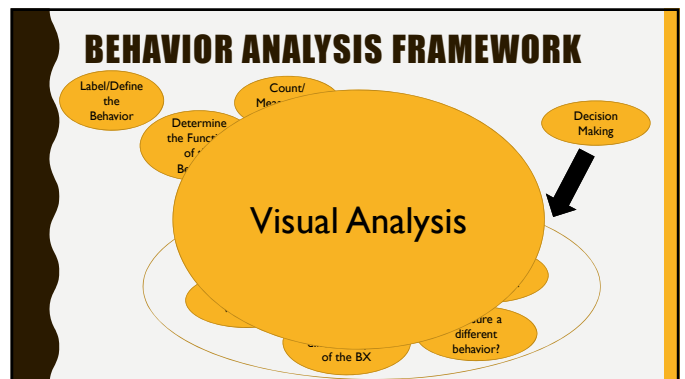
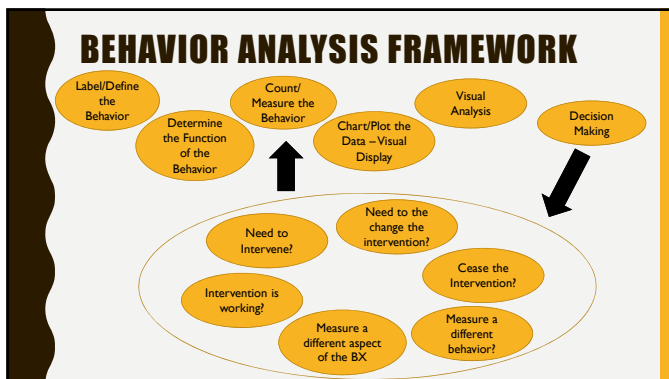


### EVIDENCE BASED BA – WEDNESDAY PRIMARY CONCLUSIONS

- Behavioral Journals devote a similar amount of page space to visual displays (i.e., graphs) as psychology.
  - Leading Behavior Journals on par with other Natural Sciences
- Primary visual display = Line Graph
  - Displays behavior change over time
  - Numerous types and amounts of graphical construction errors

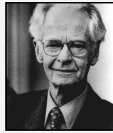
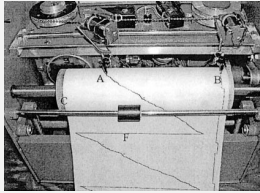
Kubie, R. M., Kostewicz, D. E., & Ditchuk, S. M. (2008). An initial survey of fractional graph and table area in behavioral journals. *The Behavior Analyst*, 31, 61-66. doi: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2793247/

Kubie, R. M., Kostewicz, D. E., Brennan, K. A., & King, S. A. (2017). A Critical Review of Line Graphs in Behavior Analyst Journals. *Educational Psychology Review*, 29, 583-598. doi: 10.1007/s10648-015-9339-x



## VISUAL ANALYSIS

"We make important aspects of behavior visible. Once this has happened, our scientific practice is reduced to simple looking" (Skinner, 1956, p. 229).



## VISUAL ANALYSIS

Visual analysis involves "(a) the extent and type of variability in the data, (b) the level of the data, and (c) trends in the data" (Cooper, Heron & Heward, 2007, p. 149).

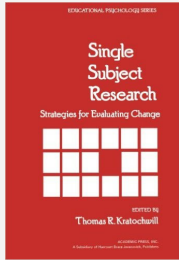
Variability (or Stability)  
Level  
Trend

## VISUAL ANALYSIS

"Visual analysis of graphic displays of data is a cornerstone of studies using a single case experimental design (SCED). Data are graphed for each participant during a study with trend, level, and stability of data assessed within and between conditions (Lane & Gast, 2014, p. 445)."

Variability (or Stability)  
Level  
Trend

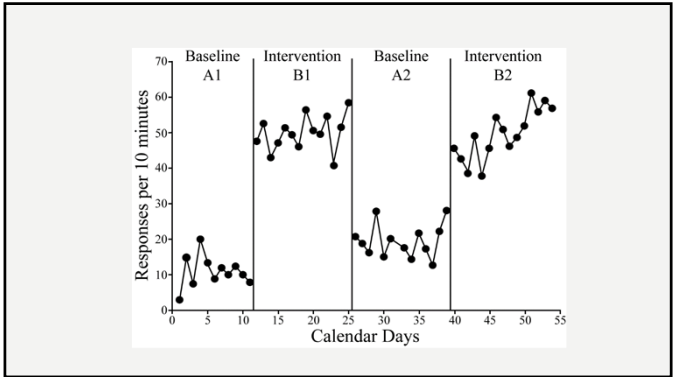
**EVERYWHERE  
THERE IS TIME  
SERIES DATA**

