Single Subject Designs

Lecture 6

Potential Uses of Single-System Designs

- Assess and monitor change
- Evaluate whether change has occurred
- Determine whether change in intervention is needed
- Determine whether intervention caused observed change
- Compare relative effectiveness of interventions

Key Characteristics of Single-System Designs

- Different phases
  - Baseline
  - Intervention
  - Follow-up
- Comparison of baseline and intervention phases
- Change intervention, as needed
- Change design, as needed

Phases

- Period of time during which distinctive evaluation activity occurs
- "A" represents baseline phases
- "B" through "Z" represent intervention phases
  - "B" or "BC" etc. represent multiple interventions
  - "B^1," "B^2," "B^3," etc. represent changes in intervention intensity

Phases (cont'd)

- Length of phases
  - Long enough to obtain a clear, representative, and stable picture of target
  - Adjacent phases should be equal length, ideally
- Comparison of nonadjacent phases should be done with care, if at all

Baseline Phase

- Period of time during which no formal intervention is implemented
- Usually first implemented prior to intervention

Baseline

- Period of time during which no formal intervention is implemented
- Usually first implemented prior to intervention
- Analogous to a control group

Purposes of Baseline

- Provides a basis of comparison to determine change (i.e., evaluation)
- Assessment
  - Determine extent of the problem
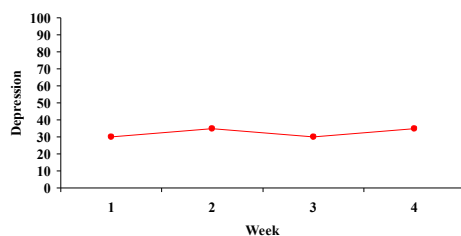 - Determine cause(s) of problem

Types of Baselines

- Concurrent/prospective
- Reconstructed/retrospective
  - Best for specific events
  - Should be recent if based on memories
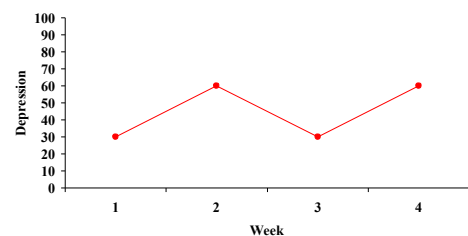- Combined retrospective and prospective

Length of Baselines

- Long enough for assessment and evaluation
  - Clear, representative, and predictable picture of target
  - Baseline/intervention comparison assumes that if the intervention had not occurred, the baseline pattern would have continued unchanged
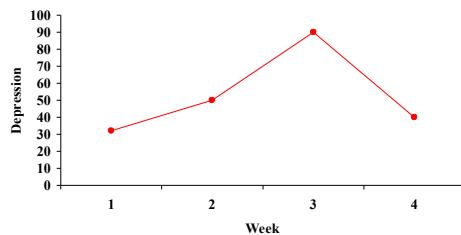- Minimum of 3 observations, ideal of 7 to 10 or more observations

Baseline: Predictable and Not Variable

Baseline: Predictable and Variable

Baseline: Not Predictable and Variable

When are Baselines Unnecessary?

- Prospective baseline unwarranted in some crises situations
- Prospective baseline unnecessary when no history of desired behavior having occurred

