



# **Assessment of Pediatric Feeding Disorders**

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# Feeding Behavior

**No human activity has greater biological and social significance than feeding.**



Achievement of feeding milestones.

Achievement of adequate physical growth.

## **FEEDING BEHAVIOR**

**Successful feeding is measured against a set of social and cultural standards.**



# PEDIATRIC FEEDING DISORDERS

- ❑ **Identified when a child fails to consume a sufficient variety or quantity of food to maintain nutritional status**



# TYPICAL VS. DISORDERED FEEDING

## Typical

- Accepts breast or bottle
- Starts baby food around 4 to 6 months of age
- Transitions to mashed table foods by 12 months of age

## Disordered

- Has difficulty breast or bottle feeding
- Consistently rejects baby food
- Has difficulty transitioning to mashed table foods



# TYPICAL VS. DISORDERED FEEDING

## Typical

- Picky eating emerges at 18 months of age
- Variety will reemerge with exposure
- Variety will be sufficient to provide adequate nutrition

## Disordered

- Reaction to non-preferred food is excessive
- Inflexible food preferences may change, but variety remains restricted
- Variety does not provide adequate nutrition



# TYPICAL VS. DISORDERED FEEDING

## Typical

- Preferences are influenced by peers
- Eating persists in different environmental conditions
- Will eat non-preferred food when hungry

## Disordered

- Insensitive to social cues around eating
- Eating is disrupted in different conditions
- Will not eat non-preferred food even when hungry



# PEDIATRIC FEEDING DISORDERS

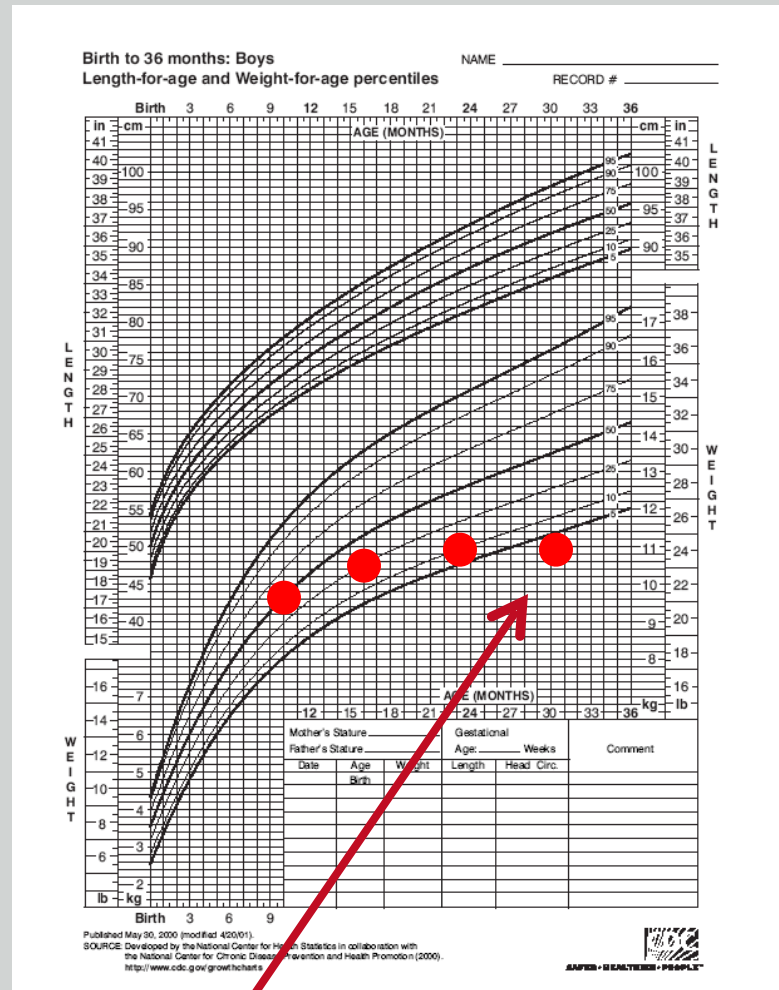
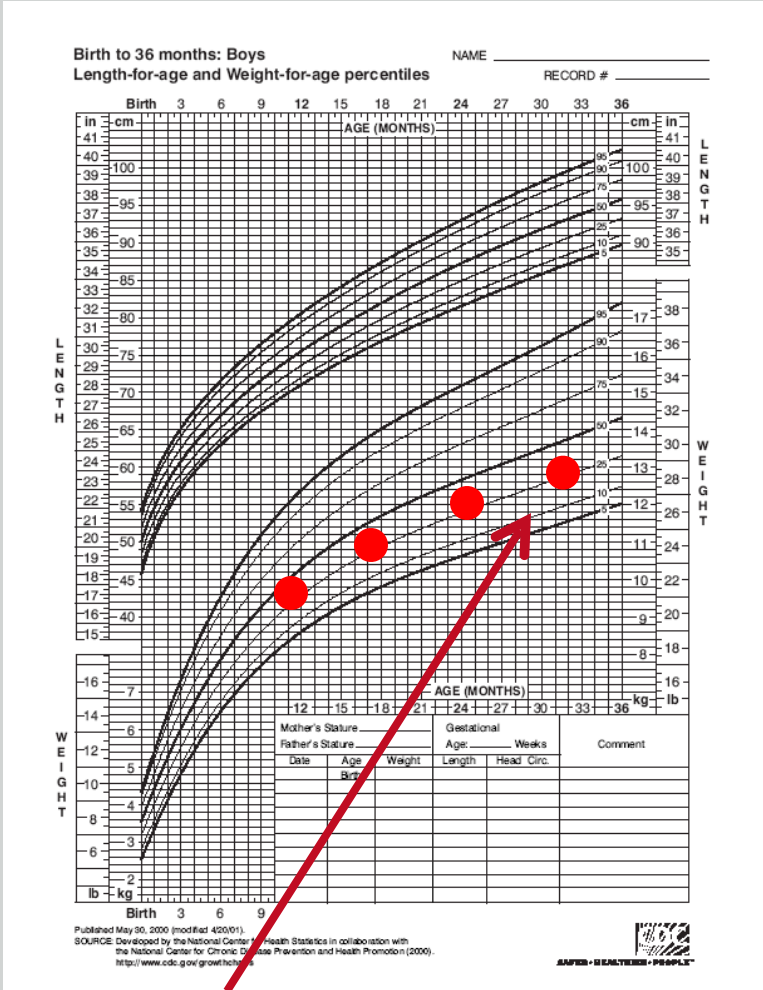
- ❑ Child has any one of the following:**
  - ❑ Child has three consecutive months of weight loss**
  - ❑ Child is diagnosed with dehydration or malnutrition, which results in emergency treatment**
  - ❑ Child has nasogastric tube with no increase in the amount of calories from oral feeding for 3 consecutive months**





# TPYICAL

# DISORDERED



Child should maintain growth along his or her own curve.

