SOLUTIONS TO CHILDREN'S SENSORY-BASED FEEDING DIFFICULTIES: DEVELOPMENT OF AN ASSESSMENT

¹Blair Carsone PhD, MOT, OTR/L, BCP & ²Bryce Smith OTD, OTR/L

¹Gannon University, Occupational Therapy Doctorate Program Corresponding author's email: carsone001@gannon.edu

ORCID: 0000-0003-0841-2782 ²Carsone KIDS Inc., Non-Profit ORCID: 0000-0002-7688-4602

Abstract

Feeding is a complex, learned skill that impacts children's development and school performance. Sensory-based feeding difficulties may be misconstrued as picky-eating or defiant behavior. Caregivers of the child may be tempted to provide extreme accommodations for the child or rely on harmful practices such as force feeding. Children with sensory-based feeding difficulties can improve from rehabilitation services provided by pediatric feeding experts. Currently, parents and teachers are often tasked with identifying children with sensory-based feeding difficulties and pediatric feeding therapists must rely on their clinical expertise to assess and treat these children. Therefore, there is a need for a sensory-based feeding assessment that can help identify these children. This report outlines the preliminary, two-phased development of the Environment, Attitudes, Temperament, and Sensory (EATS) Feeding Assessment. Phase one consisted of a mixed-methods survey of pediatric feeding experts to establish content validity. Phase two surveyed caregivers of children who were typically developing aged 1-10 years to determine if questions were answerable and appropriate for all ages. Data from both phases were utilized to enhance the content of the assessment. The assessment can now be utilized as an evaluation tool while it undergoes future studies to determine if the assessment can be used as an outcome measure.

Keywords: pediatrics, education, rehabilitation, school-based, evaluation

Introduction

Feeding is a complex, life-sustaining occupation that impacts children's development and school performance (American Occupational Therapy Association, 2017; Lukens & Silverman, 2014). A misconception exists that feeding is an instinctual habit; however, feeding is a 25 to 32 skill-based stepped process that must be cultivated and developed (Toomey & Ross, 2011). The intricate skill-based steps of feeding are reliant upon each sense processing complex stimuli and forming an appropriate response (Panerai et al., 2020; Paul & D'Amico, 2013; Toomey & Ross, 2011). An estimated 80% of children with developmental delays experience difficulties with feeding due to the demanding nature of the occupation (Benson et al., 2013; Carpenter & Garfinkel, 2021). Furthermore, consuming an inadequate amount of food or drink can lead to eventual

dependence on supplemental feedings, which may worsen feeding difficulties over time (Chatoor, 2009).

Feeding is influenced by multifaceted intrinsic and extrinsic factors (American Occupational Therapy Association, 2017). Intrinsic factors can include sensory processing, oral motor skills, coordination, and attention. Feeding, however, does not occur in isolation and is often intricately tied to extrinsic social and cultural expectations (Sibal, 2018). Extrinsic social and cultural expectations often determine how the child's difficulties are perceived and intervened.

Sensory-based feeding difficulties may be misconstrued as picky-eating or defiant behavior (Williams, 2022). Some caregivers provide extreme accommodation for the child, disrupting the feeding process of the family or peers (Trofholz et al., 2017). Conversely, other parents may rely on harmful practices such as threats or force feeding which only serve to worsen feeding difficulties (Chao & Chang, 2017; Milanaik et al., 2019). Currently, parents and teachers are often tasked with identifying children with sensory-based feeding difficulties without the aid of proper education or support.

Likewise, pediatric feeding therapists are reliant on their experiences and clinical expertise to assess and treat these children. Commonly, an informal evaluation form, therapist observations, and the Sensory Profile will be utilized. However, the Sensory Profile was not designed to address feeding (Dunn, 1999). Overall, too much responsibility is placed on teachers, parents, and therapists alike to help these children without adequate resources.

Statement of the Problem

There is a lack of formal, standardized assessment when children present with sensory-based feeding difficulties (Sdravou et al., 2021; Sharp et al. 2017).

Purpose of the Study

The purpose of phase one was to establish content validity for the EATS Feeding Assessment. The purpose of phase two was to establish an age limit and ensure that questions could be understood by the caregiver.

Research Questions and Hypotheses

Phase one asked, "Does the EATS Feeding Assessment have content validity?"

Phase two asked, "Are the EATS Feeding Assessment questions understandable, answerable, and appropriate for all ages?"

