# Single Case Research Designs in Early Childhood Contexts

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Introduction to Single Case

- Differences in focus and use:
  - RCTs
  - Case studies
- Experimental
  - Alternative explanations are ruled out, thus causal relations can be established
  - Rather than random assignment, AEs are ruled out via condition ordering

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Four Characteristics of SCR
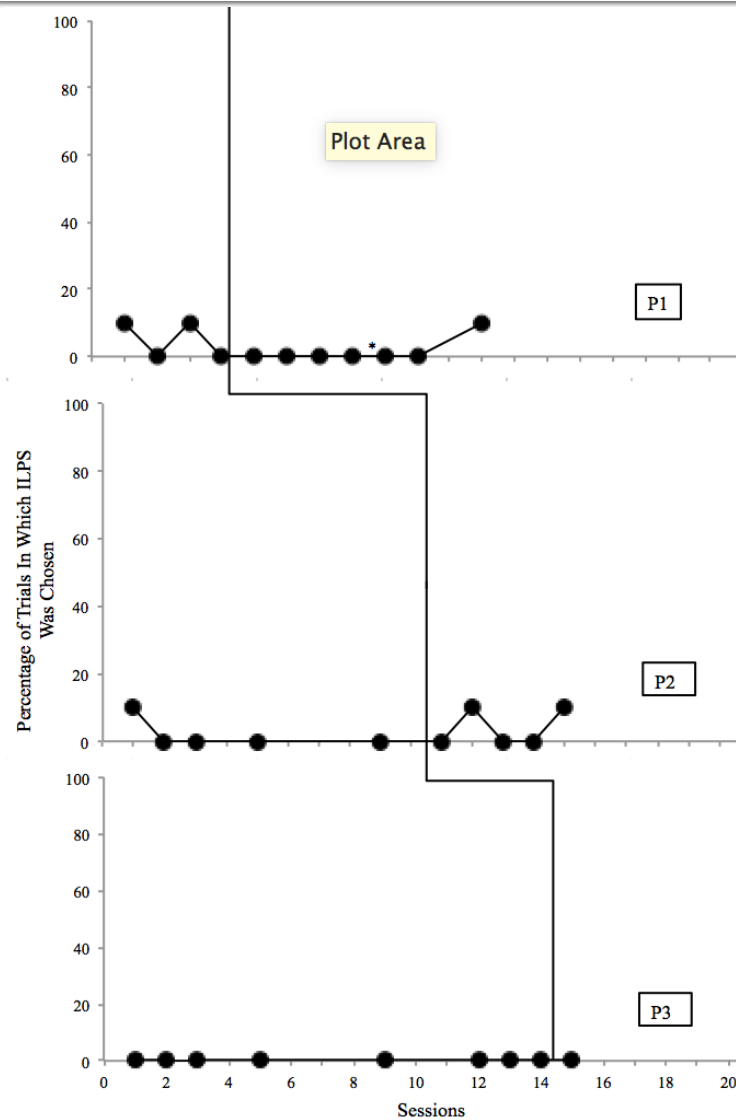
Three Categories

- Sequential introduction and withdrawal
- Rapid iterative alternation
- Time lagged introduction

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Types of Designs

|	Demonstration	Comparison
Reversible	Withdrawal (A-B-A-B) Multiple Baseline Changing Criterion	Multitreatment (A-B-C-B-C) ATD Multielement Simultaneous Treatments
Not Readily Reversible	Multiple Probe	AATD PTD Repeated Acquisition

Characterizing Single Case Designs
Adapted from Lane, Ledford, & Gast (in press)

Design Type	Use
A-B-A-B (withdrawal)	**Demonstrates** the effectiveness of an intervention on *reversible* behaviors by <u>alternating two conditions</u>
A-B-C-B-C (multitreatment)	**Compares** the effectiveness of two interventions on *reversible* behaviors by <u>alternating two conditions</u>
Multiple Baseline	**Demonstrates** the effectiveness of an intervention on *reversible* behaviors by <u>introducing the intervention in a time-lagged fashion</u> across at least three participants, behaviors, or contexts
Multiple Probe	**Demonstrates** the effectiveness of an intervention on *non-reversible* behaviors by <u>introducing the intervention in a time-lagged fashion</u> across at least three participants, behaviors, or contexts
Changing Criterion	**Demonstrates** the effectiveness of an intervention on *reversible* behaviors by <u>introducing stepwise intervention requirements in a time-lagged fashion</u> generally used for reinforcement-based interventions to increase responding for behaviors already in a learner's repertoire
Alternating Treatments	**Compares** the effectiveness of two interventions on *reversible* behaviors by <u>rapidly alternating sessions</u>
Adapted Alternating Treatments	**Compares** the effectiveness of two interventions on *non-reversible* behaviors by <u>rapidly alternating sessions</u>