Growth should not decelerate.



# Pediatric Feeding Disorders

- Parent reports any one of the following:**
  - Chronic lengthy meals**
  - Unusual or inappropriate mealtime conditions**
  - Failure to advance texture**
  - Over dependence on a single source of nutrition**
  - High levels of inappropriate mealtime behavior**
  - High levels of caregiver stress during meals**



# PEDIATRIC FEEDING DISORDERS

- ❑ **Meal lengths over 30 minutes are the best predictor of a feeding disorder relative to any other target behavior.**



# INTERDISCIPLINARY APPROACH

- ❑ **Consider a comprehensive, interdisciplinary evaluation before starting treatment**



# INTERDISCIPLINARY APPROACH

## **Interdisciplinary team evaluation:**

- Medicine: Rule out physical causes of feeding problem**
- Nutrition: Evaluate adequacy of current intake**
- Social Work: Evaluate family stressors**
- Speech/Occupational Therapy: Evaluate oral-motor status and safety**
- Psychology: Assess contribution of environmental factors**



# MEDICAL CONDITIONS

Approximately **60%** of children with feeding problems also have medical problems.



# CALORIC NEEDS BY AGE (KCAL)

<b>AGE (YEARS)</b>	<b>1</b>	<b>2-3</b>	<b>4-8</b>	<b>9-13</b>	<b>14-18</b>
	<b>900</b>	<b>1000</b>			
<b>FEMALE</b>			<b>1200</b>	<b>1600</b>	<b>1800</b>
<b>MALE</b>			<b>1400</b>	<b>1800</b>	<b>2200</b>



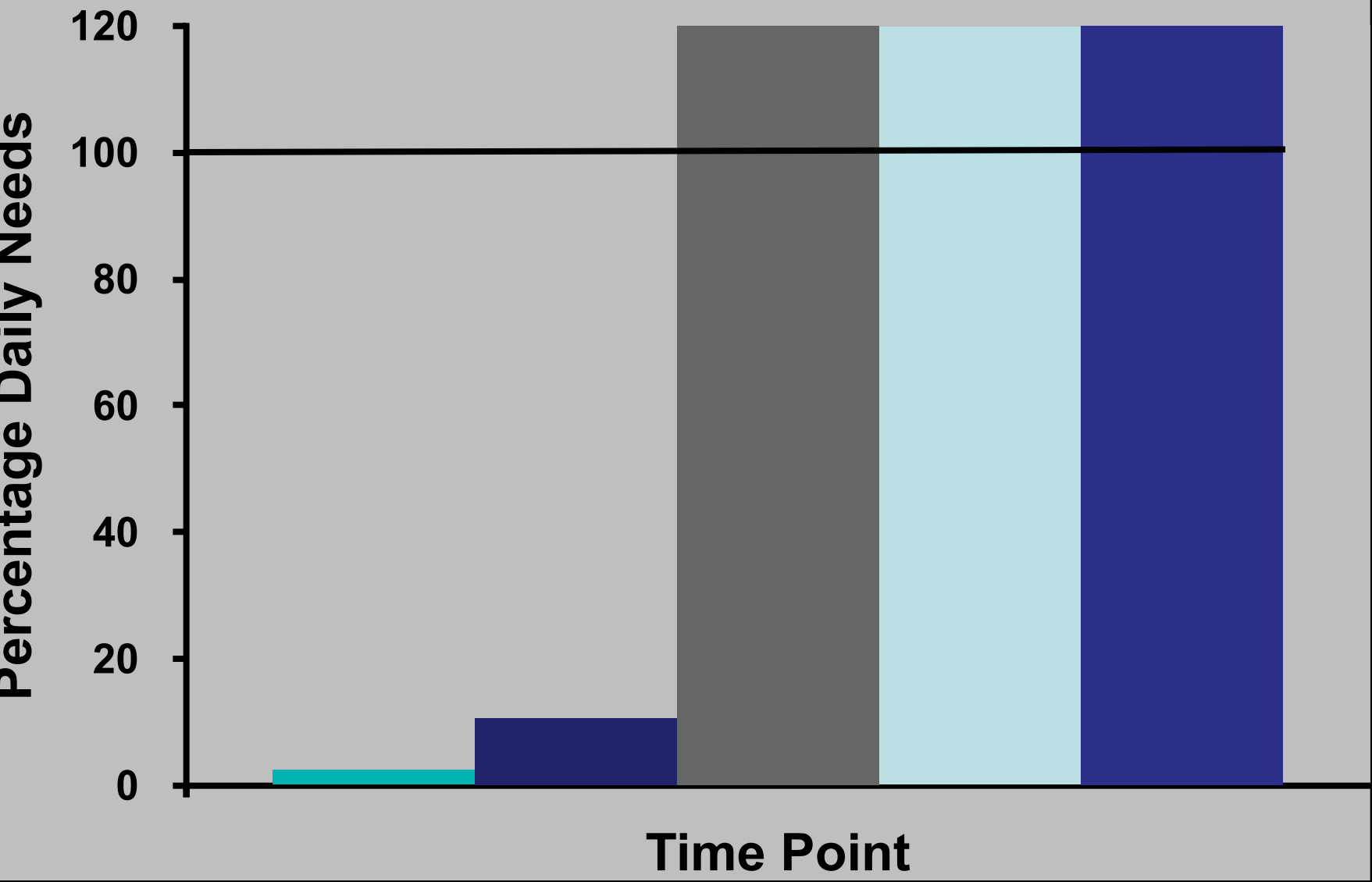
# NUTRITIONAL REQUIREMENTS

AGE (YEARS)	1	2-3	4-8	9-13	14-18
FAT (%KCAL)	30-40	30-35	25-35	25-35	25-35
DAIRY (C)	2	2	2	3	3
PROTEIN (OZ)	1.5	2	3 <sup>F</sup> 4 <sup>M</sup>	5	5 <sup>F</sup> 6 <sup>M</sup>
FRUITS (C)	1	1	1.5	1.5	1.5 <sup>F</sup> 2 <sup>M</sup>
VEGETABLES (C)	3/4	1	1 <sup>F</sup> 1.5 <sup>M</sup>	2 <sup>F</sup> 2.5 <sup>M</sup>	2.5 <sup>F</sup> 3 <sup>M</sup>
GRAINS (OZ)	2	3	4 <sup>F</sup> 5 <sup>M</sup>	5 <sup>F</sup> 6 <sup>M</sup>	6 <sup>F</sup> 7 <sup>M</sup>