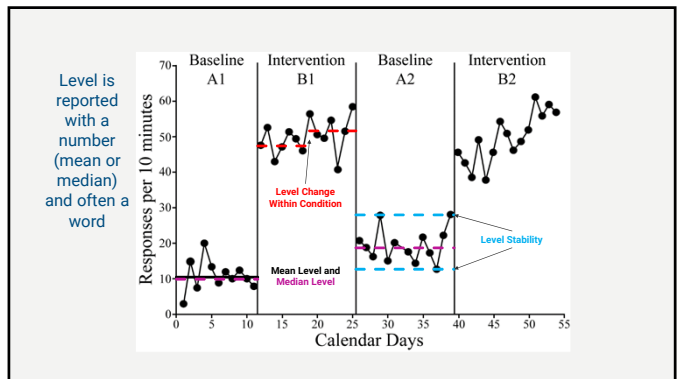
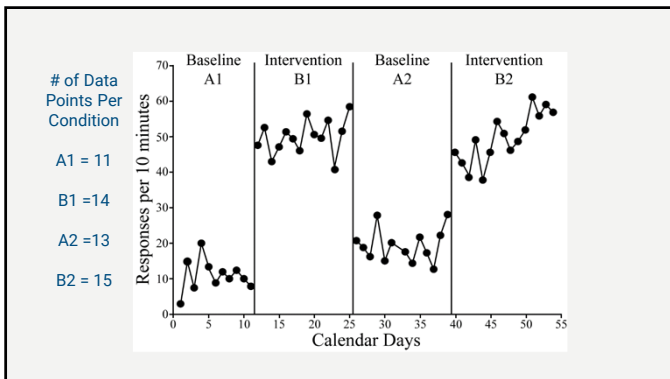
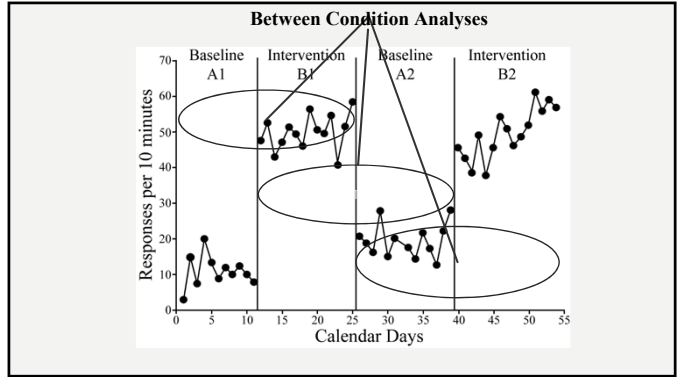
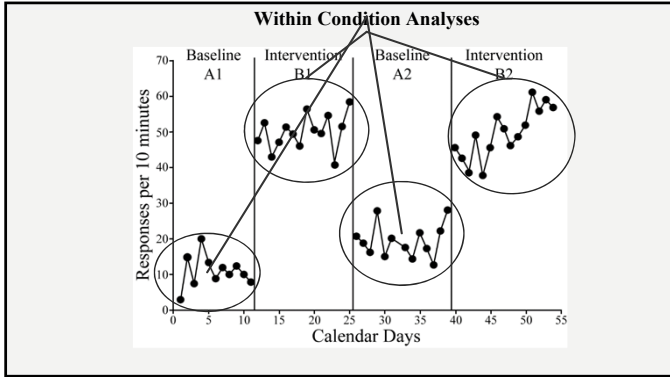


