



# ABACS, LLC

ABA CONSULTATION & SERVICES

## Using Functional Communication Training and Reinforcer Delay Fading to Treat Multiply-Maintained Aggressive Behavior

**Ashley Williams**

ABACS & Simmons College

**Gretchen A. Dittrich**

Simmons College



# SIMMONS

# Functional Communication Training

- ▶ A communication response results in access to reinforcer (Carr & Durand, 1985)
  - ▶ Extinction (e.g., Fisher et al., 1993, Hagopian et al., 1998, Wacker et al., 1990)
- ▶ Functional communication training (FCT) is effective in reducing rates of severe problem behavior (e.g., Carr & Durand, 1985; Fisher et al., 1993; Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998)
- ▶ FCT is the most published function-based treatment for problem behavior (Tiger, Hanley, & Bruzek, 2008)

# Limitations of FCT

- ▶ FCT has its limitations (Fisher et al., 2000; Fisher et al., 1993; Tiger et al., 2008)
- ▶ The individual is given immediate access on a continuous schedule (Carr and Durand, 1985; Tiger et al., 2008)
- ▶ Parents/Caregivers/Teachers (Tiger et al., 2008)
  - ▶ The reinforcer may not be immediately available
  - ▶ Caregiver may be unavailable to facilitate delivery of the reinforcer
  - ▶ The reinforcer may only be intermittently available

# Limitations of FCT

- ▶ Rates of responding are often higher than peers (Fisher et al., 2000; LeBlanc, Hagopian, Marhefka, & Wilke, 2001)
- ▶ Escape-maintained behavior (Reichle, Johnson, Monn, & Harris, 2010)
  - ▶ Requesting breaks at a high rate
  - ▶ Few learning opportunities
  - ▶ Limited tolerance to delays or denial

# Schedule Thinning following FCT

- ▶ Schedule thinning is needed (Hagopian, Boelter, & Jarmolowicz, 2011)
  1. **Delay schedules**

(e.g. Braithwaite & Richdale, 2000; Fisher et al., 2000; Hanley, Iwata, & Thompson 2001)
  2. **Chain schedules or demand fading**

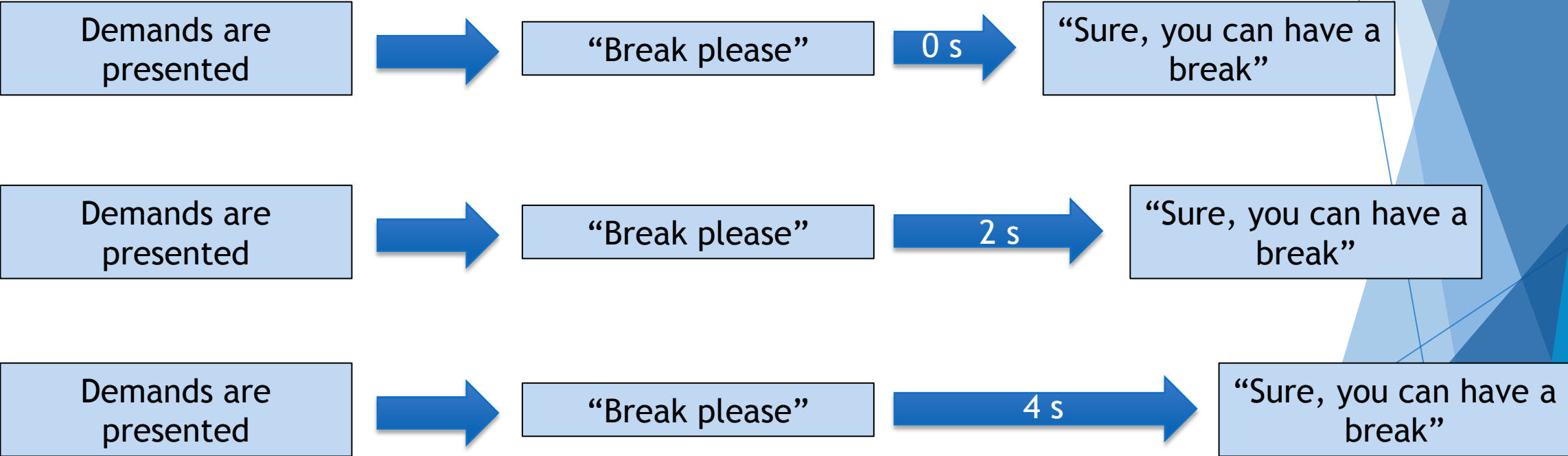
(e.g., Falcomata, Meuthing, Gainey, Hoffman, & Fragale, 2013; Fisher et al., 1993; Hagopian et al., 1998; Lalli et al., 1995)
  3. **Multiple schedules**

(e.g., Fisher et al., 1998; Hagopian et al., 2004; Hanley et al., 2001)
  4. **Response restriction**

(e.g., Hagopian et al., 2004; Roane, Fisher, Sgro, Falcomata, & Pabico, 2004)
- ▶ Only 29% of functional communication studies used schedule thinning following FCT (Hagopian et al., 2011)

