Case Studies and Small $N$ Designs

Chapter 11
November 2007
Lecture Overview

• Case Studies
  – Definition of
  – Strengths and Limitations

• Small N Designs
  – Definition of
  – Reasons for using
  – Types of Single Subject Designs
    • AB Designs
    • Withdrawal Designs
    • Multiple Baseline Designs
Case Studies

• Detailed description and analysis of a single individual
  – Used mostly in clinical psychology
  – Considered qualitative

• Many famous case studies have contributed to our knowledge of human behavior…
Phineas Gage
Phineas Gage

• Railroad construction foreman who survived a traumatic brain injury
• Iron rod passed through his skull
• Damaged his frontal lobes
  – Affected his emotional, social, and personality traits
  – Friends said he was “no longer Gage”
• First cited evidence that damage to frontal lobes can affect personality
Oliver Sacks, M.D.
“The Last Hippie”
by Oliver Sacks

• “Greg F.”, teenager in late 1960s
  – Greg loved the “hippie” movement
  – Moved away from home and joined Krishna Consciousness movement…
    • Began to lose vision, disengage from others
  – Eventually diagnosed with a brain tumor
    • Destroyed memory system in temporal lobe
    • He had no memory of events past 1970
Case Studies

• **Strengths**
  – Provides a highly detailed analysis
  – Rare cases shed light on normal behavior (by contrast)
  – Provide inductive support for theories

• **Limitations**
  – No control groups / lack control over extraneous variables
  – Results may not generalize (i.e., low external validity)
  – Susceptible to experimenter bias
  – Memory of Ss is limited
Small $N$ Designs

- Designs that involve a very small number of participants
- Rather than reporting measures of central tendency, focus is placed on observations of individual scores/behaviors
Practical Reasons for doing Small N Research

• Procedures are costly / time consuming
• Procedures are invasive
• Procedures require intensive training
• Participants are rare / hard to find
Single-Subject Designs

• **Goal**: Behavior of a single participant must be shown to change as a result of the treatment

• **Three Components**
  1) Target behavior must be operationally defined
  2) Baseline level of responding must be established
  3) Conduct treatment and monitor behavior
Single-Subject Designs

- A-B Designs (baseline → treatment)
- Withdrawal Designs
  - A-B-A Design
  - A-B-A-B Design
Study of ADHD Treatment Efficacy

- **Participants:** 3 10-year olds previously diagnosed with ADHD, not on meds

- **IV:** Treatment (single level)
  - Ss paired with non-ADHD peer who praises Ss for “on task” behavior and prompts Ss after “off task” behavior

- **DV:** “Off task” behavior
  - Looking away from assigned task for 3 seconds
Flood et al. (2002)

- Results for “Amy”: A-B Design

![Graph showing a decrease in off-task behaviors from Baseline A to Treatment B.](image)
Flood et al. (2002)

- Results for “Amy”: A-B-A-B Design

Time →

DV: Off Task Behaviors

Baseline A  Treatment B  Baseline A  Treatment B

Time →
Flood et al. (2002)

- Fake results for “Amy”: A-B-A-B Design
Single-Subject Designs

• A-B Designs (baseline → treatment)

• Withdrawal Designs
  – A-B-A Design
  – A-B-A-B Design

• Multiple Baseline Designs
Multiple Baseline Design

• Three varieties of Multiple Baseline Designs
• Baselines are established for:
  (1) 1 type of behavior in 2+ individuals in 1 setting
  (2) 2+ types of behaviors in 1 individual in 1 setting
  (3) 1 behavior in 1 individual across 2+ settings
Wagaman et al. (1993)

- **Multiple Baselines Across Subjects**
  - (1) 1 behavior in 2+ individuals in 1 setting

- **Participants:** 8 school children

- **IV:** “Regulated breathing” treatment

- **DV:** Stuttering
Wagaman et al. (1993)

Days

DV: % of stuttered words

BASELINES TREATMENTS POST-TREATMENT

0 - 100 0 - 100 0 - 100 0 - 100

Steve

Nate

Nicki

Pat
Criticisms of Small $N$ Designs

• Low external validity

• How do we handle this criticism?
  – Evaluate generalizability within the design
  – Replicate and extend the study
Ethical Considerations

• Withdrawing a treatment that has changed behavior for the good
• Treatments can be controversial
• Case of special needs children
  – Benefits of treatment