Intervention Phase

- Period of time during which formal, planned, systematic practitioner actions designed to change a target take place
- One or a combination of interventions implemented
- Should be related clearly to goals
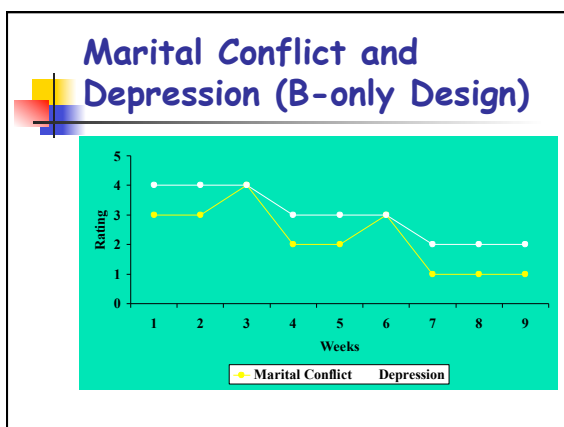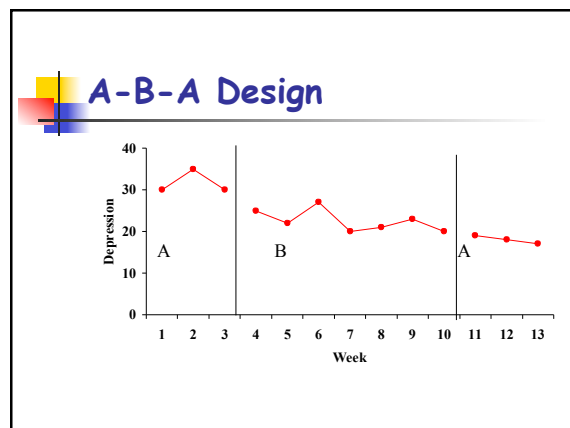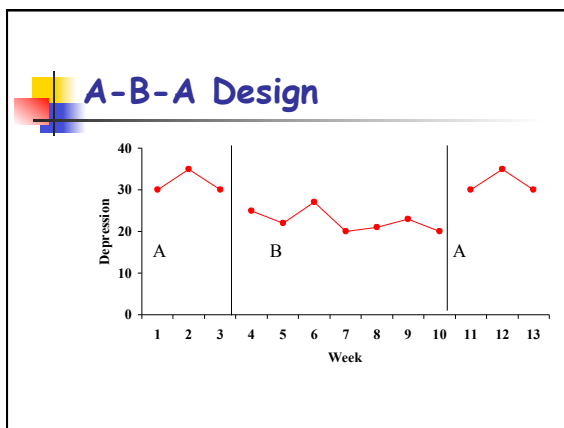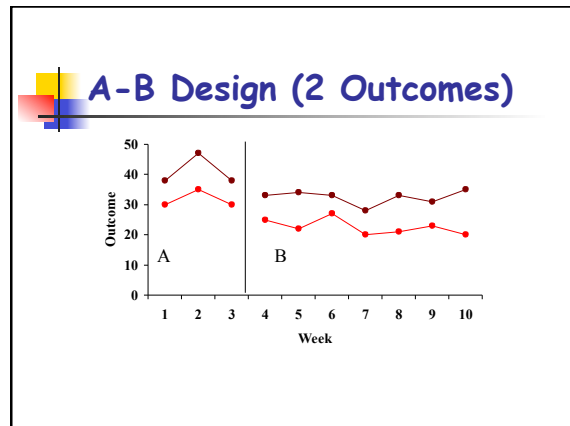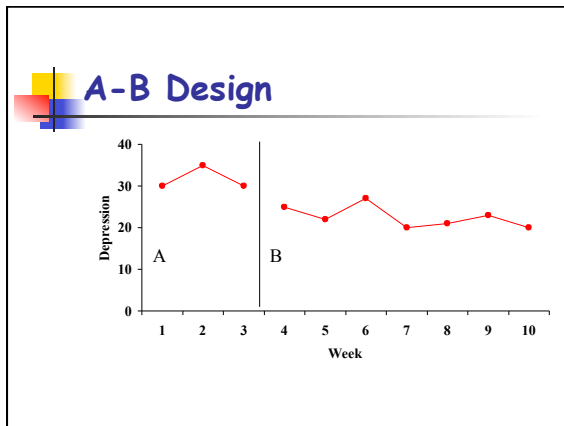- Should be specified clearly

Follow-up Phase

- Period of time after completion of an intervention during which maintenance of change is monitored and, perhaps, reinforced

Comparison of Baseline and Intervention Phases

- Used to determine change
- Assumption is that if the intervention had not occurred, the baseline pattern would have continued unchanged

Change Intervention, As Needed

- Interventions may be continued, added, removed, replaced, or changed in intensity
- Change in response to deterioration of target
- Change in response to insufficient improvement in target
- Change in response to attainment of goal

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A-B Design

A-B Design (2 Outcomes)

A-B-A Design

A-B-A Design

Marital Conflict and Depression (B-only Design)

Components of a Good Recording Plan

- Select a measurement method
- Decide who should collect data
- Decide when and where to collect data
- Decide how often to collect data
- Decide how many targets to record
- Standardize recording procedures

Decide Who Should Collect Data

- **Advantages and disadvantages with different sources**
  - Client
  - Practitioner
  - Independent evaluator (e.g., supervisor, colleagues)
  - Relevant others (e.g., spouse, parent)

Methods for Observing Behavior

- **Self-monitoring**
  - Self observation
  - Overt or covert behavior
- **Direct observation**
  - Outside observer
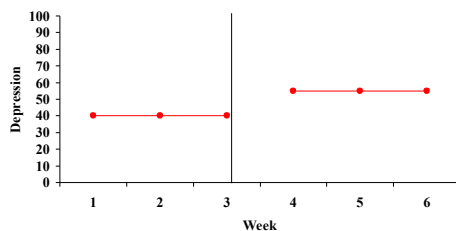 - Limited to overt behavior

