

# Feeding Problems in Autism: Evidence-Based Approaches to Intervention

William Sharp, Ph.D.

Assistant Professor  
Division of Autism and Related Disorders  
Department of Pediatrics  
Emory University School of Medicine/  
Pediatric Psychology and Feeding Disorders Program  
The Marcus Autism Center

# Specific Goals and Learning Objectives

- 1) Define and discuss the prevalence of feeding disorders in ASD.
- 2) Develop an understanding of the medical and behavioral factors that contribute to the development and maintenance of feeding disturbances in children with ASD.
- 3) Identify appropriate interventions for feeding disorders in ASD based on the severity of the presenting problem. This includes parent consultation/education, nutritional guidance, behavioral therapy, medical interventions, and intensive inpatient services.

# Autism Spectrum Disorders

- Neurodevelopmental disorder(s) of unknown genetic origin where symptoms unfold over the first few years of life:
  - *Impairments in socialization*
  - *Impairments in communication*
  - *Development of restricted interests, repetitive & perseverative behaviors, and need for sameness*

# Case Example

- K.S.
  - 4 year old male
  - Autistic Disorder
  - Preferred (Self fed): Doritos, Vanilla wafers
  - Non-preferred (caregivers presented): pureed foods, Pediasure, liquids
  - Feeding involved
    - 3 adults to complete
    - Special highchair designed by grandfather to restrain child
    - Syringe for depositing liquids
  - **No growth concerns (BMI WNL)**

# Feeding Disorders Program



## Multi-Disciplinary Program

### Core Disciplines:

- Behavioral Psychology
- Oral-motor
- Nutrition

### Increased Research and Clinical Collaboration:

- Emory GI - Dr. McElhanon

# Target Population

Chronic food refusal:  
**Volume** and/or **Variety**

Severe problem  
behavior during  
meals

- Crying
- Disruptions
- Elopement
- Aggression



# Ledford & Gast (2006)

- Time span: 1994 to 2004
- 7 descriptive studies identified
- N = 381 children with ASD
- Findings:
  - All identified maladaptive feeding behaviors related to ASD
  - Estimates ranged from 46% and 89% of children with ASD displaying significant feeding problems
  - Often no identifiable organic precursor

# Feeding Problems and Nutrient Intake in Children with Autism Spectrum Disorders: A Meta-analysis and Comprehensive Review of the Literature

William G. Sharp · Rasheda C. Berry · Courtney McCracken ·  
Nadrat N. Nuhu · Elizabeth Marvel · Celine A. Saulnier ·  
Ami Klin · Warren Jones · David L. Jaquess

## Inclusion criteria:

1. Published between 1980 and 2011
2. Focused on pediatric population (birth to 18 years)
3. Involved a comparison group
4. Evaluated feeding and/or nutrition in ASD a standardized, replicable manner
5. Presented data either descriptively (e.g., frequency, percentages) or statistically (e.g., t scores)

## Exclusion criteria:

1. Studies with known sampling bias (e.g., chart reviews from feeding programs)
2. Studies focusing on dietary manipulation (e.g., GFCF)

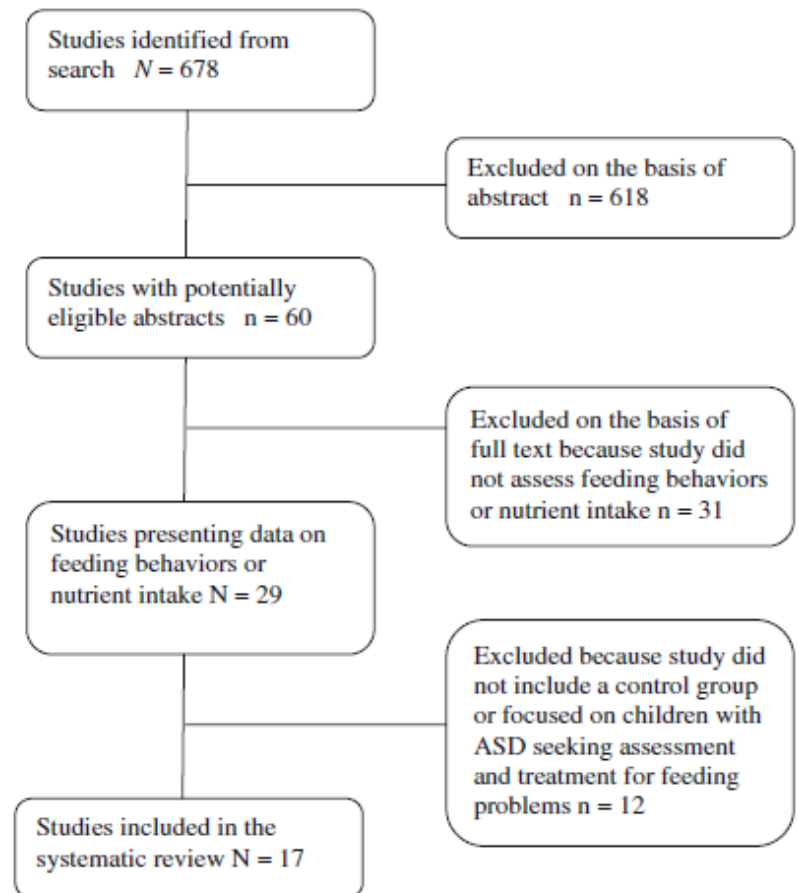


Fig. 1 Flow diagram of included and excluded studies



**Table 4** Effect sizes, 95 % confidence limits and within-group tests for heterogeneity for studies included in the meta-analysis for feeding behavior problems by comparison groups

ASD versus subgroup	Number of contributing studies	Random effects model				Within-groups		
		SMD (SE)	OR	95 % confidence limits		<i>p</i> value	$\chi^2$ test (Q)	<i>p</i> value
				LCL	UCL			
All groups	15	0.89 (0.08)	5.11	3.74	6.97	<0.001		
TD	13	0.94 (0.11)	5.49	3.77	7.98	<0.001	29.9	0.003
SB	3	0.98 (0.22)	5.89	2.73	12.71	<0.001	0.45	0.798
DD	2	0.67 (0.19)	3.36	1.69	6.67	0.001	0.012	0.913

*TD* typically developing, *DD* other developmental delay, *SB* siblings

**Table 5** Effect sizes, 95 % confidence limits and within-group tests for heterogeneity for studies included in the meta-analysis for nutritional data

