Use of Functional Analysis and Treatment Analysis in the Development of a Home-Based Pica Intervention

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Pica

- Ingestion of inedible objects (Fisher et al., 1994)
  - Etymology (Lofts, Schroeder, Maler, 1990)
- Described as the most dangerous form of self-injurious behavior (Foxx & Martin, 1975; McAdam, Sherman, Sheldon, & Napolitano, 2004; Williams & McAdam, 2012)
Due to the serious nature of pica further research is warranted (Call, Simmons, Lomas Mevers & Alvarez, 2015; Hagopian, Rooker, & Rolider, 2011; Williams & McAdam, 2012)
Previous pica treatments

- Behavioral interventions
  - Punishment procedures (Ferreri, Tamm, & Wier, 2006; Hagopian, & Adelinis, 2001; McCord, Grosser, Iwata, & Powers, 2005; Mitteer, Romani, Greer, & Fisher, 2015)
  - Discrimination training (Bogart, Piersal & Gross, 1995; Falcomata, Roane, & Pabico, 2007; Fisher et al. 1994; Johnson, Hunt, & Siebert, 1994)
  - Noncontingent reinforcement (Madden, Russo, & Cataldo, 1980; Piazza, Hanley, & Fisher, 1996)
Noncontingent reinforcement an effective treatment for problem behavior (Baker, Hanley, & Rapp, 2006; Carr, Dozier, Patel, Adams & Martin, 2002; Khang, Iwata, Thompson, & Hanley, 2000; Lanovaz, Sladeczek, & Rapp, 2011; Piazza, Adelinis, Hanley, Goh, & Delia, 2000; Wilder, Register, Register, Bajagic, & Neidert, 2009)

Suppression of responding can be maintained at low/zero levels while non-contingent reinforcement schedules are thinned (Kahng, Iwata, DeLeon, & Wallace, 2000)

NCR has been found to be more effective than DRO procedures as a treatment (Vollmer et al. 1993)
Functional Analyses

- FA and Treatment analyses have been used together in previous literature (Beavers, Iwata & Lerman, 2013; Goh, Iwata, & Kahng, 1999; Piazza, Hanley, & Fisher, 1996)
Treatment analysis

- A treatment analysis systematically evaluates potential treatments (Rodriguez, Thompson, Schlichenmeyer, & Stocco, 2012)

- Previous research used a matched/unmatched stimuli assessment to treat behaviors maintained by automatic reinforcement (Rapp, 2007; Piazza, Adelenis, Hanley, Goh, & Delia, 2000)
Method

- Participant
  - Wendy
  - 10 year old female
  - Primary diagnosis of autism
  - Full time school, 10 hours of ABA in-home per week
  - History of pica and mouthing
Method

- Setting
  - Home-based setting
  - All analyses and assessments provided within regular home-based services time (two-hour sessions)
  - Sessions took place in various rooms throughout the home
    - At least one parent and younger sibling present for all sessions
Method

Materials
- Video recording equipment (iPhone® and Vivitar® DVR508)
- Data sheets
- Pens
- Tally counters used in some sessions
- Toshiba® Satellite Laptop computer for graphing
- Baited pica items
- Chewelry necklace, water bottle, toys, and edible items
Dependent Variable

- Response: pica, defined as any instance of Wendy placing a non-edible item past the plane of her lips, may or may not include consumption of the item
- Measurement: rate per minute

<table>
<thead>
<tr>
<th>Number of responses</th>
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<tbody>
<tr>
<td>Number of minutes</td>
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Experimental Design

- Intervention utilized a multi-treatment reversal (Barlow & Hayes, 1979)
PI and IOA

- Procedural Integrity:
  - 42% of sessions

- Interobserver Agreement:
  - 41% of sessions
## Procedural Integrity (PI) and Interobserver Agreement (IOA)

<table>
<thead>
<tr>
<th>Data</th>
<th>Average (%)</th>
<th>Range (%)</th>
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<tbody>
<tr>
<td>PI</td>
<td>99.4</td>
<td>95-100</td>
</tr>
<tr>
<td>IOA</td>
<td>97.8</td>
<td>93-100</td>
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Procedures - FA

- Prior to analysis, informal interview conducted with the parent
- All sessions were 5 minutes in length
  - Control
  - No interaction
  - Tangible
  - Attention, Positive Affect
  - Attention, Negative Affect
Procedures - Treatment Analysis

- No Interaction
- Tangible
Procedures - Treatment Analysis

- No Interaction
- Tangible
- Similar edible: free access (Piazza, Fisher, Hanley, LeBlanc, Worsdell, Lindauer, & Keeney, 1998; Piazza et al., 2000)
- Similar edible: FT15s
Procedures - Treatment Analysis

- No Interaction
- Tangible
- Similar edible: free access (Piazza, Fisher, Hanley, LeBlanc, Worsdell, Lindauer, & Keeney, 1998; Piazza et al., 2000)
- Similar edible: FT15s
- Dissimilar inedible: free access
Procedures - Intervention

- All sessions 10 minutes in length
- Initial intervention: Similar edible: FT5
- Criteria to thin schedule:
  - Responding at zero rates for varying number of sessions
  - Thin by one second at a time
- Criteria to decrease to previous schedule
  - One occurrence of pica
Procedures - Treatment Package

- Response Interruption and Differential Reinforcement of Alternative Behaviors (Hagopian, González, Rivet, Triggs & Clark, 2011)
  - DRA1: Discard
  - DRA2: Use appropriately
  - DRA3: Return
Procedures

- NCR
- DRA1: Discard
  - Throw item in trash
- DRA2: Use it appropriately
  - Functional response with item
- DRA3: Return
  - Put item back on ground or where located
Limitations

- We did not complete a preference assessment to determine whether items used in the analysis were matched or unmatched.
- NCR: Thinning schedule by only one second at a time.
- Sessions only occurred four days per week.
  - and one staff taking leave January - April.
Future research

- Future researchers should evaluate generality of intervention
- May also consider looking at edibles that are sustained for longer periods
Discussion

- FA led to successful identification of function
- Treatment analysis led to effective treatment
- Maintained near-zero levels of pica during schedule-thinning
- Current schedule relative to terminal schedule
- Study is ongoing - will continue thinning schedule and conducting discrimination training
Thank you:

- Dr. Brandon Herscovitch
- Stephanie Phelan
- Megan Fowler
- Christine Aherne
- Jessica Goodman
- Hannah Greenwood
References