# Reinforcement Delay Fading

► Reinforcement delay fading



# Delay Schedules

- ▶ Reinforcement delay fading generally fails to increase delays greater than 30 s (Kelley, Lerman, Fisher, Roane, & Zangrillo, 2011)
- ▶ Signals may facilitate longer delay periods (Kelley et al., 2011)
  - ▶ For 2 of 3 participants:
    - ▶ Signal aided maintenance of responding during greater delays as compared to unsignaled delays

# Reinforcement Delay

- ▶ Largely used to treat problem behavior maintained by social positive contingencies (i.e., attention, tangible) (e.g., Braithwaite & Richdale, 2000; Fisher et al., 2000; Hagopian et al., 2001; Hagopian et al., 1998)
- ▶ Braithwaite and Richdale (2000)
  - ▶ Escape maintained SIB and aggression
  - ▶ Multiply controlled - escape and tangible
    - ▶ Treatment was separate for each function
    - ▶ Did not specify whether demands were maintained during the delay period
      - ▶ EO may not have been in place during the delay



# Purpose

- ▶ Use FCT and signaled reinforcement delay fading to decrease rates of aggression maintained by access to escape from demands and preferred items
- ▶ Establish high rates of communication and high, increasing rates of task completion as delay increased
- ▶ During ongoing home-based service delivery

# Participant

- ▶ 3-year-old boy with autism spectrum disorder
- ▶ Full day preschool
- ▶ 10 hours/week of home-based ABA
- ▶ 2 hours/week of clinic-based 1:1 therapy and social skills
- ▶ Participant behaviors:
  - ▶ PECS (Bondy & Frost, 1994) & some vocal communication (3-5 words)
  - ▶ Aggressive behaviors

# Setting

- ▶ Home
  - ▶ Living room
    - ▶ Included sofa, TV, small table and chairs, low and moderately preferred toys
    - ▶ Family members were often present and passing through the room
  - ▶ Outpatient Clinic (Generalization)
    - ▶ Workspace was an 8'x8' cubicle with one open side facing a larger room with peers
    - ▶ 2-3 peers present during session

# Materials

- ▶ Materials
  - ▶ iPad®
  - ▶ PECS book
  - ▶ Vivitar® DVR508 digital camcorder
  - ▶ Instant Data® and Instant IOA®

# Dependent Variables

- ▶ 1. Aggressive behaviors
  - ▶ 2. Task completion
  - ▶ 3. Vocal communication responses
  - ▶ 4. Nonvocal communication responses
- } Total FCRs

# Dependent Variables

- ▶ Recorded total frequency
- ▶ Video recordings of sessions
- ▶ Rate of responding was calculated by dividing the total number of responses by the session length
  - ▶ During delay sessions, the session timer was paused during the reinforcement delay and excluded from the calculation of rate (Kelley et al., 2011)

# Experimental Design

- ▶ Functional Analysis (FA)
  - ▶ FA was conducted using multi-element design (Iwata, Dorsey, Slifer, Bauman & Richman, 1982/1994)
    - ▶ Attention (A)
    - ▶ Demand (B)
    - ▶ Tangible (C)
    - ▶ Control (D)
  - ▶ ABCDCADBDCB