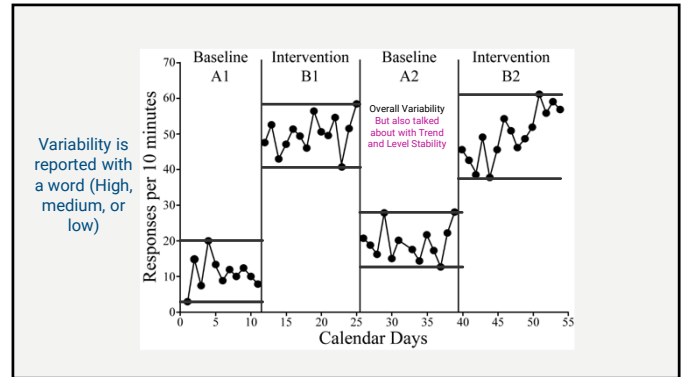
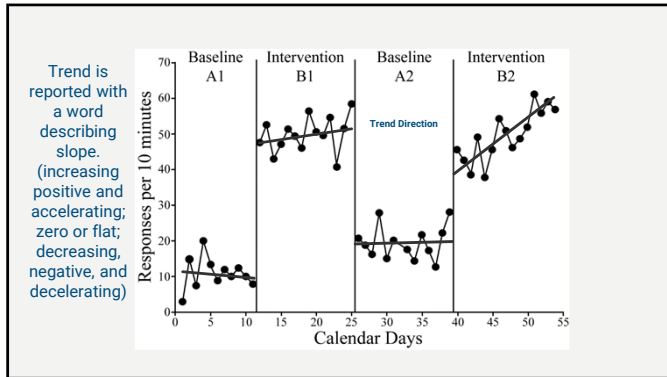
Parsonson, B. S., & Baer, D. M. (1978). The analysis and presentation of graphic data. In T. R. Kratochwill (Ed.), *Single-subject research: Strategies for evaluating change* (pp. 101-165). New York: Academic Press.

- | Within Condition Analysis              | Between Condition Analysis                   | Evaluation                                    |
|--|--|---|
| 5. Number of data points in each phase | 7. Changes in trends between adjacent phases | 9. Analysis of data across similar phases     |
| 1. Stability of baseline               | 7.1 Type of trend changes between phases     | 10. Evaluation of overall pattern of the data |
| 2. Variability within phases           | 8. Changes in level between phases           |   |
| 6. Changes in trend within phases      | 8.1 Types of changes in level between phases |   |
|  | 3. Variability between phases                |   |
|  | 4. Overlap between scores of adjacent phases |   |

# VISUAL ANALYSIS STUDY







## RESEARCH QUESTIONS

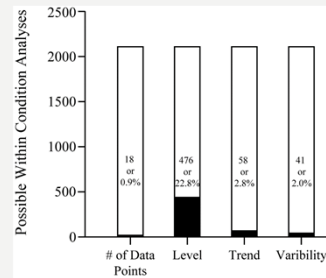
1. To what extent do researchers conduct a within condition analysis per condition with regards to number of data points, trend, level and variability?
2. When conducted, to what extent do we follow established guidelines?

## JOURNALS AND METHOD

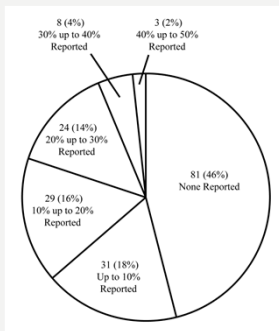
- 6 Applied Behavioral Journals
  - Behavior Modification, Journal of Applied Behavior Analysis, Education and Treatment of Children, Journal of Behavioral Education, The Analysis of Verbal Behavior, European Journal of Behavior Analysis
- Two Volumes from each (2007 and 2012).
- Article criteria:
  - Had to contain a minimum of 1 instance of a ABAB, reversal, and/or withdrawal figure in isolation. The reversals could not be embedded in other designs (e.g., Reversal with a multiple baseline).
- Scored each figure meeting criteria for instances of within condition analysis.
  - Reliability on 20% of articles (99.8%)

## OVERALL RESULTS

- 12 Volumes containing 42 Issues
- 45 Articles contained a minimum of 1 graph meeting criteria
- 176 graphs met criteria = 3.91 per article
- 338 behaviors (i.e., data paths) = 1.92 per graph
- 2086 Total Conditions = 11.85 per graph and 6.17 per behavior/data path



2086 analyses possible per tactic  
 Total of **593** or **7.1%**  
 of **8430** possible analyses reported



Possible Analyses Reported Per Graph (176)

One graph had 47% of possible analyses reported  
 Maximum amount

## Types of Analyses Conducted

Tactic	Total	Qualitative	Quantitative	Both
# of Data Points	18	0	18	0
Level	476	107	219	150
Trend	58	56	0	2
Variability	41	36	5	0
<b>TOTAL</b>	<b><u>593</u></b>	<b><u>199</u></b>	<b><u>242</u></b>	<b><u>152</u></b>

Level (5 or more times)		Trend (2 or more times)		Variability (2 or more times)	
high	57	decreased	6	variable	13
low	39	increasing	5	stable	5
moderate	11	increased	5	constant	2
relatively infrequent	9	decreasing	3	highly variable	2
infrequent	8	positive	2		
very infrequently	8	gradually decreased	2		
stable	7	decreased to zero	2		
zero	7	decrease	2		
relatively low	6				
did not BX often	5				
remained low	5				
variable	5				

## DISCUSSION

- A clear majority of graphs failed to contain even 1 within condition analysis.
- Failed to conduct a within condition analysis tactic 93% of the time.
- When conducted, varied from guiding literature.

