

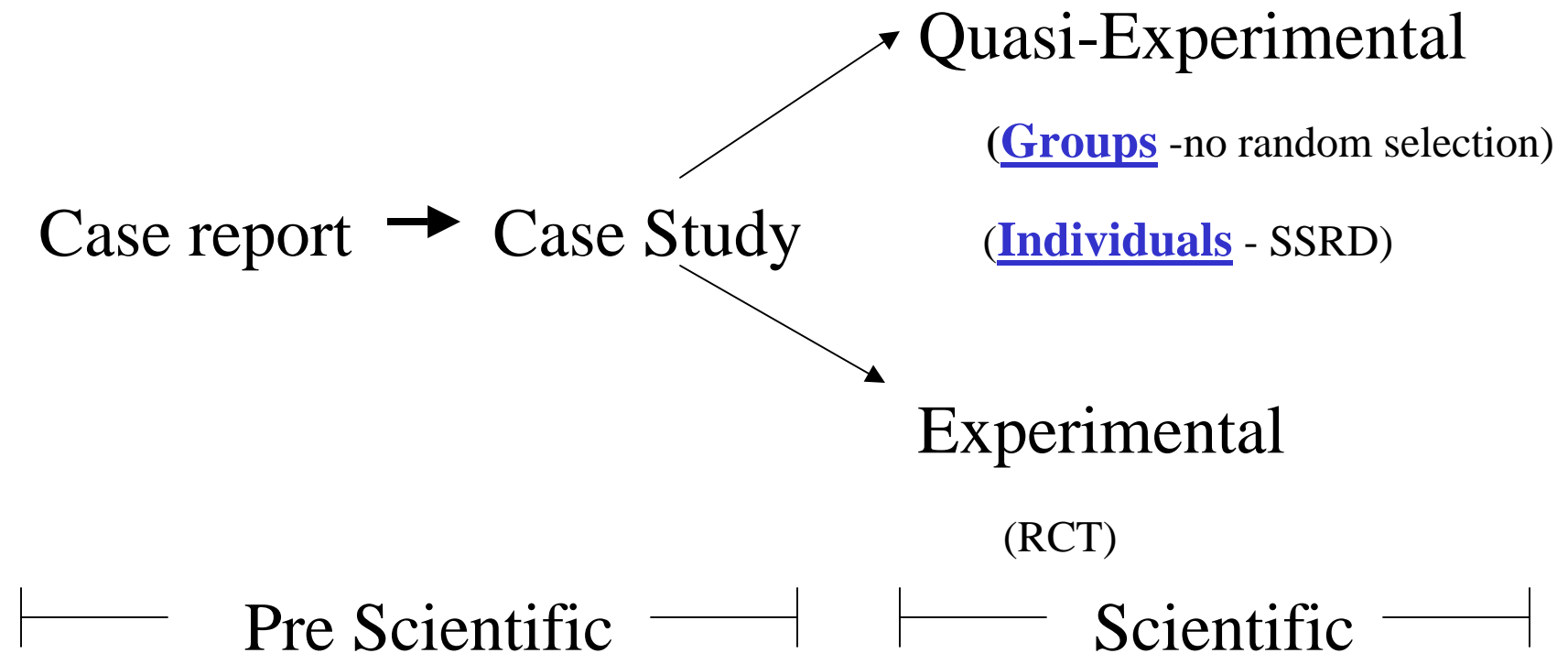
Single Subject Research Design (SSRD)

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Objectives

- Define Single Subject Research Design (SSRD)
- Rationale for using SSRD
- Describe several forms of SSRD
- Discuss the methods of analyses using SSRD
- Discuss strengths & weaknesses of SSRD

Continuum of Research



Other Names for SSRD

- Single case experimental design
- Time series design
- Small-N design
- Single system designs
- Within-subject comparison
- Idiographic research
- N of one trial

SSRD Defined

SSRD involves studying a *single individual* or system by taking *repeated measurements* of 1 or more dependent variables and *systematically applying* & sometimes, *withdrawing* or varying the independent variable.

(Ottenbacher, 1986; Bloom & Fischer, 1982)

Why Chose SSRD?

- Demonstrates individual differences
- Difficulty obtaining adequate power (N)
- Difficulty obtaining homogeneous group
- SSRD is relatively easy to do
- Helps validate practice
- Demonstrate treatment (tx) effectiveness
- Great pilot

