



Single case experimental designs

Bethany Raiff, PhD, BCBA-D

Rowan University

Outline

- Introduce single-case designs (SCDs) to evaluate behavioral data
- Highlight two types of SCD and discuss advantages and disadvantages
 - Provide an example

Single Case Design (SCD)

- Focus on one individual at a time
 - aka n-of-1 designs (even though n in a study is > 1)
 - Not the same as a “Case study”
- Common characteristics:
 - Repeated assessment
 - Replication of effects
 - Each case serves as his/her/its own control

When to use SCDs?

- Able to repeatedly assess behavior/symptoms over time
- Desire to change behavior/symptoms (not merely assess) and establish preliminary efficacy
- When it is unethical to withhold treatment from some participants.
- Limited funding or access to participants

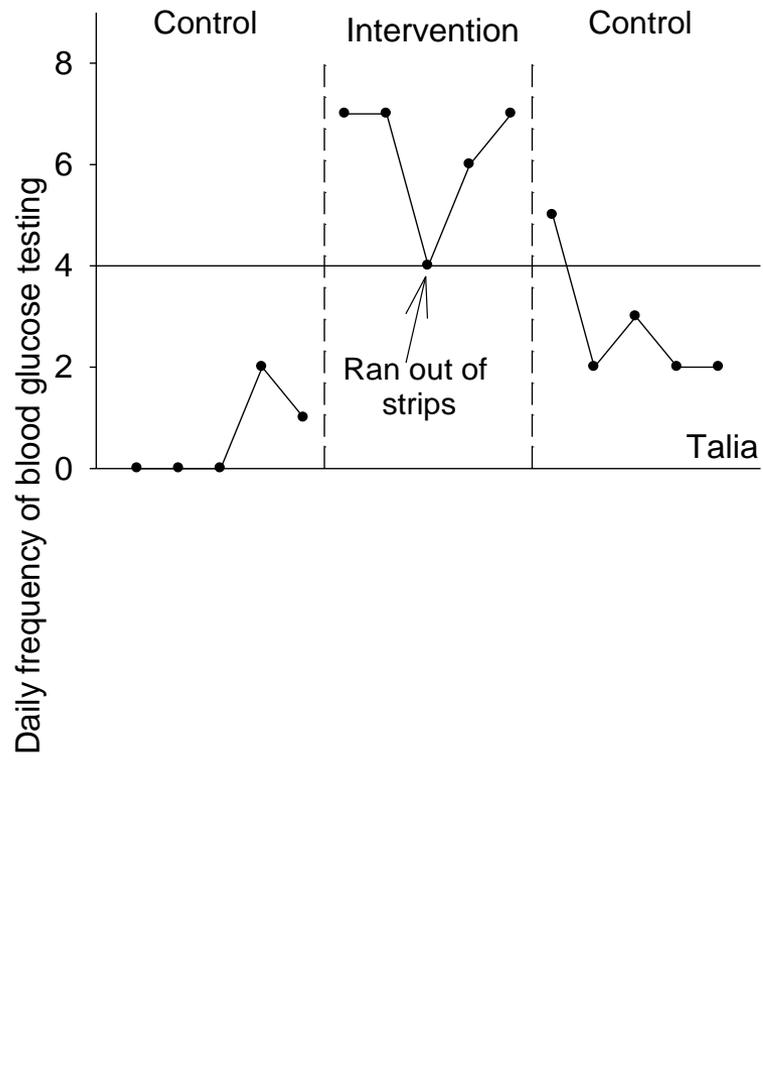
SCDs

- Types of designs
 - Reversal
 - Multiple baseline
 - Alternating treatments
 - Changing criterion
 - Combination

Example

Increasing adherence to blood glucose testing

Reversal Design



Reversal design

1. Using a SCD demonstrated the feasibility and preliminary efficacy of the intervention
2. These data served as pilot data for an R21 application to conduct a two-group, randomized controlled clinical trial (R21HD061683)