## DISCUSSION

- What are the ramifications of not following the rules for visual analysis?
- Answers lie in the primary reasons for visual analysis...

### I. Determining Effects

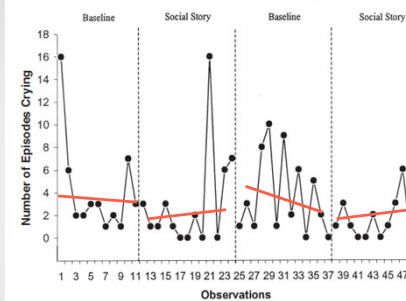
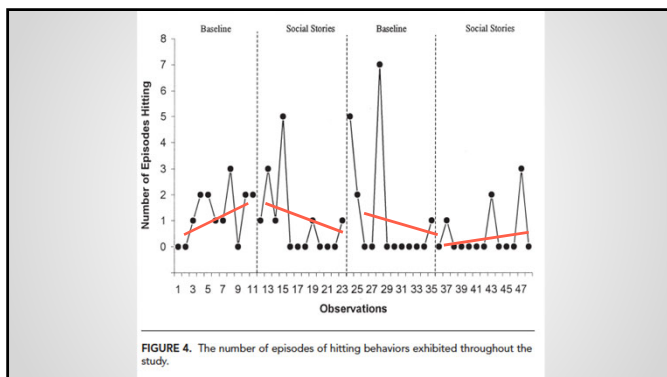
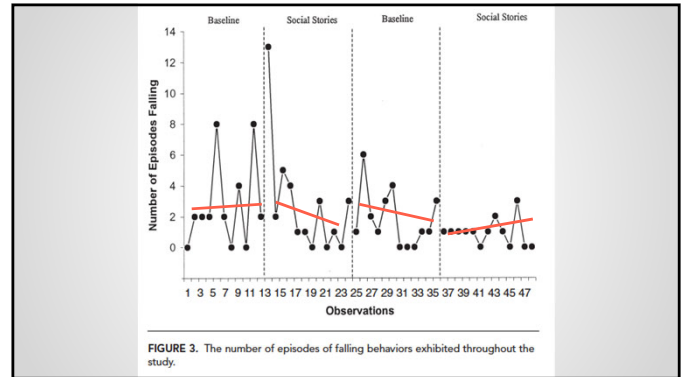
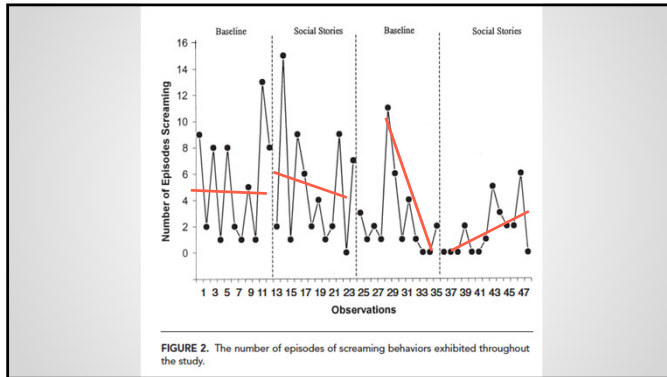


FIGURE 1. The number of episodes of crying behaviors exhibited throughout the study.



## DISCUSSION

- What are the ramifications of not following the rules for visual analysis?
- Answers lie in the primary reasons for visual analysis...

1. Determining Effects

### 2. Communicating Data

Without a proper (i.e., excluded and/or incorrect) visual analysis, we increase the likelihood of making type 1 and type 2 errors.



## CONCLUDING THOUGHTS

- Behavior analysis is a powerful system of knowledge and procedures for changing behavior.
- Visual analysis serves as the primary tactic for determining the meaningfulness of effects.
- Present study suggests visual analysis occurs frequently yet misses all the richness of analytic tactics.
  - A within condition analysis is only half the equation...an examination of between condition analyses needs to occur.