Nutrient	Number of contributing studies	Random effects model				<i>p</i> value
		SMD (SE)	OR	95 % confidence limits		
				LCL	UCL	
Calcium	8	−0.65 (0.29)	0.31	0.11	0.85	0.022
Carbohydrates	7	−0.02 (0.07)	0.97	0.76	1.24	0.810
Energy	6	0 (0.06)	0.99	0.80	1.25	0.995
Fiber	6	0.09 (0.12)	1.18	0.77	1.78	0.448
Iron	7	0.17 (0.20)	1.35	0.66	2.76	0.414
Protein	7	−0.58 (0.25)	0.35	0.14	0.86	0.021
Total fat	6	0.03 (0.06)	1.05	0.84	1.30	0.690
Vitamin A	6	−0.51 (0.35)	0.39	0.11	1.37	0.143
Vitamin C	7	−0.13 (0.19)	0.98	0.52	1.87	0.507
Vitamin D	6	−0.07 (0.19)	0.88	0.45	1.71	0.703
Vitamin E	5	0.05 (0.17)	1.10	0.61	1.98	0.742
Zinc	6	−0.03 (0.09)	0.95	0.69	1.31	0.758

<u>Study</u>	<u>ASD</u>	<u>TD</u>	<u>Summary of Findings</u>
Bandini et al. (2010)	n = 53	n = 53	ASD group refused more <b>vegetables</b> , both in absolute amount (11 +/- 6 vs 6 +/- 5; p <.0001) and as a percentage of foods offered (63% +/-31% vs 33%+/- 27%; p <.0001).
Emond et al. (2010)	n = 79	n = 12,901	ASD group consumed fewer <b>vegetables</b> , salads, and <b>fresh fruit</b> but also consumed fewer sweets and fizzy drinks.
Johnson et al. (2008)	n = 19	n = 20	ASD group consumed significantly fewer <b>vegetables</b> (p < .001).
Luckens & Linsheid (2008)	n = 68	n = 40	ASD group had significantly higher scores on a scale assessing limited dietary variety (p < .01), which was negatively associated with servings of <u>meats</u> (p < .01), <b>fruits</b> (p < .05), and <b>vegetables</b> (p < .01).
Martins et al. (2008)	n = 41	n = 41	ASD group displayed significantly more food avoidance behaviors (p < .01), with <b>vegetables</b> followed by <b>fruits</b> the most commonly avoided food types.
Schmitt et al. (2008)	n = 20	n = 18	Significantly more children with ASD choose food based on texture (70% vs. 11%; p < .05), with favorite foods in ASD including <b>pizza, pasta, and cookies/candy</b> . All children in the ASD avoided mushy foods.



VS



- 380 calories
- 2 grams of saturated fat
- 10 grams of dietary fiber
- Key micronutrients:

Vitamin A  
Thiamin  
Riboflavin  
Niacin  
Vitamin B<sub>12</sub>  
Vitamin C  
Vitamin D  
Vitamin E  
Folate  
Calcium  
Iron  
Magnesium  
Zinc

- 720 calories
- 8 grams of saturated fat
- 4 grams of dietary fiber
- Key micronutrients:

Thiamin  
Riboflavin  
Niacin  
Vitamin C  
Calcium  
Iron  
Magnesium

- No quantities of:

~~Vitamin A  
Vitamin B<sub>12</sub>  
Vitamin D  
Vitamin E  
Folate  
Zinc~~

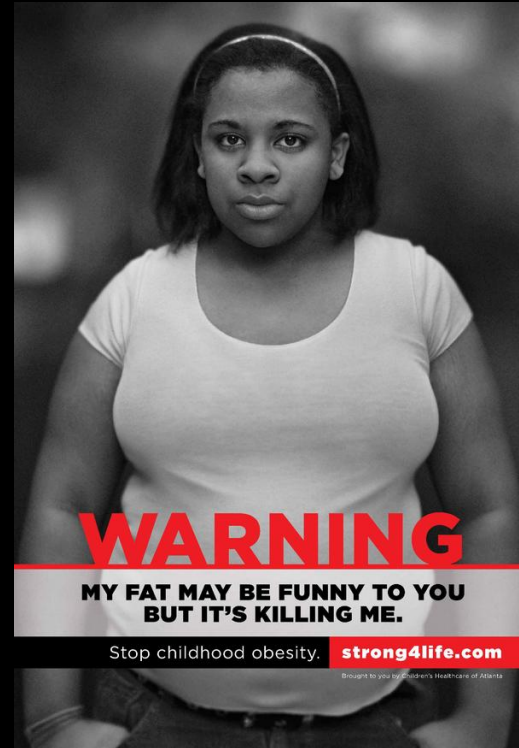
# Medical Impact



# Long term medical sequelae



Hediger et al.  
(2008)



Egan, Dreyer, Odar, Beckwith, &  
Garrison, 2013

Does high  
consumption of fats  
and snacks?



Cardiovascular  
disease and  
cancer

# Quality of Life

Reduced opportunities to eat at restaurants or social occasions

Disrupted family meals & further limitations in social interactions

Required to prepare multiple menus for each meal

Increased parental stress regarding health and development

# Etiology

- Behavioral Rigidity: Ahearn et al. (2001) - atypical feeding may represent an additional manifestation of this core diagnostic feature in ASD.
- Evidence:
  - Nadon, Feldman, Dunn, & Gisel (2011)
    - Not eating the same foods across settings (e.g., daycare; home)
    - Less likely to tolerate the introduction of new foods on their plate
  - Provost, Crowe, Osbourn, McClain, & Skipper (2010)
    - More likely to have difficulty eating outside the home (e.g., schools, restaurants)



## Pediatric Feeding Disorders: A Quantitative Synthesis of Treatment Outcomes

William G. Sharp · David L. Jaquess · Jane F. Morton · Caitlin V. Herzinger

**Abstract** A systematic review of the literature regarding treatment of pediatric feeding disorders was conducted. Articles in peer-reviewed scientific journals (1970–2010) evaluating treatment of severe food refusal or selectivity were identified. Studies demonstrating strict experimental control were selected and analyzed. Forty-eight single-case research studies reporting outcomes for 96 participants were included in the review. Most children presented with complex medical and developmental concerns and were treated at multidisciplinary feeding disorders programs. All studies involved behavioral intervention; no well-controlled studies evaluating feeding interventions by other theoretical perspectives or clinical disciplines met inclusion criteria. Results indicated that behavioral intervention was associated with significant improvements in feeding behavior. Clinical and research implications are discussed, including movement toward the identification of key behavioral antecedents and consequences that promote appropriate mealtime performance, as well as the need to better document outcomes beyond behavioral improvements, such as changes in anthropometric parameters, generalization of treatment gains to caregivers, and improvements in nutritional status.

