**Proposal v1.0 – July 2025**

**The Taste of Regulation: Oral Sensory Behaviors and Emotion Dysregulation in Children With and Without Autism**

**Introduction**

Children with autism spectrum disorder (ASD) frequently exhibit heightened reactivity to taste, texture, and other oral sensations, which can make everyday experiences like eating overwhelming or aversive (Nimbley, Golds, Sharpe, Gillespie‐Smith, & Duffy, 2022; Zickgraf, Richard, Zucker, & Wallace, 2022). In a recent scoping review, we found that individuals with ASD show elevated behavioral responses to oral sensory stimuli, and that this reactivity is associated with broader eating behaviors (Goldschlager et al., 2025).

Although feeding challenges are common in autistic populations, their relationship to emotion regulation remains poorly understood. One study suggests that sensory atypicalities in ASD are linked to emotional dysregulation via a shared vulnerability (Sung, Lin, Chu, & Lin, 2024). Supporting this connection, neuroimaging studies in neurotypical adults have identified overlapping brain regions, e.g., the mid-insula, raising the possibility of shared neural mechanisms involved in both taste and emotion processing (Avery et al., 2017). Still, evidence linking selective eating and emotional outcomes in autistic populations remains mixed (Johnson et al., 2014; Page, Souders, Kral, Chao, & Pinto-Martin, 2022; Tanner et al., 2015).

Feeding behaviors also emerge in relational contexts. Parents of children with ASD often report elevated stress during mealtimes, which can become emotionally charged routines shaped by both child behaviors and caregiver responses (Crowe, Freeze, Provost, King, & Sanders, 2016). Moreover, parental emotional responses and feeding strategies are strong predictors of children’s eating behavior, potentially reinforcing or buffering selective patterns (Zlomke, Rossetti, Murphy, Mallicoat, & Swingle, 2020).

Few studies have integrated sensory, emotional, and parenting dimensions into a developmental framework. Fewer still have compared these pathways in autistic and non-autistic populations. This project uses two nationally representative U.S. datasets, the Fragile Families and Child Wellbeing Study (FFCWS) and the National Survey of Children’s Health (NSCH, 2023), to examine how early feeding challenges relate to later emotion dysregulation. We test whether parenting behavior moderates this association, and whether patterns differ by autism status and symptom severity.

**Aims**

**Overview:** Building on a recent scoping review of taste processing and oral sensory sensitivity, this project examines whether early feeding challenges predict later emotion dysregulation in children. It also tests whether parenting behavior moderates this relationship and whether pathways differ in autistic vs. non-autistic children.

**Aim 1: Establish a developmental pathway (FFCWS)**

Test whether early childhood feeding challenges (Wave 3) predict later emotion dysregulation (Wave 9) in non-autistic children, and whether this relationship is moderated by parenting behaviors (Wave 5).

* **Hypothesis 1a:** Early feeding challenges will predict greater emotion dysregulation in adolescence.

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**Figure 1**. Hypothesized direct pathway from oral sensory reactivity during feeding to later observable emotion dysregulation

* + Predictor: Wave 3 feeding difficulty (p3a27c: "Needs more help with eating")
  + Outcome: Wave 9 emotion dysregulation, measured as the average of three CBCL items:

(1) "Is stubborn, sullen, or irritable" (p5q3cf)

(2) "Has sudden changes in mood or feelings" (p5q3cg)

(3) "Temper tantrums or hot temper" (p5q3co)

This composite score (range 0–2) reflects observable dysregulation and has been validated in prior FFCWS studies (Doom, Young, Farrell, Roisman, & Simpson, 2023)

* + Model: Linear regression
  + Covariates:
    - Child age (cm4b\_age) and sex (cm1bsex)
    - Primary caregiver’s age (cm4age or cf4age depending on identified caregiver) and sex (ensuring consistent caregiver identity across waves using cp3pcgrel, cp4pcgrel, and cp5pcgrel).
* **Hypothesis 1b:** Parenting behaviors will moderate this relationship.

A picture containing text, sport

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**Figure 2**. Parenting behaviors as regulatory amplifiers or buffers of the feeding–dysregulation pathway.

