Behavioral Interventions for Feeding Disorders

From Research to Reality

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Conflict of Interest

• No Conflicts
• No Disclosures
Caveats

• We do not provide intensive feeding services at KUSM-W
  – Patients are referred to:
    ◦ Heartspring (Wichita)
    ◦ Children’s Mercy Feeding Clinic (Kansas City)
    ◦ Munroe-Meyer Institute Feeding Clinic (Omaha)

• Intensive behavioral feeding treatment is conducted with medical consultation to ensure safety
Learning Objectives

1. Identify behavioral principles (e.g., reinforcement schedules, contingency management, successive approximation) involved in a successful feeding program

2. Identify potential barriers to successful in-home treatment programs
Munroe Meyer Institute News Story
Primary Questions

• What are pediatric feeding disorders?
• How are they behaviorally maintained?
• What are behavioral interventions and how do they work?
• What are the barriers to successful behavioral treatment, particularly in home-based settings?
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Diagnosing Feeding Disorders

(Martin-Halpine, 2014; Linscheid, 2006; Silverman, 2015)

• Food refusal
• Inadequate intake
• Too selective in types of food consumed
• Texture sensitivities
• Lack of progress in self-feeding skills
• Disruptive mealtime behaviors
Diagnosing Feeding Disorders

• Diagnosable in up to 40% of typically developing children
  – Up to 80% of children with developmental disabilities
    ◦ Autism Spectrum Disorders
    ◦ Prematurity
    ◦ Low birth weight
    ◦ Cerebral palsy
    ◦ Sensory impaired
    ◦ Specific medical conditions (e.g., CF, PKU)
  – Emerge in the first three years of life
Avoidant/Restrictive Food Intake Disorder

– Lack of interest in eating food
– Avoidance based on sensory characteristics of food
– Concern about aversive consequences of eating

◦ Associated with weight loss, nutritional deficiency, need for artificial feeding, or interference with psychosocial functioning
◦ Not due to a lack of food or cultural practice (e.g., fasting; religious food restrictions)
◦ Not due to a medical condition*
Multidisciplinary Feeding Evaluation

- Developmental pediatrics
- Gastroenterology
- Neurology
- Occupational Therapy
- Speech/Language Pathology

- Psychology
  - Diagnostic interview with parents/caregivers
  - Structured questionnaires
  - Differential diagnosis of other possible behavioral issues
  - Live or video observation of feeding session
  - Review of medical records
Primary Questions

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Behavioral Causes of Feeding Disorders

• Taste of food is not reinforcing
  – Limited palate

• Texture of food is aversive
  – Autism Spectrum Disorders, other developmental disorders
  – Sensory processing issues
  – Oral-motor weaknesses

• Hunger cessation is not reinforcing
  – Especially in children with artificial feeding interventions
Behavioral Causes of Feeding Disorders

• Anticipation of post-meal discomfort
  – GERD
  – Food allergies
  – One-trial learning taste aversion

• Unpleasant associations with eating or mealtime
  – High-stress interactions with feeding parent
  – Previous attempts at punishment

• Other behavioral challenges
  – Distraction
  – Oppositionality
Commonly Observed Behaviors

• Gagging/vomiting
• Head-turning
• Arm-swinging/hitting/aggression toward feeder
• Spitting
• Escaping from the chair/high chair
Progression to Home Training
Primary Questions

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# ABC’s of Behaviorism

A – Antecedent    B – Behavior    C – Consequence

## Brenda Hits Other Students - Why Would She Do This?

<table>
<thead>
<tr>
<th>Antecedents</th>
<th>Behavior</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susan calls Brenda a “creep face” and laughs at her</td>
<td>Brenda punches Susan on the arm</td>
<td>Susan stops laughing and walks away</td>
</tr>
<tr>
<td>A group of students at recess call Brenda fat</td>
<td>Brenda kicks several of them</td>
<td>The students run away</td>
</tr>
<tr>
<td>Brenda spells a word incorrectly during an oral review and the child behind her laughs</td>
<td>Brenda pulls the child’s hair</td>
<td>Brenda is sent to the office</td>
</tr>
</tbody>
</table>
Behaviorism Vocabulary

• **Conditioning**: Methods of controlling or changing behaviors
  – **Classical Conditioning**: Behavior is controlled through the pairing of a naturally reinforcing stimulus with a neutral stimulus until the neutral stimulus becomes reinforcing (e.g., Pavlov’s dogs)
  – **Operant Conditioning**: Behavior is controlled by consequences – reinforcement or punishment – that increase or decrease behavior

• **Target Behavior**: Specific behavioral unit

• **Reinforcement**: Response that increases the target behavior

• **Punishment**: Response that decreases the target behavior
Consequences

• Reinforcement – Increases the behavior
  – (PR) Positive – Something positive is added
  – (NR) Negative – Something unpleasant is taken away

• Punishment – Decreases the behavior
  – (PP) Positive – Something unpleasant is added
  – (NP) Negative – Something positive is taken away
# Reinforcement Schedules

