Environmental and Familial Factors Associated with Child Eating Behaviors: Observational Approaches to Studying Mealtimes

JACLYN A. SALTZMAN, MPH, PHD

HARVARD T. H. CHAN SCHOOL OF PUBLIC HEALTH
MASSACHUSETTS GENERAL HOSPITAL FOR CHILDREN

HER NOPREN EARLY CHILDHOOD GROUP, APRIL 15TH, 2019
Aim

Describe the barriers and facilitators to collecting and coding high quality observational data in the home environment.

Discuss how these methods can be applied in other contexts, such as the center- or home-based child care context.
Outline

- Quick topical introduction
- STRONG Kids 2: Protective Parents Subproject
  - Data collection
  - Coding
- Application: Recent findings
  - Mealtime emotional climate and child eating behavior
  - Distractions and maternal feeding responsiveness
- Discussion
Health and health behavior in early childhood need to be studied in context of:

1. The family as a system of interrelated units
   - Individuals
   - Dyads
   - Triads, etc.

2. The family as a standalone unit of analysis
Family Systems and Children’s Weight-Related Health

More than a third of 2-5 year olds (36%) are considered overweight or obese (> 85th percentile of BMI for age and sex)

Obesity tracks into adolescence and adulthood, promotes risk for increased morbidity and mortality

Parents are the gatekeepers to child health in early life

Family mealtime routines are a “window of opportunity” to observe:
- Typical family functioning in a patterned/repeated daily interaction around food
- How these patterns may be linked to weight-related health

Skinner, Ravanbakht, Skelton, Perrin, & Armstrong, 2018; Lumeng, Taveras, Birch, & Yanovski, 2015; Woo Baidal et al., 2016; Frankel et al., 2012; Fiese & Bost, 2016; Fiese, Foley, & Spagnola., 2006
STRONG Kids 2: Protective Parents Subproject

PI: KELLY BOST, BARBARA FIESE, SHARON DONOVAN
PROJECT MANAGER: JACLYN SALTZMAN
STRONG Kids Program Context

- Transdisciplinary research team comprised of experts from:
  - Nutrition + sensory science
  - Human development and family studies
  - Community/public health
  - Economics
  - Biostatistics
  - Genetics
**STRONG Kids Program Cohorts 1 and 2**

**STRONG Kids 1 (SKP1): 2008-2011**
- *Ecological Systems Approach To Studying Trajectories of Unhealthy Weight Gain in Preschool Age Children*
- 497 families
- Recruited from child care centers

**STRONG Kids 2 (SKP2): 2012-2017**
- *A Cells-to-Society Approach to Nutrition in Early Childhood*
- Supported by the Dairy Research Institute (Rosemont, IL), $1.1M
- Birth to 3 years of age (n=468)
- Recruited from clinics and birthing centers in third trimester of pregnancy
- Additional 40 families
- 24 hour recalls
- Home Visit Subsample (n = 110)
### STRONG Kids 2 Timeline

<table>
<thead>
<tr>
<th>Your Baby's Age</th>
<th>What Will Happen at This Visit?</th>
<th>Gift Card Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 weeks</td>
<td></td>
<td>$25</td>
<td>Home visit with birth height and weight record, stool sample from baby</td>
</tr>
<tr>
<td>6 weeks</td>
<td></td>
<td>$40</td>
<td>Survey, home visit with stool samples from mom and baby, saliva samples from mom and baby, weight and length for baby and height and weight for mom, breast milk/formula sample</td>
</tr>
<tr>
<td>3 months</td>
<td></td>
<td>$40</td>
<td>Survey, home visit with length and weight for baby, stool sample from baby, food inventory, height and weight for mom</td>
</tr>
<tr>
<td>Introduction of solid food</td>
<td></td>
<td>$25</td>
<td>Stool sample picked up after your baby begins solids</td>
</tr>
<tr>
<td>12 months</td>
<td></td>
<td>$40</td>
<td>Survey, home visit with length and weight for baby, stool sample from baby, food inventory, height and weight for mom</td>
</tr>
<tr>
<td>18 months</td>
<td></td>
<td>$60</td>
<td>Survey, home visit with length and weight for baby, stool sample from baby and height and weight for mom</td>
</tr>
<tr>
<td>2 years</td>
<td></td>
<td>$60-80</td>
<td>Survey, home visit with length and weight for baby, stool sample from baby, food inventory, height and weight for mom</td>
</tr>
<tr>
<td>3 years</td>
<td></td>
<td>$60-80</td>
<td>Survey, home visit with length and weight for baby, stool sample from baby, food inventory, height and weight for mom</td>
</tr>
<tr>
<td>4 years</td>
<td></td>
<td>$60-80</td>
<td>Survey, home visit with length and weight for baby, stool sample from baby, food inventory, height and weight for mom</td>
</tr>
<tr>
<td>5 years</td>
<td></td>
<td>$60-80</td>
<td>Survey, home visit with length and weight for baby, stool sample from baby, food inventory, height and weight for mom</td>
</tr>
</tbody>
</table>
Home Visits at 18-24 months