Bold text indicates purpose, *italic text indicates behavior type*, <u>underlined text indicates condition ordering</u>

Sequential Introduction and Withdrawal
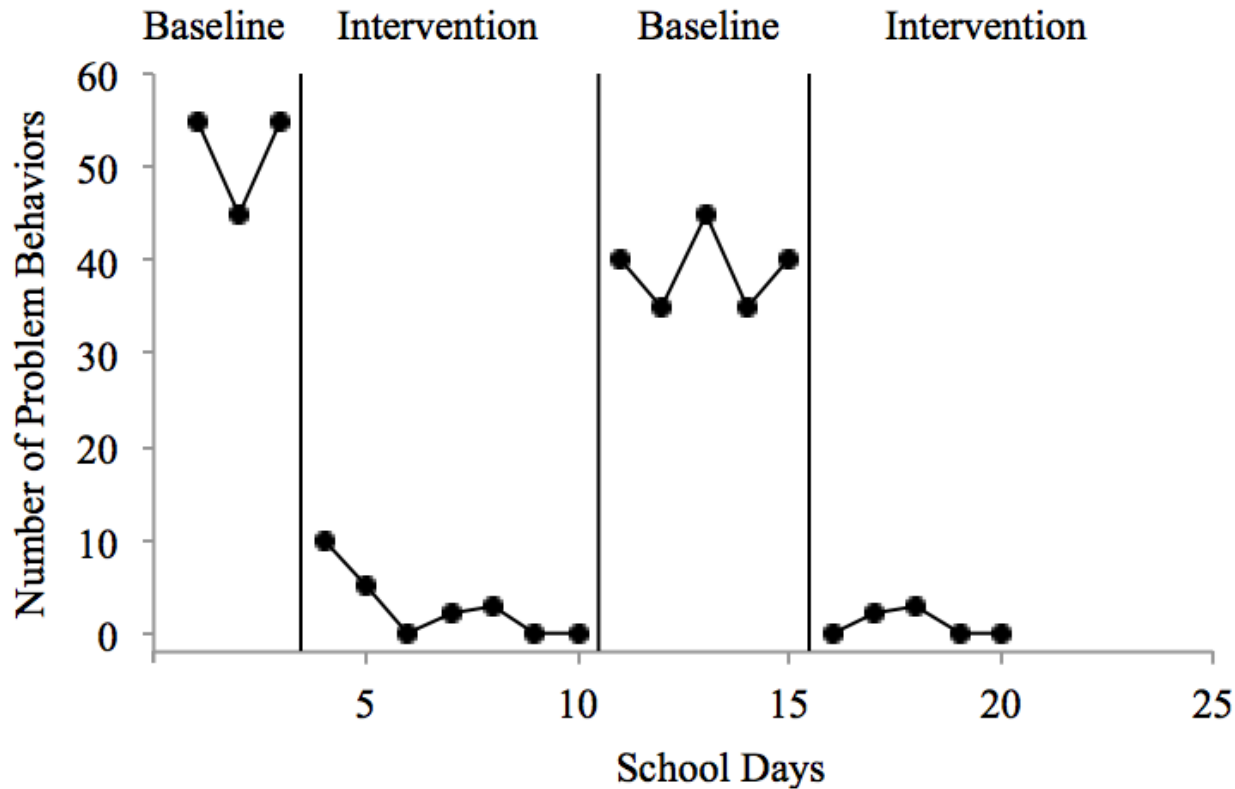
A-B-A-B, withdrawal, reversal, multitreatment

Examples of Use

- Does use of a visual schedule improves engagement in preschool activities for young children with problem behavior?
- Does use of a "stay-play-talk" intervention with contingencies improves peer proximity, play, and interactions for young children with ASD?