<table>
<thead>
<tr>
<th>Reinforcement Scheduled</th>
<th>Nature of Reinforcement</th>
<th>Effect on Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>Reward given after each desired behavior</td>
<td>Fast learning of new behavior but rapid extinction</td>
</tr>
<tr>
<td>Fixed-interval</td>
<td>Reward given at fixed time intervals</td>
<td>Average and irregular performance with rapid extinction</td>
</tr>
<tr>
<td>Variable-interval</td>
<td>Reward given at variable times</td>
<td>Moderately high and stable performance with slow extinction</td>
</tr>
<tr>
<td>Fixed-ratio</td>
<td>Reward given at fixed amounts of output</td>
<td>High and stable performance attained quickly but also with rapid extinction</td>
</tr>
<tr>
<td>Variable-ratio</td>
<td>Reward given at variable amounts of output</td>
<td>Very high performance with slow extinction</td>
</tr>
</tbody>
</table>
Behaviorism Vocabulary

• **Shaping**: Reinforcement of gradual steps toward a behavior, or “successive approximations”

• **Chaining**: Joining several units together into a complete task

• **Fading**: Slowly reducing a specific supportive behavior

• **Extinction**: Stopping a behavior by removing reinforcement

• **Extinction Burst**: Burst of the behavior before it stops
Applied Behavior Analysis Vocabulary

• **Positive reinforcement**: Child is provided with a reward (food, toys, praise, etc.) each time the child engages in the desired eating behavior.

• **Differential positive reinforcement**: Only desired behaviors are reinforced; all other behaviors are ignored with the goal of extinction.

• **Escape extinction**: Not allowing an escape from, or avoidance of, the appropriate eating behavior.
  - E.g., positioning the spoon in front of the child’s mouth until the bite is accepted, thereby preventing the child from escaping or avoiding the bite.
Applied Behavior Analysis Vocabulary

• **Non-contingent positive reinforcement**: Providing a preferred stimulus continuously throughout the meal, regardless of target behavior
  – E.g., providing the child with a video during the meal

• **Simultaneous presentation**: Presenting a less preferred food together with a more preferred food

• **Stimulus fading**: Gradually changing the ratio or concentration of the paired preferred and nonpreferred food
  – E.g., progressing from a 90:10 ratio of preferred:nonpreferred food, to a 50:50, 25:75
Unexpected Consequences

• Functions of behavior may change over time
• Children may find some “punishments” unexpectedly pleasant (e.g., “Negative Attention”)
• Reinforcers that are meaningful may change over time
Common Problems

• Inconsistency (Grandparents, Shared Custody, School)
• Consequences are not immediate
• Punishment is too long to be meaningful (lose hope)
• Modeling poor behavior
Behavioral Feeding Interventions

• Designed after individual analysis
  – What is the function of the child’s avoidance of eating?
  – What rewards are salient and reinforcing to the child?
  – What stimuli are aversive and what are the avoidance behaviors?

• Consider organic, mechanical, and psychosocial factors

• Implemented with multidisciplinary consultation
Typical Intensive Feeding Program

• Inpatient or day hospital setting
• 4 to 8 weeks
• Direct child intervention, often without parent present
• Intensive parent training
• Modifications to:
  – Mealtime schedule and structure
  – Behavior management
  – Caregiver training
Day 2 Intensive Therapy
Behavioral interventions

• Appetite manipulation

• Contingency management
  – Differential social attention
  – Positive & negative consequences
  – Stimulus control
Appetite Manipulation
(Linscheid, 2006)

• Controversial

• Maintenance of subjects at 85-90% of ad-lib weight (in animal models)

• Differential reinforcement of intake & compliance

• Long-term maintenance
  – Satiation of hunger
  – Taste of food
Appetite Manipulation

(Linscheid, 2006)

• Relies on child’s ability to sense hunger
• Restriction of caloric intake between planned meals
• Forced manipulation of artificial feedings
  – Often done while sleeping to reduce the connection between feeding and hunger cessation
• Can speed successful removal of feeding tube
  – 61 days at KKI vs. 9 days at Nationwide Children’s Hospital
Appetite Manipulation - Case Example
(Linscheid, 2006)

• 18 month-old boy
• 1-2 hours to eat ½ jar of baby food x 3 meals per day
• Consuming ¾ gallon of milk by bottle per day (~1800 cal)
• Appetite manipulation = reducing milk intake
• Sped the introduction of textured foods
• Reduced contingency management skills needed by parents
Appetite Manipulation - Concerns

• Dehydration
• Weight loss
• Inability to tolerate distress in medically fragile children
• Parents unwilling to induce distress in their child
• Need for inpatient intervention
# Environmental Interventions

(Silverman, 2015)

