

Comparative Designs

SPCD 619
Week 10



Types of Comparisons

- Comparing *two effective interventions*
- Comparing *variations of an intervention* (parametric or component analysis) to “refine” the intervention
- Comparing *a new intervention and an established intervention*
- Comparing *the effect of contextual variables on one or more interventions*
 - Physical, social, temporal, instructional variables

Particular threats to internal validity for multielement designs include multitreatment interference (effect of one condition on performance in another condition), nonreversibility of effects (behavior does not return to original levels so no chance to compare effects of interventions), and separation of treatment issues (can't be certain that one intervention is the cause of the behavior change).



Multitreatment Interference (effect of one condition on performance in another condition):

Carryover effects – one condition influences performance in another condition

Sequence effects – the order in which the conditions take place affects performance

Alternation effects – rapidly alternating interventions creates change in the performance of the DV

Nonreversibility of Effects

- The DV doesn't reverse easily to baseline levels, so can't do a comparison of interventions



Separation of Treatments

- Can't truly separate the effects of one intervention from another



When selecting a comparative design, consider:

- Is the behavior of interest reversible?
- How much time do you have to conduct the study?
- How many individuals are available to participate in the study?
- Whether one design is better for this particular research context and question than another?

Multitreatment Designs: **Comparative**

- A minimum of 2 different interventions (or variations of one intervention) are introduced and withdrawn
- Can be used with behaviors that accelerate or decelerate but behaviors must be reversible
- Can be used with or without a baseline condition, but including a baseline condition is best
 - Can compare two or more interventions, take apart/build an intervention (component analysis), or investigate parametric variations of an intervention

Guidelines for a strong multitreatment design

(see also p. 341 in Gast, 2010):

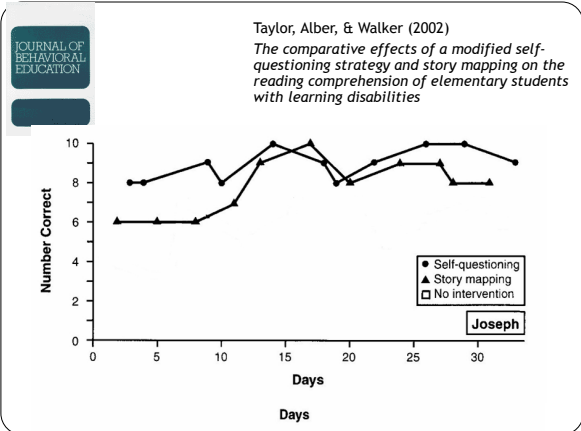
- Introduce/remove only one intervention, component, or parametric variation at a time
- Must include a demonstration and a minimum of two replications (e.g., A-B-C-B-C)
- Data should change in a consistent way each time there is a condition change
- Best to have 4-6 participants
- Counterbalance the order of implementation of the interventions

Multitreatment Design Limitations & Strengths

- Long designs so increase chances of threats to internal validity (e.g., maturation, history, attrition, observer drift, procedural validity, multitreatment interference)
- Because of length, may require substantial resources
- Are flexible so allow for different types of comparisons and can be used with different types of interventions.

Alternating Treatments Design (ATD): **Comparative**

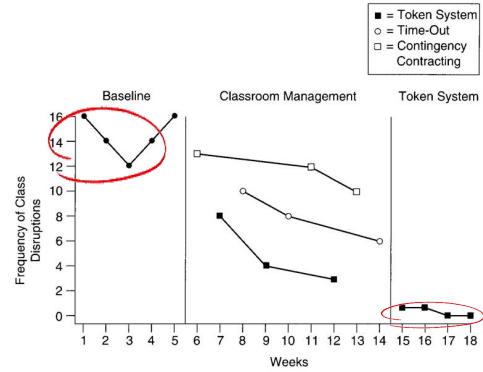
- Is most often used to compare 2-3 interventions (ATD) but can be used to compare up to 6; or to determine what factors precipitate/maintain challenging behavior (M-ED)
- Use with a minimum of 3-5 participants
- The design allows rapid and repeated implementation of two or more interventions on one dependent variable that is a reversible behavior, to determine which intervention is most effective.
 - Can also use it to conduct parametric and component analysis of a single intervention
 - Behavior pattern in at least one intervention condition **differentiates** itself from the other conditions (**response differentiation**)



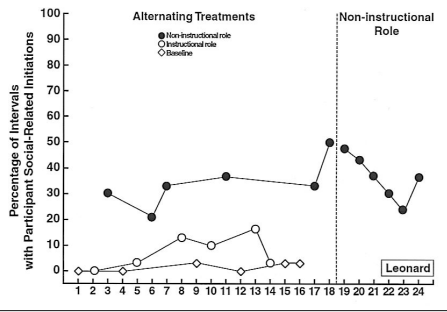
Alternating Treatments Design

- Need 5 repetitions of the alternating sequence to meet the WWC standards

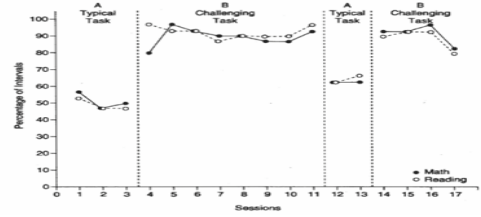
ATD Example



Education and Training in Developmental Disabilities



ATD Example



Data Analysis

- Can use PND between conditions to quantify replications;
- The variability of data is less important than consistency between conditions (interventions).