# Rapid Iterative Alternation
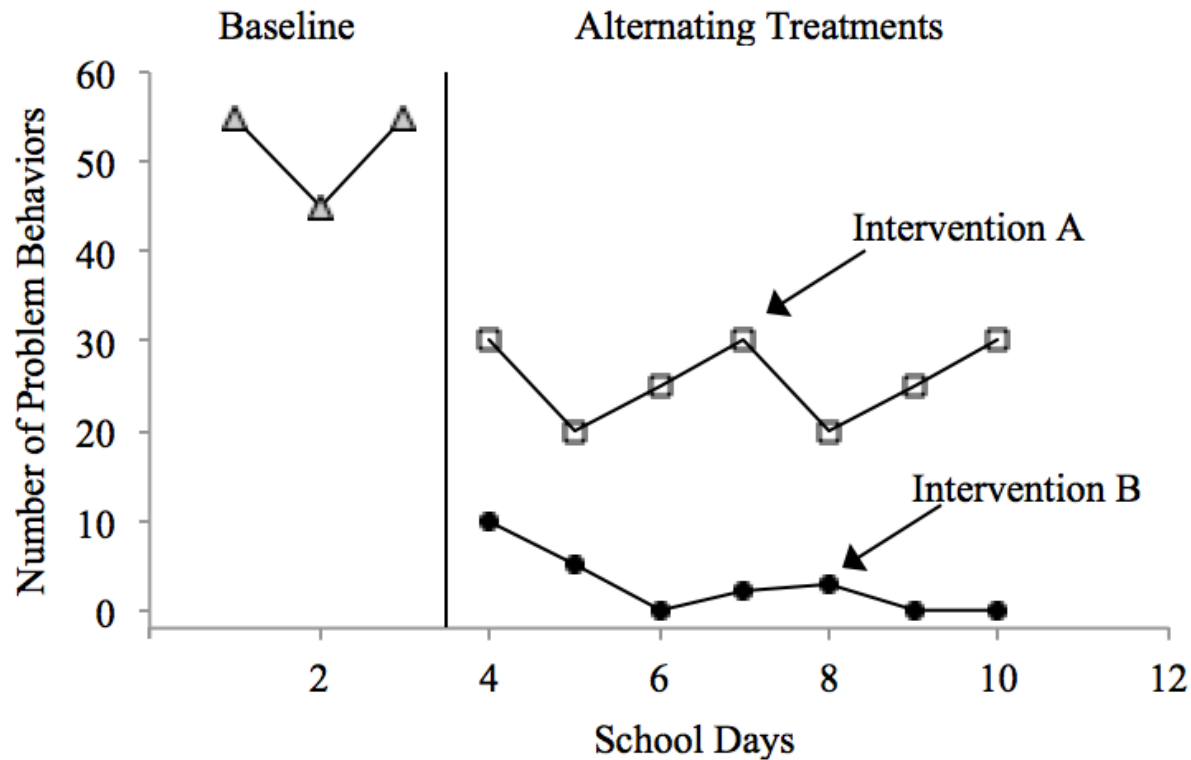
Alternating treatments, adapted alternating treatments, multielement

Examples of Use

- Does moderate-to-vigorous physical activity before a large group activity improve engagement, compared with seated activities?
- Does the use of headphones result in increased engagement in small group activities, compared with no headphones?
- Does the use of an OT-designed sensory break result in increased engagement in small group activities, compared with a structured playground activity?