Methods and Materials

The EATS Feeding Assessment (first version) was drafted from feedback provided by an impromptu Quality Improvement (QI) meeting of pediatric feeding therapists. This version of the assessment was utilized for phase one of this study. The Environment section consisted of 10 open-ended questions. The Attitudes section was comprised of 5 5-point Likert scale questions. The Temperament section was multiple choice and focused on non-functional behavior. The Sensory section was divided by sensory system (i.e., auditory, visual, tactile, vestibular, oral processing, gustatory, and olfactory). Each question was paired with one question conveying "sensory seeking" and the other question conveying "sensory avoiding" behavior.

Phase one consisted of a mixed-methods survey of expert pediatric feeding therapists that was initiated after receiving approval from the institutional review board (IRB). Purposive sampling through e-mail invitations were utilized to ensure the expertise of participants. The EATS Feeding Assessment (first version) was entered into an

anonymous online survey. The written informed consent proceeded the survey. Each subject who agreed to participate anonymously reviewed the EATS Feeding Assessment (first version) questions. The participating therapists rated each question on a Likert scale from 0 to 5 (0 being the worst and 5 being the best). Space for qualitative feedback was provided after each question, section, and at the end of the assessment as a whole.

Item scores and qualitative recommendations were considered. Items that were scored 3 or lower on the Likert scale were addressed with qualitative feedback. Items that were scored 4 or higher on the Likert scale were deemed as having a consensus among the experts. Once the modifications and editions were honed, the EATS Feeding Assessment was revised (second version). This completed phase one of the research.

Phase two consisted of a caregiver survey that was initiated after receiving IRB approval. Convenience sampling through social media flyers recruited parents and caregivers of children who were typically developing. Parents and caregivers of children ages 12 months to 10 years 11 months, that did not have a formal or suspected diagnosis (developmental delay, autism spectrum disorder, attention deficit hyperactivity disorder, etc.), and had not received early intervention services/therapy services, were asked to participate. The revised EATS Feeding Assessment (second version) questions were entered into an anonymous online survey, as seen in Figure 1. The written informed consent proceeded the survey. Each subject was asked to select "Yes" (if they could answer the question), "No" (if they could not answer the question due to their child's age), or "Confusing" (if they did not understand the question). Figure 1

EATS Feeding Assessment (Second Version)

Environment, Attitudes, Temperament, and Sensory (EATS) Feeding Assessment

Environment

- 1. Does your child eat meals? Does your child eat snacks?
 - a. How many meals does your child eat during a typical day? How many snacks does your child eat during a typical day?
 - b. How long does it typically take your child to eat a meal? How long does it typically take your child to eat a snack?
 - c. Does your child eat their meals at the same time every day? Does your child eat their snacks at the same time every day?
- 2. Where does your child typically eat meals (ex. home in the dining room, daycare at the feeding table, school in the cafeteria)? Where does your child typically eat snacks (ex. home in the dining room, daycare at the feeding table, school in the cafeteria)?

a.	How would you describe the lighting at mealtime? (Ex. dark, somewhat dark/dim, or bright) How would you describe the lighting at snack time?
b.	How noisy is the room when your child eats meals? How noisy is the room when your child eats snacks?
C.	Is technology present during mealtimes? (Ex. TV, tablet, computer, cell phone) Is technology present during snack time(s)?
	position does your child eat meals in (ex. sitting, laying, standing)? What on does your child eat snacks in (ex. sitting, laying, standing)?
a.	Can your child remain seated during a meal? Can your child remain seated during a snack?
b.	Does your child require special seating like a highchair, booster seat, or adapted chair?
	s present during meals (ex. parents, siblings, pets)? Who is present during (ex. parents, siblings, pets)?
a.	What are these people doing during meals (ex. also eating, watching tv, doing chores)? What are these people doing during snacks (ex. also eating, watching tv, doing chores)?
5. Is you child?	ur child able to feed themselves meals and snacks? If not, who feeds your
a.	Does your child use utensils to eat? Does your child use their hands to eat? If your child does not feed themselves, does your child prefer being fed from utensils, hands, or both?
b.	What plates, bowls, or containers does your child use to eat? Does your child require special plates/bowls?
6. Is you	r child able to drink by themselves? If not, who gives your child drinks?
a.	What cups (sippy cup, bottle, open cup, lid with straw, open cup with straw, etc.) does your child use to drink?