# Folate Intake





# SETTING GOALS FOR TREATMENT

## **Goals should be:**

- Individualized
- Observable
- Measurable

## **Sample goals:**

- Increase total oral intake to 50% of needs
- Increase variety by 8 new foods
- Increase acceptance of solids to 80%
- Decrease inappropriate mealtime behavior to 1 per minute or less



# ASSESSMENT

## Why is it important to structure meals?

- Creates a predictable environment for the child
- Ensures the expectations of the meal are clear to the child
- Allows for systematic changes when doing treatment components



# HOW DO WE STRUCTURE THE MEAL?

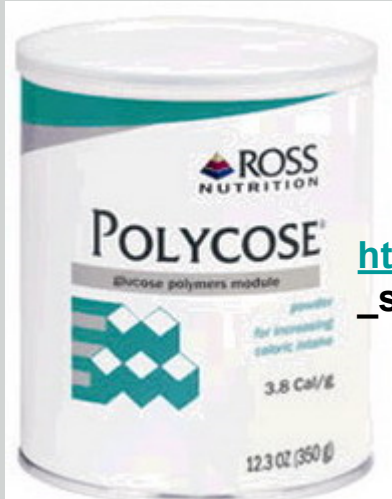
## Identify foods you will present

- Identify food type
- Specify foods by name, food group, brand, recipe
- Identify food texture
- Precisely describe how you make the texture



# SPECIALTY PRODUCTS

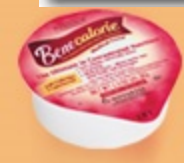
Consult a speech or occupational therapist if your child has swallowing difficulties.



[http://www.axcan.com/canada\\_scandi\\_info.php?lang=1](http://www.axcan.com/canada_scandi_info.php?lang=1)



<http://www.thickitretail.com/>



<http://abbottnutrition.com/Products/polydose>



Consult a dietitian if your child has poor weight gain or poor nutrition.



[www.NestleNutritionStore.com](http://www.NestleNutritionStore.com)



# EATING AND DRINKING UTENSILS

Rubber-Coated Baby Spoons



Maroon Spoons



Nuk Brush



Cut-out (nosey) cups





# HOW DO WE STRUCTURE THE MEAL?

## Solids



AGE	UTENSIL TYPE	BOLUS
4 to 8 months	Coated baby spoon	1/4 level spoon
9 to 12 months	Coated baby spoon	1/2 level spoon
13 to 18 months	Coated baby spoon	Level spoon
19 months to 6 years	Small maroon spoon	Level spoon
7 years+	Large maroon spoon	Level spoon





# HOW DO WE STRUCTURE THE MEAL?

## Length of meal

- Time based (e.g., 5 min, 15 min)
- Bite or drink based (e.g., 1 bite, 5 bites)
- Set the child up for success
- What is feasible for follow through?





# OPERATIONALLY DEFINING BEHAVIOR

- Concise, detailed definition of behavior**
- Used to remove ambiguity and ensure all data collectors are measuring same behavior**



# Operationally Defining Behavior

## Child

- Bite Presented
- 5-s Acceptance
- Bite Taken After 5 s
- Expel
- Mouth Clean
- Pack
- Gag
- Cough
- Vomit
- Inappropriate Behavior
- Negative Vocalizations

## Feeder

- Incorrect Escape
- Spoon at lips
- Incorrect Positive Reinforcement
- Incorrect Praise





# SAMPLE DATA SHEET

Sample data for a child who refuses food and engages in inappropriate behavior.

	<b>FOOD</b>	<b>TRIAL</b>	<b>Accept</b>	<b>Inapprop Behavior</b>	
Child accepted green beans.	Green beans	1	Y	N	Child did not have inappropriate behavior during presentation of green beans.
Child did not accept chicken.	Chicken	2	N	Y	Child had inappropriate behavior during presentation of chicken.
Child did not accept applesauce.	Applesauce	3	N	Y	Child had inappropriate behavior during presentation of applesauce.
Child accepted potato.	Potato	4	Y	Y	Child had inappropriate behavior during presentation of potato.

Y = Yes  
N = No





# FUNCTIONAL ANALYSIS OF PEDIATRIC FEEDING DISORDERS

- ❑ **Piazza, Fisher, et al. (2003) conducted functional analyses of inappropriate mealtime behavior of 15 children diagnosed with a pediatric feeding disorder.**
- ❑ **Piazza, C. C., Fisher, W. W., Brown, K. A., Shore, B. A., Katz, R. M., Sevin, B. M., Gulotta, C. S., & Patel, M. R. (2003). Functional analysis of inappropriate mealtime behaviors. *Journal of Applied Behavior Analysis*, 37, 187-204.**



# Functional Analysis

<b>Condition</b>	<b>Consequence for Inappropriate Behavior</b>	<b>Bite Presentation</b>
<b>ESCAPE</b>	<b>30 s of escape</b>	<b>remove for 20 s</b>
<b>ATTENTION</b>	<b>30 s of attention</b>	<b>remains at midline</b>
<b>TANGIBLE</b>	<b>30 s of access tangible</b>	<b>remains at midline</b>
<b>CONTROL</b>	<b>no differential consequence</b>	<b>remains at midline</b>



## Escape Condition

Feeder delivers 30 s of **escape** following inappropriate behavior.