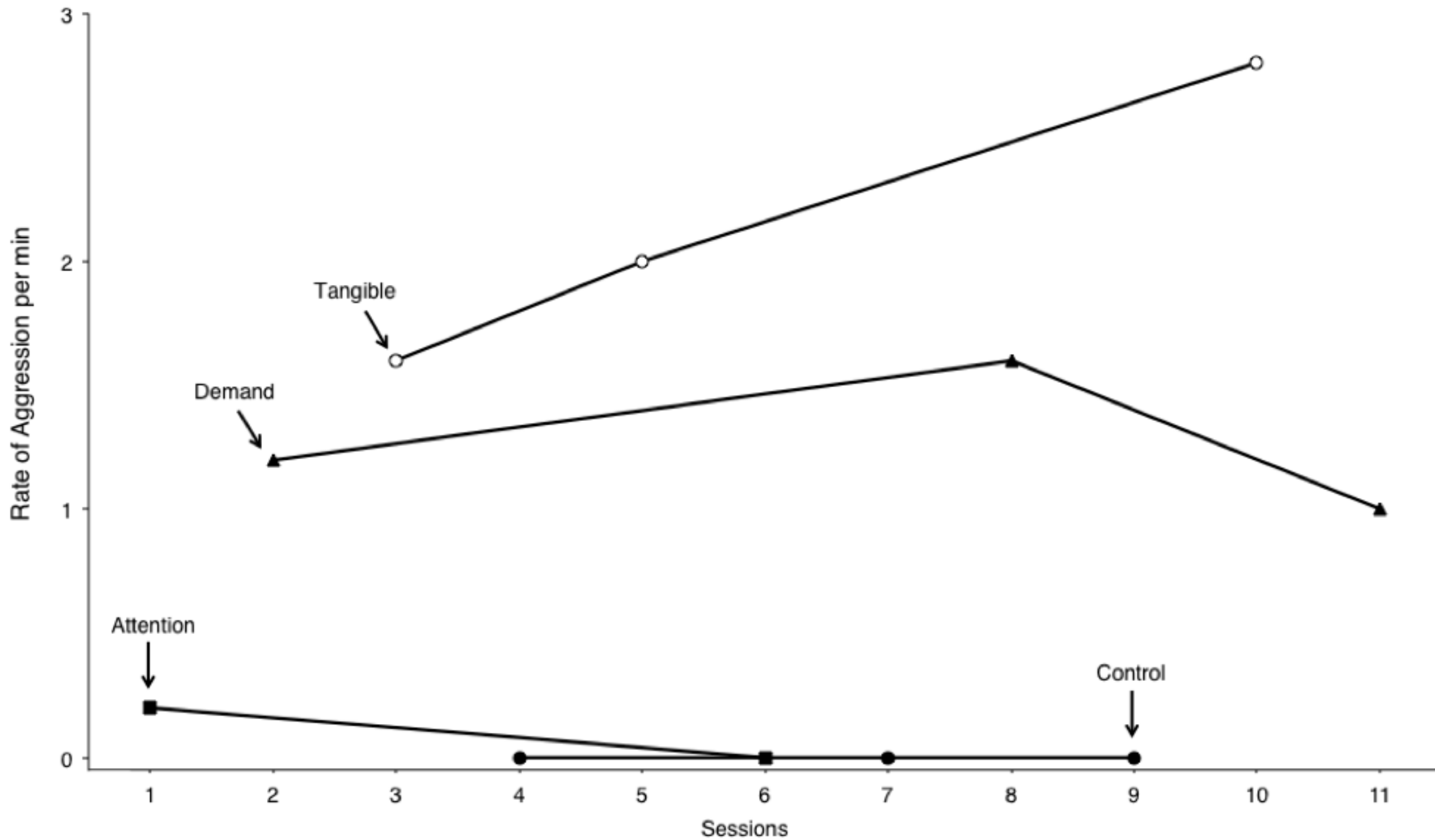
# Experimental Design

- ▶ Treatment
  - ▶ Multiple treatment with reversal (Barlow & Hayes, 1979)
  - ▶ Probes sessions of the terminal delay schedule
    - ▶ Baseline (E)
    - ▶ Extinction (F)
    - ▶ Functional communication training (G)
    - ▶ Reinforcement delay fading with extinction (H)
  - ▶ EFGEGH



# Functional Analysis (FA) Procedures

- ▶ Session length 5 min with a 1-3 minute break between sessions