About SSRD

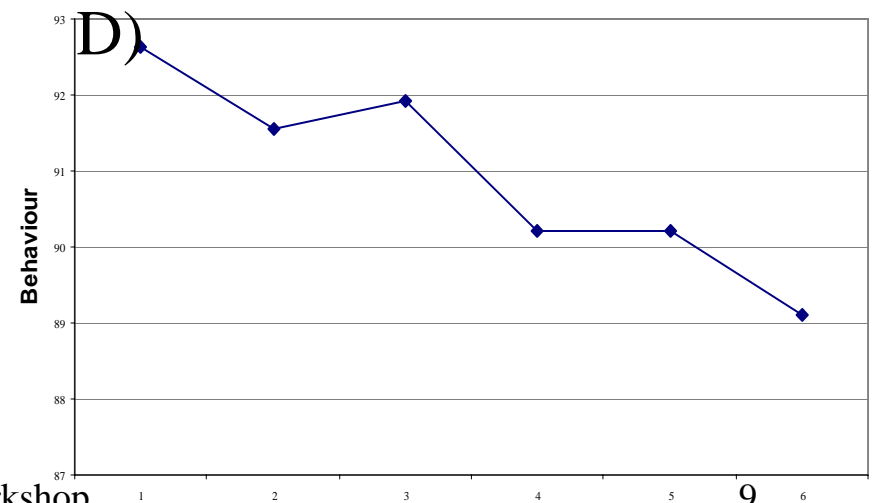
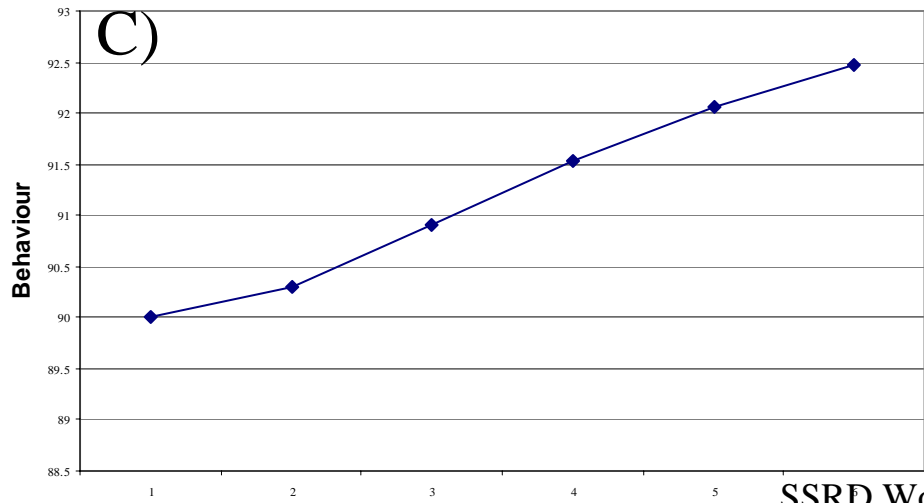
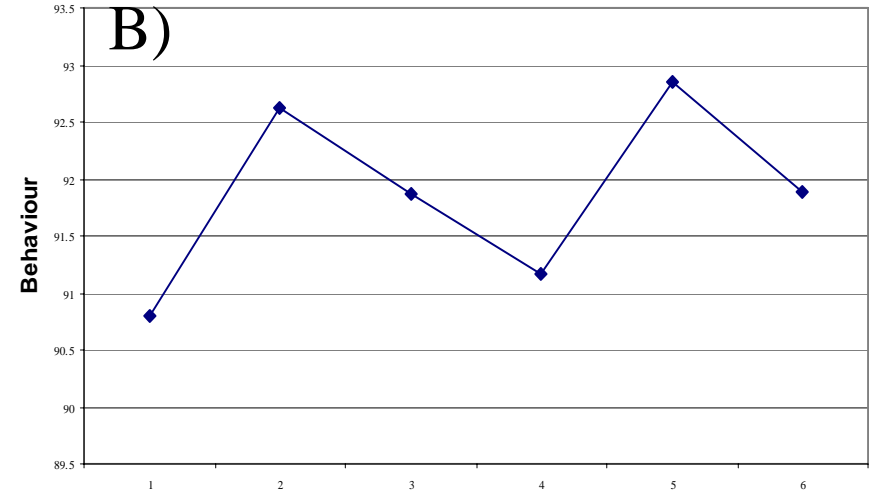
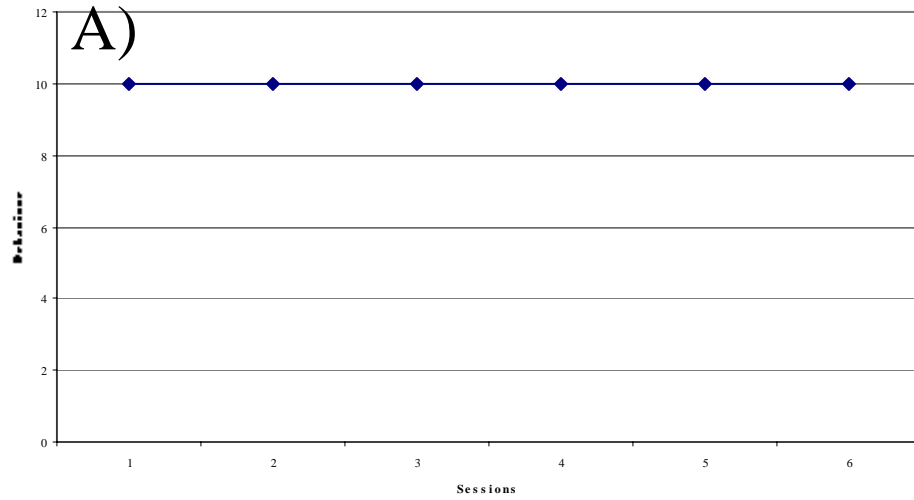
- Collection of methods (eg; AB, ABAC)
- Answers research question or tests hypothesis
- Involves at least one;
 - Subject (individual or clinical unit/department)
 - Baseline or “A” Phase - series of repeated observations or measurements with no intervention
 - Intervention or “B” Phase - introduction of experimental variable with evaluation to see if change occurs
 - Dependent variable (quantifiable)
 - Independent variable (treatment / intervention)