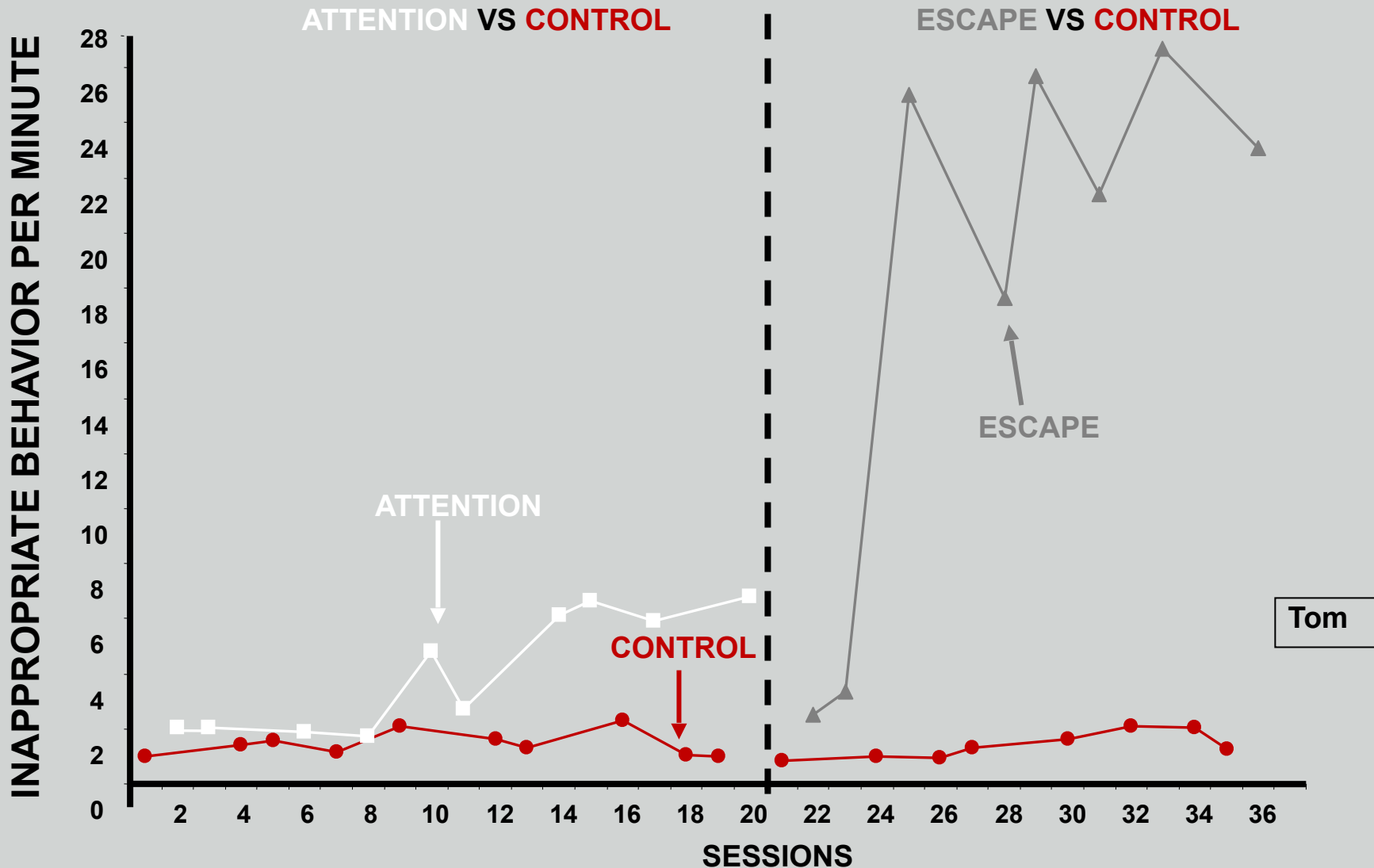
## Attention Condition

Feeder delivers 30 s of **attention** following inappropriate behavior.



# FUNCTIONAL ANALYSIS OF PEDIATRIC FEEDING DISORDERS

- ❑ **67% of participants displayed high levels of inappropriate mealtime behavior in one or more test conditions.**
- ❑ **90% of participants whose functional analyses were differentiated displayed sensitivity to negative reinforcement.**
- ❑ **80% of participants whose functional analyses were differentiated displayed sensitivity to multiple reinforcing contingencies.**

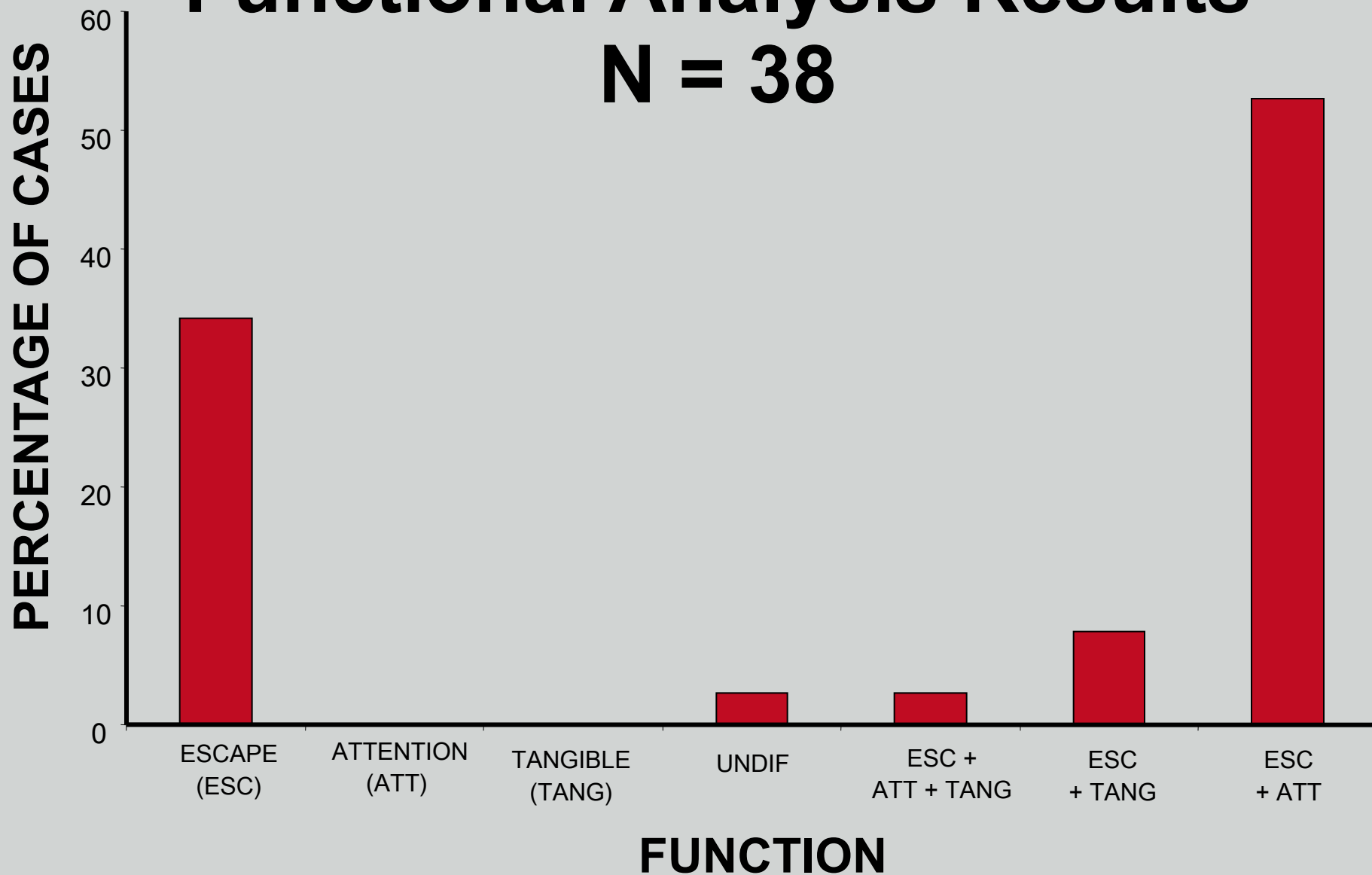


Bachmeyer, M. H., Piazza, C. C., Fredrick, L. D., Reed, G. K., Rivas, K. D., & Kadey, H. J. (2009). Functional analysis and treatment of multiply controlled inappropriate mealtime behavior. *Journal of Applied Behavior Analysis, 42*, 641-658.