- ▶ Attention, demand, tangible and control
- ▶ Based on Iwata and colleagues (1982/1994)



# Procedures

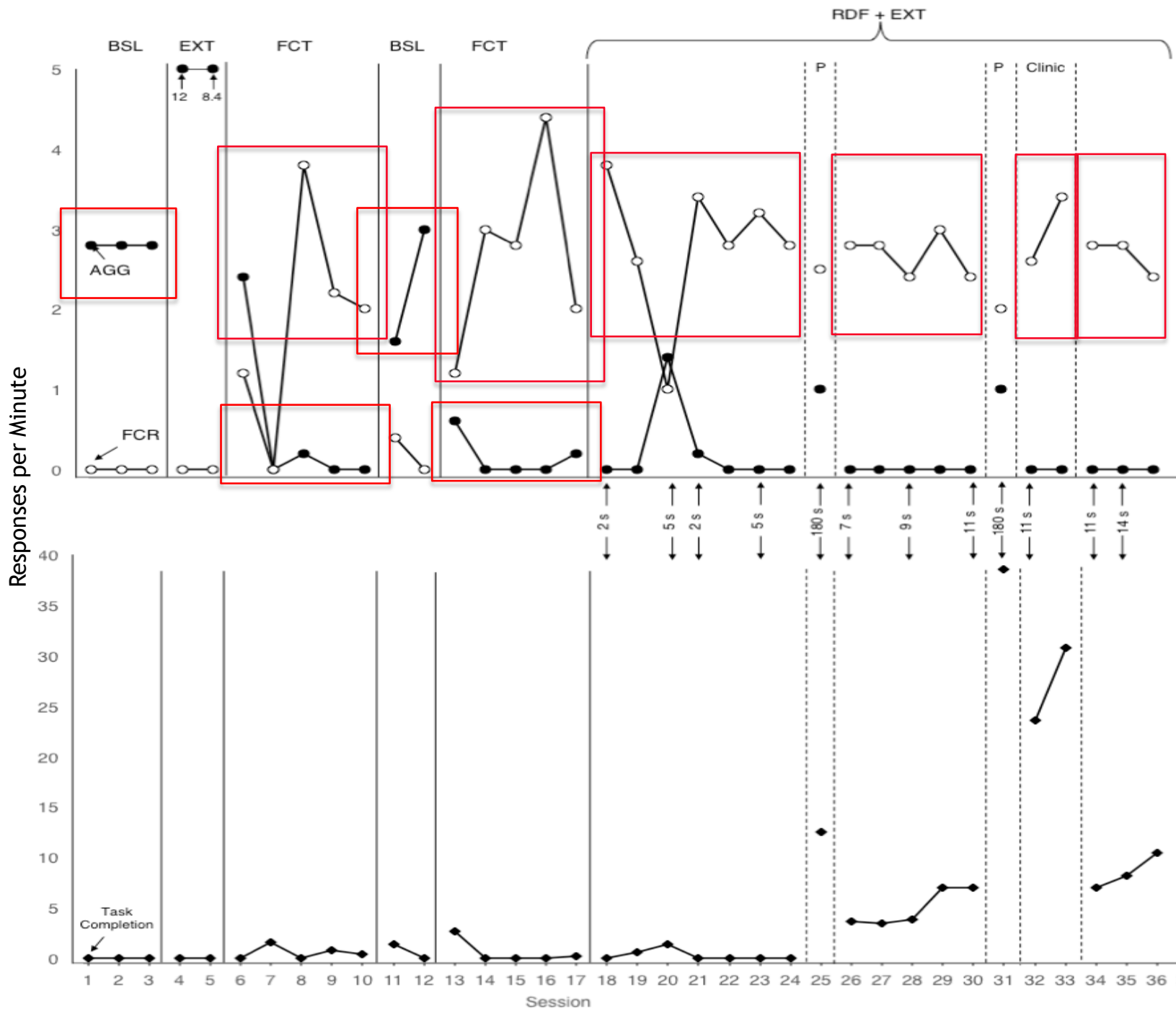
- ▶ Treatment
  - ▶ All sessions were 5 minutes in length
  - ▶ Probe sessions 2 minutes in length
  - ▶ Across all phases, the antecedent conditions included the presentation of demands and access to the iPad® was withheld