**Table 2** Description of participants

Characteristic	<i>n</i>	%
Age (in months)	<i>M</i> = 48.06; <i>SD</i> = 30.47; range 10–168	
Gender		
Male	62	64.6
Female	34	35.4
Total	96	
Feeding concerns		
Feeding tube	43	44.8
Food selectivity	30	31.3
Bottle/liquid dependence	15	15.6
Poor oral intake	8	8.3
Developmental issues		
Reported	63	65.6
Not reported	23	23.9
“Typically developing”	10	10.5
Breakdown of developmental issues <sup>a</sup>		
Developmental delay	29	31.2
Autism spectrum disorder	22	23.7
Mental retardation	20	21.5
Speech/language delay	9	9.7
Other	4	4.3
Medical issues		
Reported	65	67.7
Not reported	31	32.3
Breakdown of medical issues <sup>a</sup>		
Failure to thrive	25	26.0
Gastroesophageal reflux	21	22.8
Gastrointestinal problems	14	15.2
Anatomical abnormalities	10	10.9
Genetic disorder	10	10.9
Pulmonary disorder/dysfunction	7	7.6
CNS disorder/malformation	6	6.5
Prematurity	4	4.3
Food allergies	3	3.3
Cardiac impairment	2	2.2
Other	11	12.0

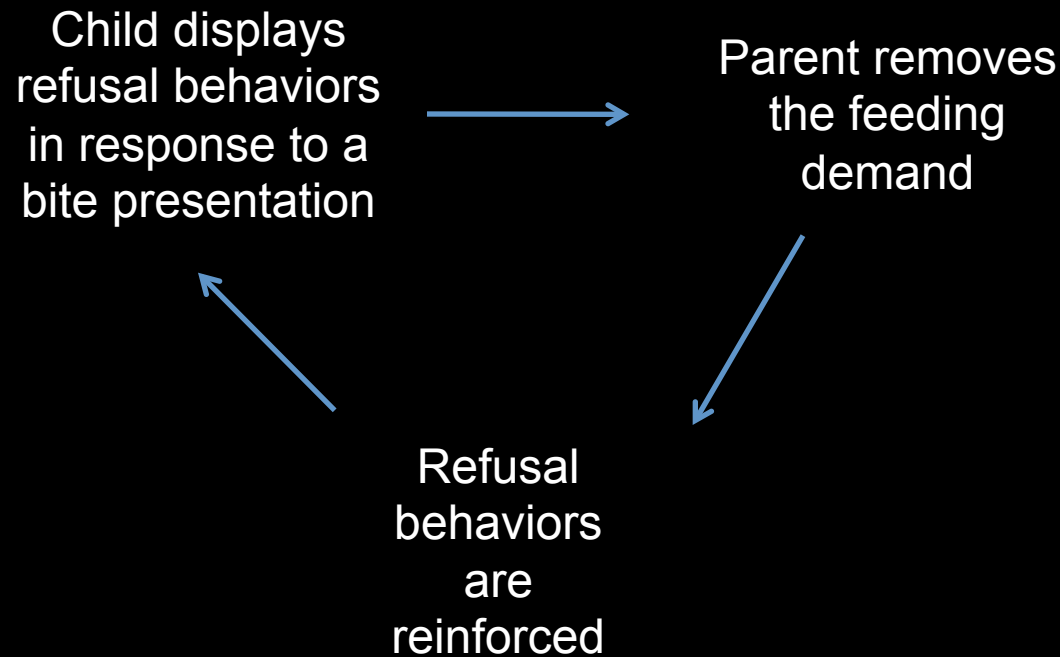
# Etiology: Organic

- The **available evidence** suggests that the type and prevalence of gastrointestinal signs, symptoms, and conditions reported in ASD are similar to that observed in the general population, with the possible exception of feeding problems, chronic constipation and encopresis as a consequence of constipation (see Buie et al., 2010 for a review).

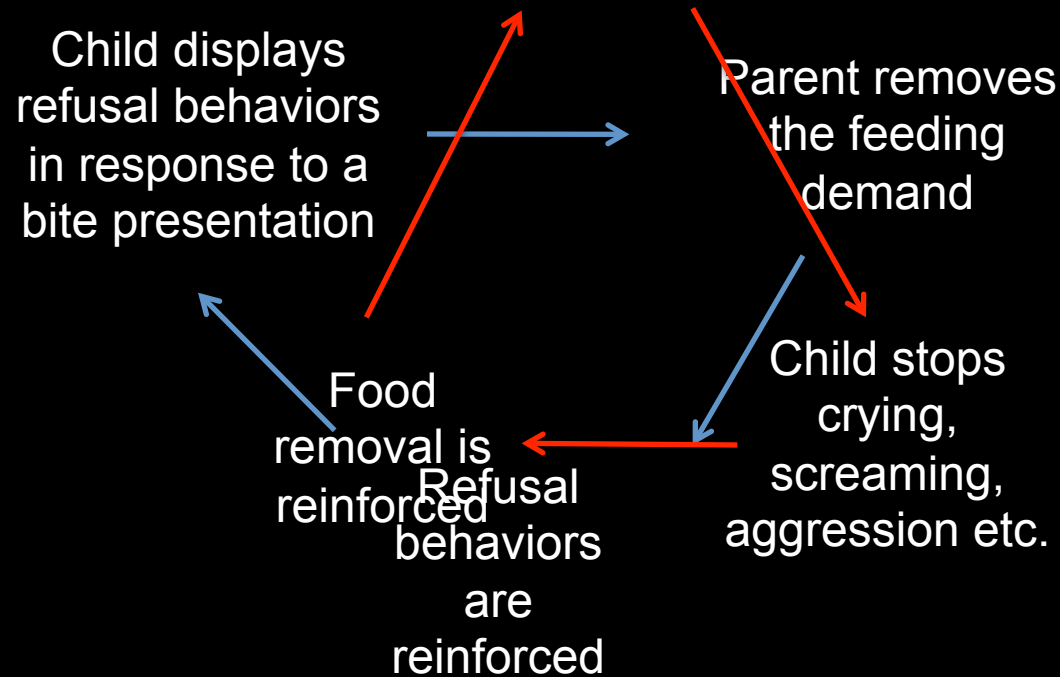
# Etiology: Learning Process

- Regardless of what factors contribute to the emergence of restrictive patterns of intake in ASD, food selectivity often is maintained by a cycle of negative reinforcement, with learning occurring on **both sides of the child/parent dyad.**

# Learning Process: Parent-Child Dyad



# Learning Process: Parent-Child Dyad



# “The Arms Race”



# Topography and Prevalence

- Up to 95% of children with ASD might experience some type of feeding problem (Lockner et al., 2008)
- Food selectivity: only eating a narrow variety of foods by type, texture, and/or presentation
  - Reject vegetables and fruits
  - Preference for crispy or crunchy snack foods
- **THIS IS NOT JUST PICKY EATING**

# Environmental Influence:

**A - ANTECEDENT**



**B - BEHAVIOR**



**C - CONSEQUENCE**



# A - ANTECEDENT

Antecedent-based Interventions may involve:

- Identifying situations associated with challenging behavior
- Modify the environment to decrease probability of challenging behavior
  - Task demands, task presentation, length of engagement
  - Promotes contact with reinforcement

# B - BEHAVIOR



“Gets upset when taken to the bathroom”

vs.

“Hits, cries, and flops on the floor when I try to take him to the bathroom”

“Does not sleep well at night”

vs.

