

Quasi-Experimental Designs

Psychology 280 Lecture
5/15/2006

Main Types of Designs

- Descriptive (Nonexperimental)
 - Describe the characteristics of an existing phenomenon
 - Little to no control over variables; no variables manipulated
 - No cause and effect
- Historical (Nonexperimental)
 - Relate events that have occurred in the past to current events
 - Little to no control over variables; no variables manipulated
 - No cause and effect
- Correlational design (Nonexperimental)
 - Examine the relationship between variables
 - Low to medium control over variables; no variables manipulated
 - No cause and effect

Main Types of Designs (con't)

- Quasi-experimental design
 - Test for causal relationships among variables without having full control
 - No variables manipulated or random assignment (observed only)
 - Moderate control over variables
 - Results are suggestive, but trouble concluding cause and effect
- Experimental design
 - True cause and effect relationships
 - Manipulating variables
 - Randomly assigning participants into conditions
 - High control over variables
 - Reach better conclusions about cause and effect

Background on Quasi-Experimental Designs

Quasi-experimental designs

- Emerged from the need to conduct applied research in settings in which the control features of a true experiment cannot be achieved
 - A quasi-experimental design is one that looks a bit like an experimental design but lacks the key ingredient -- random assignment
 - Independent variables are ideally manipulated (rather than sampled)
- Causal inferences much more difficult
- Quasi-experimental designs are used for research other than program evaluation, too

Background on Quasi-Experimental Designs (con't)

- Quasi-experiments have IV's, DV's, and control variables but are missing random assignment of subjects to levels of the IV.
 - Random assignment and manipulating the IV cannot always be achieved
 - Practical & ethical constraints are substantial in some instances
- Design compromises are sometimes reasonable and warranted
 - During early exploration, e.g., a possible confound is tolerable, since positive results could then be followed by a vastly more expensive study eliminating the confound
- An imperfect study may be the best possible, and worth studying
 - e.g., the effects of trauma are worth studying despite limits in Independent variable (IV) manipulation; so are many subject variables

Program Evaluation

Research on programs that are proposed and implemented to achieve some positive effect on a group of individuals

- Donald Campbell (1969) urged a culture of evaluation
 - Programs honestly evaluated to determine whether they are effective
 - The initial focus of program evaluation was outcomes but now we are concerned with more than outcomes

Program Evaluation (con't)

Five types of program evaluations (Rossi, Freeman, & Lipsey, 1999)

"five types are not necessarily distinct"

1. Needs assessment = asks whether there are problems that need to be addressed in a target population
2. Assessment of program theory = asks if the program based on valid assumptions and whether the program addresses the needs in appropriate ways

Program Evaluation (con't)

3. Process evaluation (program monitoring) = monitors the implementation of the program to determine if it is reaching the target population, attracting enough clients, etc.
4. Outcome evaluation (impact assessment) = asks whether the intended goals are being realized
5. Efficiency assessment = asks whether the resources used to implement the program was "worth it"

Impact of Nonexperimental Designs on Validity

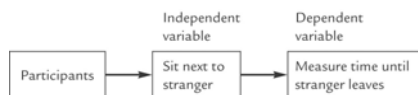
- Validity = are we measuring what we want to measure?
- Four main types of validity
- Statistical conclusion validity = is there a relationship between the IV and DV, and is it significant?
 - Concerns with this type of validity center around if any of the assumptions underlying statistical tests are violated (e.g., normal distribution, etc)

Impact of Nonexperimental Designs on Validity (con't)

- Internal Validity = given there is a relationship between the IVs and DVs, is it likely that the former caused the latter?
- Construct validity = are the constructs we use to talk about causal relationships appropriate?
 - Are we really measuring the construct we intend to?
- External validity = how well can we generalize these results across persons, settings and times?

Quasi-Experimental Designs

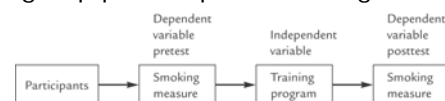
- One-group posttest-only design (called a "one-shot case study")



Lacks a crucial element of a true experiment: a control or comparison group. ... how do we know that the DV measurement would have occurred with or with out the manipulation of the IV?

Quasi-Experimental Designs (con't)

- One-group pretest-posttest design



- This design allows a comparison before the manipulation (pretest) and after the manipulation (posttest). May be used to determine an index of change from the pretest to the posttest.

-Cannot conclude with certainty that any changes are due to the program because of threats to internal validity ... As a broad generalization - how do we know that our participant group wasn't influenced by other factors?

Quasi-Experimental Designs (con't)

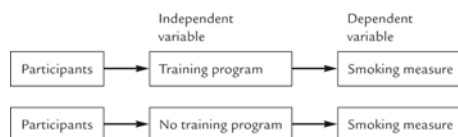
- Alternative explanations to studies using the one-group pretest-posttest design ...also called threats to internal validity
 - History – event is confounded with the manipulation
 - Maturation – changes that occur systematically over time (fatigue, hunger, intelligence, etc.)
 - Testing – pretest sensitizes people to the purpose of experiment or make them more adept at a skill being tested

Quasi-Experimental Designs (con't)

- Alternative explanations to studies using the one-group pretest-posttest design (con't)
 - Instrument decay – basic characteristics of the measuring instrument change over time
 - Regression toward the mean – when participants are selected because they score extremely high or low on some variable; scores tend to change in the direction of the mean when tested again

Quasi-Experimental Designs (con't)

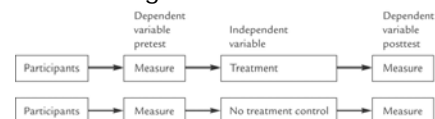
- Nonequivalent control group design
 - Adds a control group to the one-group posttest only design.



- Problem is that the groups are not equivalent. An alternative explanation is selection differences (self selection).
- Often used to evaluate training and intervention programs

Quasi-Experimental Designs (con't)

- Nonequivalent control group pretest-posttest design



- Problem is participants are not randomly assigned to conditions, but allows us to see if our participants were the same on the pretest – how equivalent are they?
- Only lack of random assignment to groups distinguishes this from a pretest-posttest experimental design
- Often use to study effects of IV using intact groups (e.g., classrooms)

Quasi-Experimental Designs (con't)

- Interrupted time series design
 - Examines the dependent variable over an extended period of time, both before and after the IV is implemented
 - May be a "natural experiment" where manipulation is not under experimental control
 - Interpretation problems (possible regression to the mean)
 - Example: measuring fatality deaths pre- and post-intervention for a given state
 - This design greatly enhanced by adding in a control group (for instance, comparable states)
 - Look at trends for the control group that did not receive intervention compared to group that received intervention.

The End