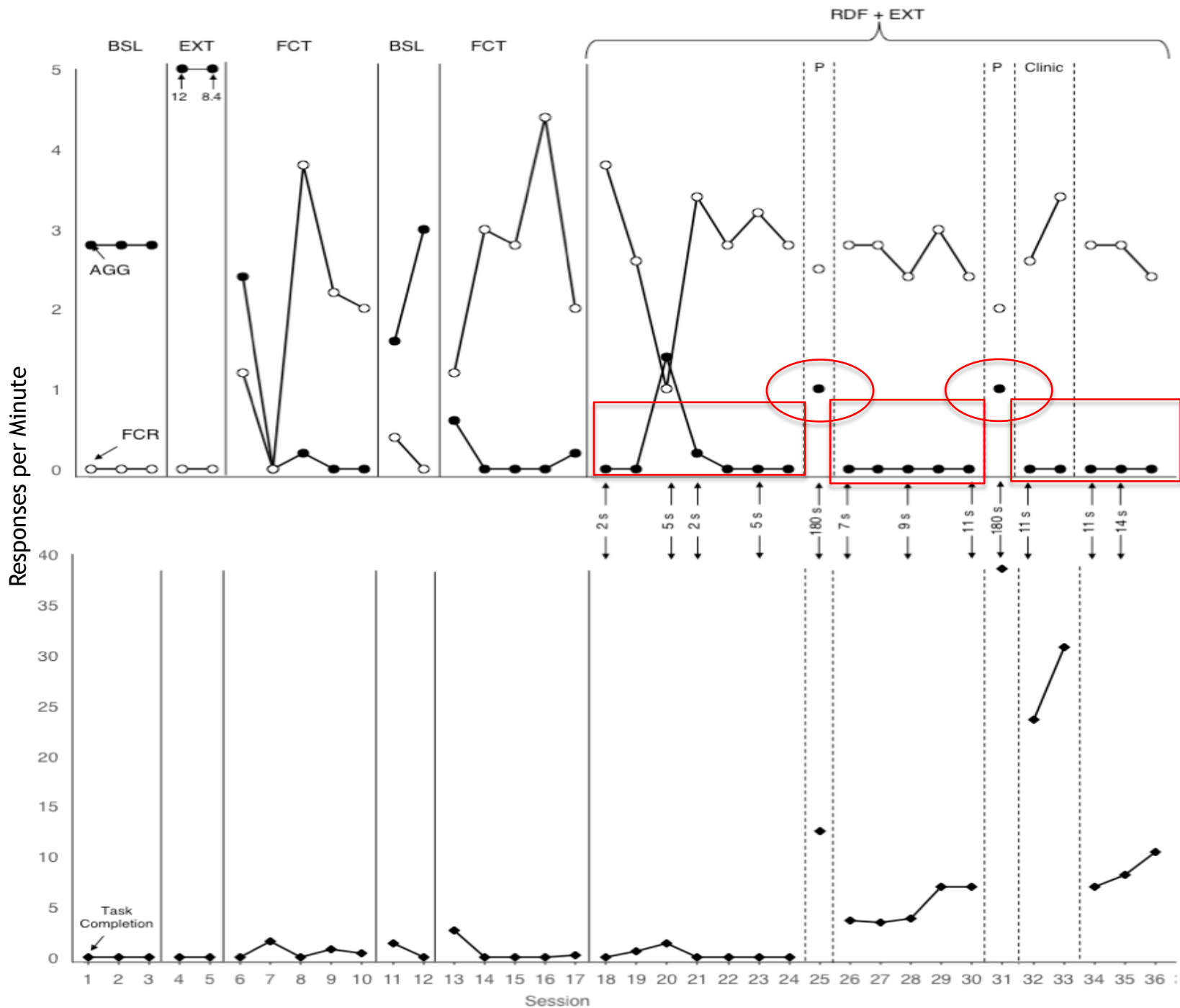
# Procedures

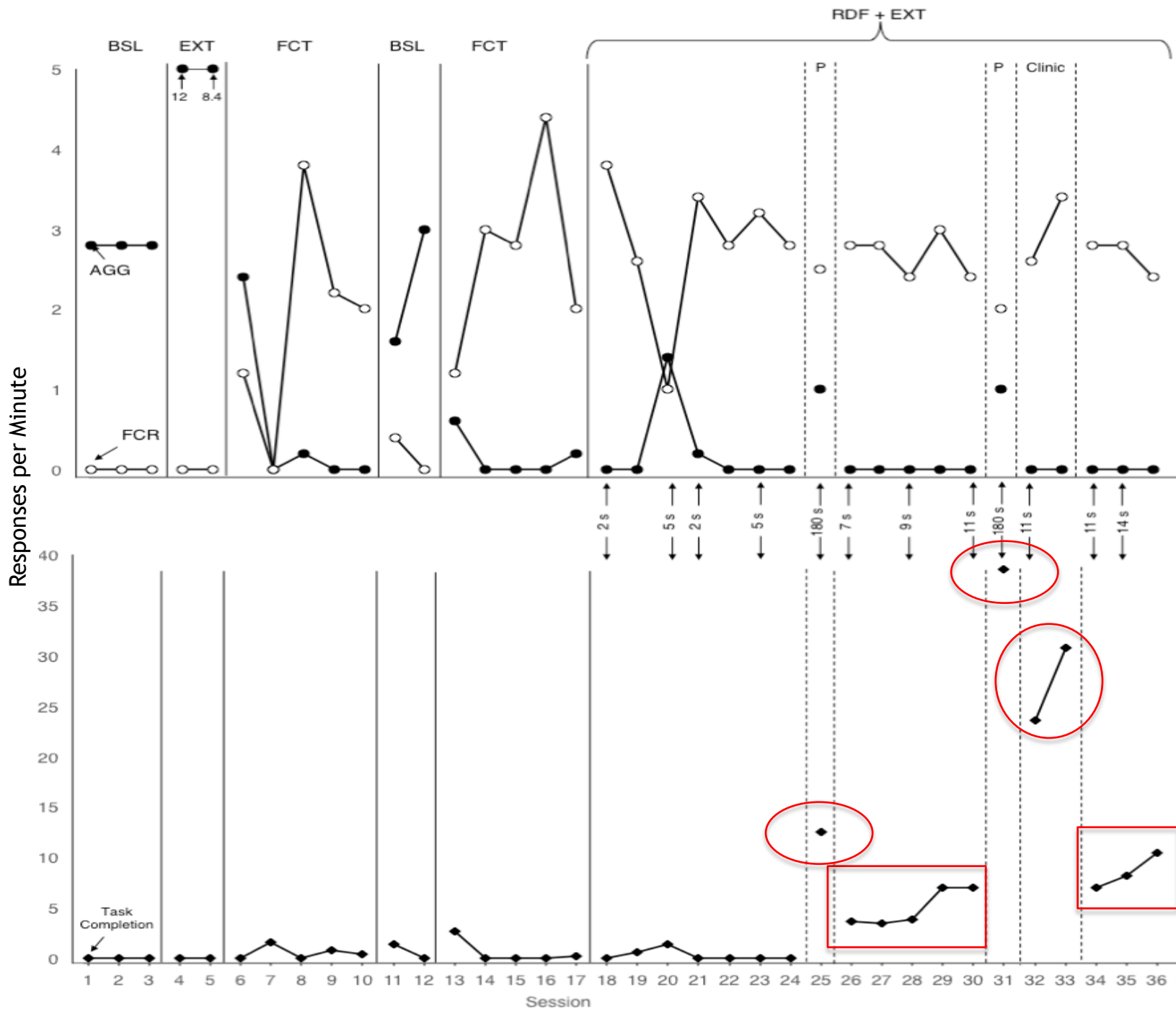
- ▶ **Baseline**
  - ▶ Functional reinforcers (escape and access to tangibles) were provided for aggression
  - ▶ No other programmed consequence was provided
- ▶ **Extinction**
  - ▶ Aggression and FCRs were ignored
  - ▶ Task completion resulted in neutral praise
- ▶ **FCT**
  - ▶ FCRs resulted in 15 s access to functional reinforcers (escape and access to tangibles)
  - ▶ Least-to-most prompting was provided for task completion, and praise for compliance