“Wakes up 2 to 3 times per night and cries out for me”

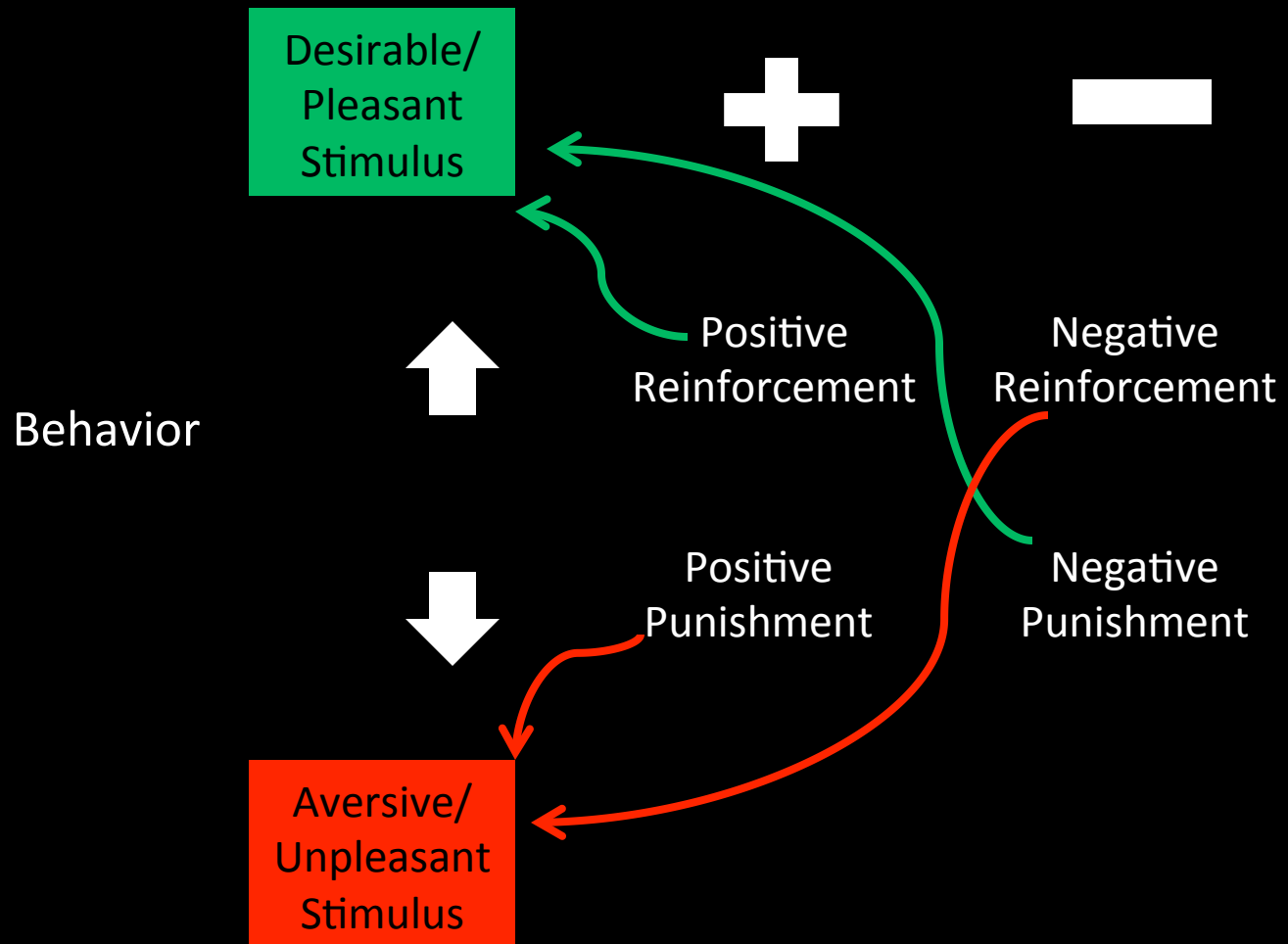
“Does not like new food”

vs.

“Pushes away the plate and leaves the table when new food presented”

# C - CONSEQUENCE

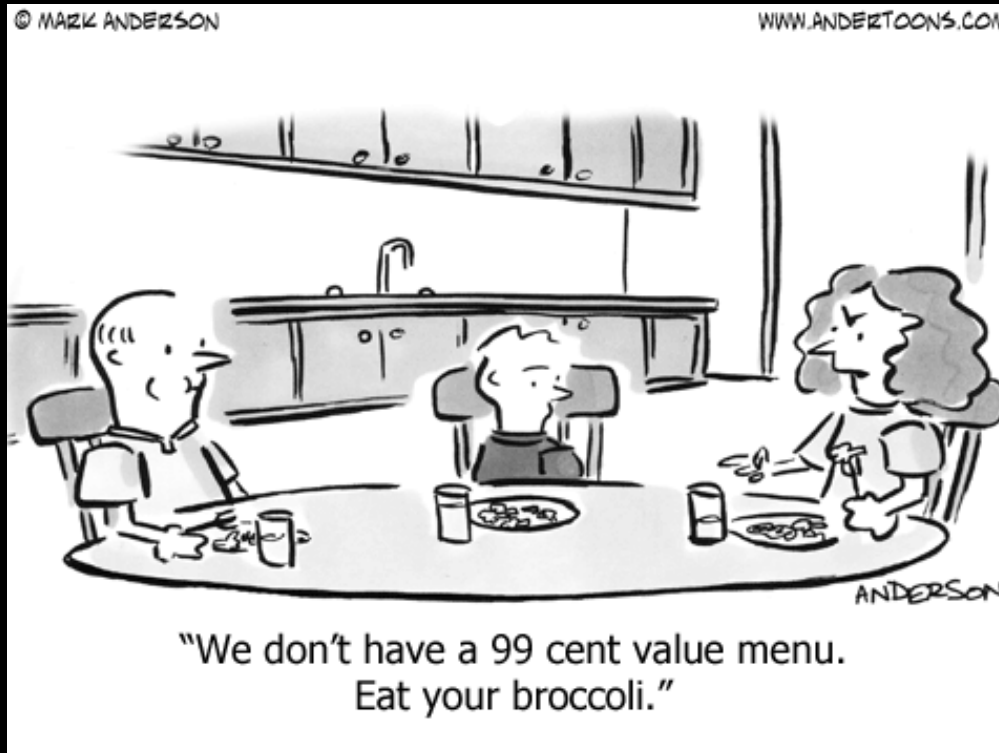
Consequence



# Key Points

- Once medically cleared.....
- Assessment and intervention should focus on both the antecedents and consequences associated with a behavior
  - Antecedent interventions: Match demand with child's presentation
    - Promote contact with reinforcement
    - Stimulus fading beginning with a reasonable demand
  - Consequence Based Intervention
    - Consider the function of the behavior – **escape, avoidance, attention, access**
    - Reinforcement of alternative (more desirable) behavior