# Functional Analysis Results

N = 38





# FUNCTIONAL ANALYSIS OF PEDIATRIC FEEDING DISORDERS

- ❑ **The findings suggest that:**
  - ❑ **Negative reinforcement plays a primary role in the maintenance of feeding problems.**
  - ❑ **Children with feeding problems may be sensitive to other reinforcement contingencies.**



# HOW DO I USE THIS INFORMATION TO DEVELOP A TREATMENT FOR MY CHILD?

- 1. Start a baseline.** The baseline gives you information about your child's current behavior. You will use this baseline to determine if child behavior is improving once you start treatment. Don't try to take a short cut and skip this step.
- 2. What is a baseline?** It's a series of things you do *consistently* during meals. Just do what you have been doing, only do the same thing *every meal*. For example, make the meals the same length, use the same utensils.
- 3. Take data.** The data will be the **ONLY** way you will know whether your child's behavior is improving. Don't try to take a short cut and skip this step.



## HERE'S AN EXAMPLE OF A BASELINE

There is no “right” way or “wrong” way of doing a baseline. Here's an example, but what you do will be specific to you and your child.

**Meal length: 10 minutes**

**Utensil: Small maroon spoon**

**Amount on spoon: Fill the bowl of the spoon**

**Foods that you will present: Chicken, green beans, peaches, potato**

**Number of bites: 4 bites of each food (8 bites total)**

**Procedure:**

1. At meal time, tell your child it is “time to eat”. Tell your child to sit at the table.
2. Once your child is seated at the table, put the plate of food in front of him and say “It’s time to eat.”
3. Set a timer for 10 minutes.
4. Remind your child *once* every minute, “It’s time to eat.” (one reminder every minute in a 10-minute meal = 10 reminders). Only give the reminder at the scheduled time and not at any other time.
5. Any time your child puts a bite in his mouth or swallows a bite, say “Good job” as enthusiastically as you can.
6. If your child has inappropriate behavior (e.g., pushes the plate away) or cries, do not respond. Wait until the *scheduled* time for the reminder and say, “It’s time to eat.”
7. At the end of 10 minutes, remove the plate and allow your child to leave the table.



# EXAMPLE BASELINE DATA

In this example, the child accepted 10%, 20%, and 10% of the bites, respectively, in each of the meals. Because acceptance of bites is low and *predictable*, you could **start** your treatment at the next meal.

Meal 1

FOOD	TRIAL	Accept
Green beans	1	N
Chicken	2	N
Applesauce	3	N
Potato	4	N
Green beans	5	N
Chicken	6	N
Applesauce	7	Y
Potato	8	N
Green beans	9	N
Chicken	10	N
<b>TOTAL Accept</b>		<b>1</b>
<b>%</b>		<b>10%</b>

Meal 2

FOOD	TRIAL	Accept
Applesauce	1	Y
Potato	2	N
Chicken	3	N
Green beans	4	N
Applesauce	5	N
Potato	6	N
Chicken	7	N
Green beans	8	N
Applesauce	9	Y
Potato	10	N
<b>TOTAL Accept</b>		<b>2</b>
<b>%</b>		<b>20%</b>

Meal 3

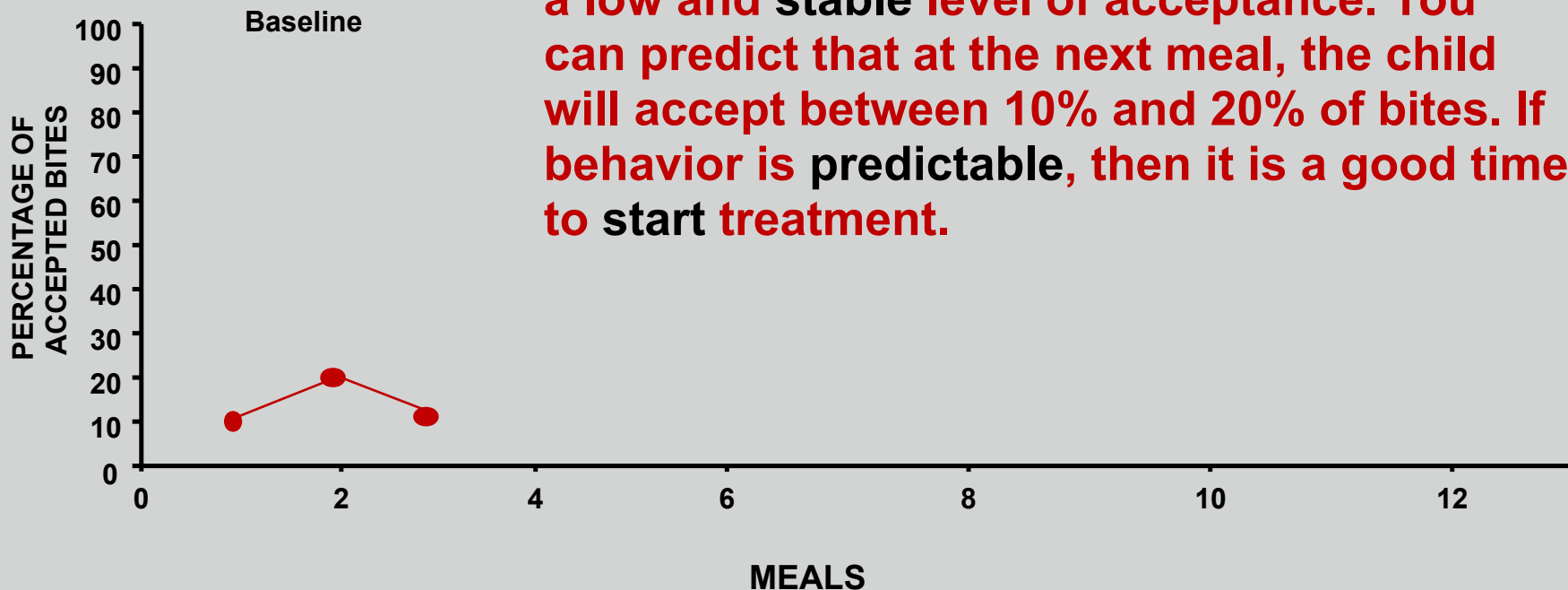
FOOD	TRIAL	Accept
Potato	1	N
Applesauce	2	Y
Green beans	3	N
Chicken	4	N
Potato	5	N
Applesauce	6	N
Green beans	7	N
Chicken	8	N
Potato	9	N
Applesauce	10	N
<b>TOTAL Accept</b>		<b>1</b>
<b>%</b>		<b>10%</b>





# EXAMPLE BASELINE DATA

In this example, the child's level of acceptance is between 10% and 20%. This is a low and **stable** level of acceptance. You can predict that at the next meal, the child will accept between 10% and 20% of bites. If behavior is **predictable**, then it is a good time to **start treatment**.





