

Chapter 6 – Threats to Internal Validity

I. Internal Validity

- Infer causal relationships between the IV (some manipulation/treatment) and the DV (whatever your measuring).
- Adequate levels are only obtained from well planned experiments
- Established through random assignment (equivalent groups) and avoiding confounds.

A. Time-Related Threats (Campbell & Stanley, 1963)

- Especially Pre-test / Post-test design
- Randomly Assigned Control groups help identify these effects.

1. **Historical Context**

2. **Maturation** - Change due to time alone

3. **Practice effects** - creates sensitization and familiarity

- control with parallel forms

4. **Instrumentation** - Changes in calibration, criterion, or metrics

5. **Regression to the Mean** - difference in t1 & t2 scores may reflect effects of extreme scores.

B. Selection Threats- Non Equivalent groups

- Manipulation group and Control group must be equivalent prior to manipulation.
- Kills internal validity for Quasi-Experimental Designs.

1. Using **Pre-existing groups & Non-Random groups** means groups may differ systematically on a given characteristic. Group diffs on DV may reflect non-equivalence effects and not treatment effects.

- Volunteer problems (Rosenthal & Rosnow, 1975) box 6.1 in Whitley

Volunteers have higher:

Education, SES, IQ, Need for Social Approval, Sociability, Sensation Seeking needs, Unconventionality, Authoritarianism, Need for Conformity, likelihood to be from small town, religiosity, altruism, self-disclosure, maladjustment.

Volunteers tend to be: women, Jewish more likely than Protestant, Protestant more likely than Catholic.

2. **Mortality** – Participant Attrition & Withdrawal

Longitudinal:

Non-equivalence between times resulting from attrition. One type of person more likely to withdraw than another.

- e.g. average grades decrease over time for students in Student Assistance Programs.

- Clinical study of treatment effectiveness, extremely pathological participants drop out. (average pathology scores appear to decrease)

Experimental:

Non-equivalence between groups resulting from Differential Attrition.

- e.g. E – Study manipulating disgust – highly disgust sensitive subjects leave experimental group (too gross).

- I/O – field experiment on employee incentive programs. Intrinsically motivated people in experimental group drop out and the extrinsically motivated people in the control group drop out.

C. Confounding

1. Measurement

- Shared Method Variance - associations result of method not true associations
- Poor Discriminant Validity - Measure may tap multiple constructs
- Context Effects - order of measures affects responding. Counter Balance the order of the questionnaires.

2. Naturally Occurring Phenomenon - e.g. sex and shoe size.

3. Treatment Confounds – e.g. - Different experimenters giving slightly different directions (e1 = 30 experimental and 70 control subs; e2 = 50/50)

D. Reactance - Participant Behavior changes as a reaction to participation. (potential problem for external validity as well).

1. To Experiment

a. **Evaluation Apprehension** = The anxiety of being judged

- Can lead to Social Desirability and Distraction (wash out experimental manipulations)
- Limit by making participants feel comfortable
 - Mark Greenberg - Experimenter effects (the hippy vs. the white lab coat) regardless of experiment the researcher who appeared friendly, was casually dressed, spoke extemporaneously yielded effects but the stiff, white-coated, scripted researcher did not.
- Give an interesting/engaging task
- Avoid negative feedback. Tell participants what they are doing right and then what you further need them to do. Don't tell them what they are doing wrong.

b. Social Desirability = Resulting from Evaluation Apprehension

- Use anonymous questionnaires.
- use open ended response format.
- Deceive participants about studies purposes. (deception by omission vs. commission)
- Tell participants you will know when they are lying (Bogus Pipeline)

c. Novelty Effect = The strangeness of the lab effects behavior & attention limiting effectiveness of treatment.

- Allow participants to habituate to environment
- Use warm up tasks that direct participant to the relevant aspects of the test environment prior to presenting main manipulation.

2. To Manipulation/Treatment Condition
 - a. **Diffusion of Treatments**- Participants find out what the treatment conditions are: Talking to friends in the study, Knowing the type to research that the experimenter is doing, Research Question is Transparent
 - b. **Compensatory Equalization of Treatments** – People involved with the study wash out treatment effects. Problematic for field experiments where teachers, supervisors, or therapists are aware of the aims of the study.
 - c. **Compensatory Rivalry**: Participants in one group work harder to improve performance. (demand characteristics)
 - d. **Resentful Demoralization**: Participants in one group work poorly due to apathy or hostility (demand characteristics)

- E. Experimenter Bias
 1. Expectancy Confirmation Bias = We attend to & encode expectancy consistent information better than inconsistent information.
 - We tend not to look for evidence that will disconfirm our expectations, unless strongly motivated to do so.
 2. Influence on participant behavior - verbal and non-verbal cues
 3. Can be limited by
 - a. Double Blind Methodology
 - b. Use well developed research protocols (scripts)
 - c. Minimize experimenter role
 - d. no data snooping (peeking at data before sample is collected) - Only an issue if researcher is running own subjects (otherwise you are a fool not to look at the data somewhat to identify potential problems)