SSRD Phases

Baseline

- Period of no tx - reflects natural state
- Provide standard for evaluating tx effect
- Measurements usually repeated until stability demonstrated
- 5 or more data points

Sample Baseline Phases



SSRD Phases

Intervention Phase

- Introduce tx or intervention
 - = independent variable
- Multiple treatments are alright
- Repeated measurement of dependent variable
- Phase length should be approximately same as baseline

Dependent Variable

- Variable of interest needs to be quantifiable
- Does not require a standardized test
 - Usually frequency, duration, magnitude
 - i.e. episodes of self-abuse / walk time / pain intensity
- Should assess reliability of variable
 - » total % agreement
 - » Point by point % agreement
 - » kappa

Simple Design

A-B

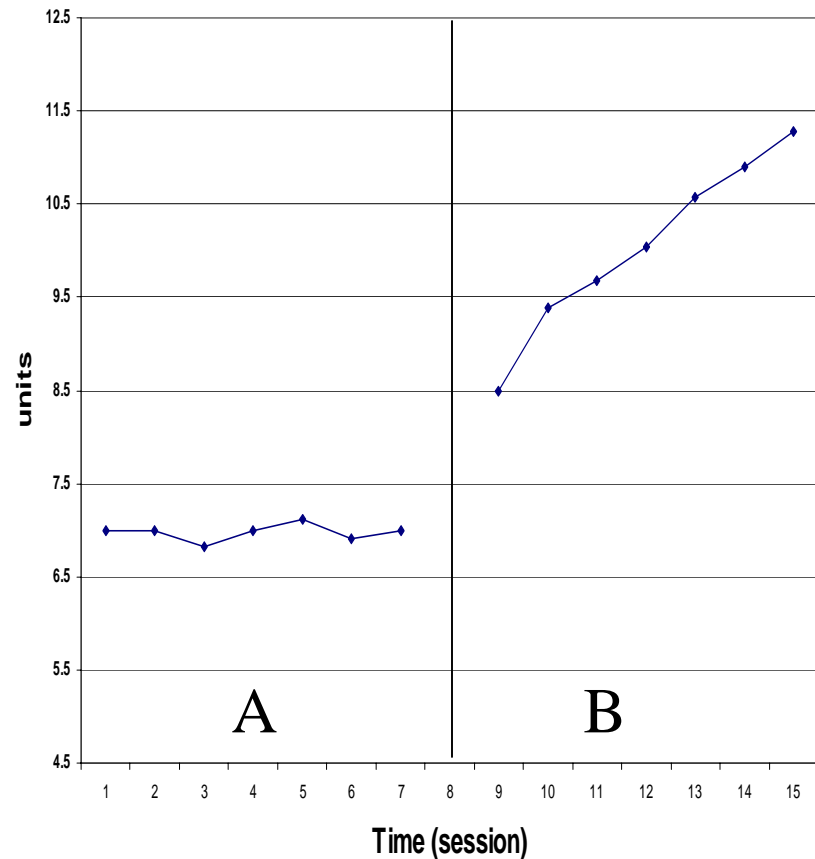
- 1 baseline + 1 tx phase

Problems

- Limited control over threats to internal validity

Solution → Replication

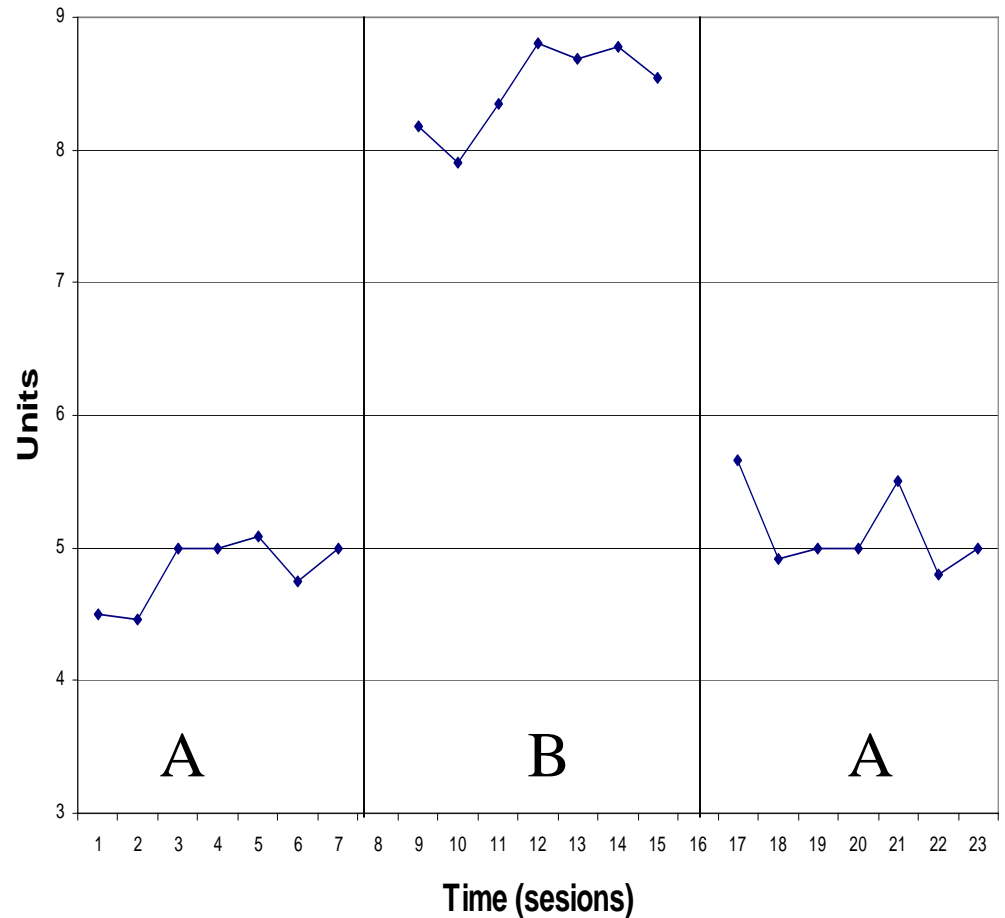
- Add phases
- Add other tx/interventions
- Add subjects