Reversal Design

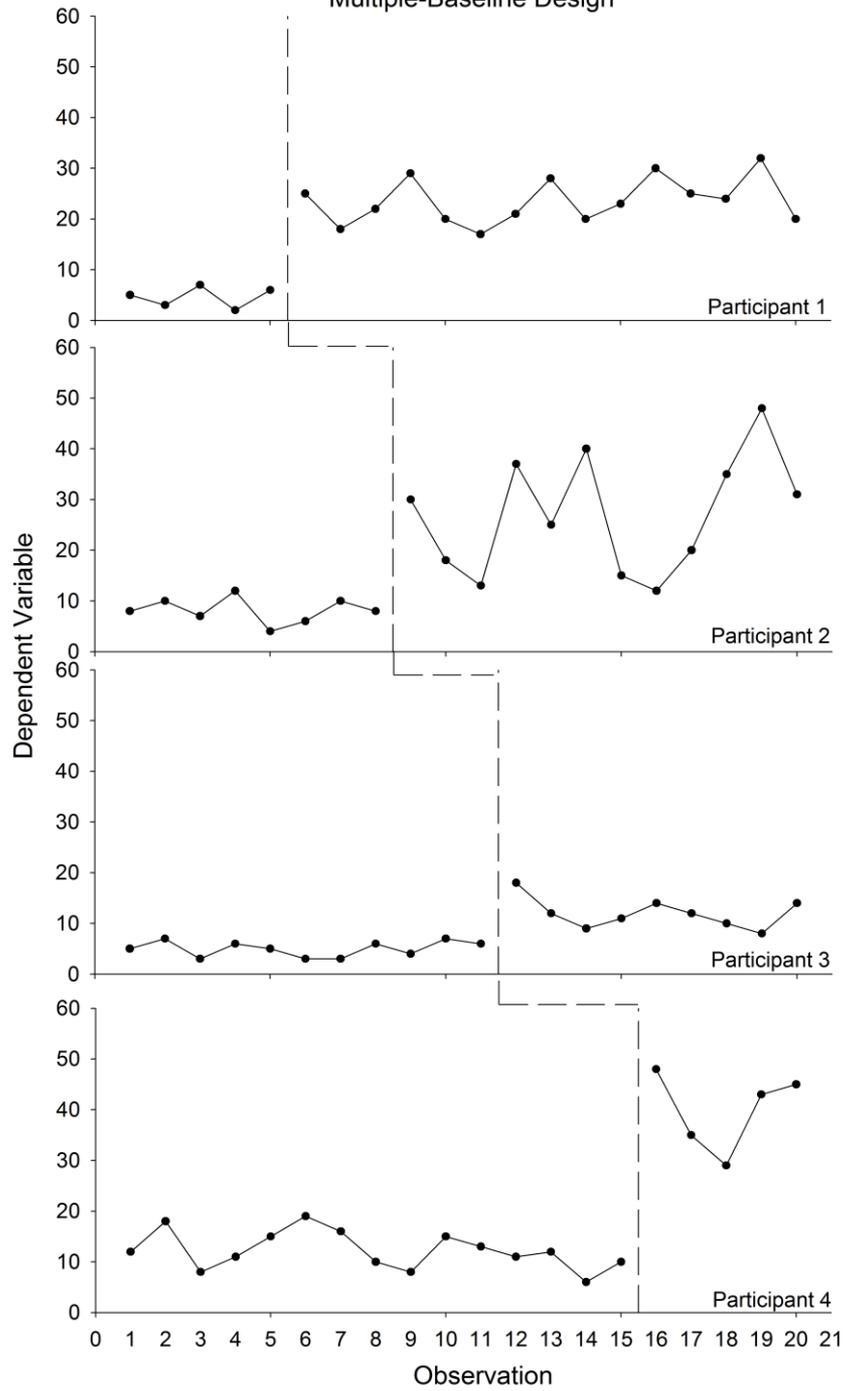
□ Advantages

- Shows within-subject replication
- Clear demonstration of the effect of the independent variable
- Flexible (ABA, ABAB, ABACACB, BAB)

□ Disadvantages

- Must remove a treatment to demonstrate experimental control (not always ethical)
- Will not work with irreversible treatments

Multiple-Baseline Design



Multiple baseline designs

- Advantages:

- Do not need to remove an effective treatment
- Flexible (behavior, settings, participants)