8. What foods does your child have access to during snacks? Do you pick or does your child pick? 9. Where does your child eat the best (ex. home, school, grandparents)? a. What is different about that place? 10. Where does your child eat the worst (ex. restaurant, home, school)? a. What is different about that place? Therapist Additional Notes: Circle one answer for each question. 1. Iam happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. Iam happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 3. Iam happy (satisfied) with how much my child drinks:	7.					ing meals? Do th I, or does your ch	
a. What is different about that place? 10.Where does your child eat the worst (ex. restaurant, home, school)? a. What is different about that place? Therapist Additional Notes: Attitudes Circle one answer for each question. 1. Lam happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. Lam happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) Agree (1) (2) (3) Disagree (4) (0)	8.			s your child have	e access to dur	ing snacks? Do y	ou pick or does
Attitudes Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly (1) (2) (3) Disagree (4) (3) Disagree (4) (6) 3. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (6)	9.	Where	e does you	ır child eat the b	est (ex. home,	school, grandpar	ents)?
a. What is different about that place? Therapist Additional Notes: Attitudes Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) Agree (1) (2) (3) Disagree (4) (0)		a.	What is d	ifferent about th	at place?		
Attitudes Circle one answer for each question. 1. Lam happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. Lam happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. Lam happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)	10	.Where	does you	ır child eat the w	orst (ex. restau	ırant, home, scho	pol)?
Attitudes Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) Agree (1) (2) (3) Disagree (4) (0)		a.	What is d	ifferent about th	at place?		
Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)	Thera	pist Ad	ditional No	otes:			
Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)			 				
Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)							
Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)							
Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)							
Circle one answer for each question. 1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)							
1. I am happy (satisfied) with the variety of foods my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)					Attitudes		
Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)	Circle	one ar	nswer for e	each question.			
Agree (1) (2) (3) Disagree (4) (0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)	1.			sfied) with the va	•	my child eats:	
(0) 2. I am happy (satisfied) with how much food my child eats: Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)				_		_	
2. <u>I am happy (satisfied) with how much food my child eats:</u> Strongly Agree Neutral Disagree Strongly Agree (1) (2) (3) Disagree (4) (0)		F	•	(1)	(4)	(3)	Disagree (4)
Agree (1) (2) (3) Disagree (4) (0)	2.		appy (sati				
(0)			• •	-		_	• • •
		,	•	(1)	(2)	(3)	Disagree (4)
	3.	<u>I am h</u>		sfied) with how i	much my child	<u>drinks</u> :	

	Strongly A Agree (0)	Agree (1)	Neutral (2)	Disagree (3)	Strongly Disagree (4)
4.	Family mealtime with	my child is Agree (1)	<u>enjoyable</u> : Neutral (2)	Disagree (3)	Strongly Disagree (4)
5.	Preparing food for my	child is eas Agree (1)	s <u>y</u> : Neutral (2)	Disagree (3)	Strongly Disagree (4)
Thera	pist Additional Notes:				
Tatal	/20				
rotai:	/20 max	To	mnoramont		
Routii	20	1 61	mperament		
		"no" for one	o b		
	"yes," "sometimes," or				ndina) if "
•	nild has a negative rea	`	ieitdown, tantrum	, screaming, cr	ying) if
1.	There is a change dui Yes (2)	ring meals:	Sometimes (1)		No (0)
2.	There is a change dur Yes (2)	ring snacks	: Sometimes (1)		No (0)
3.	They do not eat or dri Yes (2)	nk at the sa	me time every da Sometimes (1)	ay:	No (0)
4.	They do not eat or dri Yes (2)	nk at the sa	me place every of Sometimes (1)	day:	No (0)
5.	They do not eat or dri Yes (2)	nk with the	same people eve Sometimes (1)	ery day:	No (0)
6.	New food is presented Yes (2)	d:	Sometimes (1)		No (0)
7.	New drink is presente Yes (2)	d:	Sometimes (1)		No (0)
			Foi	r Therapist:	/ 8 max
Thera	pist Additional Notes:				