# Procedures (continued)

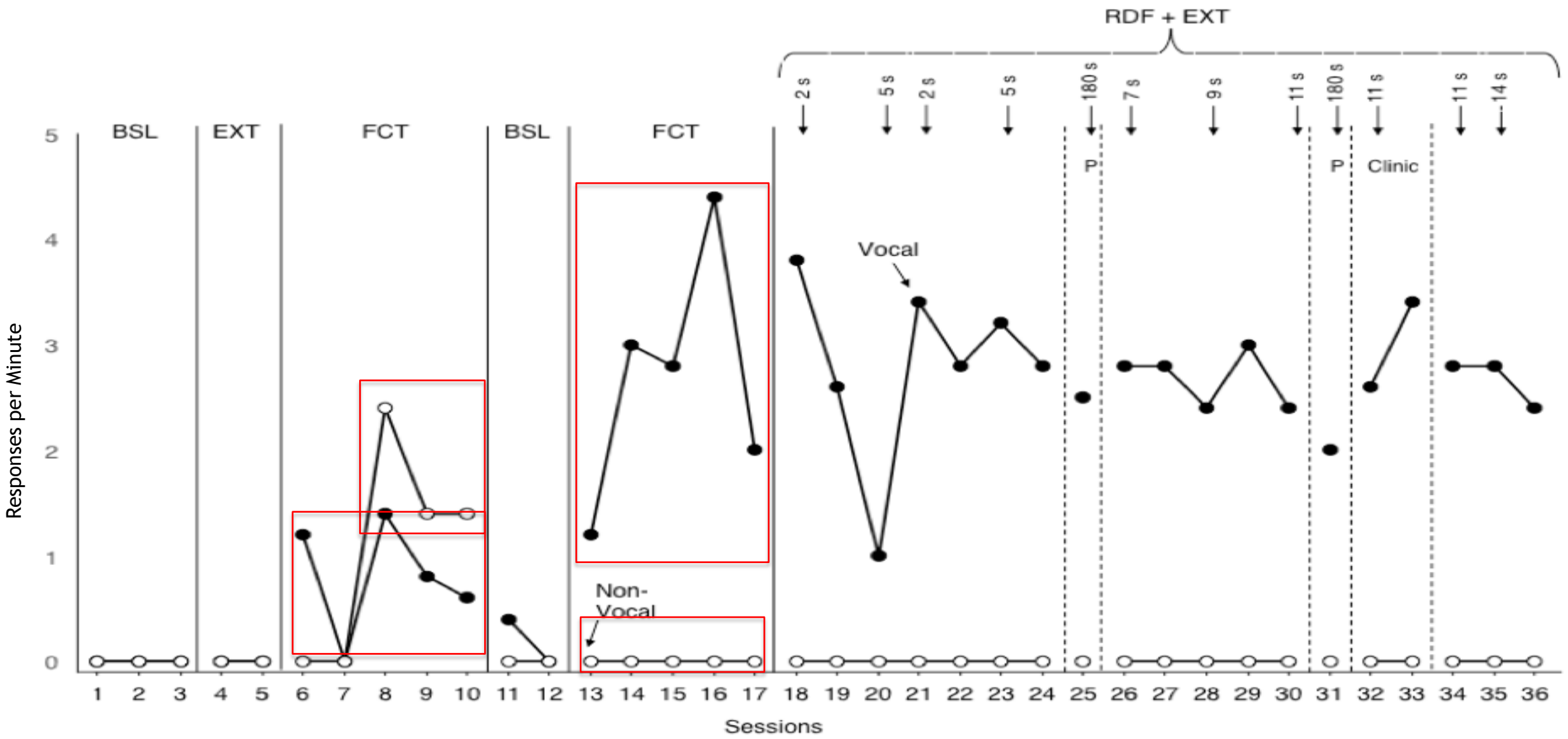
- ▶ Delay fading
  - ▶ Contingent on FCRs, the therapist stated “wait” and showed a visual wait sign for the duration of the delay
  - ▶ Demands were maintained during the delay and praise was provided for compliance
  - ▶ Delay length was increased by 30% following 2 consecutive sessions with high rates of FCR & low rates of aggression

