



Examination of Trends in Behavioral Improvement Over the Course of a One Year After School Behavioral Intervention Using Time Series

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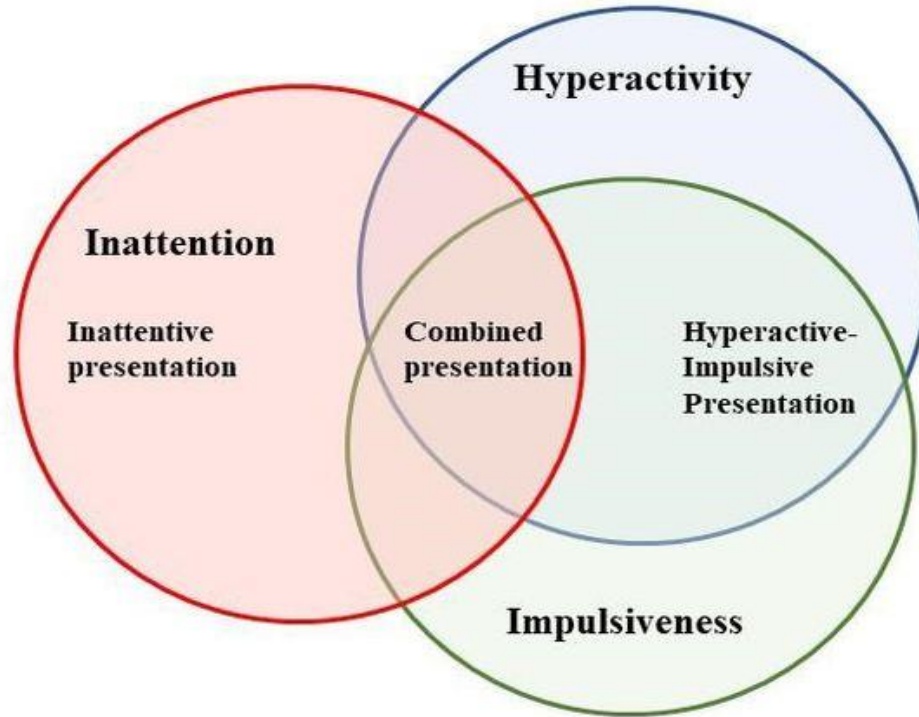


Brief Agenda

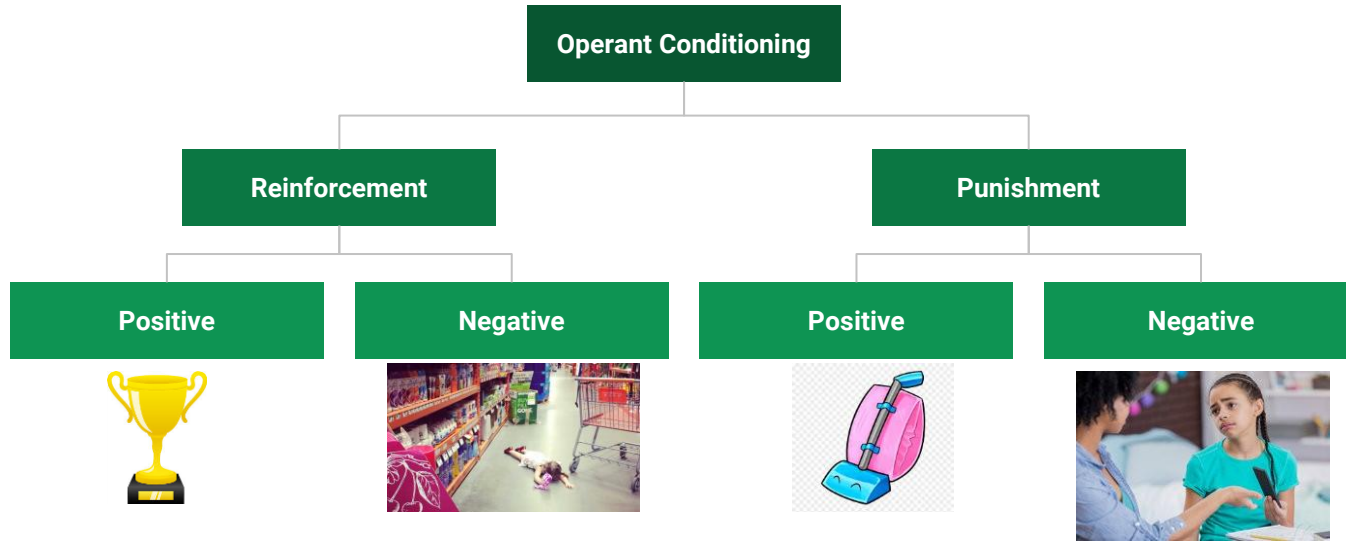
- Discuss typical study designs (e.g., between group, within group) as well as limitations of these designs
- Introduce single case designs and time series
- Describe proof-of-concept study on implementing time series



