Experimental Designs

Today's Topics:

I.   Causal inference

II. Internal validity

III. Pre-Experimental, Experimental, and Quasi-
     Experiential Designs

IV. External validity

I. Causal Inference

A. Three conditions of causality

1. Cause precedes the effect

2. Cause and effect must correlate

3. No third variable involved

II. Internal Validity

A. Internal validity

- Confidence that changes in Dependent (DV) Variable <u>are actually caused by</u> the Independent Variable (IV)

- ❖ Validity (in measurement)

II. Internal Validity (Cont.)

B. Threats to internal validity:

- Factors other than IV affects DV:

    1. History

    2. Maturation (passage of time)

    3. Testing

    4. Instrumentation

II. Internal Validity (Cont.)

B. Threats to internal validity (Cont.):

5. Statistical regression

6. Research reactivity

7. Selection biases

8. Attrition (experimental mortality)

III. Pre-Experimental, Experimental, and Quasi-Experimental Designs

Notations:

X = introduction of stimulus, intervention, or treatment

O = observation/measurement

III. Experimental Designs (Cont.)

A. Pre-experimental designs:

1. One shot case study

X O

2. One group pretest-posttest design

O X O

III. Experimental Designs (Cont.)

B. (True) Experimental Designs:

Essential components

1) Random assignment
   (* *Random selection*)

2) Experimental group and control group

3) Compare changes between the groups

III. Experimental Designs (Cont.)

B. Experimental designs:

1. Pretest-posttest control group design
   (Classic experimental design)
   R O X O
   R O   O

2. Posttest only control group design
   R   X O
   R   O

III. Experimental Designs (Cont.)

B. Experimental designs:

- Strengths:

- Weaknesses:

III. Experimental Designs (Cont,)

C. <u>Quasi-experimental</u> designs:

1. Non-equivalent comparison group design
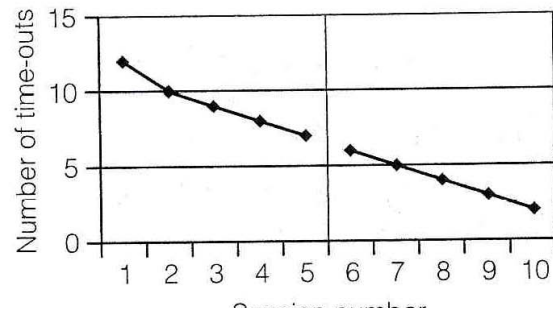
O X O

O   O

2. Time-series design
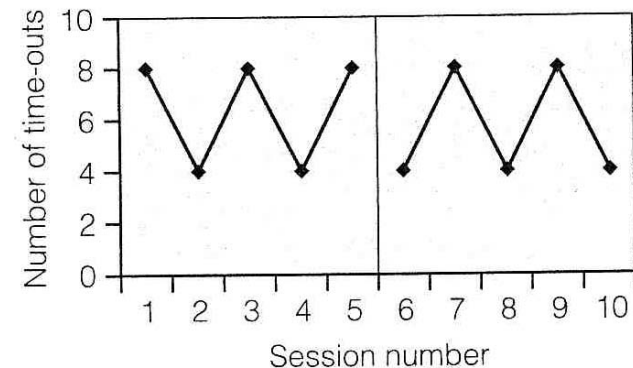
O O O O O X O O O O O

III. Experimental Designs (Cont.)

C. Quasi-experimental designs
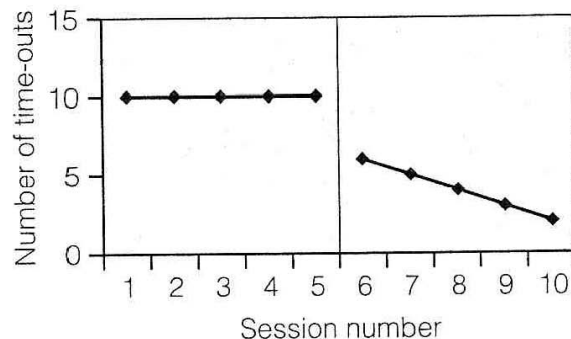
2. Time-series design

Figure 12-3 Three Patterns of Number of Time-Outs in a Longer Time-Series Perspective

IV. External Validity

- Generalizability

- Representativeness of sample, setting and procedures

- Sampling and survey research

NEXT WEEK:

Single-case design