Hearing / Auditory Circle "yes," "sometimes," or "no" for each. "My child has a negative reaction (ex. meltdown, tantrum, screaming, crying) if..." 8. They hear food being prepared (microwave beeping, food sizzling, etc.): Yes (2) Sometimes (1) No (0) 9. Someone talks about food ("It's time to eat"): Yes (2) Sometimes (1) No (0) 10. They hear someone eating food: Yes (2) Sometimes (1) No (0) 11. They hear someone drinking: Yes (2) Sometimes (1) No (0) For Therapist: / 8 max Seeing / Visual Circle "yes," "sometimes," or "no" for each. "My child has a negative reaction (ex. meltdown, tantrum, screaming, crying) if..." 12. They see food, plates, or utensils: Yes (2) Sometimes (1) No (0) 13. They see drinks or cups: Yes (2) Sometimes (1) No (0) 14. They see unfamiliar food on their plate: Sometimes (1) Yes (2) No (0) 15. They see unfamiliar liquid in their cup: Sometimes (1) Yes (2) No (0) 16. They receive food from an unfamiliar package (ex. Burger King wrapper rather than McDonald's): Yes (2) Sometimes (1) No (0) 17. They receive drink from an unfamiliar package (ex. different color milk carton or juice box): Yes (2) Sometimes (1) No (0) For Therapist: _____/ 12 max Touch / Tactile Circle "yes," "sometimes," or "no" for each. "My child has a negative reaction (ex. meltdown, tantrum, screaming, crying) if..."

	nal Research on Children, Paren https://ercptjournal.org/	ts & Teachers, Volume 5, Number 2, 2024,	143-162
18. Food tou	ches their hands: Yes (2)	Sometimes (1)	No (0)
19. Food tou	ches their face: Yes (2)	Sometimes (1) For Therapist:	No (0)
Movement / Ve	estibular	,	
Circle "yes," "so	metimes," or "no" for ea	ch.	
-		neltdown, tantrum, screaming, cr	rying) if"
20. They are	not allowed to move are Yes (2)	ound (walk, run, spin) while eatir Sometimes (1)	ng: No (0)
21.They hav	ve to sit down in a chair t Yes (2)	for a meal: Sometimes (1)	No (0)
		For Therapist:	/ 4 max
Mouth / Oral P	rocessing		
Circle "yes," "so	metimes," or "no" for ea	ch.	
"My child has a	negative reaction (ex. m	neltdown, tantrum, screaming, cr	rying) if"
22. Food goe	es in their mouth Yes (2)	Sometimes (1)	No (0)
23. Drink go	es in their mouth Yes (2)	Sometimes (1)	No (0)
		For Therapist:	/ 4 max
Taste / Gustate	ory		
24. They tas	te certain foods (vegetal Yes (2)	oles, fruits, meat): Sometimes (1)	No (0)
	ınk certain flavors (straw	berry, grape) or if there is a lack	of flavor (plain
water):	Yes (2)	Sometimes (1)	No (0)
26.Food tas	tes different than norma Yes (2)	l (new seasoning, prepared diffe Sometimes (1)	erently): No (0)
27. Drink tas	tes different (bottled vs. Yes (2)	tap water, 2% vs. whole milk): Sometimes (1)	No (0)
		For Therapist:	/ 4 max
Smell / Olfacto	ry		

Journal of Educational Research on Children, Parents & Teachers, Volume 5, Number 2, 2024, 143-162 ISSN: 2664-3812, https://ercptjournal.org/ 28. They smell certain foods: Yes (2) Sometimes (1) No (0) 29. They smell certain drinks: Sometimes (1) No (0) Yes (2) 30. They smell a new food or drink: Yes (2) Sometimes (1) No (0) For Therapist: _____/ 6 max Sensory **Hearing / Auditory** Circle "yes," "sometimes," or "no" for each. Seeking Sensitive 1. My child is only able to eat if there 2. My child is only able to eat in is noise (tv, tablet, music): complete silence: Sometimes Sometimes Yes (2) No (0) Yes (2) No (0) (1) (1) 3. My child seeks out mealtime 4. My child avoids mealtime sounds sounds (hearing food cooking in (avoids kitchen during cooking): the microwave/on the stove): Yes (2) Sometimes Sometimes No (0) Yes (2) No (0) (1) (1) 5. My child only eats loud foods 6. My child only eats guiet foods that (crunchy/chips, snap/carrots): don't make noise (oatmeal, mashed potatoes): Sometimes Sometimes No (0) Yes (2) No (0) Yes (2) (1) (1) 7. My child only likes drinks that have 8. My child only likes drinks that are a sound (popping, fizzing): quiet and don't make a sound (no

Sometimes

(1)