ADHD



Behavior Modification [BM]

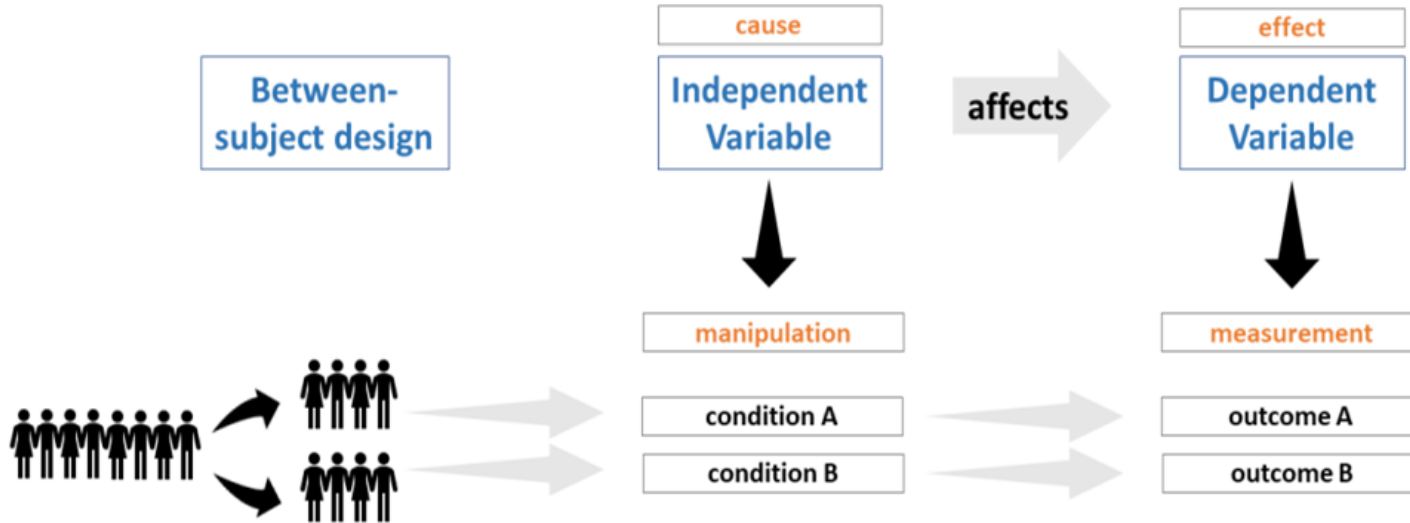




Existing Challenges in the BM Literature

- For whom?
- Stimulant med doses \neq BM “doses”
 - SMART trial: additional dosing required for those in the BM first condition
- If we could identify *when* someone was not responding to treatment, we could make changes sooner

Between-Groups





Limitations of These Designs

- **Variability of treatment**
 - **Variability is treated as error so is often disregarded**
- **Violation of assumptions**
 - **Linearity**
- **Failure to understand processes that occur within treatment**