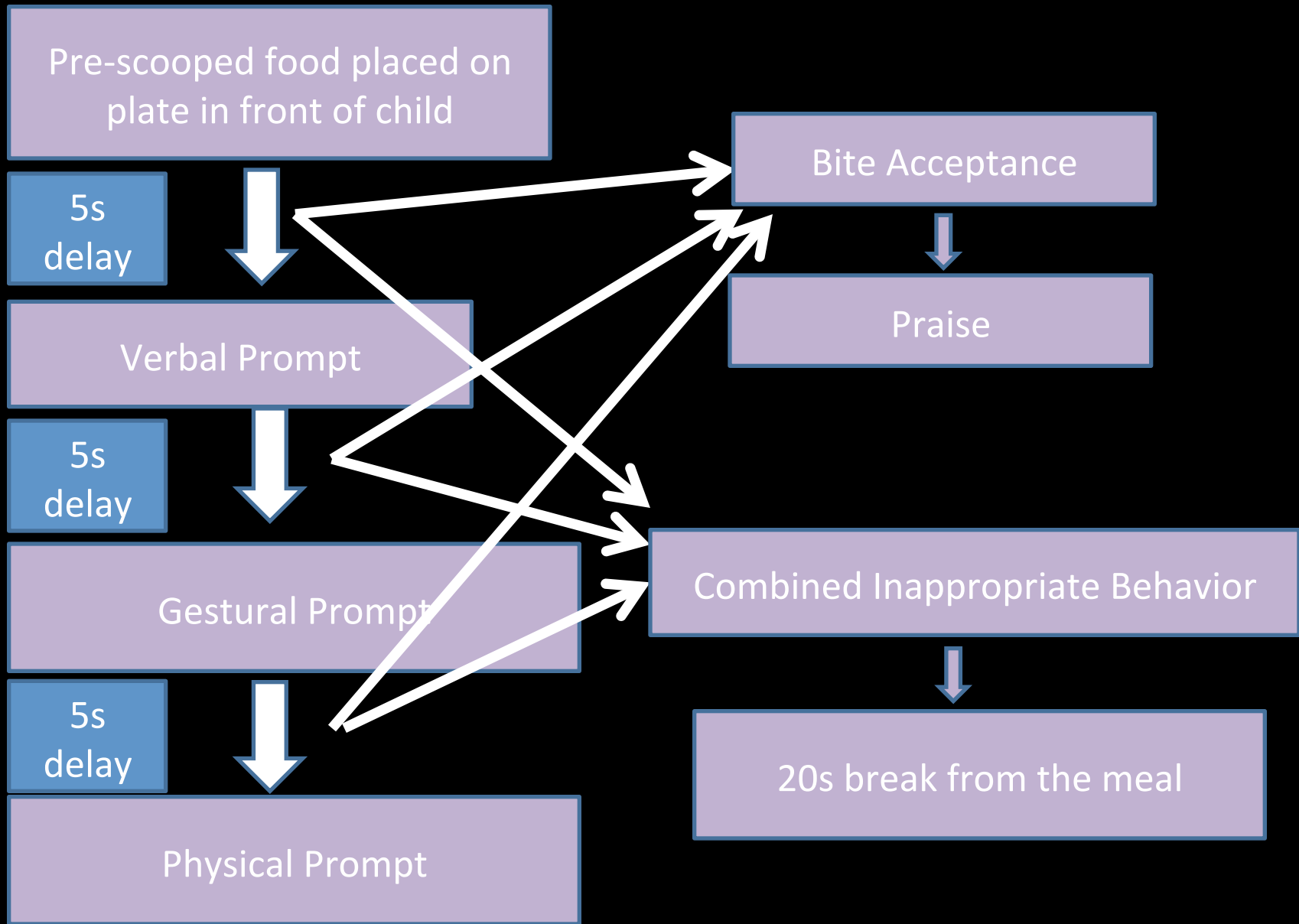
# Assessment of Feeding Concerns



# Behavioral Observations

- Key Considerations:
  - Naturalistic versus Structured
  - Environment
  - Feeder
  - Foods (type, texture)
  - Presentation format
  - Bolus size
- Few examples in the literature
  - Munk & Repp (1994)
  - Ahearn, Castine, Nault, & Green (2001)
  - Sharp, Jaquess, & Lukens (2013)

# Sharp, Jaquess, & Luken (2013)



# Behavioral Observation: Pros/Cons

- Pros:
  - “Gold standard” of assessment, provides objective data regarding actual performance
- Cons:
  - Design questions
  - Cost (e.g., time, data collection, emotional response)



# BAMBI

Think about mealtimes with your child over the past 6 months. Rate the following items according to how often each occurs, using the following scale:

**Never/Rarely**

**Seldom**

**Occasionally**

**Often**

**At Almost Every Meal**

**1**

**2**

**3**

**4**

**5**

Circle YES if you think an item is a problem for you or NO if you think it is not a problem.

- |  |   |   |   |   |   |     |    |
|--|---|---|---|---|---|-----|----|
| 1. My child cries or screams during mealtimes.   | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 2. My child turns his/her face or body away from food.   | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 3. My child remains seated at the table until the meal is finished.  | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 4. My child expels (spits out) food that he/she has eaten.   | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 5. My child is aggressive during mealtimes (hitting, kicking, scratching others).                              | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 6. My child displays self-injurious behavior during mealtimes (hitting self, biting self).                     | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 7. My child is disruptive during mealtimes (pushing/throwing utensils, food).                                  | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 8. My child closes his/her mouth tightly when food is presented.   | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 9. My child is flexible about mealtime routines (e.g., times for meals, seating arrangements, place settings). | 1 | 2 | 3 | 4 | 5 | YES | NO |
| 10. My child is willing to try new foods.  | 1 | 2 | 3 | 4 | 5 | YES | NO |

# Standardized Assessments: Pros/Cons

- Pros:
  - Quick access to information
    - Time
    - Scoring
    - Yields important data regarding parent perception of problem
- Cons:
  - No link with behavioral data
  - No cut-off scores for clinical interpretation
- Screening measure?