# EXAMPLE BASELINE DATA

In this example, the child accepted 80%, 20%, and 60% of the bites, respectively, in each of the meals. Because acceptance of bites is variable (**unpredictable**), you should *wait* to start treatment.

Meal 1

FOOD	TRIAL	Accept
Green beans	1	Y
Chicken	2	N
Applesauce	3	N
Potato	4	Y
Green beans	5	Y
Chicken	6	Y
Applesauce	7	Y
Potato	8	Y
Green beans	9	Y
Chicken	10	Y
<b>TOTAL Accept</b>		<b>8</b>
<b>%</b>		<b>80%</b>

Meal 2

FOOD	TRIAL	Accept
Potato	1	N
Applesauce	2	N
Green beans	3	N
Chicken	4	N
Potato	5	N
Applesauce	6	Y
Green beans	7	N
Chicken	8	N
Potato	9	N
Applesauce	10	Y
<b>TOTAL Accept</b>		<b>2</b>
<b>%</b>		<b>20%</b>

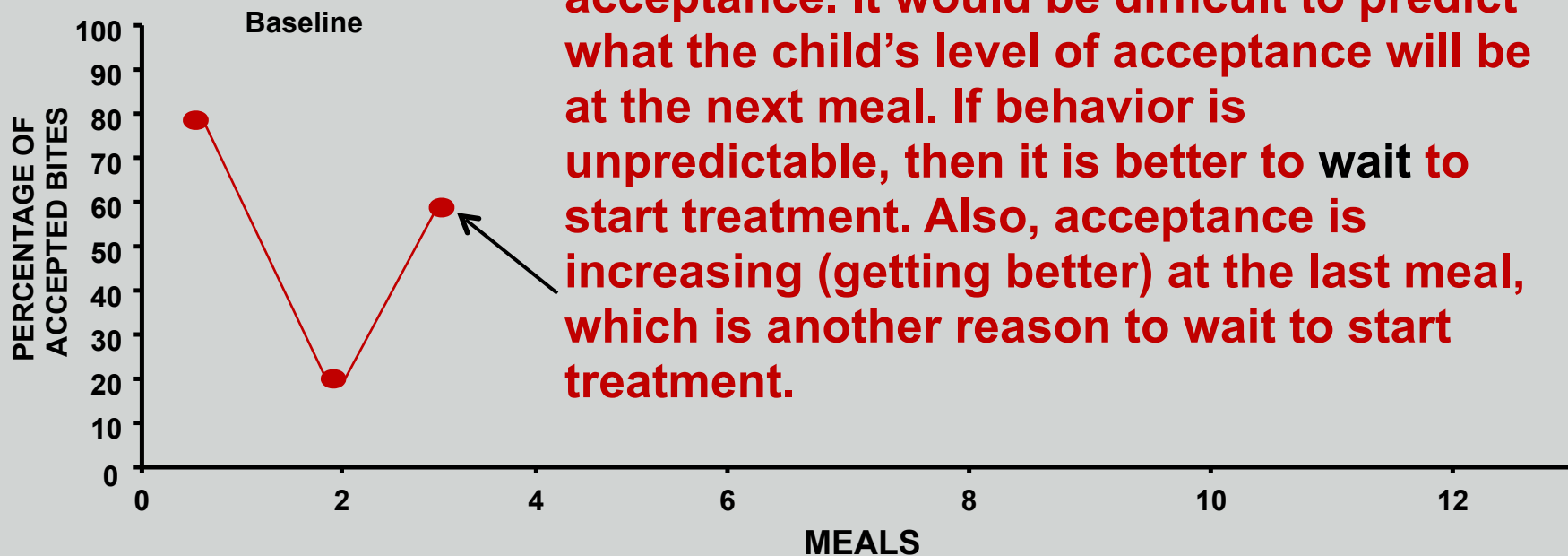
Meal 3

FOOD	TRIAL	Accept
Applesauce	1	Y
Potato	2	N
Chicken	3	Y
Green beans	4	N
Applesauce	5	Y
Potato	6	N
Chicken	7	Y
Green beans	8	Y
Applesauce	9	N
Potato	10	Y
<b>TOTAL Accept</b>		<b>6</b>
<b>%</b>		<b>60%</b>