Within-subject and Pre-Post



Behavior at
Time 2



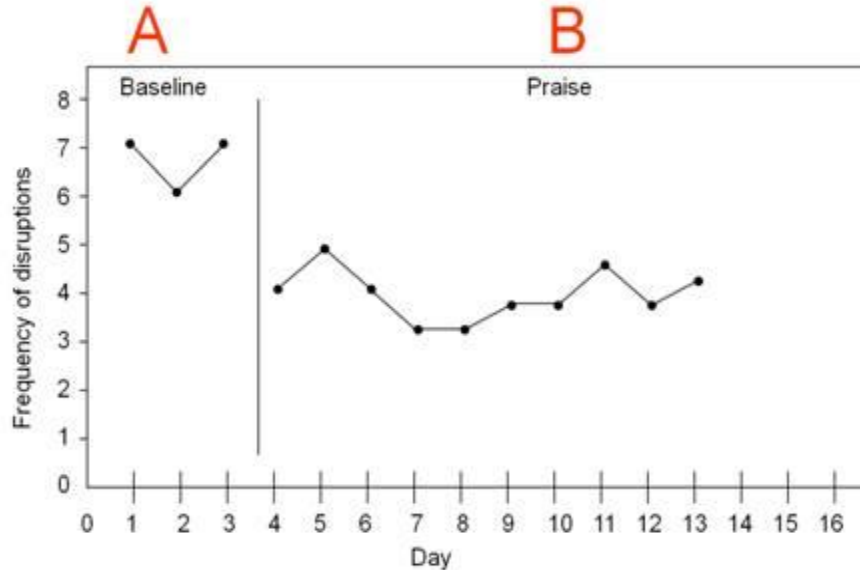
Behavior at
Time 3



Challenges

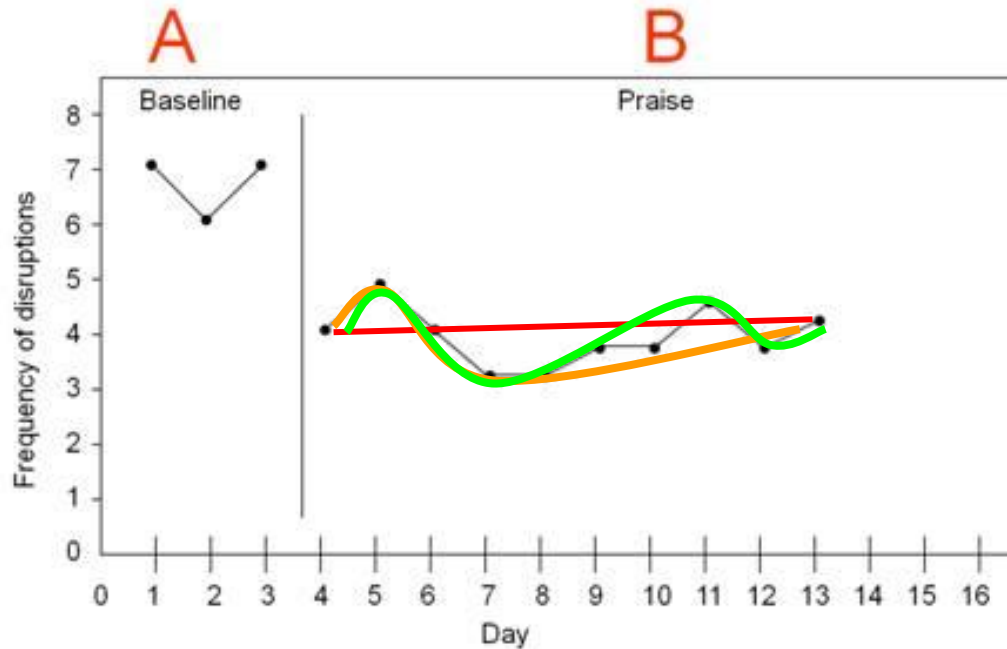
- **Still truncates variability of response to treatment**
- **Within-subject analyses do not handle large amounts of data well**

Single Case Designs and Time Series

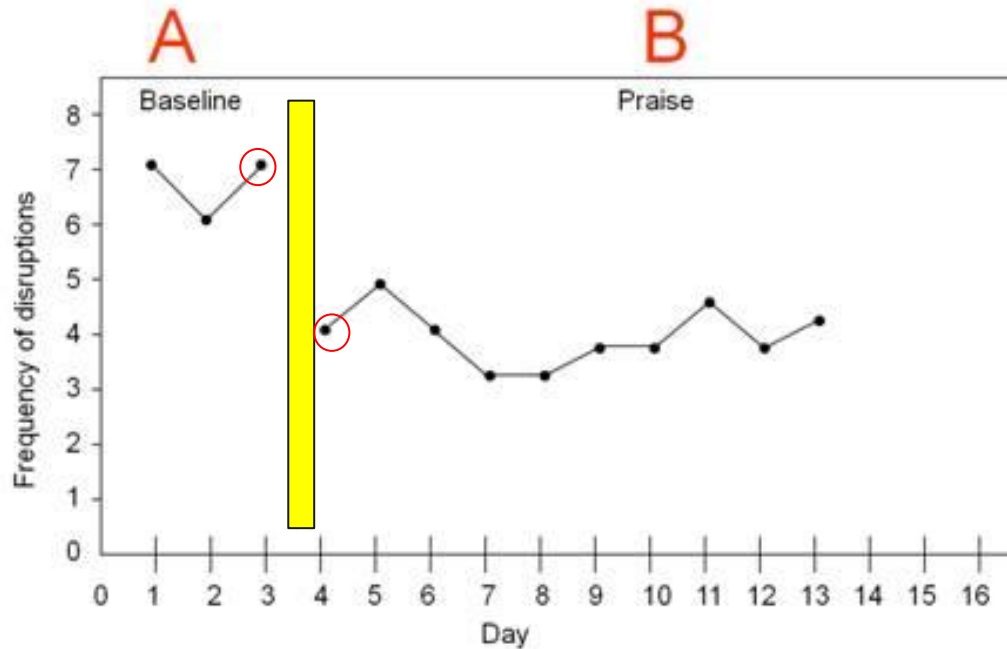


- To understand variability of response to treatment over time
- Translation from science to practice
- How does BM work for this child?