# Nutrition Assessment: Diet Analysis

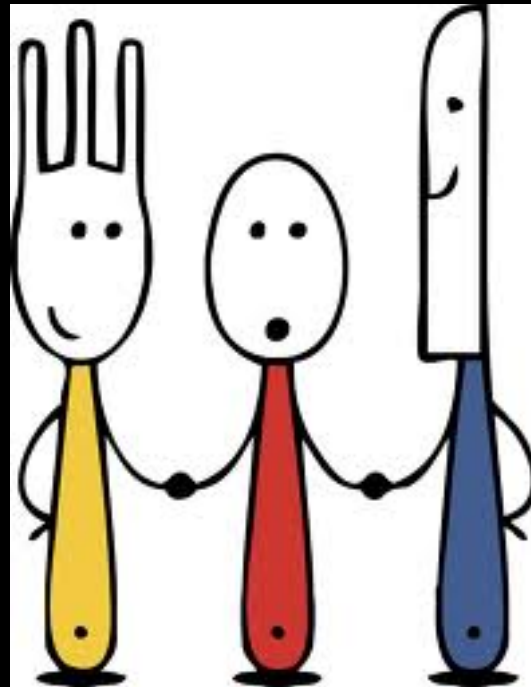
- Clinical interview
  - Preferred food list
  - Feeding schedule
    - School vs. weekend
    - Grazing
- Three-day food intake record

# The Marcus Autism Center Pediatric Feeding Disorder Program

**Instructions: Indicate foods your child currently eats (Preferred), foods your child used to eat (Dropped), and foods you would like for your child to eat (Target) by marking an X in the column.**

	Preferred	Dropped	Target
Protein:			
Baked Beans, Vegetarian			
Black-eyed Pea			
Cheese, slice			
Cheese, string			
Cottage Cheese			
Chicken Breast Strips - Tyson - fzn			
Chicken Breast, canned, Swanson			
Chicken Nuggets			
Egg beaters - carton			
Fish Stick			
Garbanzo Bean			
Hamburger, frozen, White Castle			
Hot Dog			
Peanut Butter Sandwich, grape jelly			
Vienna Sausage			
Vanilla yogurt			
Strawberry Yogurt			

# Behavioral Intervention to Expand Dietary Diversity



# Levels of Intervention

1

- **Parent Consultation**

- Limited clinical contact (e.g., 1 to 2 visits)
- Involves guidance, education, and general recommendations
- Educational handouts and parents primary agents of change

2

- **Outpatient Treatment**

- Regular, ongoing clinical contact (e.g., weekly appointments)
- Child and family work directly with clinician to modify feeding behaviors or dietary intake
- “Scope of practice” and cross disciplinary collaboration

3

- **Intensive Programs**

- Admission to inpatient or day treatment unit up to 8 weeks or more
- Interdisciplinary treatment team: Behavioral psychology, nutrition, oral-motor, social work, nursing
- Trained therapist implements treatment protocol and parent training occurs once behaviors stable

# Child-guided approach

- Child's behavior:
  - Guides starting point and behavioral elements
  - Decisions rules of increasing in feeding demand
    - Involves the following key behaviors
      - Increase approach: Rapid Acceptance with minimal prompting
      - Decreased avoidance: Crying, negative statements, gagging, grimaces
- Generalization to caregivers once target level achieved

# Medical Considerations

Work with medical team to assess presence of:

- (1) Metabolic abnormalities or defects in absorption that accompany certain conditions
  - cystic fibrosis, mitochondrial disease, short bowel syndrome, or lactose intolerance
- (2) Gastrointestinal issues
  - gastroesophageal reflux, gastroenteritis, dysmotility
- (3) Food allergies



## **Pediatric Feeding Disorders: A Quantitative Synthesis of Treatment Outcomes**

William G. Sharp · David L. Jaquess ·  
Jane F. Morton · Caitlin V. Herzinger

- Articles in peer-reviewed scientific journals (1970–2010) evaluating treatment of severe food refusal or selectivity were identified.
- Studies demonstrating strict experimental control were selected and analyzed.
- Forty-eight single-case research studies reporting outcomes for 96 participants were included in the review
- Most children presented with complex medical and developmental concerns and were treated at multidisciplinary feeding disorders programs.
  - 23.7% diagnosed with ASD
- All studies involved behavioral intervention; no well controlled studies evaluating feeding interventions by other theoretical perspectives or clinical disciplines met inclusion criteria.

# Sharp et al. (2010)

## Setting:

- 60.4% - Inpatient or day treatment setting
- 29.2% - Home/school
- 10.4% - Outpatient clinics
- 6.3% - Residential facilities

## Most Common Treatment Packages:

- Escape extinction
- Differential Reinforcement of an Alternative Behavior
- Antecedent Manipulations

## Pediatric Feeding Disorders: A Quantitative Synthesis of Treatment Outcomes

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**Table 4** PND, NAP, and effect size values by dependent variable

Dependent variable	# Contributing studies (%)	# Contributing participants (%)	Mean PND (Standard deviation) $n = 109^a$	Mean NAP (Standard deviation) $n = 109^a$	Effect size ( $d$ ) $n = 106^a$
Acceptance (Percent)	$n = 29$ (60.4%)	$n = 54$ (56.3%)	87.87 (31.63)	.97 (.09)	2.598
Acceptance (Frequency)	$n = 6$ (12.5%)	$n = 17$ (17.7%)	88.8 (24.8)	.98 (.04)	2.698
Swallowing (Percent)	$n = 11$ (22.9%)	$n = 22$ (22.9%)	81.75 (36.04)	.91 (.20)	1.81
Swallowing (Frequency)	$n = 2$ (4.2%)	$n = 7$ (7.3%)	98.85 (3.27)	.98 (.03)	2.88
Volume	$n = 6$ (12.5%)	$n = 9$ (9.4%)	95.40 (5.5)	.97 (.03)	2.89
Total	$n = 54$	$n = 109^a$	87.95 (29.54)	.96 (.12)	2.46

PND percent of non-overlapping data, NAP non-overlap of all pairs

<sup>a</sup> Data for some participants contributed to more than one dependent variable

Metric (small effect = .2, medium = .5, large = .8)

# Evidence-based treatments for depression and anxiety versus treatment-as-usual: A meta-analysis of direct comparisons<sup>☆</sup>

Bruce E. Wampold<sup>a,b,\*</sup>, Stephanie L. Budge<sup>c</sup>, Kevin M. Laska<sup>a</sup>, A.C. Del Re<sup>a,d</sup>, Timothy P. Baardseth<sup>a</sup>, Christoph Flückiger<sup>a,e</sup>, Takuya Minami<sup>a</sup>, D. Martin Kivlighan II<sup>a</sup>, Wade Gunn<sup>a</sup>

