental or control groups

#### Non-equivalent Control Group Pretest/Posttest Design

- Largely an \_\_\_\_\_ of above, this follow the same procedures as the previous design, but now includes measurements before and after the intervention.

#### Interrupted Time-series Design

- This is when we are \_\_\_\_\_ some variable for a period of time, and then it's measurement is “interrupted” by some clear event

#### Non-equivalent Control Group Interrupted Time Series Design

- A \_\_\_\_\_ of the time series and non-equivalent control group designs, where we have both comparison groups and also a historical event that interrupts some variable measured over time.

### 3.2 Internal Validity

- Just like with true experiments, these designs are similarly affected by threats to internal validity
    - E.g., \_\_\_\_\_, selection, order, attrition, etc.
  - We can still make \_\_\_\_\_ to control for these possibilities, *but* we should be cautious on how the “quasi-” part of these studies are cause for concern
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- Thankfully, the \_\_\_\_\_ for many of these are similar to their non-quasi counterparts!

### **Selection Effects**

- Recall that a selection effect occurs if there is \_\_\_\_\_ variability in one condition of the IV.
- This can be especially \_\_\_\_\_ to account for, because of the general lack of random assignment - which is largely how we prevent these effects normally
- Solution:
  - Carefully monitor and consider \_\_\_\_\_ differences between groups
  - Use a pretest/posttest design to see different \_\_\_\_\_ points and trends over time
  - Compare \_\_\_\_\_ groups on demographic characteristics
  - Plan a \_\_\_\_\_-list design, where treatment times are staggered

### **Design Confound**

- Similar to above, but this is when there is some systematic variation that occurs at the \_\_\_\_\_ time as the change in condition.
- Solution:
  - Same as above

### **Maturation Effects**

- Like as with the “normal” maturation effects, we can account for this by observing comparison groups and using a pretest/posttest design.

### **History Effect**

- First thing to consider is whether a history effect cause systematic variability in only one \_\_\_\_\_.
  - Solution:
    - Still using comparison groups and pretest/posttest!
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## Regression to the Mean

- Surprise, surprise, this is still the same \_\_\_\_\_ as discussed before
- Solution:
  - Still using comparison groups and pretest/posttest!

## Attrition

- Be mindful to check for attrition effects across \_\_\_\_\_ variables and IV conditions.

## Testing & Instrumentation

- Largely, just ensure construct validity and use parallel forms to prevent practice effects.

## Observer Bias, Demand Characteristics, & Placebo Effects

- Observer bias is only present if we use \_\_\_\_\_ measures
- \_\_\_\_\_ characteristics will be minimized if participants are blinded and unaware of what “condition” they are in
- Placebo \_\_\_\_\_ are only a concern when we have a comparison group receiving an inert treatment, and can be nullified with a control group.

## 3.3 Priorities of Validity

### Real-world Opportunity

- Sometimes, societal change presents an interesting question for researchers, that wouldn't otherwise be possible on such a \_\_\_\_\_

### External Validity

- In some ways, these types of studies are more \_\_\_\_\_ and observe participants in a more natural environment, enhancing external validity.
  - But still watch out for sampling \_\_\_\_\_ !
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## Ethics

- Like with [Real-world Opportunity](#), quasi-experiments may be done on naturally occurring groups that wouldn't be ethical to \_\_\_\_\_.

## Construct and Statistical Validity

- Just like with previous studies, our construct validity is an analysis of how well our \_\_\_\_\_ variables are captured in the study
- Statistical validity is:
  - \_\_\_\_\_
  - Magnitude (effect size)
  - Precision (confidence intervals)

## 3.4 With Correlational Studies

- The primary \_\_\_\_\_ between the correlational and quasi-experimental studies is intentions
- Quasi-experiments usually are looking at a specified separate groups or specific \_\_\_\_\_ event, whereas correlational studies deal more with just casting a wider net and measuring naturally occurring phenomena.

## 3.5 Quasi-independent vs. Participant Variables

- Quasi-independent \_\_\_\_\_ are primarily those that change over a large portion of society or people
- Participant Variable are personal characteristics, such as age, gender, race, etc.

# 4 Small-n

## 4.1 Overview

- Small-n designs are unique in their extremely small sample \_\_\_\_\_. Sometimes, it is just one person!
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- This is often due to our group of interest being naturally small, or an extreme time to each participant.
- The of small-n studies are often more concerned on individualized impact, which is a departure from the traditional probabilistic goals of most quantitative research.

## 4.2 Core Characteristics

- Each person is treated as an individual, rather than with others.
- Data is not (i.e., turned into a mean or median)
- Designs are used to closely monitor timing and to interventions.
- Often used in therapeutic or care settings

## 4.3 Types

- Small-n designs all share a relatively small sample size, but have different .

### Stable-baseline

- This is when a person or few people are held at a for sufficient time to observe an unchanging status on some outcome variable.
- This baseline period is then followed-up with some or change, and more measurements

### Multiple-baseline Design

- This design requires people, and necessitates staggering the timing of the intervention across the participants, to see if the timing alone is explanatory in the change.
  - It also helps in observing whether multiple participants see the same of behavior change
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## Reversal Design

- This is when a naturally undesirable \_\_\_\_\_ is allowed to occur at baseline, and then a therapy is applied to reduce it.
- Then, after sometime, the treatment is removed, and the \_\_\_\_\_ of the behavior is analyzed.

## Single-n

- This is a general category term that captures any study that looks at only one person over usually a \_\_\_\_\_ period of time.
  - It is common that multiple measurements for this person may be gathered \_\_\_\_\_ the study.
- This may sometimes be called a \_\_\_\_\_ study.

## 4.4 Balancing Priorities in Small-n

- These studies are naturally very limited in their ability to \_\_\_\_\_ to other situations and people, due to the uniqueness of the person under study.
- However, they tend to be useful in examining and describing \_\_\_\_\_ or unique cases that cannot be replicated - and some implication may inform directions in future research.

## 4.5 Disadvantages of Small-n

- Without comparison groups, we often open ourselves up to numerous internal validity \_\_\_\_\_.
  - E.g., \_\_\_\_\_ threats, regression threats, etc.
- External validity will tend to be naturally \_\_\_\_\_ as the cases are so specific to individual tendencies.
  - A single person can hardly be considered \_\_\_\_\_ of many people!

## 4.6 Assessing Validity in Small-n

- Internal validity can be reasonably \_\_\_\_\_, especially in the case of multiple baseline and reversal designs!
    - Like with any design, the central question to internal validity is whether there was \_\_\_\_\_ for possible confounds.
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- External validity is relatively weak, but may be \_\_\_\_\_ more with further, larger studies.
    - And not all \_\_\_\_\_ need to generalize!
    - E.g., a clinician working with only a few clients with a specific problem
  - Construct validity is assessed just like any study - with the use of \_\_\_\_\_ bias tools and observations.
    - I.e., look at the \_\_\_\_\_ statistics for tools, as well as authors' explanations and rationale
  - Statistical validity tends to often be more so graphical than truly statistical (because most \_\_\_\_\_ statistics require large groups).
    - E.g., our trusty friend, \_\_\_\_\_ plots!
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