Time Lagged Introduction
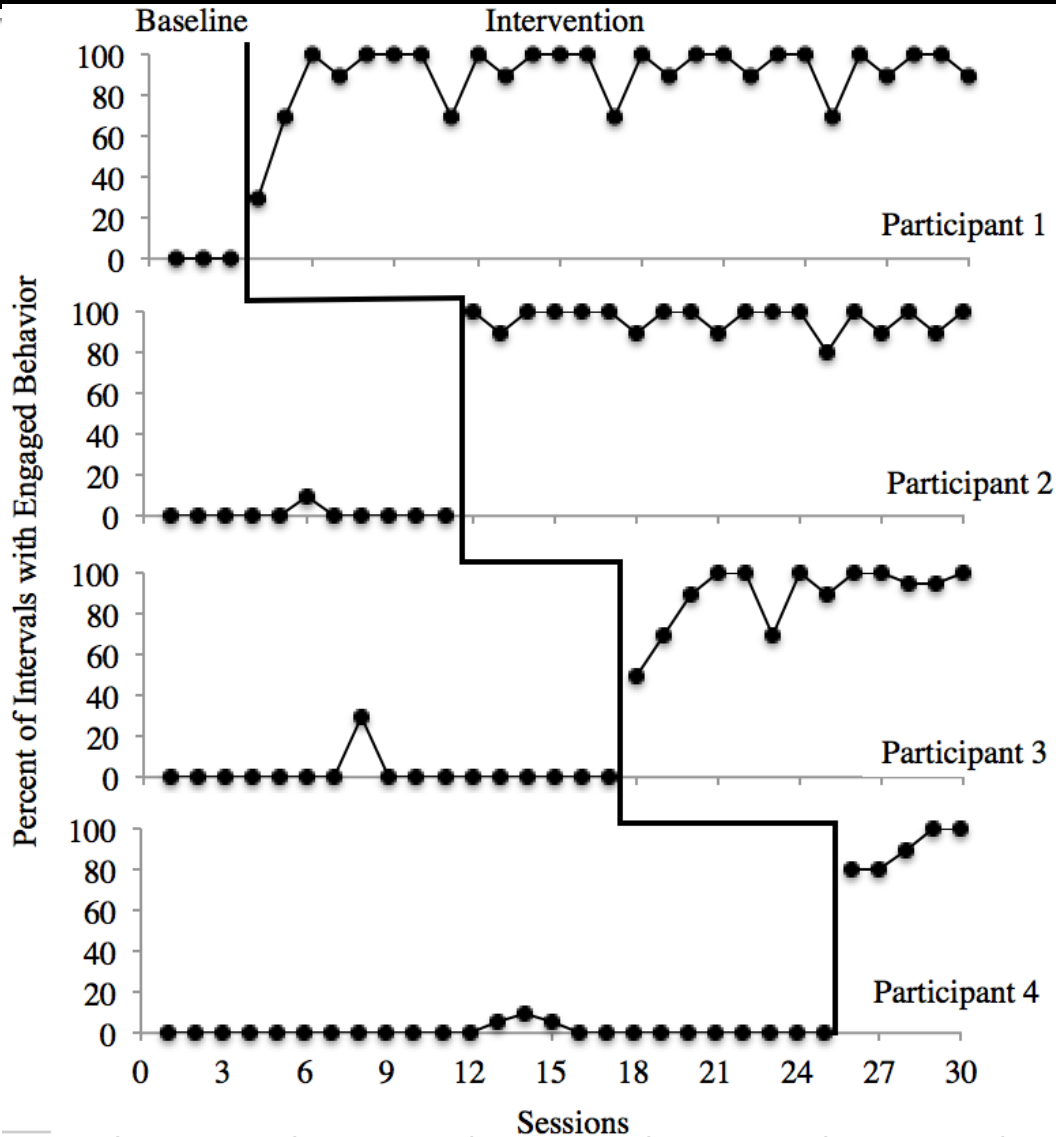
Multiple baseline or multiple probe *across* participants or behaviors or contexts

Examples of Use

- Does training and coaching improve paraprofessionals use of intervention strategies related to improving small group engagement for young children with autism?
- Does teacher responsiveness and praise result in increased complexity of block play?

Multiple Probe Designs

- The *only* difference between MP and MB designs are that MB designs include continuous measurement during the *pre-intervention baseline conditions* while MP designs included **planned** *intermittent measurement only during the pre-intervention baseline conditions*
- Measurement during intervention conditions are continuous

Current Rigor and Quality Standards

- At least 3 potential demonstrations of effect
- Data from an independent second observer (IOA)
- Data showing that all conditions were implemented as expected (fidelity)
- Each condition has at least three data points (some say 5 is preferred; WWC)

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More Standards

- Adequate descriptions
  - baseline,
  - participants,
  - dependent variables
  - setting
- Social validity data
- Indicators of ecological validity

- 3-5-20 rule

Rigorous MB/MP Designs

- ***Concurrent Measurement***
  - Including concurrent (or near-concurrent) start dates
- Sufficiently separate start points
  - Minimally: when change between conditions has been established
- Data that correspond to pre-intervention and post-intervention starts in previous tiers

Data Analysis

- Visual analysis→functional relation
  - Consistency + replication > size
- Description of changes and consistency in *level, trend, and variability* in both conditions and in *overlap, consistency,* and *immediacy of effect.*

Synthesis across Studies

- Numerous proposed
  - Many based on percentage of non-overlapping data points (PND)
  - Some based on means
- Institute of Education Sciences

- No currently used ES are comparable to those used in group research

Questions?