Withdrawal Designs

A-B-A

- Shows intervention leads to target behaviour (TB)
- TB disappears when intervention stopped
- Problems
 - Unethical to withdraw tx
 - Reversible target behaviour



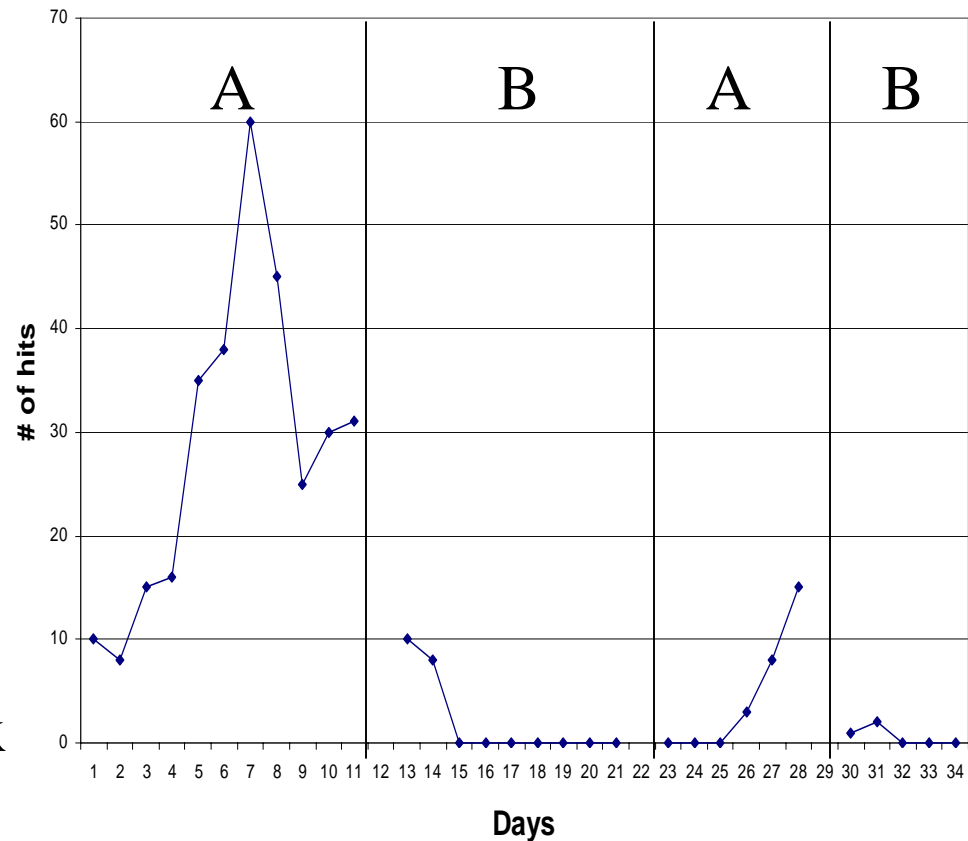
Withdrawal Designs

A-B-A-B

- adds an extra tx phase
- ↑ confidence in tx effect

Problems

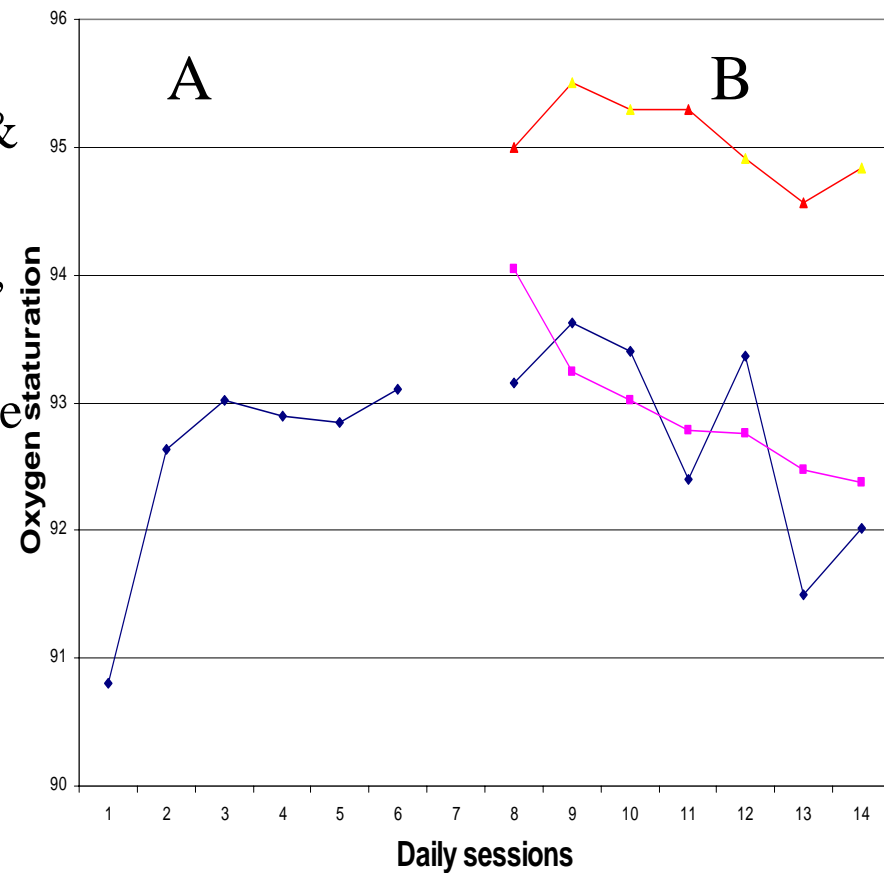
- Reversible target behaviour
- Unethical to withdraw tx