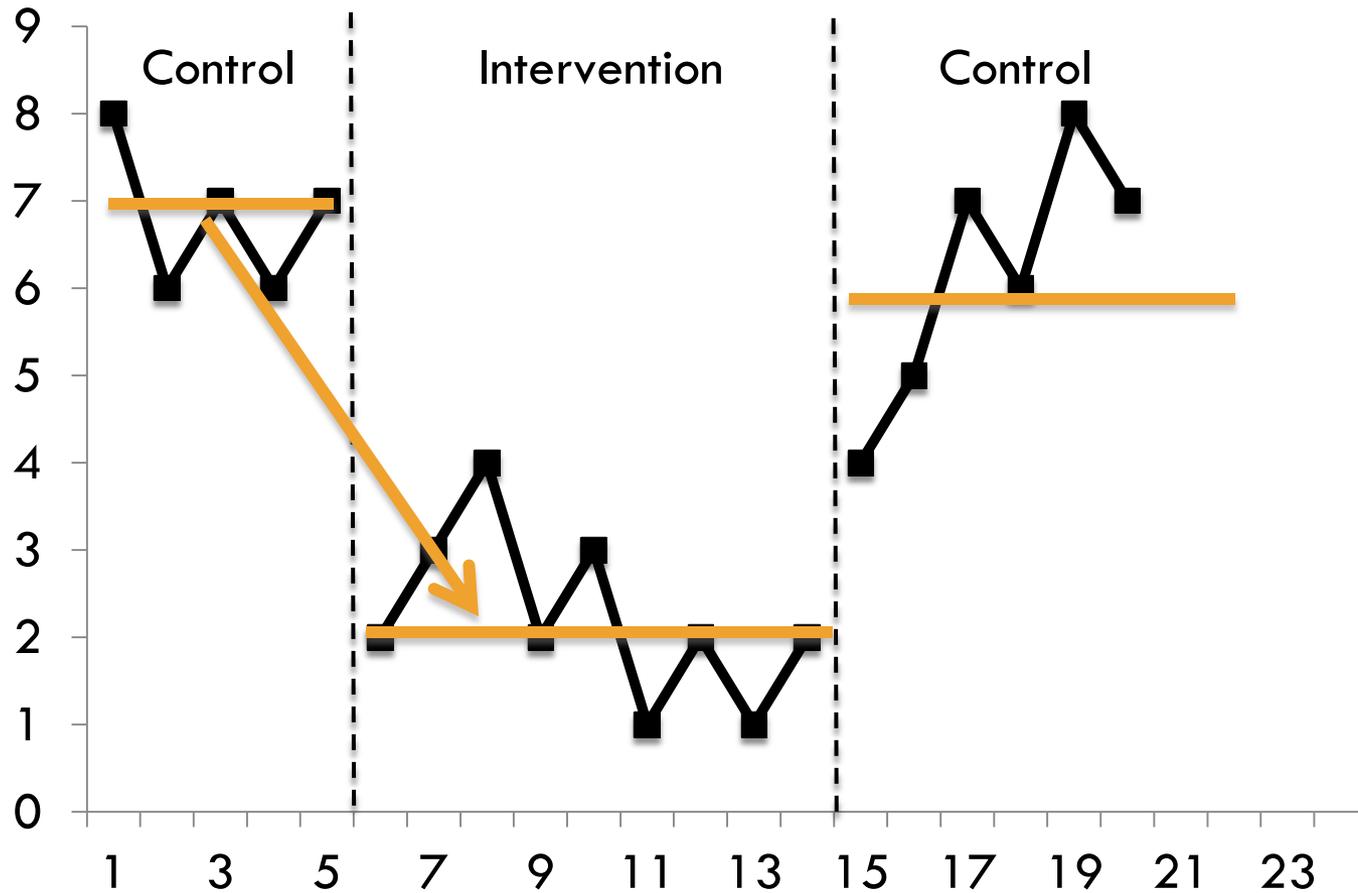
- Disadvantages:

- Similar to a Pre-post design but more rigorous
- May need more subjects to convincingly show experimental control

