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

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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**

  - Demands are presented → “Break please” → 0 s → “Sure, you can have a break”
  - Demands are presented → “Break please” → 2 s → “Sure, you can have a break”
  - Demands are presented → “Break please” → 4 s → “Sure, you can have a break”
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

- 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)
Results

The graph illustrates the rate of aggression per minute across different sessions for three conditions: Tangible, Demand, and Attention. The y-axis represents the rate of aggression per minute, while the x-axis represents sessions numbered from 1 to 11.

- **Tangible**: The line represents the rate of aggression for the Tangible condition, showing an increase over sessions.
- **Demand**: The line for the Demand condition also shows an increasing trend in aggression rates.
- **Attention**: The Attention condition line depicts a decrease in aggression rates over sessions.

An additional note indicates a control condition at session 9, but its specific impact on aggression rates is not detailed in the graph.
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
Task completion

Responses per Minute

Delay Length (seconds)
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 5th 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
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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)
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References