Time Series: Trend Analysis



Time Series: Interrupted Time Series





Aims and Hypotheses

- Trend analysis
 - **Evaluate the extent to which trend characterizes desirable and undesirable behaviors**
 - Desirable behaviors would increase over time
 - Undesirable behaviors would decrease over time
 - No specific predictions about quadratic or cubic effects
- Interrupted time series
 - **Evaluate the extent to which interrupted time series characterizes changes in behavior across a holiday break**
 - We predicted that desirable behavior would be significantly lower following a holiday break
 - We predicted that undesirable behavior would be significantly higher following a holiday break

Afterschool Treatment Program [ATP]

- Analog to Summer Treatment Program
- Desirable behaviors are rewarded
- Undesirable behaviors are punished
- Behaviors are logged on a trial-by-trial basis throughout the afterschool program over a school year





Participant

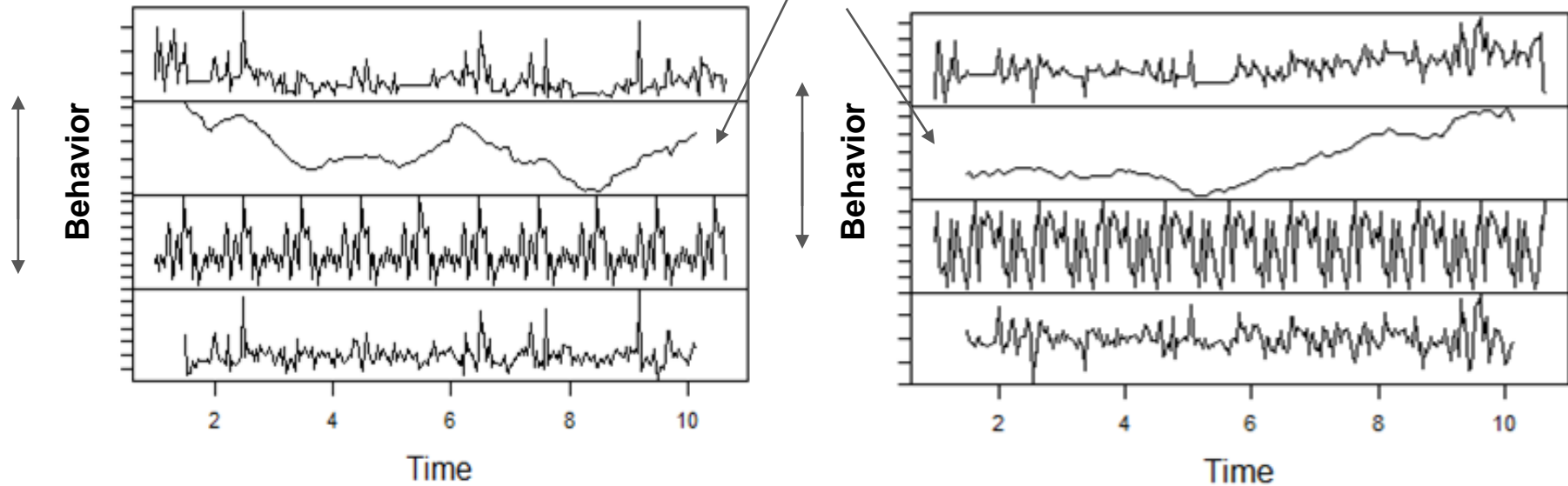
- “Jared”
 - 7 year old Caucasian Hispanic male at beginning of treatment
 - 1st grade
 - Diagnosed with ADHD-combined
 - Presenting problems include difficulties with sustained attention, always “on the go”
 - FSIQ score of 84