* + Moderator: CTSPC subscales (Nonviolent Discipline, Psychological Aggression, Physical Assault) (See **Appendix A**)
  + Model: Linear regression with interaction terms
* **Exploratory Extension:** Additional models will include full CBCL subscale scores (e.g., Aggressive Behavior, Anxious/Depressed, Attention Problems) to examine whether early feeding challenges predict broader emotional and behavioral difficulties.

**Aim 2: Test for autism-specific divergence (NSCH)**

Test whether current feeding difficulties are more strongly associated with emotion dysregulation in autistic vs. non-autistic children.

* **Hypothesis 2:** Associations between feeding behavior and dysregulation will be stronger in autistic children.

Diagram

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**Figure 3**. Proposed differences in moderation pathways between autistic and non-autistic children.

* + Predictors: ENGAGE\_PICKY, ENGAGE\_INTEREST
  + Outcome: Parent-perceived dysregulation, measured using three items:

(1) K8Q31: “Much harder to care for than peers”

(2) K8Q32: “Does things that really bother you”

(3) K8Q34: “Feel angry with this child.”

Items will be averaged to parallel the 3-item CBCL measure used in FFCWS.

* + Moderator: ASD status (K2Q35A = 1 AND K2Q35B = 1)
  + Model: Linear regression with interaction term
  + Covariates:
    - Child’s age (C\_AGE\_YEARS) and sex (C\_SEX)
    - Caregiver’s age (A1\_AGE) and sex (A1\_SEX)

**Aim 3 (Exploratory): Assess autism-related moderators (NSCH)**

Within the ASD subgroup, test whether associations vary by diagnosis severity, treatment status, or age of diagnosis.

* Moderators: K2Q35A\_1\_YEARS (diagnosis age), AUTISMMED, AUTISMTREAT, ASD severity
* Model: Moderated regression (ASD subgroup only)

**Statistical Analysis Plan**

* **Software:** All analyses conducted in R

**FFCWS (non-ASD only)**

* Exclusion Criteria:
  + Food insecurity:
    - p3d1c = 1: "Couldn’t afford to eat balanced meals"
    - p3d3 = 1: "Child(ren) not eating enough due to cost”
  + Change in primary caregiver:
    - Responses to cp3pcgrel, cp4pcgrel, and cp3pcgrel are not consistent
  + ASD diagnosis:
    - p5h2f = 1
* Aim 1a: Linear regression (feeding difficulty → CBCL dysregulation composite)
* Aim 1b: Linear regression with interaction (feeding × parenting)
* Exploratory: Add full CBCL subscales as outcomes (e.g., Aggressive Behavior, Attention Problems)

**NSCH (ASD vs. non-ASD)**

* Exclusion Criteria:
  + Exclude children who were ever diagnosed with ASD but no longer meet criteria
    - (K2Q35A = 1, K2Q35B = 2)
  + Food insecurity:
    - FOODSIT = 3 or FOODSIT = 4
* Aim 2: Linear regression with interaction (feeding × ASD diagnosis)
* Aim 3: Moderated regressions within ASD group (treatment, severity, etc.)
* NSCH dysregulation outcomes will be harmonized with the CBCL 3-item composite using three analogous parent-report items (K8Q31, K8Q32, K8Q34).

**Appendix A: CTSPC Subscales**

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| --- | --- | --- |
| **CTSPC Category** | **FFCWS Variable** | **Question Text** |
| **Nonviolent Discipline** | p5q1a | Explained why something was wrong |
| p5q1b | Gave child a time-out |
| p5q1e | Gave child something else to do instead |
| p5q1l | Took away privileges or grounded child |
| **Psychological Aggression** | p5q1f | Shouted at child |
| p5q1h | Swore or cursed at child |
| p5q1i | Sent child away or put child in another room |
| p5q1j | Threatened to spank child |
| p5q1n | Called child dumb or lazy |
| **Physical Assault** | p5q1c | Shook child |
| p5q1d | Hit child on bottom with an object |
| p5q1g | Spanked child with bare hand |
| p5q1k | Slapped child |
| p5q1m | Pinched child |

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