- **Primary Aim**: Examine behaviors and routines around mealtimes, and associations with child eating behaviors.
- **Secondary Aim**: Evaluate how attachment moderates associations between mealtime routines/behaviors and child eating/weight.

**Format:**
- 3 hours, weekday nights (+1 hour before and 2 hours after visit for prep, takedown, and data entry/evaluation write-up)
- Each visit involved:
  - Behavioral task batteries with children
  - Semi-structured attachment interview with mothers
  - Observational evaluation of child attachment
  - Video-recording of family mealtime
Recruitment

- Took 3 years to recruit \( n = 110 \) families already involved in the SK2 study, with \( n = 108 \) having usable videos

- Fliers, phone calls, newsletters, rapport

- Challenges during recruitment
  - Distance + transportation
  - Staffing
  - Parent willingness to participate, intrusiveness
  - Scheduling (and re-scheduling)

- Facilitators to successful recruitment:
  - Flexible staff
  - Strong communication with families
  - Pre-established and maintained relationships (scheduler is key, consider newsletters)
  - Lots of time
    - Rolling (long term) recruitment vs. short recruitment timeframe
Data Collection: Behavioral Tasks

- Child executive functioning tasks
  - Fruit stroop vs. sweet stroop (attentional control)
  - Gift delay task (inhibitory control)
  - Reverse categorization

- Yields scores for child:
  - Attentional control
  - Inhibitory control
  - Attentional shifting (ultimately unsuccessful)
Data collection: Mealtime Videos

- Family ready for dinner, set up the camera facing target child
- Leave the home, wait for notification

VARIED FACTORS
- Fathers
- Other family members
- Location
- TV
- Eating together?
Data collection: Semi-structured attachment interview

- Attachment script assessment (ASA)
- Six word prompts, three adult-adult, three adult-child
- Tell a story from the word prompts
- Yields scores for parent/adult attachment security

Table 1. Elements of a secure script (internal working model) of attachment

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<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Attachment partners are occupied constructively</td>
</tr>
<tr>
<td>(2)</td>
<td>Attachment partners are interrupted and one partner is distressed</td>
</tr>
<tr>
<td>(3)</td>
<td>Cue or bid for help</td>
</tr>
<tr>
<td>(4)</td>
<td>Bid for help is recognized and help is offered</td>
</tr>
<tr>
<td>(5)</td>
<td>Help is accepted</td>
</tr>
<tr>
<td>(6)</td>
<td>Help is effective in solving the problem</td>
</tr>
<tr>
<td>(7)</td>
<td>Help is effective in alleviating or regulating negative affect</td>
</tr>
<tr>
<td>(8)</td>
<td>Attachment partners go back to their prior occupation together, or initiate a new interaction</td>
</tr>
</tbody>
</table>

*Note. Adapted from Waters & Waters, 2006*
Data collection: Observation of child attachment

Attachment Q-sort
Completed directly AFTER visit
20% Double coded AQS’s
Yields score for child:
- Secure base behavior
- Smoothness of interactions with mother
- Physical contact with mother
- Interactions with other adults
- Proximity to mother