Data Reduction and Data Analytic Plan

Undesirable Behavior

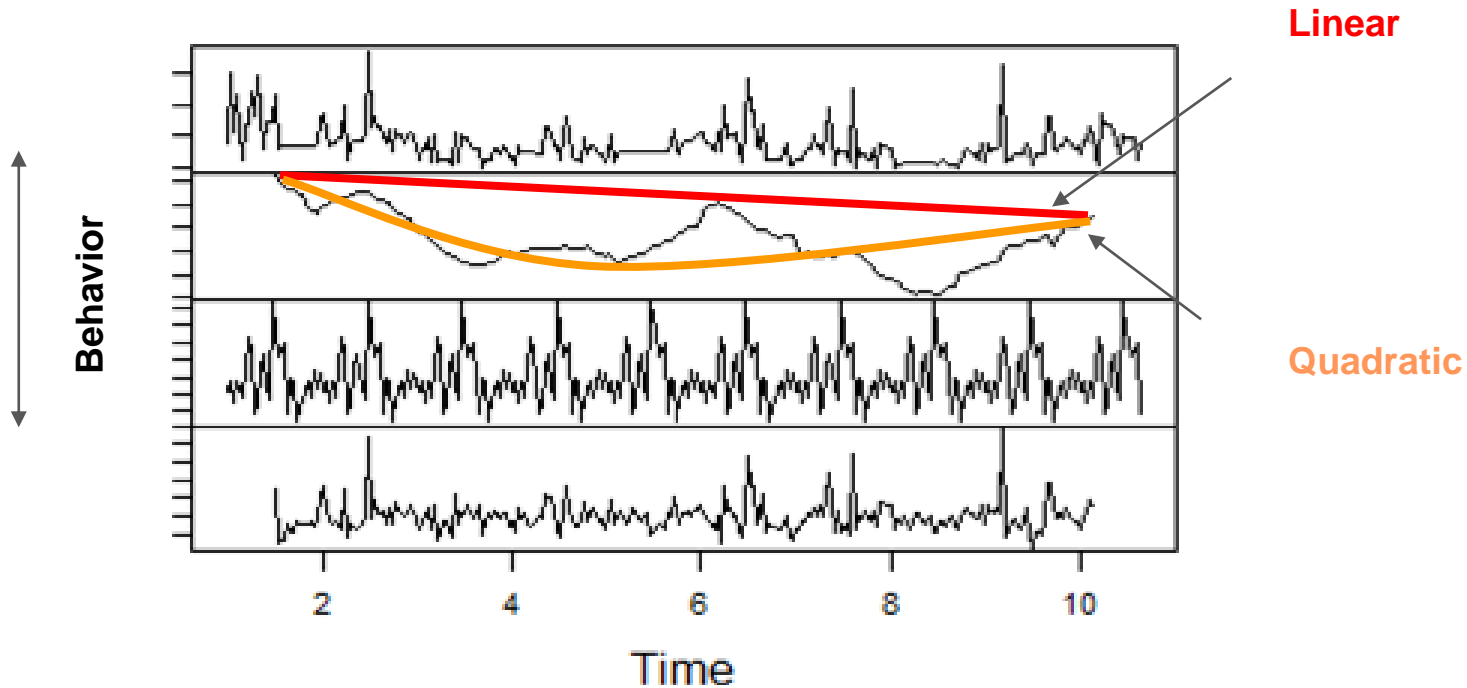
Trend

Desirable Behavior



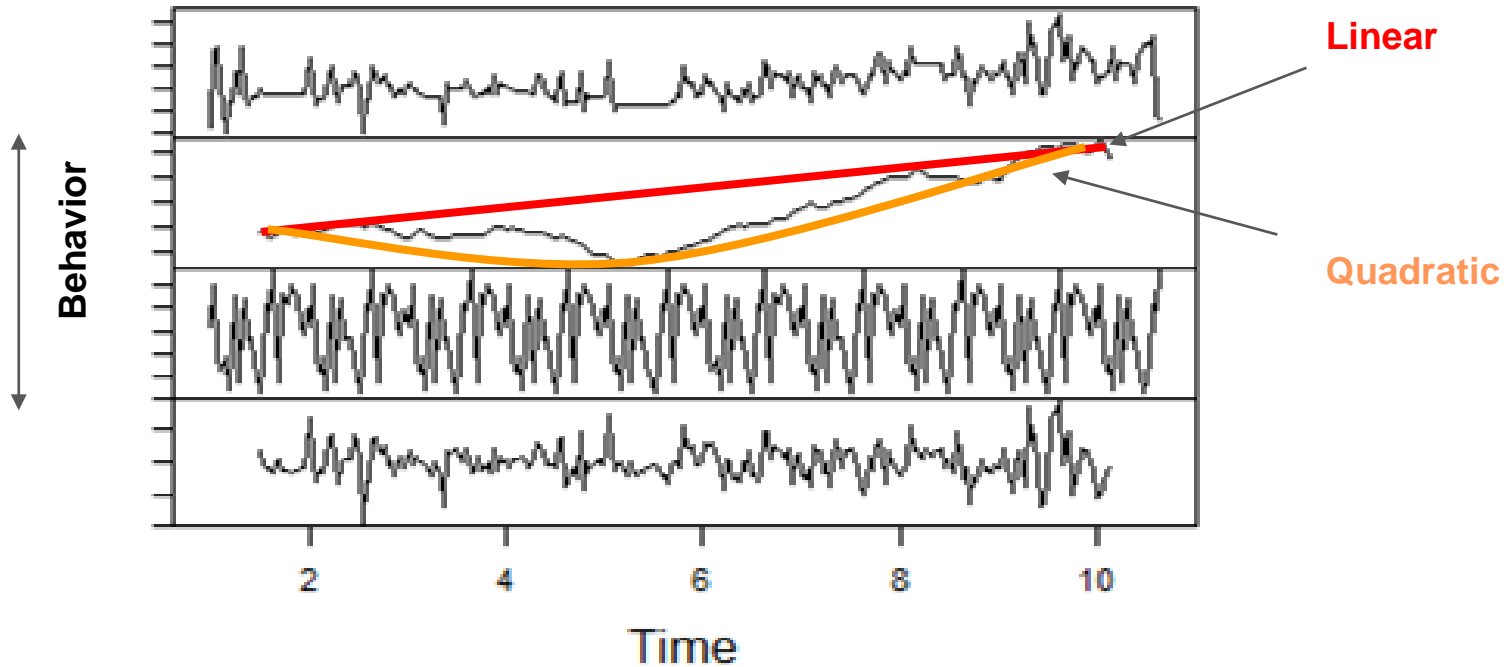


Undesirable Behavior



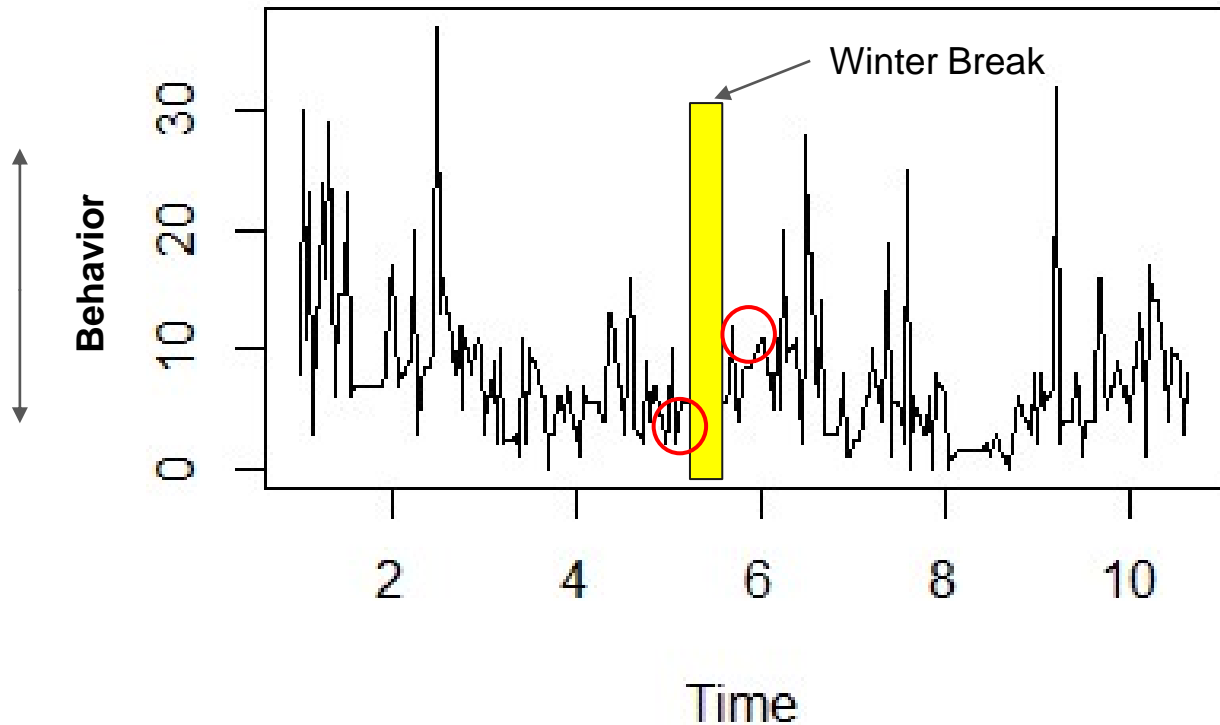


Desirable Behavior



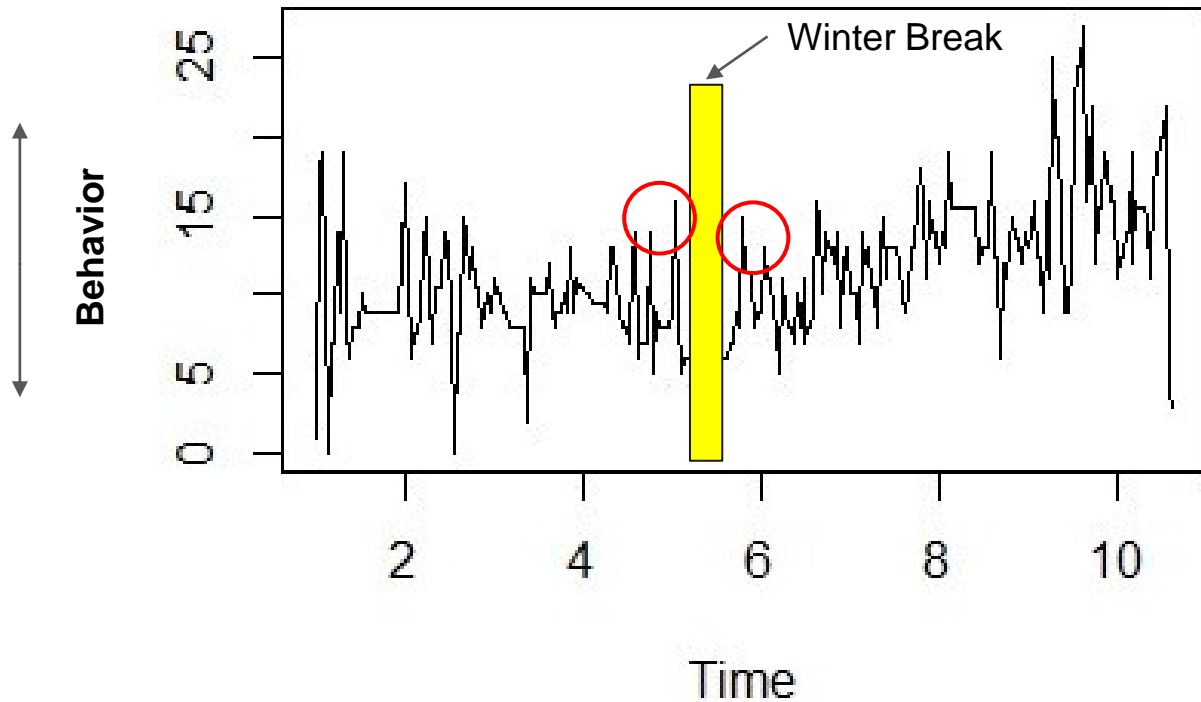


Undesirable Behavior





Desirable Behavior



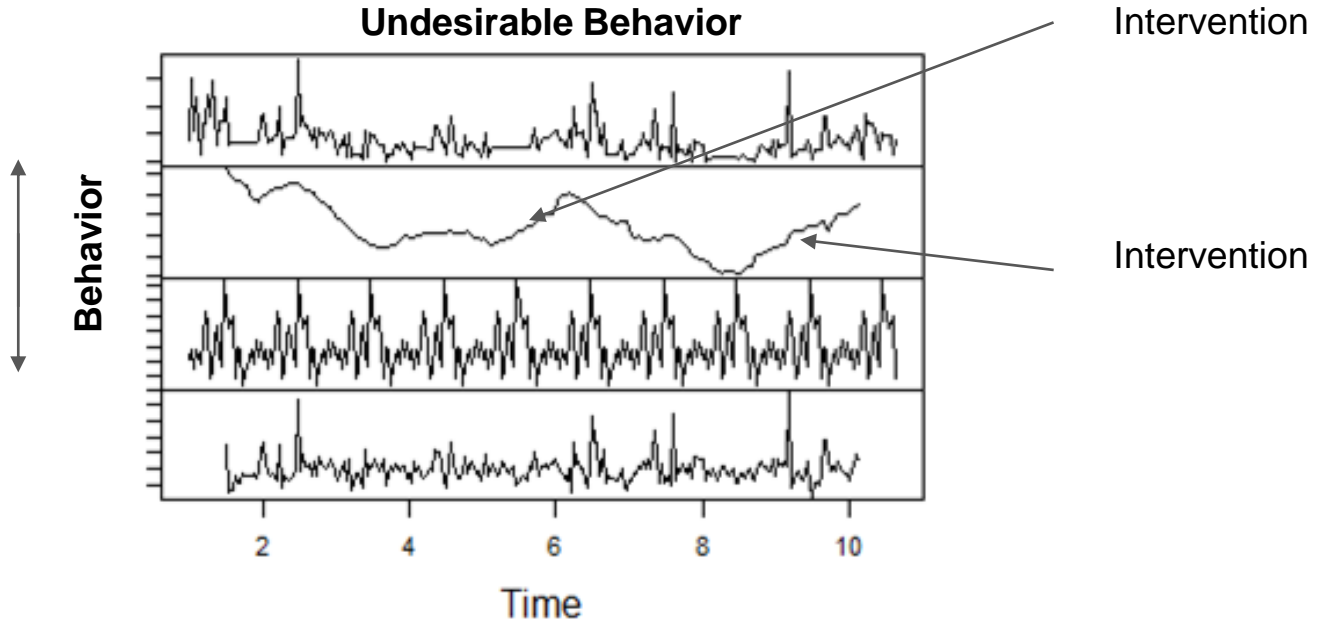