Charting Conventions

- Outcome on vertical axis
- Time on horizontal axis
- Phases separated by vertical line
- Don't connect lines across phases
- Use care in plotting missing data
- "A" designates baseline phase, B…Z designate intervention phase
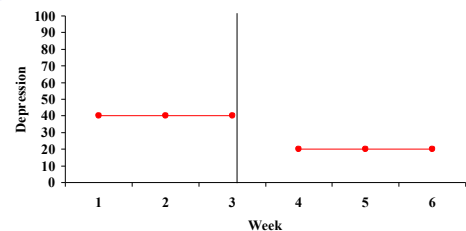- 2 or 3 outcomes can be plotted on the same chart to examine covariation
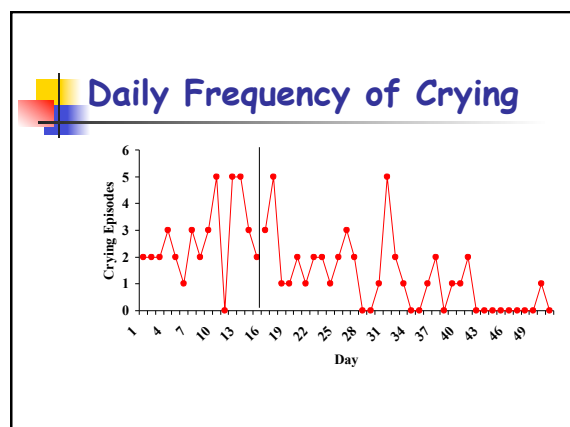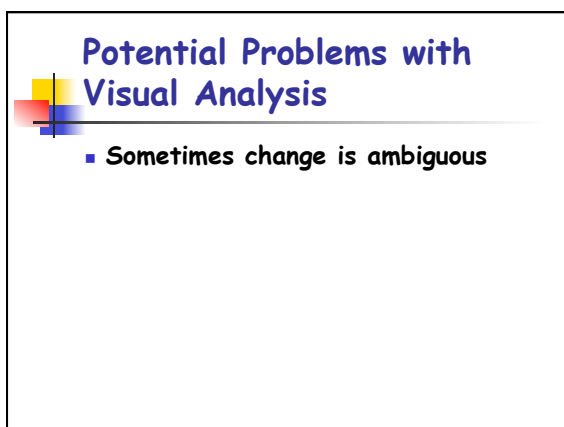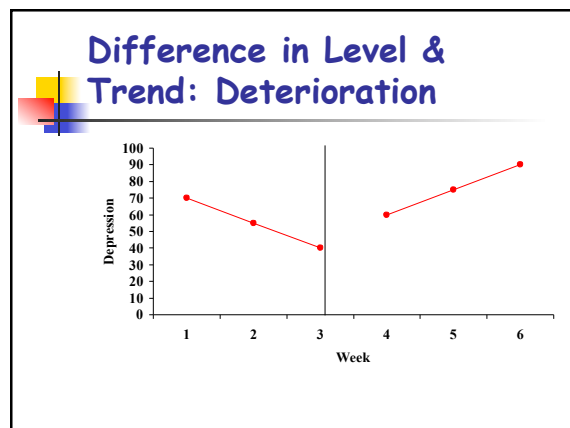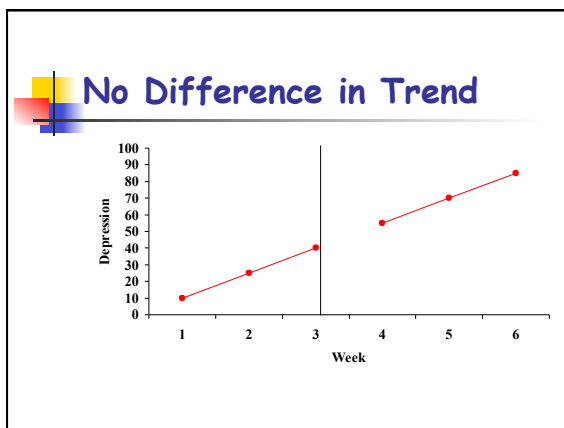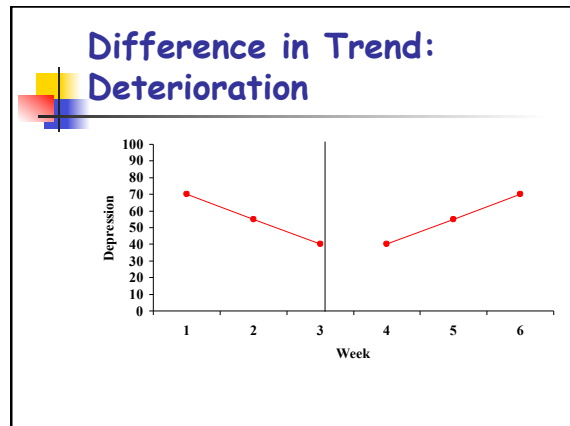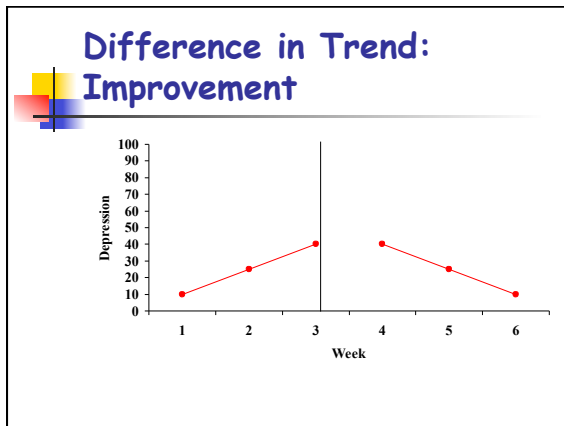
Visual Analysis