Yes (2)

No (0)

No (0)

popping or fizzing):

Sometimes

(1)

Yes (2)

Journal of Educational Research on Children, Parents & Teachers, Volume 5, Number 2, 2024, 143-162 ISSN: 2664-3812, https://ercptjournal.org/ For Therapist: Total: /8 max Total: _____ /8 max Additional Notes: Seeing / Visual Circle "yes," "sometimes," or "no" for each. **Sensitive** Seeking 1. My child will only eat brightly 2. My child will only eat colored foods (artificially colored colorless/beige foods (oatmeal, foods like cheese puffs and cheerios. bread): candy): Yes (2) Sometimes No (0) Yes (2) Sometimes No (0) (1) (1) 3. My child inspects/looks intensely at 4. My child avoids looking at their food their food and drinks: and drinks: Sometimes Yes (2) Sometimes No (0) Yes (2) No (0) (1) (1) 5. My child will only drink brightly 6. My child will drink clear liquids that colored drinks (artificially colored do not have color (water): pop, kool-aid): Yes (2) Sometimes No (0) Yes (2) Sometimes No (0) (1) (1) For Therapist: /6 max Total: ____ /6 max Total: **Touch / Tactile** Sensitive Seeking

 My child will only eat fo hands because they en touching food (spaghet potatoes): 	joy	utensils because	will only touch for be fed by other my child refuser their hands:	ers
Yes (2) Sometimes (1)	No (0)	Yes (2)	Sometimes (1)	No (0)
		4 14 131		
My child will only touch cups with drinks that ar cold (refuses room tem food/drinks):	e hot or	with drin	will only touch for ks that are room ture (not hot or c	·
Yes (2) Sometimes (1)	No (0)	Yes (2)	Sometimes (1)	No (0)
5. My child has to explore		_	will not touch fo	od with
their food with their han Yes (2) Sometimes (1)	No (0)	their har Yes (2)		No (0)
My child will only touch mixed or extreme textu peanut butter, sauce or	res (chunky	_	will only touch fouch fouch four (crispy chips s):	
Yes (2) Sometimes (1)	No (0)	Yes (2)	Sometimes (1)	No (0)

Movement / Vestibular

Circle "yes," "sometimes," or "no" for each.

	Seeking		
 My child has to constantly move during mealtime (eats while walking, spinning around): 			
Yes (2)	Sometimes (1)	No (0)	

Sensitive

2. My child requires special seating (highchair, booster) or has difficulty staying upright in a seat during meals (slouches):

Yes (2) Sometimes No (0) (1)

ISSN: 2664-3612, nups://ercptjournal.org/	
3. My child is rough with their utensils (over-scoops, spills):	4. My child struggles to hold or bring utensils to their mouth:
Yes (2) Sometimes No (0) (1)	Yes (2) Sometimes No (0) (1)
5. My child is rough with their cups (grabs too tightly, puts cup down forcefully on the table):	6. My child struggles to hold or drink from an open cup (spills, misses mouth):
Yes (2) Sometimes No (0) (1)	Yes (2) Sometimes No (0) (1)

Journal of Educational Research on Children, Parents & Teachers, Volume 5, Number 2, 2024, 143-162

Mouth / Oral Processing

For Therapist:

Total: ____

Circle "yes," "sometimes," or "no" for each.

/6 max

Seeking			
1. My child mouth: Yes (2)	always overstuf Sometimes (1)	fs their No (0)	

- My child always gags when eating or drinking:
 Yes (2) Sometimes No (0)
 (1)
- hands near/in their mouth (chews, nibbles even without food):
 Yes (2) Sometimes No (0)
 (1)

5. My child enjoys having utensils or

Sensitive

2. My child always has food fall out of their mouth:

Yes (2) Sometimes No (0)

(1)

Total: ___

- 4. My child always drools when eating or drinking:Yes (2) Sometimes No (0) (1)
- hands near/in their mouth:

 Yes (2) Sometimes No (0)

 (1)

6. My child avoids having utensils or

/6 max

7.	My child	will only eat foo	d and
	drink dr	inks that are hot	or cold (no
	room te	mperature):	
`	(00 (0)	Comotimos	No (O)

Yes (2) Sometimes No (0) (1)

8. My child will only eat food and drink drinks that are room temperature (no hot or cold):Yes (2) Sometimes No (0)

(1)

9. My child will only eat food that have mixed or extreme textures (chunky peanut butter, sauces or salsa):

Yes (2) Sometimes No (0)

10. My child will only eat food that is one texture (crispy chips, dry crackers):

Yes (2) Sometimes No (0) (1)

For Therapist:

Total: _____/8 max

Total: _____/8 max

Taste / Gustatory

Circle "yes," "sometimes," or "no" for each.