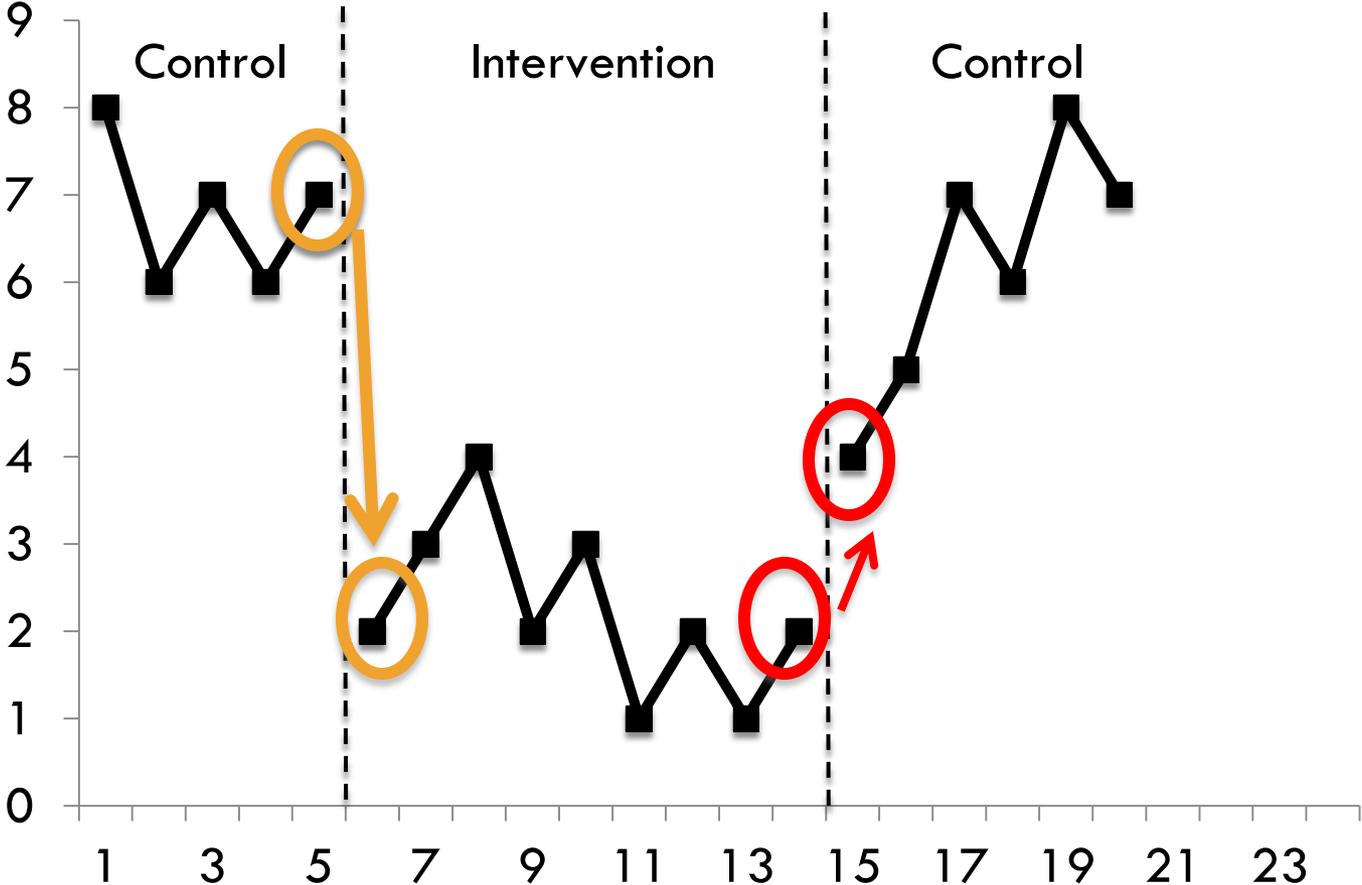
Data analysis

- Is there a reliable effect of the intervention?
- What is the magnitude of the effect?
- Are the results clinically meaningful and socially valid?