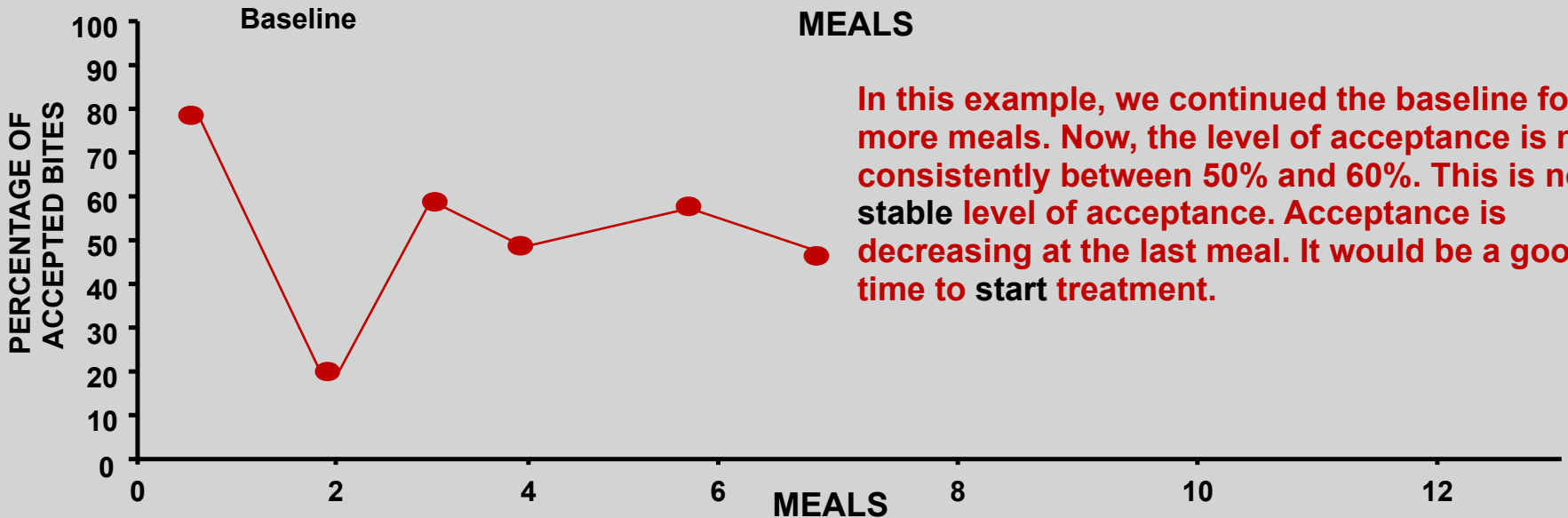
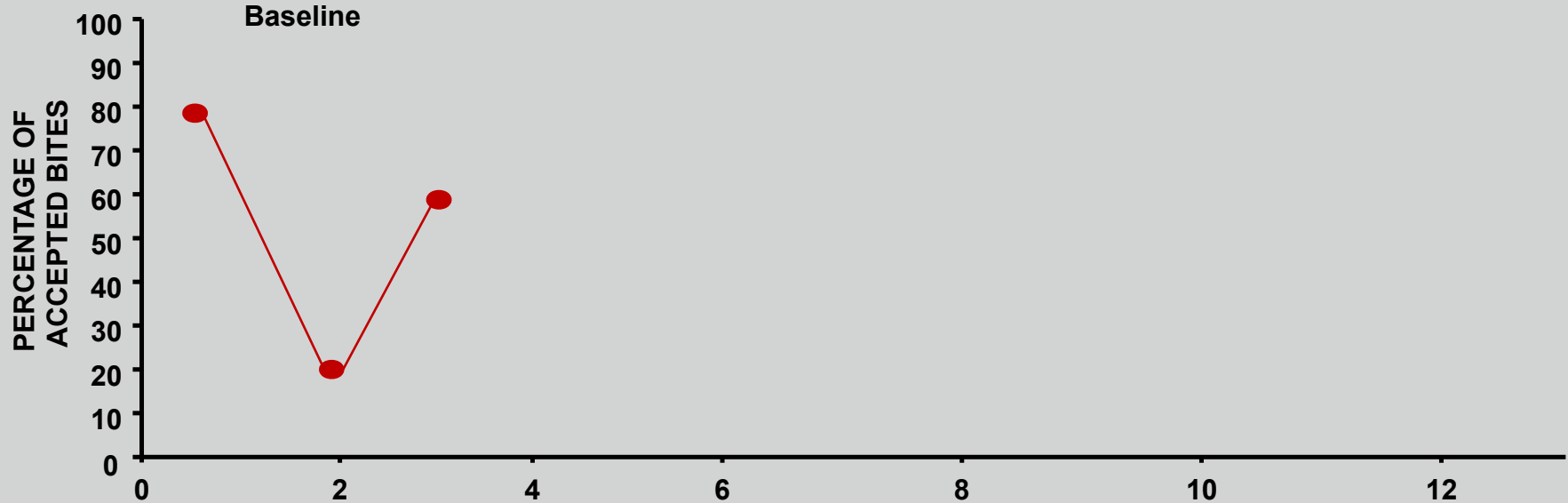
# EXAMPLE BASELINE DATA

In this example, the child's level of acceptance is between 20% and 80%. This is a *variable* (unpredictable) level of acceptance. It would be difficult to predict what the child's level of acceptance will be at the next meal. If behavior is unpredictable, then it is better to **wait** to start treatment. Also, acceptance is increasing (getting better) at the last meal, which is another reason to wait to start treatment.





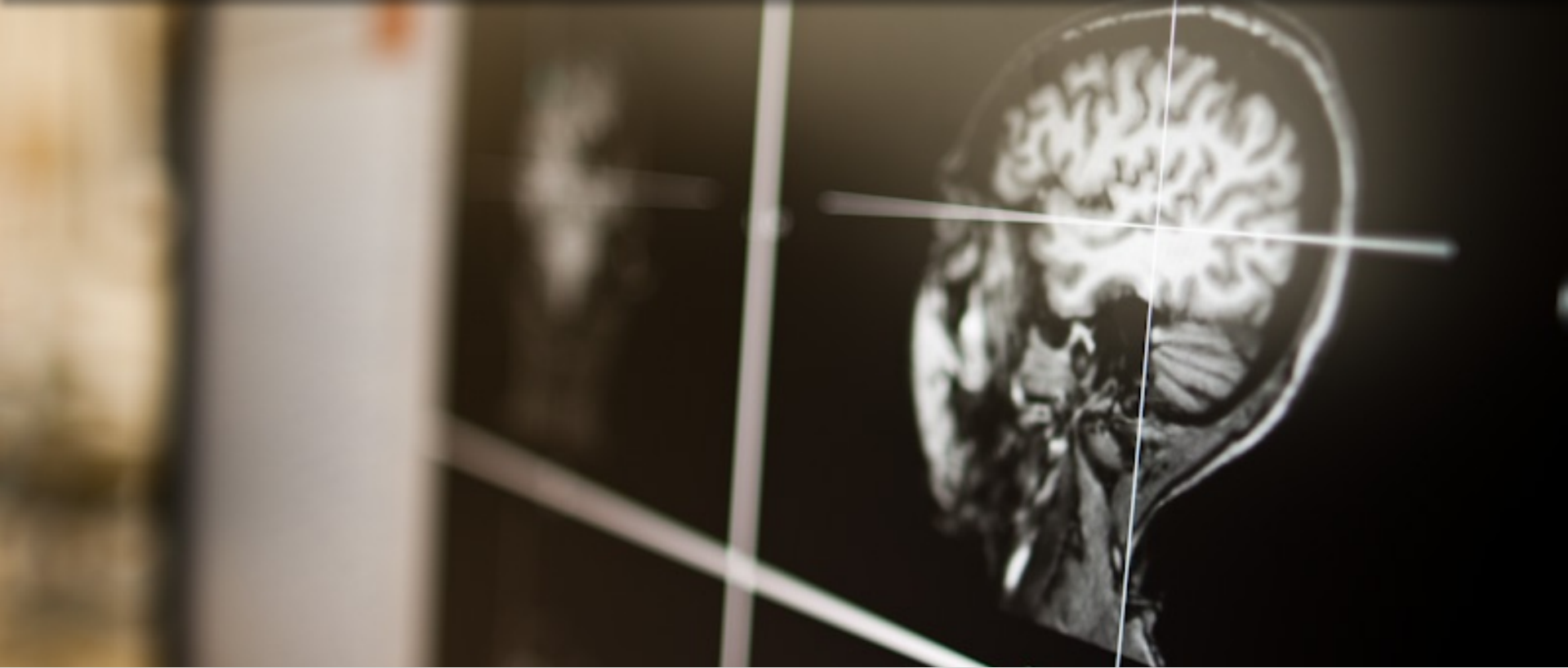
# EXAMPLE BASELINE DATA



In this example, we continued the baseline for 3 more meals. Now, the level of acceptance is more consistently between 50% and 60%. This is now a stable level of acceptance. Acceptance is decreasing at the last meal. It would be a good time to start treatment.