<table>
<thead>
<tr>
<th>Environmental strategy</th>
<th>Definition</th>
<th>Examples of interventions</th>
</tr>
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<tbody>
<tr>
<td>Repeated exposure</td>
<td>Repeated offerings of new/nonpreferred foods at challenge meals and snacks</td>
<td>Attempting to complete 10 or more exposures to a food before changing to a new challenge. Children must taste challenge foods at specified meals and snacks</td>
</tr>
<tr>
<td>Schedule and duration of meals</td>
<td>Feeding a child on a fixed schedule of meals and snacks with periods of no caloric intake between scheduled feedings to induce hunger</td>
<td>Meals and snacks scheduled at least 3 h apart. Meal duration not to exceed 30 min</td>
</tr>
<tr>
<td>Stimulus control</td>
<td>Manipulation of mealtime environmental factors known to increase desirable behaviors and reduce problem behaviors within the meal. These techniques do not require specific training in applied behavioral strategies but do require nutritional monitoring to ensure safety of use</td>
<td>All meals at the table. Child securely seated in an appropriate chair. Rigid meal time schedule. Meal free from distractions (e.g. TV, toys). Elimination of grazing between meals. Decrease in supplemental feedings. Allow the child to ‘fail’ a meal to experience the natural consequence of increased hunger</td>
</tr>
<tr>
<td>Mealtime transition</td>
<td>Strategies which facilitate a child’s transition to the mealtime environment. Typically, families are advised to avoid active or strongly preferred activities just before the meal as this may contribute to a child’s resistance to the transition</td>
<td>Quiet or less desirable activities preceding the meal. Ritual activities preceding the meal (e.g. washing hands, giving thanks). Pleasant activity planned if the child reaches meal objectives</td>
</tr>
</tbody>
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# Contingency Management

(Silverman, 2015)

<table>
<thead>
<tr>
<th>Increasing behavior strategies</th>
<th>Definition</th>
<th>Examples of interventions</th>
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| Positive reinforcement         | Increases the frequency of a desirable feeding behavior due to the *addition* of a reward immediately following the desired feeding response | Cheering for a child who tastes a new food  
Giving a sticker as a reward for reaching a food volume goal  
Offering a preferred food after the child accepts a new or nonpreferred food |
| Negative reinforcement         | Increase the frequency of a desirable feeding behavior when the consequence is the *removal* of an aversive stimulus immediately following the desired feeding response | Avoidance conditioning occurs when a behavior prevents an aversive stimulus from starting or being applied (e.g. if a new food is accepted, the child will not have an increase in the total number of bites needed to reach the bite goal  
Escape conditioning occurs when behavior removes an aversive stimulus that has already started (e.g. release of a physical restraint when the child accepts the food presented) |
| Discrimination training        | This technique teaches the individual that specified behaviors will be reinforced in the presence of a defined stimulus. The reinforcement schedule or the targeted behavior may evolve to build more complex behaviors | Positively reinforcing requested feeding behaviors but not other behaviors observed during the meal  
Modeling a desired feeding behavior and then praising when the behavior is exhibited by the child  
Shaping a behavior by reinforcing successive approximations of a more complex or higher-order behavior |
## Contingency Management

(Silverman, 2015)

<table>
<thead>
<tr>
<th>Interventions to decrease behaviors</th>
<th>Definition</th>
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| Extinction                        | Reduces the frequency of an undesired feeding behavior due to the *removal* of a reward immediately following the undesired feeding response | Ignoring inappropriate feeding behaviors  
Continuing to prompt desired feeding behavior |
| Punishment                        | Reduces the frequency of an undesired feeding behavior by presenting an aversive stimulus or removing a rewarding stimulus as a consequence of undesired behavior | The child receives a verbal rebuke for noncompliance  
The child is given a timeout  
Preferred activities or toys are withheld after the meal |
| Desensitization                   | The negative behavior is reduced by pairing repeated exposures to the aversive stimulus (e.g. new or nonpreferred food) in the absence of an aversive event or with the presence of a positive reinforcer | The child’s physiological anxiety response is reduced after numerous exposures  
Distraction techniques may be paired with the exposures (e.g. plays with preferred toy)  
Relaxation techniques may be used to reduce or eliminate anxiety response when the child is presented with the feared stimulus |
Parent Training

• Bibliotherapy and exposure to behavioral principles
• Therapist modeling desired feeding behaviors
• Direct coaching (in the room or “bug in the ear”)
• Therapist review of in-home video
Fig. 2. Behavioral methods appropriate for parent training. Methods in white are suitable for families to implement at home with education and ongoing consultation. Methods in grey are suitable for families to implement at home with regular contact with the treatment team. Methods in black may not be suitable for home use and require close contact with the treatment team for any use.
Primary Questions

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• What are the barriers to successful behavioral treatment, particularly in home-based settings?
Critique this Example
Barriers to Successful Home Treatment

• Inability to keep the necessary schedule
• Inconsistent reinforcement schedule
• Difficulty seeing their child in distress or discomfort
• Parental frustration or emotionality
Institutional Barriers

• Constraints imposed by managed care
  – Medical vs. behavioral benefits
  – Preauthorization needs
  – Failure to approve extended time required

• “Turf wars” among specialists

• Belief that behavioral interventions are torture or “forced feedings” that harm the child
Preventing Barriers

• Ensuring appropriate treatment goals are established
• Development of a detailed, collaborative treatment plan
• Frequent check-ins with professional team
• Video exchanges or teleconferencing
• Booster sessions at the institution
Munroe Meyer Institute Demonstration
Questions?