Multiple Treatment Designs

Alternating

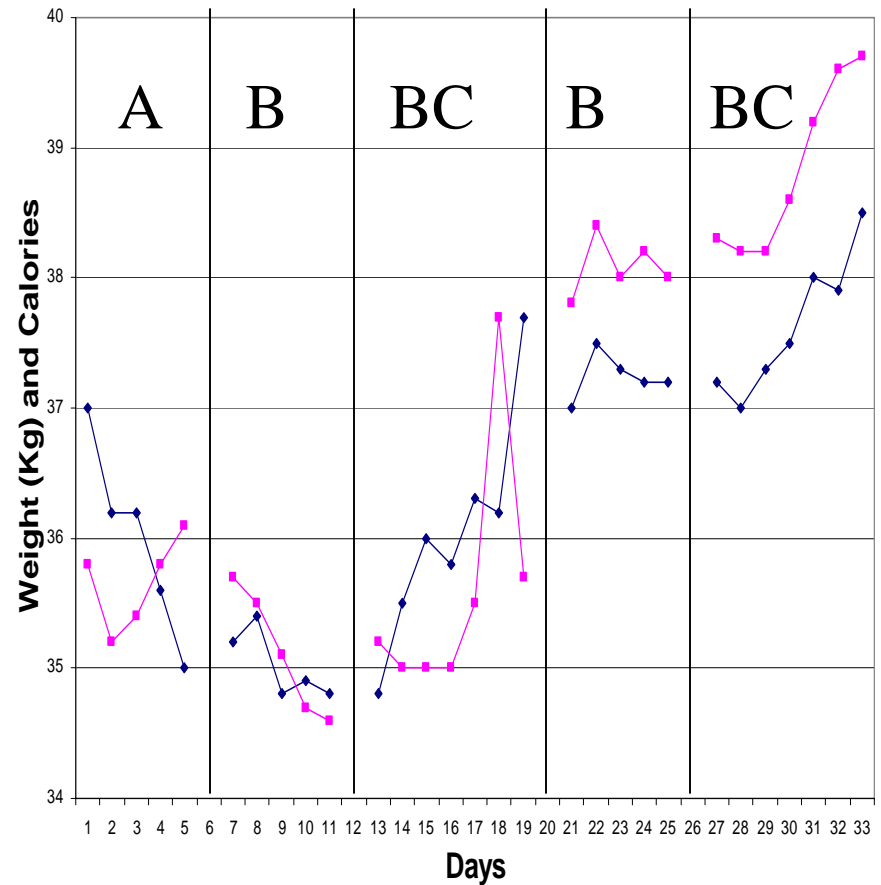
- Rapid alternation of ≥ 2 txs (or tx & placebo)
- Tx's alternated within same session, session to session
- Advantage = quick results, baseline unnecessary
- Sequence effect randomizing counterbalance
- Target must be clear & happen rapidly



Multiple Treatment Designs

Interactive (A-B-BC-B-BC)