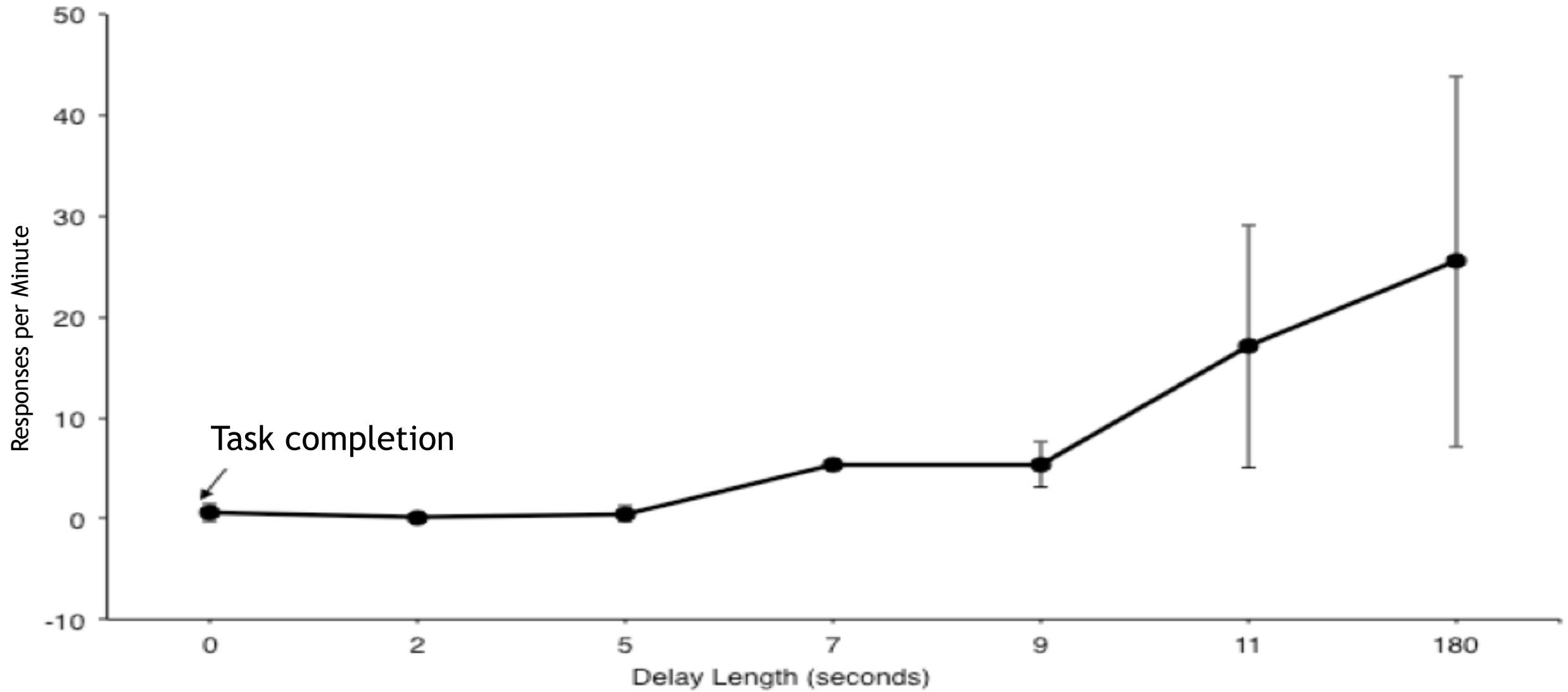












# IOA & PI

- ▶ Interobserver Agreement
  - ▶ 70% of sessions
  - ▶ Average at least 95% across all dependent variables
- ▶ Procedural Integrity
  - ▶ Procedural integrity data were collected for 41% of sessions and averaged 91.5% (range: 85.7%-100%)

# Discussion

- ▶ Treatment package was successful
  - ▶ Reduced rates of aggression
  - ▶ High rates of FCR
  - ▶ High rates of task completion
- ▶ Responding was maintained to a delay period of 14 s
- ▶ Probe sessions indicated reemergence of aggression
  - ▶ Not yet able to rapidly increase delay length

# Discussion

- ▶ Generality of the treatment was assessed
- ▶ Support for previous research
  - ▶ Effectiveness of FCT in treating problem behavior (Carr & Durand, 1985)
  - ▶ Effectiveness of reinforcement delay fading (Tiger et al., 2008)
  - ▶ Need for schedule thinning following FCT
    - ▶ Escape-maintained behaviors
    - ▶ Increasing learning opportunities

# Limitations

- ▶ Probe design
  - ▶ Probe conducted after 5<sup>th</sup> session of reinforcement delay fading
  - ▶ Design could be strengthened by conducting probe following FCT
- ▶ Additional teaching opportunities during service delivery
  - ▶ Acquisition of FCR may have been aided by ongoing service delivery
- ▶ Only 1 participant

# Future Research

- ▶ Extend beyond 14 s delay length
- ▶ Address Kelley and colleagues (2011) concern that delays in applied research have not been demonstrated beyond 30 s
- ▶ Evaluate signaled versus unsignaled delays (Kelley et al., 2011)
- ▶ Combine other methods for schedule thinning, recommended by Tiger and colleagues (2008)

# Future Research

1. Delay schedules

(e.g. Braithwaite & Richdale, 2000; Fisher et al., 2000; Hanley, Iwata, & Thompson 2001)

2. Chain schedules or demand fading

(e.g., Falcomata, Meuthing, Gainey, Hoffman, & Fragale, 2013; Fisher et al., 1993; Hagopian et al., 1998; Lalli et al., 1995)

3. Multiple schedules

(e.g., Fisher et al., 1998; Hagopian et al., 2004; Hanley et al., 2001)

4. Response restriction

(e.g., Hagopian et al., 2004; Roane, Fisher, Sgro, Falcomata, & Pabico, 2004)



# Acknowledgements

- ▶ Thank you to:
  - ▶ Brandon Herscovitch
  - ▶ Stephanie Phelan
  - ▶ Meghan Clausen
  - ▶ Ksenia Kravtchenko
  - ▶ Christine Ahearne
  - ▶ Allie Connealy