Seeking

1. My child will only eat food that is heavily seasoned (hot sauce, salt and pepper):

Yes (2) Sometimes No (0) (1)

- Sensitive
- 2. My child will only eat bland food and won't eat anything seasoned (no salt or pepper):

Yes (2) Sometimes No (0) (1)

3. My child will only drink sweetened or flavored drinks (chocolate milk, kool-aid, pop):

Yes (2) Sometimes No (0) (1)

4. My child will only drink water (no milk, juice, etc.):

Yes (2) Sometimes No (0) (1)

5. My child will only eat foods if that are all mixed together (mixes everything together even if it's not meant to be):

Yes (2) Sometimes No (0)

6. My child refuses to have mixed foods (no gravy or sauce; everything must be separate):

Yes (2) Sometimes No (0) (1)

Journal of Educational Research on Children, Parents & Teachers, Volume 5, Number 2, 2024, 143-162 ISSN: 2664-3812, https://ercptjournal.org/ For Therapist: /6 max Total: Total: /6 max Smell / Olfactory Circle "yes," "sometimes," or "no" for each. Sensitive Seeking 1. My child has to smell their food or 2. My child will not smell their food or drink and actively avoids smelling drink: it: Yes (2) Yes (2) Sometimes No (0) Sometimes No (0) (1) (1) For Therapist: /2 max /2 max Total: Total: ____ Therapist Additional Notes: EATS Feeding Assessment questions labeled as confusing were addressed. Age limitation was considered. The EATS assessment was updated accordingly (third version). This completed phase two of the research. Results

In phase one, 8 surveys were submitted electronically. The 10 questions rated 3 or lower were addressed in accordance with the qualitative feedback submitted. Questions with scores of 4-5 were considered to have a consensus. Therefore, the null hypothesis was rejected for 30 questions and was accepted for 10 questions. Meaningful qualitative feedback was received, including recommendations to separate paired sensory questions and clarify items for parents and caregivers to better understand what is being asked about their child's abilities, as seen in Figure 2 below. The preliminary set of questions was modified and edited to reflect the participants' insightful feedback. Figure 2

Updated Assessment Based on Phase One Results

Journal of Educational Research on Children, Parents & Teachers, Volume 5, Number 2, 2024, 143-162 ISSN: 2664-3812, https://ercptjournal.org/

Sensory

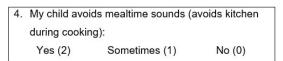
Hearing / Auditory

Circle "yes," "sometimes," or "no" for each.

		Seeking	
 My child is only able to eat if there is noise (tv, 			
	tablet, music	:):	
	Yes (2)	Sometimes (1)	No (0)

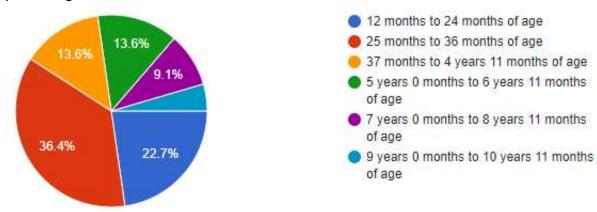
3.	My child see	eks out mealtime sound	ls (hearing food
	cooking in the	ne microwave/on the st	ove):
	Yes (2)	Sometimes (1)	No (0)

	Avoiding		
2. My child is o	2. My child is only able to eat in complete silence:		
Yes (2)	Sometimes (1)	No (0)	



In phase two, 22 surveys were submitted electronically. All age groups were represented with the majority being 36 months and younger, as seen in Figure 3 below. Figure 3

Reported Ages of Children



Parents and caregivers of children aged 12-to-24 months identified several questions as being unable to answer throughout the entirety of the assessment. Although the responses for the 12-to-24-month age group were not consistent, parents and caregivers of children aged 25 months and older were able to consistently answer the assessment questions. No other age groups reported difficulties answering the questions. Therefore, the null hypothesis was rejected for all age groups except 12-to-24 months.