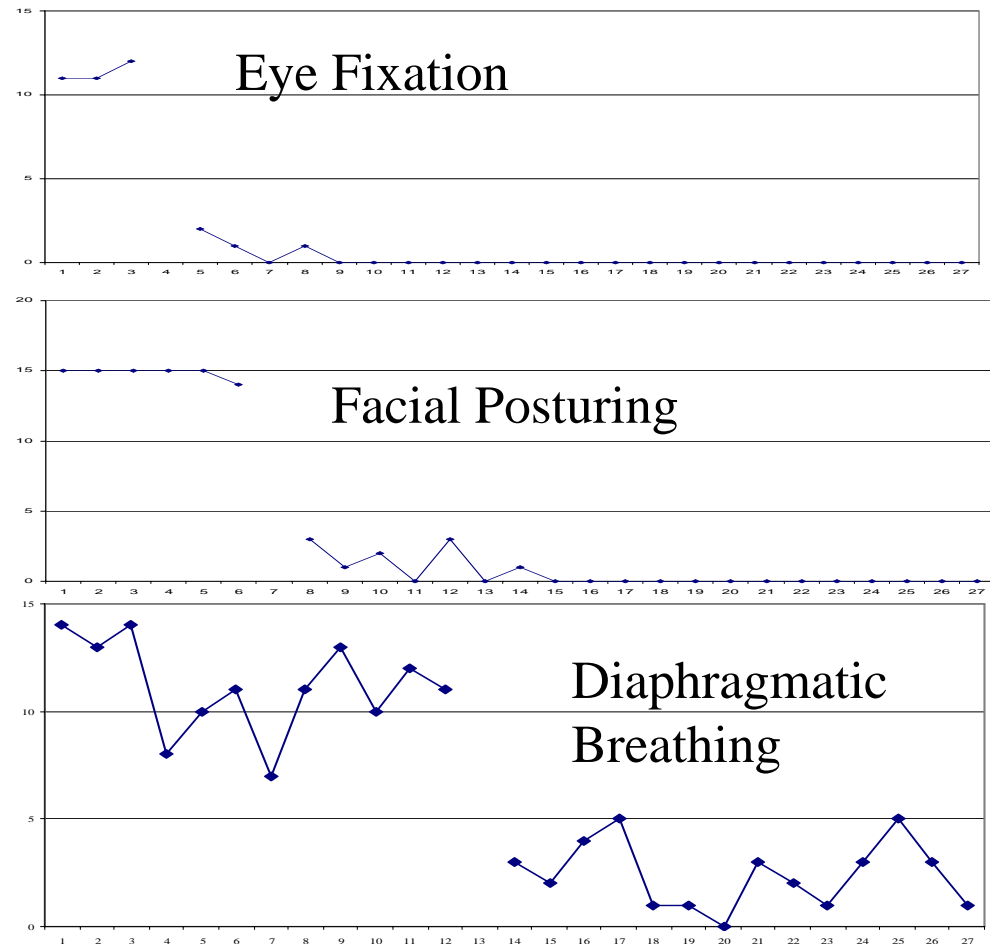
- Assess separate & joint effects of 2 or more txs
- Best to replicate tx
- Interactions can be tested



Multiple Baseline Designs

Across Subjects /Conditions /Behaviors

- Useful when:
 - Behaviours non-replicable
 - Unethical to withdraw tx
- Uses basic A-B phase design
 - Measure baseline in all
 - Establish stability
 - Intro tx to 1st subject/condition...
 - Intro next tx when previous tx stabilizes

