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

Undergraduate Research Methods in Psychology

Quinton Quagliano, M.S., C.S.P

Department of Psychology

Table of Contents

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

- Because we lack control, it is better to refer to these as quasi-_____variables.

3.1 Types

3.1.1 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

3.1.2 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.

3.1.3 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

3.1.4 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

- Thankfully, the _____ for many of these are similar to their non-quasi counterparts!

3.2.1 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

3.2.2 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

3.2.3 Maturation Effects

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

3.2.4 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!

3.2.5 Regression to the Mean

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

3.2.6 Attrition

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

3.2.7 Testing & Instrumentation

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

3.2.8 Observer Bias, Demand Characteristics, & Placebo Effects

- Observe 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

3.3.1 Real-world Opportunity

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

3.3.2 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 _____!

3.3.3 Ethics

- Like with Real-world Opportunity, quasi-experiments may be done on naturally occurring groups that wouldn't be ethical to _____.

3.3.4 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!

- 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 _____.

4.3.1 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

4.3.2 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

4.3.3 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.

4.3.4 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.

- 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!