Discussion

- Both undesirable and desirable behaviors demonstrated linear and quadratic trends
- Impact of winter break on subsequent undesirable and desirable behavior
- Time series analysis is sensitive to measure changes in behavior over time and is capable of handling large amounts of data

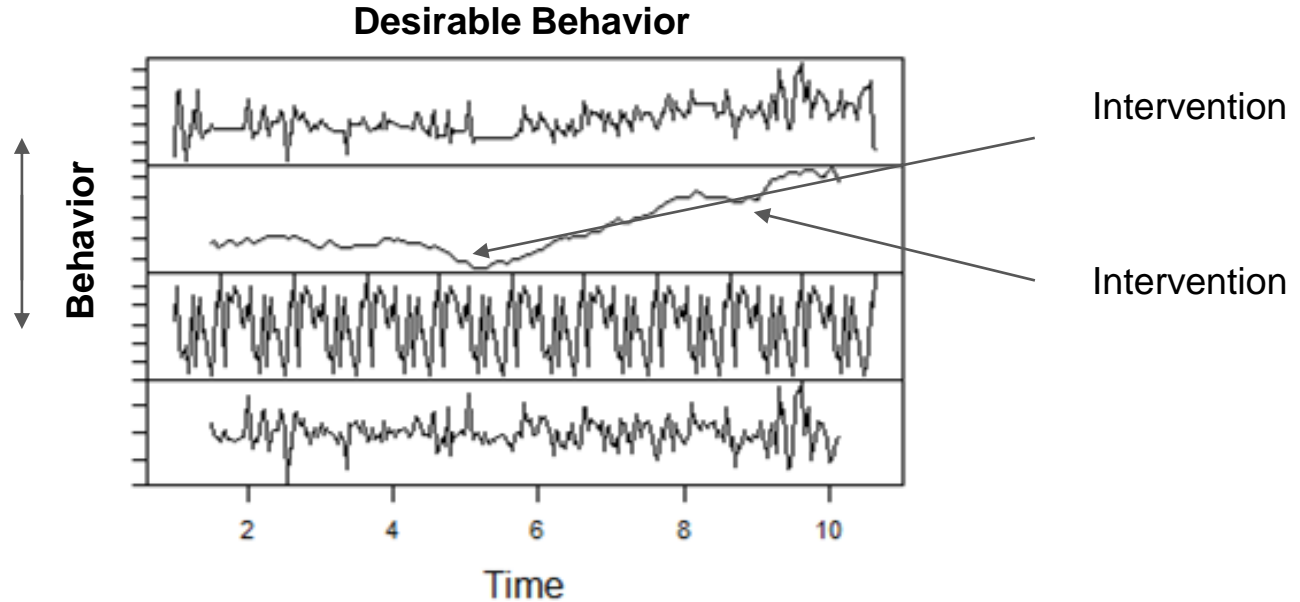


Recommendations for Intervention





Recommendations for Intervention





Thank you!

- To the wonderful families that we have the privilege of knowing through the Afterschool Treatment Program [ATP]
- Drs. Raiker, Timmons, Morrow, and Fosco
- Cinthya Lozano [Former director of ATP] and the many counselors who worked with the children at the ATP
- The PALM graduate student family - Mileini Campez and Jessica Smith



Resources for Time Series

- **Primer on time series (with supplementary R code): Jebb et al., (2015) - Time Series for Psychological Research**
- **Using Time Series in R: A Little Book of R for Time Series by Avril Coghlan**
- **Importance of Single Case Designs: Borckardt et al., (2008) - Clinical Practice as Natural Laboratory for Psychotherapy Research: A Guide to Case-Based Time-Series Analysis**



Questions?