Minimizing Threats to Internal Validity in ATD designs



- Is a relatively short duration design so maturation and history are generally controlled
- Control for instrumentation by collecting IOA data and procedural fidelity data frequently
- Multitreatment interference can be minimized by using the superior condition alone phase, increasing time between sessions
- Can't do too much to control for separation of treatments issue

Summary of Alternating Treatment Designs

Appropriate to Use When

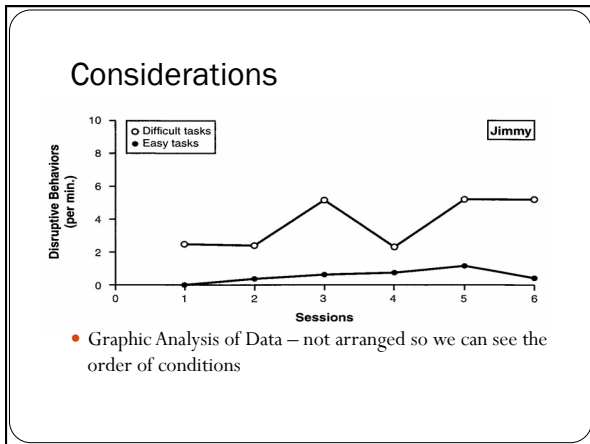
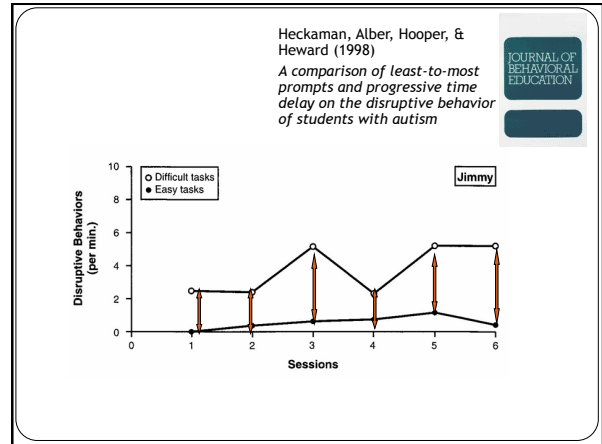
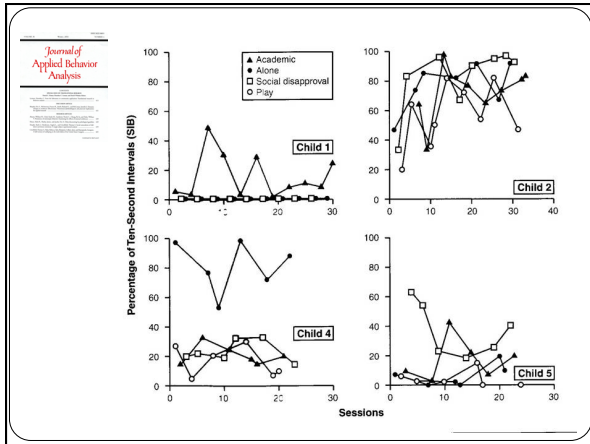
- Target behavior is reversible
- Want to compare multiple interventions/conditions
- When baseline data are unavailable or unstable (Kennedy, 2006)

Not Appropriate to use When

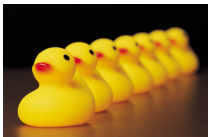
- Target behavior is NOT reversible or takes a long time to reverse (e.g., some medications)
- If participants will have great difficulty distinguishing between interventions
- If interventions being used typically create slow behavioral changes

Multi-element Design (M-ED) (Wollery et al. consider this a variation of the ATD)

- Two or more conditions implemented sequentially
 - Within sessions
 - At different times during the same day
 - Across different days
- Most often used to determine what is maintaining challenging behavior
- Behavior pattern in at least one condition **differentiates** itself from the other conditions (**response differentiation**)



Coming up . . .



- Week 11**
 - Discuss Adapted Alternating Treatments (Rob?) & Parallel Treatments designs (Jessica)
- Week 12**
 - Discuss Changing Criterion and Nonconcurrent Baseline designs
 - Take-Home Quiz 2 is due