- **Change in level**
- **Change in trend**
- **Nature of change**
  - Improvement
  - Deterioration
  - No change

Difference in Level: Deterioration

Difference in Level: Improvement

Difference in Trend: Improvement

Difference in Trend: Deterioration

No Difference in Trend

Difference in Level & Trend: Deterioration

Potential Problems with Visual Analysis

- Sometimes change is ambiguous

Daily Frequency of Crying
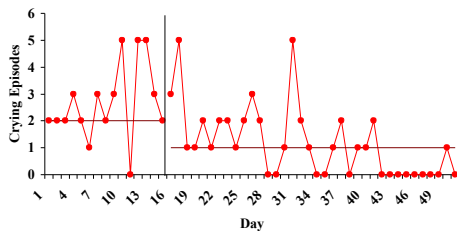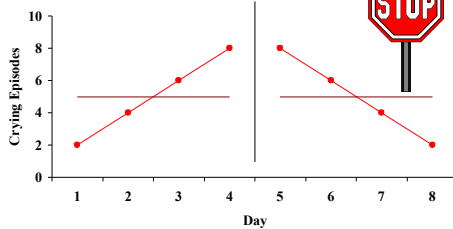
Daily Frequency of Crying With Median Lines

Trend

- Average rate of increase or decrease over time
- <u>Measures of central tendency are inappropriate for data exhibiting a trend</u>

Trend with Mean Lines

Repeated Measurement Using Individualized Rating Scale (IRS)

- Also known as a "target complaint scale," a "self-anchored scale," and an "individual problem rating scale"
- Tailor-made for each client

IRS Example

Intensity of anxiety today
(1) Little or no anxiety
(2) Some anxiety
(3) Moderate anxiety
(4) Strong anxiety
(5) Intense anxiety

Advantages of IRS's

- Can be completed by clients, practitioners, relevant others, or independent evaluators
- Tailored to individual clients
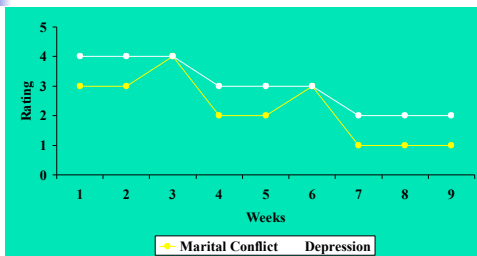- Easy to administer and score, and so can be used frequently

Advantages of IRS's (cont'd)

- Can be used with most clients
- Can be used to measure intensity of targets
- Can be used to measure thoughts and feelings
- Evidence of good reliability, validity, and sensitivity to change
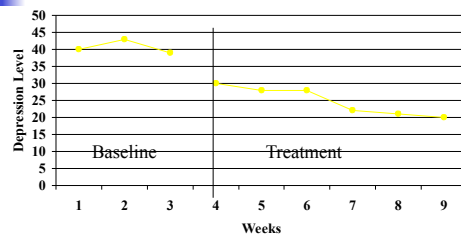
Repeated Measurement Using Logs

- Also known as "client annotated records" and "critical incident recording"
- Organized journal of events relevant to targets, and the client's perceptions of the circumstances under which these occur
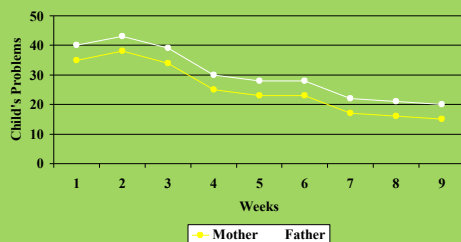- Used mostly by clients, but can be used by practitioners and significant others

Marital Conflict and Depression (2 outcomes)

Depression Level

Child's Problems Rated by Mother and Father

Internal Validity

A claim to good external validity is how <u>representative</u> is the study's participants.

Few human services projects and program evaluation use random sampling of the population and use convenience of some kind.

Replication

- The process of duplicating an experiment-in which the same hypotheses, variables, sampling procedures, testing instruments, and techniques are used with a different sample of the same population. (Barker, 1999, p. 409) (Case confidence)