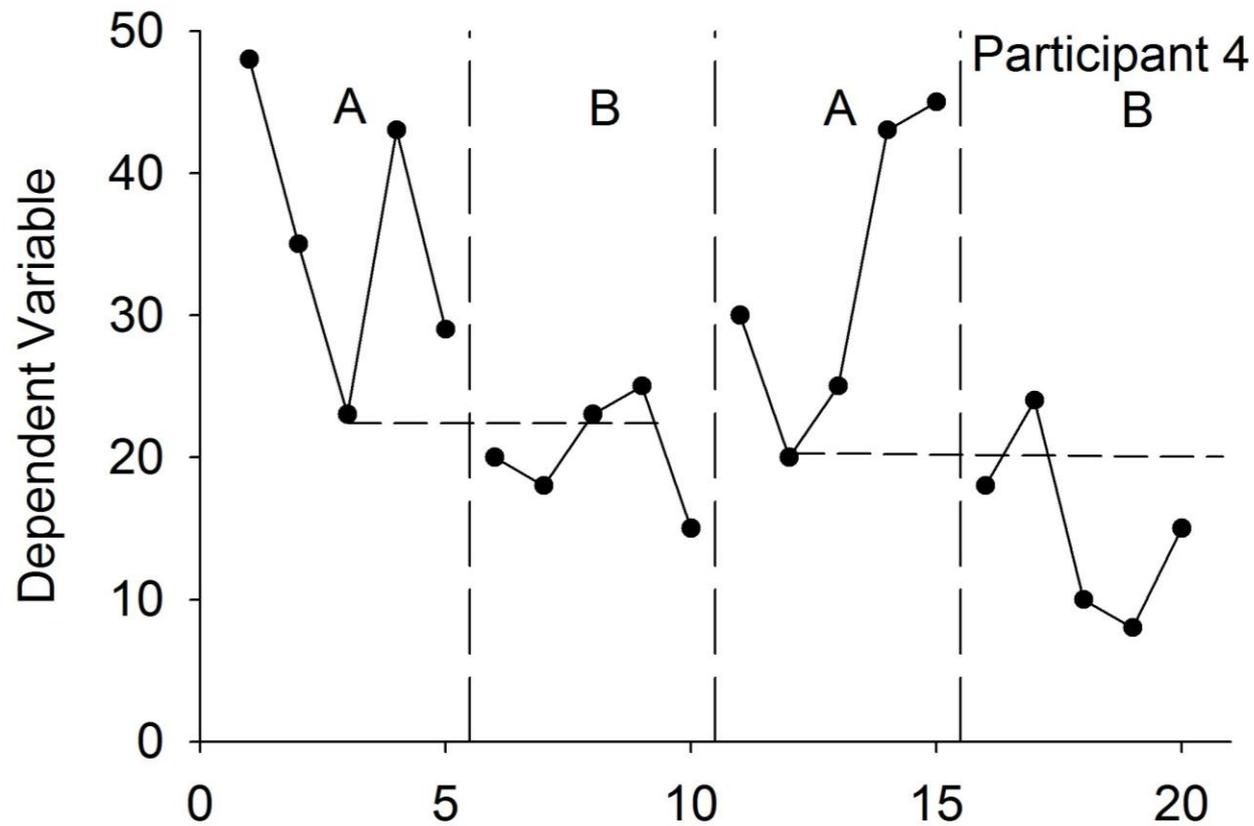
Mean Shift



Level Shift



Variability, overlapping data, trends



General Conclusion about SCDs



- Rigorously and efficiently establish feasibility and preliminary efficacy
- Overcome ethical barriers to withholding or discontinuing effective treatment
- Obviate logistical issues (e.g., limited funding or access to participants)

For more information about SCDs

Books

- Barlow & Nock (2008). *Single-case experimental designs: strategies for studying behavior change*. Pearson Publishers
- Kazdin (2010). *Single-case research designs: methods for clinical and applied settings*. Oxford Publishers

Journal Articles

- Dallery, J. & Raiff, B.R. (2014). Optimizing behavioral health interventions with single-case designs: from development to dissemination. *Translational Behavioral Medicine: Practice, Policy and Research (online first)*.
- Dallery, J., Cassidy, R., Raiff, B.R. (2013). Single-case experimental designs to evaluate technology-based health interventions. *Journal of Medical Internet Research*, 15, online. doi: 10.2196/jmir.2227



Thank you!
Questions?