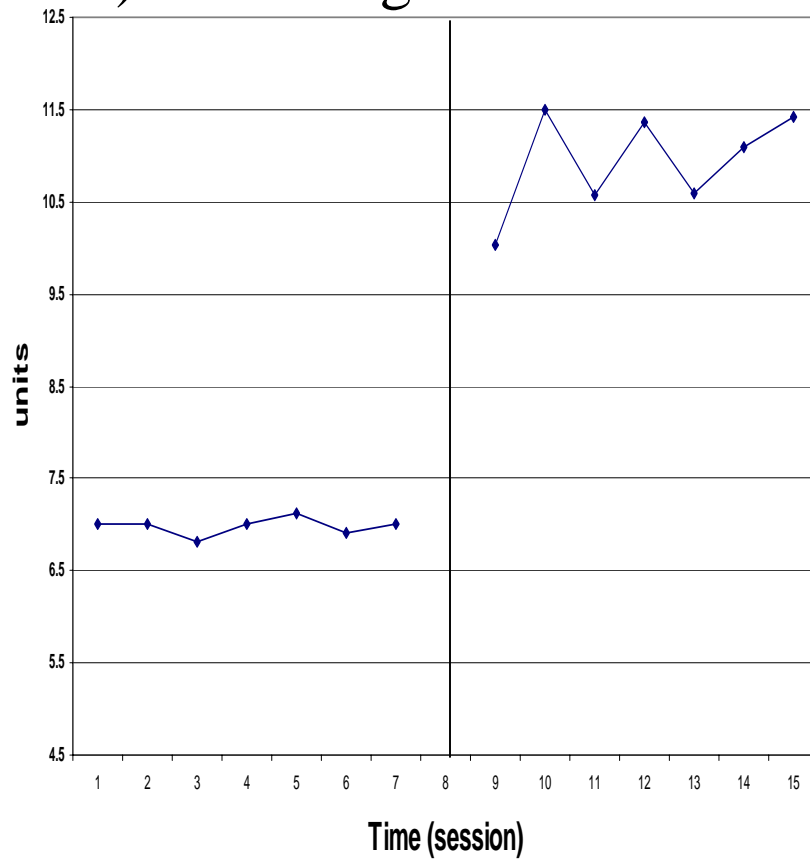


SSRD Analysis

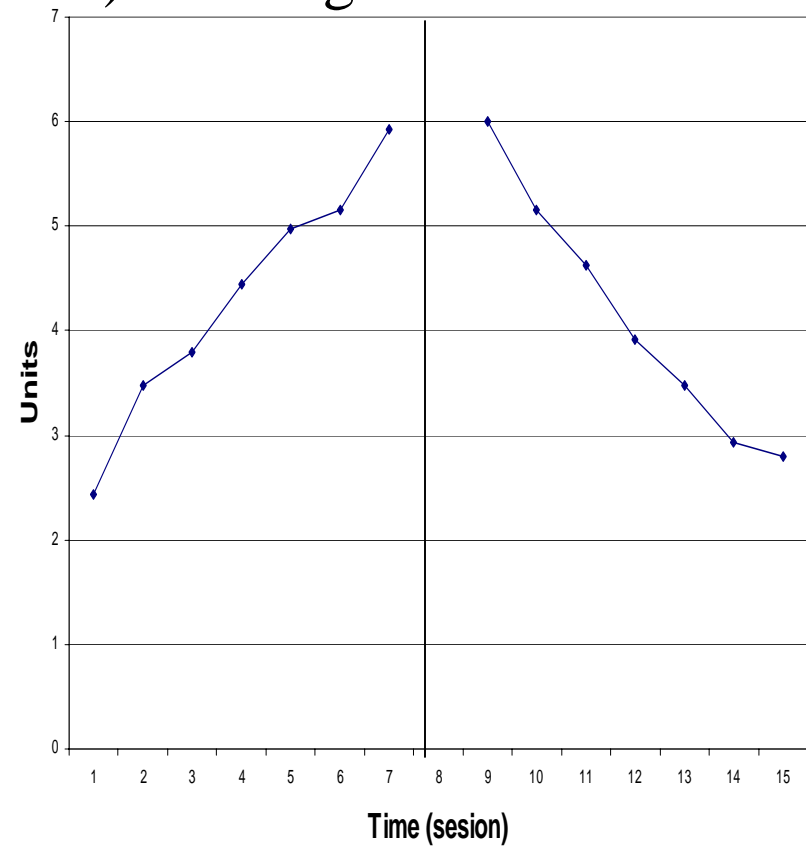
- Visual analysis most common
- Assess trends & levels between adjacent phases
 - Level – refers to change in value or magnitude of dependent variable after intervention
 - Trend – refers to change in direction
 - Described as accelerating, decelerating, stable or variable
- Another technique Split middle Difference
 - Uses celeration line to which statistical significance can be explored
 - Also 2 standard deviation method

Visual Analysis

A) Change in level

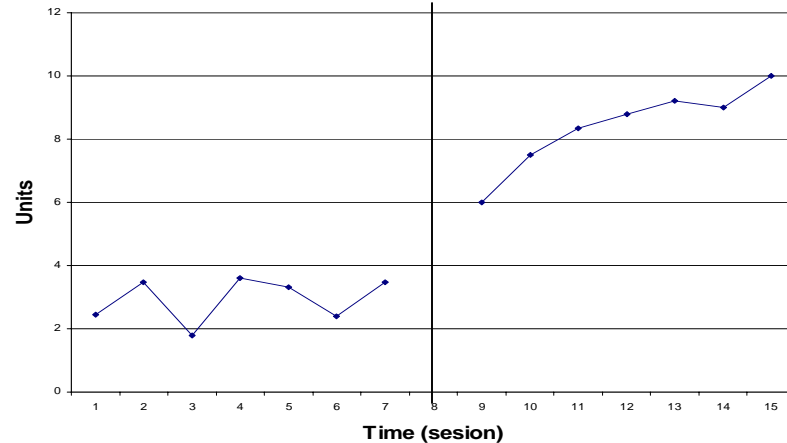
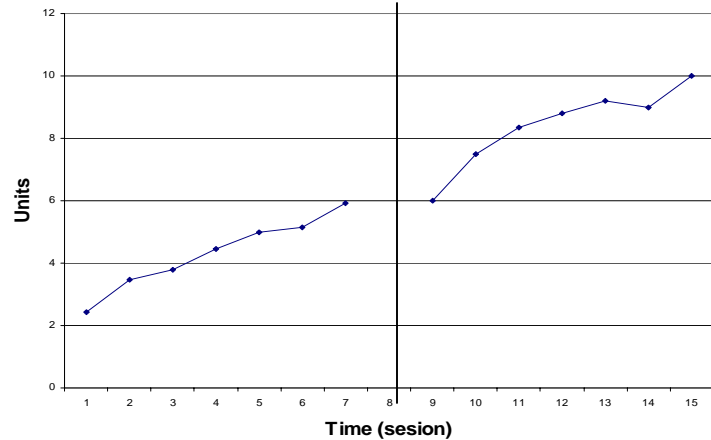
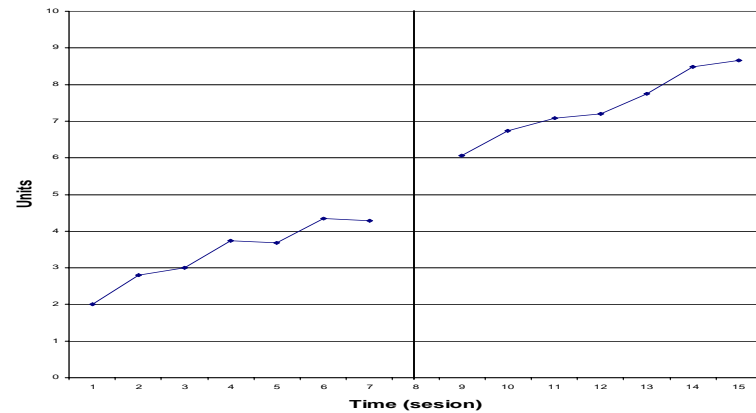
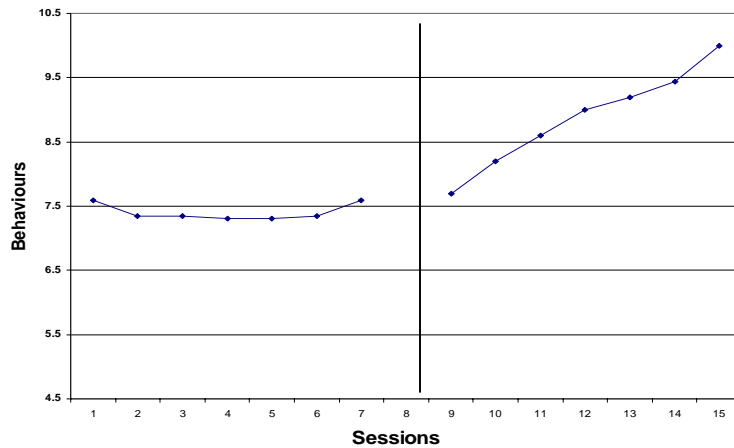