Six questions were labeled as confusing therefore accepting the null hypothesis. The 6 questions came from the Environment and Temperament sections. The confusing Environment questions were a subset of questions 9 and 10: "Where does your child eat the best?" and "Where does your child eat the worst?" The subset questions 9a and 10a asked, "What is different about that place?" as seen in Figure 4 below. Figure 4

Confusing Environmental Questions

Journal of Educational Research on Children, Parents & Teachers, Volume 5, Number 2, 2024, 143-162 ISSN: 2664-3812, https://ercptjournal.org/

9. Where	e does your child eat the best (ex. ho	me, school, grandparents)?	
a.	What is different about that place?		
10. Where	e does your child eat the worst (ex. re	estaurant, home, school)?	
a.	What is different about that place?		
and 15 and section asl reaction (e questions v Figure 5	d "Taste" questions 24 ar ks parents and caregive .g. Meltdown, tantrum, s		elow. The Temperament My child has a negative
		Seeing	
14. They s	ee unfamiliar food on their plate:		
	Yes (2)	Sometimes (1)	No (0)
15. They s	ee unfamiliar liquid in their cup: Yes (2)	Sometimes (1)	No (0)
		Taste	
24. The	y taste certain foods (vegetables, f	ruits, meat):	
	Yes (2)	Sometimes (1)	No (0)
26. Foo	d tastes different than normal (new	v seasoning, prepared differently):	

Discussion

Yes (2)

Sensory-based feeding difficulties may be misconstrued as picky-eating or defiant behavior (Williams, 2022). Caregivers of the child may be tempted to provide extreme accommodations for the child or rely on harmful practices such as force feeding. Children with sensory-based feeding difficulties can improve from rehabilitation services provided by pediatric feeding experts. Currently, parents and teachers are often tasked with identifying children with sensory-based feeding difficulties. Pediatric feeding therapists must rely on their clinical expertise to assess and treat these children. Therefore, there was a need for a sensory-based feeding assessment to help identify these children and guide therapists' treatments. The purpose of this two-phased study was to establish

Sometimes (1)

No (0)

content validity and to determine if the EATS questions were understandable, answerable, and appropriate for all ages. Phase one presented the first version of the EATS and the experts provided meaningful feedback. Phase two presented the second version of the EATS and the parents and caregivers identified several questions as being unable to answer throughout the entirety of the assessment due to age along with six questions being labeled as confusing. The EATS Feeding Assessment was updated accordingly.

The EATS Feeding Assessment can now be used clinically to help identify and treat children with sensory-based feeding difficulties. For teachers and parents, it is helpful to know that children who become distressed during meals, refuse food, choke or gag while eating, and/or have limited foods that they are willing to eat may have sensory-based feeding difficulties. For healthcare providers, it is important to remember that children who have a history of autism, force feeding, "cardiac issues, gastroesophageal issues (e.g., gastroesophageal reflux disease (GERD), eosinophilic esophagitis (EoE)," (Children's National, 2023, pg. 1) are more likely to have sensory-based feeding difficulties. When a child is recognized with a sensory-based feeding difficulty, it is essential that the child be evaluated and treated by a pediatric feeding therapist who can provide the child's caregivers with regular, updated recommendations. Typically, children can continue to eat their preferred foods until they begin feeding therapy. Children should never be punished, threatened, force fed, or neglected because of their feeding difficulty.

Overall, the EATS Feeding Assessment is a practical evaluation tool for pediatric sensory-based feeding difficulties. The assessment helps to eliminate the burden on caregivers and healthcare providers to recognize and evaluate this often elusive and misunderstood condition. Although the EATS Feeding Assessment can be used in its current form, The EATS Feeding Assessment should continue to undergo future validity and reliability studies. Most importantly, discrimination validity should be assessed, and normative scores should be established.

Conclusion

Feeding is critical to life and well-being. The burden of recognizing and evaluating pediatric sensory-based feeding difficulties was previously placed on teachers, parents, and pediatric feeding therapists. The need for a sensory-based feeding assessment was prompted during a QI meeting and led to the preliminary creation of the EATS Feeding Assessment (first version). A two-phase study was planned for its development. The EATS Feeding Assessment was updated accordingly based on the research findings and is now ready for use until further studies can be conducted.

Acknowledgements: We would like to thank our wonderful focus group of feeding experts and parent participants who helped to create the EATS Feeding Assessment.

Declaration of Conflicting Interest: The authors declare there is no conflict of interest or funding source.