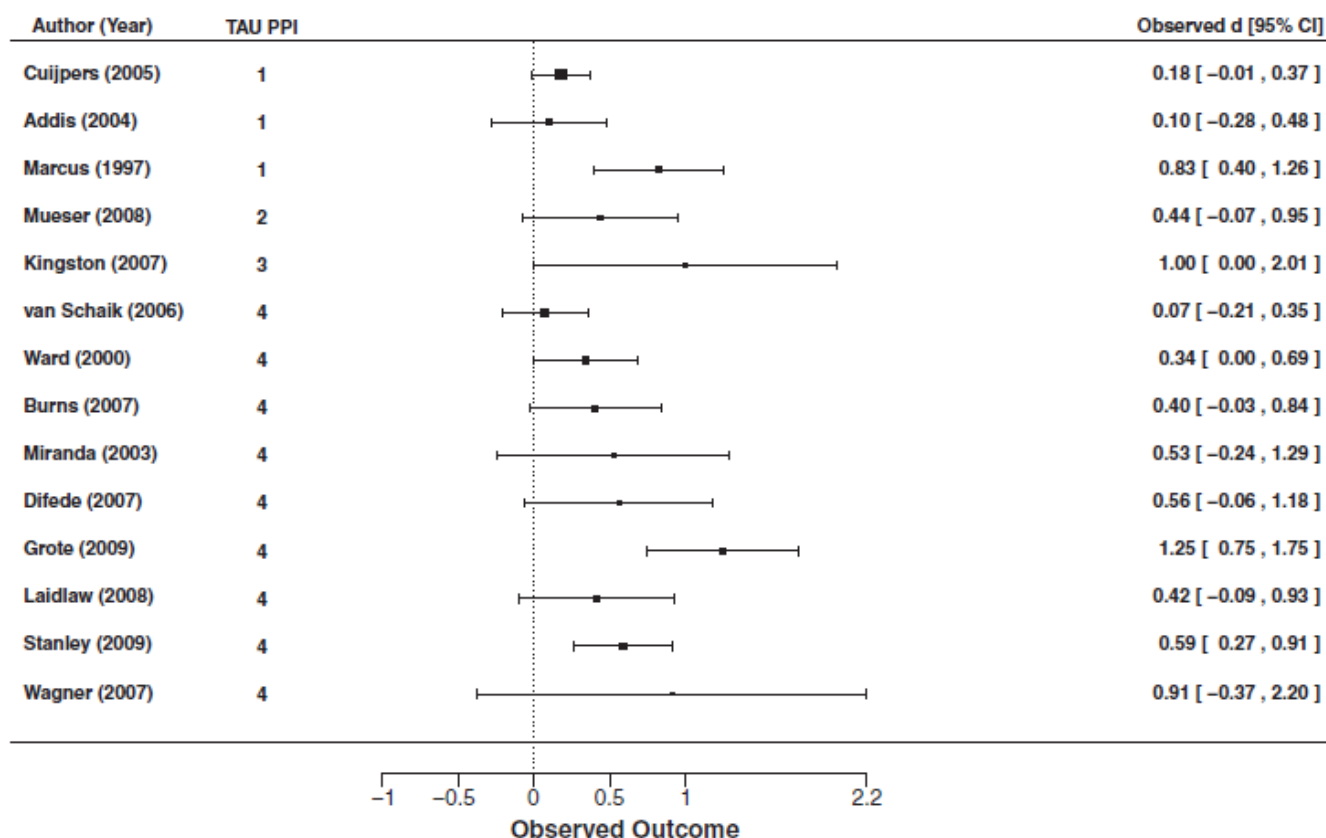
<sup>a</sup> University of Wisconsin, Madison, USA

<sup>b</sup> Forskningsinstituttet, Modum Bad Psychiatric Center, Norway

<sup>c</sup> University of Louisville, USA

<sup>d</sup> VA Palo Alto Health Care System & Stanford University School of Medicine, USA

<sup>e</sup> University of Bern, Switzerland



d = .45

Fig. 2. Forest plot of effects, in order of TAU PPI.

# A Retrospective Chart Review of Dietary Diversity and Feeding Behavior of Children With Autism Spectrum Disorder Before and After Admission to a Day-Treatment Program

William G. Sharp,<sup>1,2</sup> David L. Jaquess,<sup>1,2</sup> Jane F. Morton,<sup>1,2</sup>  
and Aida G. Miles<sup>3</sup>

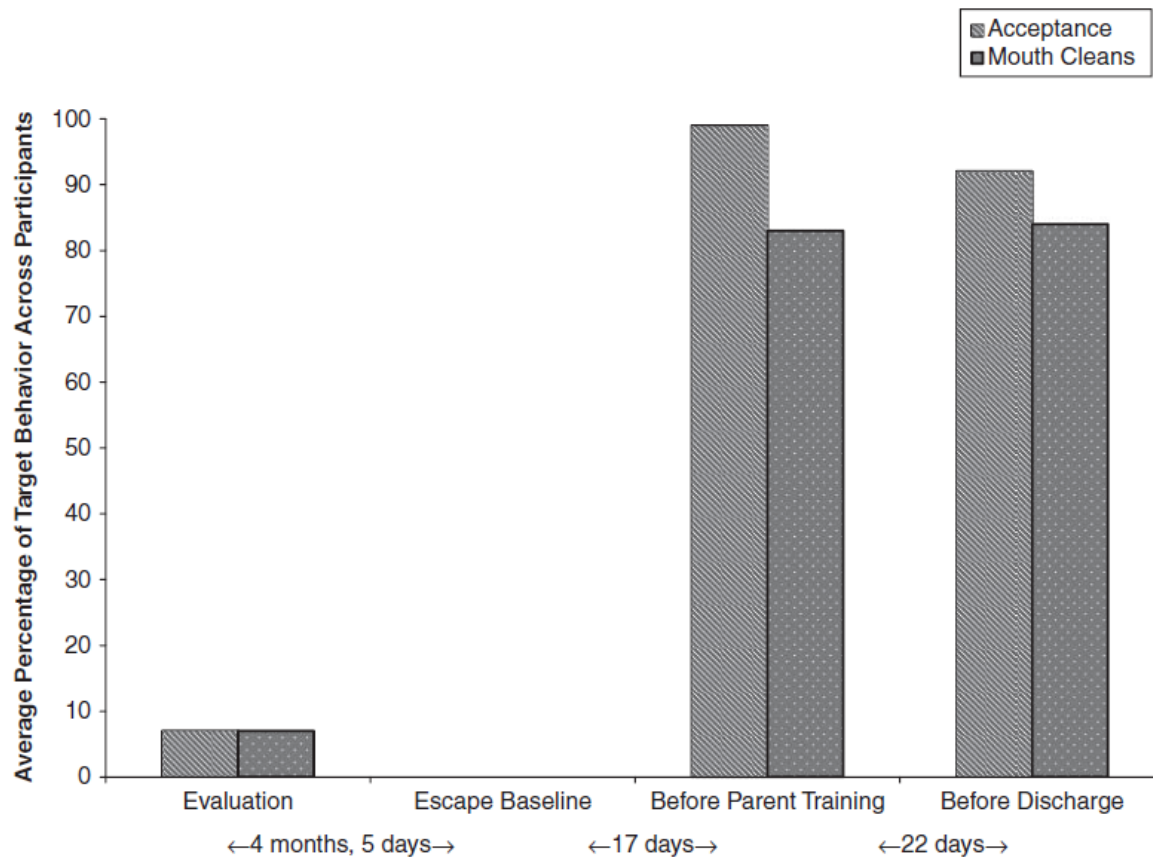


Figure 1. Acceptance and swallowing of nonpreferred food by time

# Sharp et al. (2010)

- Key points:
  - With relatively few interdisciplinary feeding programs spread out geographically, developing and evaluating alternative treatment avenues will help assure appropriate access to care.
  - Need to establish evidence base for other disciplines providing feeding therapy (e.g., medical, occupational therapy, speech therapy, dietetics).