Least descriptive of the child
Most descriptive of the child

Introduction
STRONG Kids
Application
Discussion
Data Collection Summary

- One three hour home visit yields:
  - Parent attachment security
  - Child attachment security (several variables)
  - Child executive functioning/self-regulation
  - Mealtime behaviors
    - Distractions from technology, toys, food, leave-taking
    - Maternal and child emotion
    - Maternal emotional responsiveness
    - Maternal (and now paternal) feeding responsiveness
    - Child eating behavior (rapid eating)
    - Presence/absence of father
    - TV watching
    - Lots of other possibilities

Key Challenges/ Facilitators:
1) Flexibility + adaptability
2) Respect for diversity
3) The “unknown” error (cats, communication, technology)
4) Careful written protocols
5) Clear division of responsibility
6) Parent-researcher rapport
Codebook development

1) Evaluation of literature, key aims of studies. Identify a shared theoretical framework

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**Development of Appetite Self-Regulation: Integrating Perspectives From Attachment and Family Systems Theory**

Jaelyn A. Saltzman, Barbara H. Fiese, Kelly K. Bost, and Brent A. McBride

University of Illinois at Urbana-Champaign

**ABSTRACT**—Appetite self-regulation develops rapidly during the first 2 years of life, with implications for weight-related health and well-being over the life span. Attachment theory suggests that interpersonal interactions between caregivers and children are part of the biobehavioral system designed to promote the development of self-regulation. Moreover, parent-child dyads are embedded within the family system, which also influences individual differences in appetite self-regulation. In this review, we synthesize research on appetite self-regulation from the perspectives of attachment and family systems theories to identify strengths and limits in how we understand the development of appetite self-regulation. We propose an integrative theoretical framework in which familial and dyadic factors influence appetite self-regulation directly and indirectly via modifications in the quality of parent-child interactions during infancy and early childhood. Finally, we identify avenues for research to test pathways of risk, resilience, and well-being toward optimal appetite self-regulation and weight outcomes.

**KEYWORDS**—appetite self-regulation; mother-child relation; family relations

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**Introduction**

**STRONG Kids**

**Application**

**Discussion**
Codebook development

1) Evaluation of literature, key aims of studies. Identify a shared theoretical framework

2) Identify units of analyses (family, father, mother, dyad, child, etc.)

3) Each stakeholder group identifies best-practices and coding schemes in their own field


5) Reiterate, apply, re-evaluate, re-apply.
Coding Procedure Overview

1) Codebook drafted, discussed, and revised with coding team (Fiese, Bost, Donovan, Cole, Saltzman).

2) INTERACT is pilot tested and coding schemes are set up

3) Each coding scheme (chaos, emotion, feeding, and eating) has one master coder, and two primary coders. The master coder is the double-coder.

4) All code training videos of mealtimes (not from SK2, n = 7)

5) Revise coding schemes, according to experiences on the training videos.

6) Primary coders each code half (n = 60) of the videos, checking in during weekly meetings on progress and questions (about 4 videos per week per person).

7) Master coders double-code 20% (n = 24) of the whole dataset, and will overlap on 12 videos for each primary coder.

8) Discussion of disagreement
Coding Tools: INTERACT

- INTERACT (Mangold International):
  - Construct and apply hierarchical or non-hierarchical coding schemes with complex skip patterns
  - Code duration or incidence of behavior (can also code in epochs)
  - Apply multiple coding schemes to each video, organized data storage
  - Evaluate inter-rater agreement in a variety of ways
### Introduction

**STRONG Kids Application**

**Discussion**

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#### Settings

1. **Define your way of Logging Observations**
   - **Observation source**
     - Multimedia coding
     - Live observation
   - **Coding mode**
     - Standard (ad hoc)
     - Local (post hoc)
     - Refine existing Events
     - Complex
   - Checks during data logging:
     - May sound on invalid key stroke
     - If no consecutive codes are the same
     - Continue automatically after redefinition

2. **Select your Individual Coding Options**
   - **How to log Events**
     - Push & release mode
     - Combine new Codes with previous cell contents
   - Multimedia control during data logging:
     - Start multimedia files when logging an Event
     - Start new Event with next video image
     - Pause multimedia files after logging an Event
     - Do not pause video when Codes without duration
   - Entering comments:
     - Pause multimedia file on entering a comment
     - Continue playing multimedia file after entering a comment
     - Copy comments additionally into a separate column
   - **Column name**:
     - [Column name] (Comment)
     - Live logical coding prefix for comment column name