Research Ethics: Phase 1 (IRB Log Number: GUIRB-2022-2-6843) and Phase 2 (IRB Log Number: GUIRB-2022-4-6887)

References

- American Occupational Therapy Association. (2017). The practice of occupational therapy in feeding, eating, and swallowing. *American Journal of Occupational Therapy*, 71(Suppl. 2), 7112410015p1-7112410015p13. https://doi.org/10.5014/ajot.2017.716S04
- Benson, J. D., Parke, C. S., Gannon, C., & Muñoz, D. (2013). A retrospective analysis of the sequential oral sensory feeding approach in children with feeding difficulties. *Journal of Occupational Therapy, Schools & Early Intervention*, 6(4), 289-300. https://doi.org/10.1080/19411243.2013.860758
- Carpenter, K. M., & Garfinkel, M. (2021). Home and parent training strategies for pediatric feeding disorders: The caregivers' perspective. *The Open Journal of Occupational Therapy*, 9(1), 1-21. https://doi.org/10.15453/2168-6408.1725
- Chao, H., & Chang, H. (2017). Picky eating behaviors linked to inappropriate caregiver-child interaction, caregiver intervention, and impaired general development in children. *Pediatrics & Neonatology*, 58(1), 22-28. https://doi.org/10.1016/j.pedneo.2015.11.008
- Chatoor, I. (2009). Sensory food aversions in infants and toddlers. *Journal of Zero to Three: National Center for Infants, Toddlers, and Families*, 29(3), 44-49.
- Children's National. (2023). Pediatric sensory-based feeding difficulties. *Children's* National. https://childrensnational.org/visit/conditions-and-treatments/ear-nose-throat/sensory-based-feeding-difficulties
- Dunn, W. (1999). The sensory profile manual. Psychological Group.
- Lukens, C. T., & Silverman, A. H. (2014). Systematic review of psychological interventions for pediatric feeding problems. *Journal of Pediatric Psychology*, *39*(8), 903-917. https://doi.org/10.1093/jpepsy/jsu040
- Milanaik, R., Kahan, T. F., Muthiah, N., Fruitment, K., & Sidhu, S. (2019) Parental management of picky eaters: Common parenting pitfall. *Pediatrics*, *144*(2), 210. https://doi.org/10.1542/peds.144.2MA3.210
- Panerai, S., Ferri, R., Catania, V., Zingale, M., Rucella, D., Gelaradi, D., Fasciana, D., & Elia.
 - M. (2020). Sensory profiles of children with autism spectrum disorder with and without feeding problems: A comparative study in Sicilian subjects. *Brain Sciences*, 10(6), 336. https://doi.org/10.3390/brainsci10060336
- Paul, S., & D'Amico, M. (2013). The role of occupational therapy in the management of feeding and swallowing disorders. *New Zealand of Occupational Therapy*, 62(2), 27-31.
- Sdravou, K., Fotoulaki, M., Emmanouilidou-Fotoulaki, E., Andreoulakis, E., Makris, G., Sotiriadou, F., & Printza, A. (2021). Feeding problems in typically developing children, a population-based study. *Children*, 8(5), 388. https://doi.org/10.3390/children8050388
- Sharp, W. G., Volkert, V. M., Scahill, L., McCracken, C. E., & McElhanon, B. (2017). A systematic review and meta-analysis of intensive multidisciplinary intervention for pediatric feeding disorders: How standard is the standard of care?. *The Journal of Pediatrics*, *181*, 116-124. https://doi.org/10.1016/j.jpeds.2016.10.002

- Sibal, V. (2018). Food: Identity of culture and religion. Scholarly Research Journal for Interdisciplinary Studies, 6(46), 10908-10915.
- Toomey, K. A., & Ross, E. (2011). SOS approach to feeding. *Perspectives on Swallowing & Swallowing Disorders (Dysphagia*), 20(3), 82-87. https://doi.org/10.1044/sasd20.3.82
- Trofholz, A. C., Schulte, A. K., & Berge, J. M. (2017). How parents describe picky eating and its impact on family meals: A qualitative analysis. *Appetite*, *110*, 36-43. https://doi.org/10.1016/j.appet.2016.11.027
- Williams, V. (2022). The impact of sensory-based feeding difficulties on children and their families: Caregivers' perspectives (Publication No. 18455) [Doctoral dissertation, University of Tasmania].