# References

- Betz, A. M., Fisher, W. W., Roane, H. S., Mintz, J. C., & Owen, T. M. (2013). A component analysis of schedule thinning during functional communication training. *Journal of Applied Behavior Analysis*, 46(1), 219-241. doi:10.1002/jaba.23
- Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis*, 18(2), 111-26. doi:10.1901/jaba.1985.18-111
- Falcomata, T., S., Muething, C., S., Gainey, S., Hoffman, K., & Fragale, C. (2013). Further evaluations of functional communication training and chained schedules of reinforcement to treat multiple functions of challenging behavior. *Behavior Modification*, 37(6), 723-746. doi:10.1177/0145445513500785
- Fisher, W. W., Thompson, R. H., Hagopian, L. P., Bowman, L. G., & Krug, A. (2000). Facilitating tolerance of delayed reinforcement during functional communication training. *Behavior Modification*, 24(1), 3. doi:10.1177/0145445500241001
- Fisher, W., Piazza, C., Cataldo, M., Harrell, R., Jefferson, G., & Conner, R. (1993). Functional communication training with and without extinction and punishment. *Journal of Applied Behavior Analysis*, 26(1), 23. doi:10.1901/jaba.1993.26-23
- Hagopian, L. P., Fisher, W. W., Sullivan, M. T., Acquisto, J., & LeBlanc, L. A. (1998). Effectiveness of functional communication training with and without extinction and punishment: A summary of 21 inpatient cases. *Journal of Applied Behavior Analysis*, 31(2), 211-235. doi:10.1901/jaba.1998.31-211  
doi:10.1901/jaba.2005.43-04

- Hagopian, L. P., Kuhn, S. A. C., Long, E. S., & Rush, K. S. (2005). Schedule thinning following communication training: Using competing stimuli to enhance tolerance to decrements in reinforcer density. *Journal of Applied Behavior Analysis*, 38(2), 177-193.
- Hagopian, L. P., Toole, L. M., Long, E. S., Bowman, L. G., & Lieving, G. A. (2004). A comparison of dense-to-lean and fixed lean schedules of alternative reinforcement and extinction. *Journal of Applied Behavior Analysis*, 37(3), 323-337. doi:10.1901/jaba.2004.37-323
- Hagopian, L. P., Wilson, D. M., & Wilder, D. A. (2001). Assessment and treatment of problem behavior maintained by escape from attention and access to tangible items. *Journal of Applied Behavior Analysis*, 34(2), 229-232. doi:10.1901/jaba.2001.34-229
- Hanley, G. P., Iwata, B. A., & Thompson, R. H. (2001). Reinforcement schedule thinning following treatment with functional communication training. *Journal of Applied Behavior Analysis*, 34(1), 17. doi:10.1901/jaba.2001.34-17
- Horner, R. H., & Day, H. M. (1991). The effects of response efficiency on functionally equivalent competing behaviors. *Journal of Applied Behavior Analysis*, 24(4), 719-32. doi:10.1901/jaba.1991.24-719
- Kelley, M. E., Lerman, D. C., Fisher, W. W., Roane, H. S., & Zangrillo, A. N. (2011). Reinforcement delay fading during differential reinforcement of communication: The effects of signals on response maintenance. *Journal of the Experimental Analysis of Behavior*, 96(1), 107-122. doi:10.1901/jeab.2011.96-107

- Kurtz, P. F., Chin, M. D., Huete, J. M., Tarbox, R. S. F., O'Connor, J. T., Paclawskyj, T. R., & Rush, K. S. (2003). Functional analysis and treatment of self-injurious behavior in young children: A summary of 30 cases. *Journal of Applied Behavior Analysis*, 36(2), 205. doi:10.1901/jaba.2003.36-205
- Lalli, J. S., Casey, S., & Kates, K. (1995). Reducing escape behavior and increasing task completion with functional communication training, extinction, and response chaining. *Journal of Applied Behavior Analysis*, 28(3), 261-268. doi:10.1901/jaba.1995.28-261
- LeBlanc, L. A., Hagopian, L. P., Marhefka, J. M., & Wilke, A. E. (2001). Effects of therapist gender and type of attention on assessment and treatment of attention-maintained destructive behavior. *Behavioral Interventions*, 16(1), 39-57. doi:10.1002/bin.73.abs
- Michael, J. (1993). Establishing operations. *The Behavior Analyst*, 16(2), 191-206.
- Reichle, J., Johnson, L., Monn, E., & Harris, M. (2010). Task engagement and escape maintained challenging behavior: Differential effects of general and explicit cues when implementing a signaled delay in the delivery of reinforcement. *Journal of Autism & Developmental Disorders*, 40(6), 709-720. doi:10.1007/s10803-010-0946-6
- Roane, H. S., Fisher, W. W., Sgro, G. M., Falcomata, T. S., & Pabico, R. R. (2004). An alternative method of thinning reinforcer delivery during differential reinforcement. *Journal of Applied Behavior Analysis*, 37(2), 213. doi:10.1901/jaba.2004.37-213
- Tiger, J. H., Hanley, G. P., & Bruzek, J. (2008). Functional communication training: A review and practical guide. *Behavior Analysis in Practice*, 1(1), 16-23.
- Wacker, D. P., & Others, A. (1990). A component analysis of functional communication training across three topographies of severe behavior problems. *Journal of Applied Behavior Analysis*, 23(4), 417-29. doi:10.1901/jaba.1990.23-417