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# ADDITIONAL READINGS



# ESCAPE EXTINCTION

- ❑ Bachmeyer, M. H., Piazza, C. C., Fredrick, L. D., Reed, G. K., Rivas, K. D., & Kadey, H. J. (2009). Functional analysis and treatment of multiply controlled inappropriate mealtime behavior. *Journal of Applied Behavior Analysis, 42*, 641-658.
- ❑ LaRue, R. H., Stewart, V., Piazza, C. C., & Volkert, V. M. (2011). Escape as reinforcement and escape extinction in the treatment of feeding problems. *Journal of Applied Behavior Analysis, 44*, 719-735.
- ❑ Patel, M. R., Piazza, C. C., Martinez, C. J., Volkert, V. M., & Santana, C. M. (2002). An evaluation of two differential reinforcement procedures with escape extinction to treat food refusal. *Journal of Applied Behavior Analysis, 35*, 363-374.
- ❑ Piazza, C. C., Patel, M. R., Gulotta, C. S., Sevin, B. M., & Layer, S. A. (2003). On the relative contributions of positive reinforcement and escape extinction in the treatment of food refusal. *Journal of Applied Behavior Analysis, 36*, 309-324.
- ❑ Reed, G. K., Piazza, C. C., Patel, M. R., Layer, S. A., Bachmeyer, M. H., Bethke, S. D., & Gutshal, K. A. (2004). On the relative contributions of noncontingent reinforcement and escape extinction in the treatment of food refusal. *Journal of Applied Behavior Analysis, 37*, 27-41.



# FADING

## Blending

- Mueller, M. M., Piazza, C. C., Patel, M. R., Kelley, M. E., & Pruett, A. (2004). Increasing variety of foods consumed by blending nonpreferred foods into preferred foods. *Journal of Applied Behavior Analysis*, 37, 159-170.
- Patel, M. R., Piazza, C. C., Kelly, M. L., Ochsner, C. A., & Santana, C. M. (2001). Using a fading procedure to increase fluid consumption in a child with feeding problems. *Journal of Applied Behavior Analysis*, 34, 357-360.

## Liquid to baby food

- Bachmeyer, M. H., Gulotta, C. S., & Piazza, C. C. (2013). Liquid to baby food fading in the treatment of food refusal. *Behavioral Interventions*, 34, 357-360.

## Spoon distance

- Rivas, K. D., Piazza, C. C., Patel, M. R., & Bachmeyer, M. H. (2010). Spoon distance fading with and without escape extinction as treatment for food refusal. *Journal of Applied Behavior Analysis*, 43, 673-683.

## Spoon to cup

- Groff, R. A., Piazza, C. C., Zeleny, J. R., & Dempsey, J. R. (2011). Spoon-to-cup fading as treatment for cup drinking in a child with intestinal failure. *Journal of Applied Behavior Analysis*, 44, 949-954.

## Syringe to cup and spoon

- Groff, R. A., Piazza, C. C., Volkert, V. M., & Jostad, C. M. (in review). Syringe fading as treatment for feeding refusal. *Journal of Applied Behavior Analysis*.





# SWALLOW FACILITATION AND RE-DISTRIBUTION

- ❑ Dempsey, J., Piazza, C. C., Groff, R. A., & Kozisek, J. M. (2011). A flipped spoon and chin prompt to increase mouth clean. *Journal of Applied Behavior Analysis, 44*, 961-965.
- ❑ Gulotta, C. S., Piazza, C. C., Patel, M. R., & Layer, S. A. (2005). Using food redistribution to reduce packing in children with severe food refusal. *Journal of Applied Behavior Analysis, 38*, 39-50.
- ❑ Rivas, K. R., Piazza, C. C., Kadey, H. J., Volkert, V. M., & Stewart, V. (2011). Sequential treatment of a feeding problem using a pacifier and flipped spoon. *Journal of Applied Behavior Analysis, 44*, 318-391.
- ❑ Volkert, V. M., Vaz, P. C. M., Piazza, C. C., Frese, J., & Barnett, L. (2011). Using a flipped spoon to decrease packing in children with feeding disorders. *Journal of Applied Behavior Analysis, 44*, 617-621.
- ❑ Wilkins, J. W., Piazza, C. C., Groff, R. A., Volkert, V. M., Kozisek, J. K., & Milnes, S. M. (in press). Utensil manipulation during initial treatment of pediatric feeding problems. *Journal of Applied Behavior Analysis*.



# CHASER

- ❑ **Vaz, P. C. M., Piazza, C. C., Stewart, V., Volkert, V. M., Groff, R. A., & Patel, M. R. (2012). Using a chaser to decrease packing in children with feeding disorders. *Journal of Applied Behavior Analysis, 45, 97-105.***



# CHEWING

- ❑ Volkert, V. M., Piazza, C. C., Vaz, P. C. M., & Frese, J. (2013). A pilot study to increase chewing in children with feeding disorders. *Behavior Modification*, 37, 391-408.



# SENSORY INTEGRATION

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# TEXTURE OR CONSISTENCY MANIPULATION

- ❑ Kadey, H., Piazza, C. C., Rivas, K. M., & Zeleny, J. (2013). An evaluation of texture manipulations to increase swallowing. *Journal of Applied Behavior Analysis, 46*, 539-543.
- ❑ Patel, M. R., Piazza, C. C., Layer, S. A., Coleman, R., & Swartzwelder, D. M. (2005). A systematic evaluation of food textures to decrease packing and increase oral intake in children with pediatric feeding disorders. *Journal of Applied Behavior Analysis, 38*, 89-100.
- ❑ Patel, M. R., Piazza, C. C., Santana, C. M., & Volkert, V. M. (2002). An evaluation of food type and texture in the treatment of a feeding problem. *Journal of Applied Behavior Analysis, 35*, 183-186.



# AVOIDANCE

- ❑ Rivas, K. M., Piazza, C. C., Roane, H. S., Volkert, V. M., Stewart, V., Kadey, H. J., & Groff, R. A. (in press). Analysis of self-feeding in children with feeding disorders. *Journal of Applied Behavior Analysis*.
- ❑ Vaz, P. C. M., Volkert, V. M., & Piazza, C. C. (2011). Using negative reinforcement to increase self-feeding in a child with food selectivity. *Journal of Applied Behavior Analysis*, 44, 915-920.