# General Behavioral Concepts

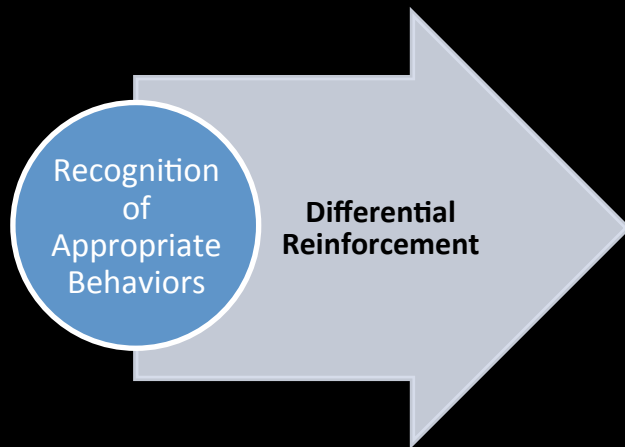
Treatment must involve:



Levels-

- Ignoring negative statements
- Non-removal of the plate
- Non-removal of the spoon
- Physical guidance

Exposure with Response Prevention



Types-

- Praise and attention
- Access to preferred activities
- Consumption of preferred food
- Escape / break



# General Behavioral Concepts

- Reasonable Demand (a.k.a. - Antecedent manipulations + fading)
  - Match feeding demand to child's response during meals
  - Increase demand after stability (Must take data!!!!)
    - 3 meals with no problems behaviors, double the bite size
  - Manipulation: Portion size, bite volume, food texture, mealtime variety



# Parent Consultation

- Increase structure and routine:
  - Regular meal/snack schedule
  - Meals involve a table with age appropriate seating
- Differential Attention
  - Provide attention and praise for appropriate mealtime behaviors-
    - Accepting bites, swallowing, eating properly with a spoon, trying a new food, or staying seated throughout the meal
  - Ignore minor behavior problems
    - Whining, negative statements regarding food, messy eating (if age appropriate)

# Parent Consultation

- Education regarding developmental considerations
  - Oral motor skills – Age and texture?
  - Self-feeding skills – Messy eating?
  - Pickiness and appetite fluctuations – Selectivity?

# Outpatient treatment

- Extinction + differential reinforcement + antecedent manipulation

## Antecedent Manipulations:

- Bite Size
  - Decrease demand
- Food Texture
  - Taste Exposure
- Mealtime Variety
  - Select items previously accepted or similar
- Blending Foods
  - Ratio preferred to non-preferred
- Bite Placement/Presentation
  - Flipped spoon

# Treatment – Tangibles

- Differential Reinforcement:
  - To increase a behavior: reinforce it
    - Praise / attention
    - Brief toy play
    - Brief break (escape)
  - Go in small steps for complex behavior
- End on a good note:
  - Meal termination rule:
    - 20 bites or 20 minutes, whichever comes first
    - Occurs even if doing well

# Extinction - Reinforcement Removal

- Attention:
  - Selective ignoring (especially verbal – but also non-verbal)
  - Change in feeder attitude is “attention”
- Escape (Caution):
  - Acceptance
    - Non-removal of the food
    - Non-removal of the spoon
  - Expelling: re-presentation (size of a pea)
  - Packing / pocketing
    - Redistribution
    - Helper food
- **Issue: Extinction burst**

<b>Food</b>	<b>¼ pea</b>	<b>½ pea</b>	<b>Pea</b>	<b>2 pea</b>	<b>½ level</b>	<b>level</b>	<b>heaping</b>
Strawberry	□□□	□□□	□□□	□□□	□□□	□□□	□□□
Rice	□□□	□□□	□□□	□□□	□□□	□□□	□□□
Carrots	□□□	□□□	□□□	□□□	□□□	□□□	□□□
Rawberry gogurt	□□□	□□□	□□□	□□□	□□□	□□□	□□□
Waffle	□□□	□□□	□□□	□□□	□□□	□□□	□□□
String cheese	□□□	□□□	□□□	□□□	□□□	□□□	□□□
Strawberry yogurt	□□□	□□□	□□□	□□□	□□□	□□□	□□□
Wheat bread	□□□	□□□	□□□	□□□	□□□	□□□	□□□
Blueberry yogurt	□□□	□□□	□□□	□□□	□□□	□□□	□□□

# Inpatient and Day Treatment Programs

- Most support for behavioral intervention has occurred in this treatment setting.
- Typically involves multidisciplinary approach
  - Nutritionist
  - OT/Speech
  - Psychologist
  - Nursing
  - Social Work
- Trained therapist implement treatment (initially)
- 4 meals daily, 6 to 8 week admissions
- When to refer?



# Example Home Protocol

## Feeding Recommendations

1) Bite presentations: The family is encouraged to gradually introduce feeding demands with parents presenting bites on a spoon using the non-removal of the spoon (NRS) protocol enclosed. This includes ignoring disruptions, limiting prompting, and gentle blocking disruptions as needed. These procedures were also modeled during the evaluation process.

2) Use of a toy/video: Continue to provide access to a toy throughout the meal using the non-contingent access (NCA) protocol enclosed.

3) Collecting behavioral data: The family was encouraged to record child's mealtime behaviors and use this information to guide the introduction of new foods or increasing the bolus. A data sheet was provided to the family to help in this process. This information will be used with the decision rules provided below.

4) Meal length: The family should begin with a reduced session length. 5 bites was the targeted length discussed to introduce treatment. Conduct as many sessions per day as possible based on the family's schedule. The sessions should not occur during regular mealtimes, but rather as separate "snack times".

5) Feeding demand: All presentations should involve an empty spoon initially. Use the following decision rule to add new foods into the meal or increase the bites per meal.

**3 Meal Rule:** The following criteria must be met across three meal blocks for the empty spoon:

- 80% or > 5 sec ACC (rapid acceptance) - i.e., at least 4 out of the 5 bite presentations
- No disruptions or crying

Once a food is introduced, add the following criteria:

- 80% or > swallowing

Steps to introduce food include using the same **3 meal rule**:

1) Preferred crackers (1/4 spoon size)

2) Increase to 10 bites per session

3) 2 peas bite size *currently accepted fruit or vegetable* when mixed with rice, such as banana or okra.

These foods should be cut into very small pieces, mashed or pureed based on her response. The family should pick one food to work on at a time.

4) Increase to 20 bites per session

5) Increase the bite volume for new food.

- 1/4 level spoon
- 1/2 level spoon
- level spoon

5) Once she is accepting the food at a full spoon, introduce this food into meals and select another food to target and begin at step 3 for this food.

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