B) Change in trend

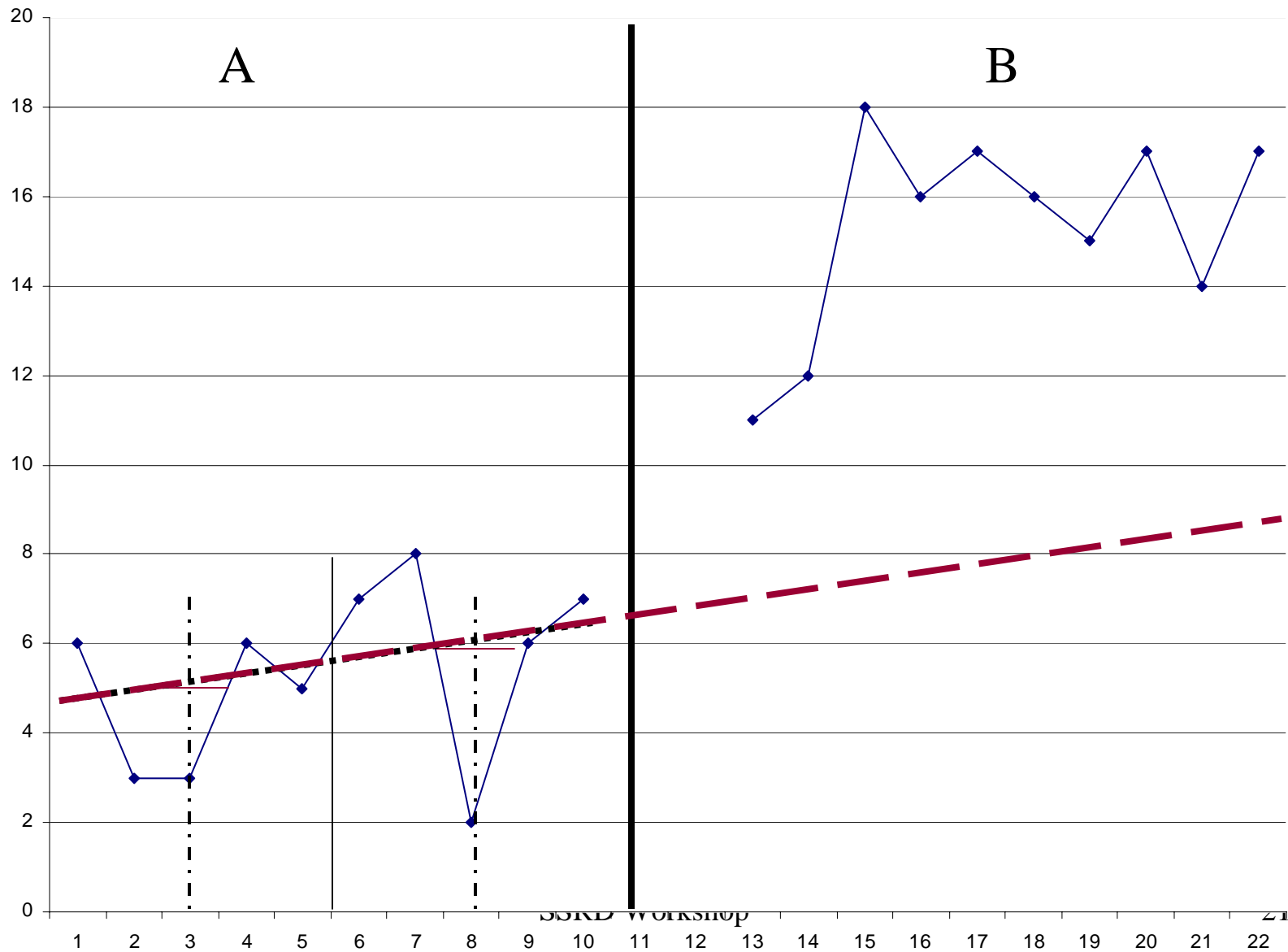


Sample Visual Analyses

How would you describe the following changes?



Split-Middle Technique



SSRD, Case Study & Group Designs: Contrast and Comparison

	SSRD	Case Study	Between Groups
Subject	Own control	No control	Group control
Hypothesis	Test	Generate	Test
Extraneous variable	Controls	Describes	May control
Design flexibility	Permits change	Permits change	No change
Differences	Individual	Individual	Group
Generalizability	Limited	None	Similar to groups
Measurement	Repeated freq	Through-out	Few
Cost	Low	Low	Can be high
Statistics	Limited	None	Significance bt grps
	SSRD Workshop		22

Useful References

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