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**Table**

<table>
<thead>
<tr>
<th>Person</th>
<th>Affect</th>
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<tbody>
<tr>
<td>Child</td>
<td>Negative Affect</td>
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<tr>
<td>Child</td>
<td>Positive Affect</td>
</tr>
<tr>
<td>Child</td>
<td>Positive Affect</td>
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</tr>
</tbody>
</table>

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**Video Recap**

- [Video Link]

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**References**


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**Discussion**

- How the STRONG Kids Application enhances children's understanding of complex social situations.
- Challenges in implementing the application in various educational settings.
- Future directions for improving the application's effectiveness.

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**Conclusion**

The STRONG Kids Application provides a comprehensive tool for educators and caregivers to better understand and respond to children's emotional needs. Its integration into daily classroom activities can significantly improve children's social-emotional competence, setting a strong foundation for their future success.
### Introduction

**STRONG Kids**

**Application**

**Discussion**

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<tr>
<th>Person</th>
<th>Affect</th>
<th>NAffect</th>
<th>Parent</th>
<th>SelfResp</th>
<th>Response</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child-target</td>
<td>Positive Affect</td>
<td>Child negative affect</td>
<td>Mother</td>
<td>attempt to fix</td>
<td>Passive attending</td>
<td>Sensitive</td>
</tr>
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<td>Child-target</td>
<td>Positive Affect</td>
<td>Child negative affect</td>
<td>Mother</td>
<td>Other-directed verbalization</td>
<td>Ignoring/Max not present</td>
<td>Sensitive</td>
</tr>
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<td>Child-target</td>
<td>Positive Affect</td>
<td>Child negative affect</td>
<td>Mother</td>
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<td>Passive attending</td>
<td>Sensitive</td>
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</tbody>
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Data Coding Challenges and Facilitators

**CHALLENGES**

- Technology learning curve and cost of INTERACT
- Iterative nature of coding (oh, just one more thing!)
- Coding operational definitions: making time for discussion of uncertainty
- Personnel training and retention

**FACILITATORS**

- Customer support/service from technology companies
- Clear hierarchical management structure → division of responsibility
- Institutional environment fostered effective collaboration across disciplines
- Organized and planned approach to management and logistics (do not underestimate, do not ignore)
- Incentives for staff to stay: clear path to authorship, posters, papers; incrementally increasing responsibility, training opportunities
- Observational approach appealing to funders
Observational Research Overview

<table>
<thead>
<tr>
<th>BENEFITS</th>
<th>LIMITATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological validity and reliability</td>
<td>Significant potential for researcher bias</td>
</tr>
<tr>
<td>Opportunity to operationalize new constructs using empirical data</td>
<td>Time and labor intensive</td>
</tr>
<tr>
<td>Behaviors may be context dependent (e.g. mealtime vs. playtime differences)</td>
<td>Demographic representativeness is rare and difficult to attain</td>
</tr>
<tr>
<td>“Real-world” view of behaviors</td>
<td>Doesn’t represent attitudes and opinions, just behavior</td>
</tr>
<tr>
<td>Rich data available from recorded interactions (endless possibilities for recoding)</td>
<td>Not experimental, so no causation</td>
</tr>
<tr>
<td>Hawthorne Effect: awareness of observation may change behavior</td>
<td></td>
</tr>
</tbody>
</table>
Examples of papers
Predictors and Outcomes of Mealtime Emotional Climate in Families With Preschoolers

Jaclyn A. Saltzman, MPH, Kelly K. Bost, PhD, Salma M. A. Musaad, MD, PhD, Barbara H. Fiese, PhD, Angela R. Wiley, PhD, and The STRONG Kids Team

University of Illinois at Urbana-Champaign

All Correspondence concerning this article should be addressed to Jaclyn A. Saltzman, Department of Human Development and Family Studies, University of Illinois at Urbana-Champaign, Urbana, IL 61801, USA. E-mail: saltzm2@illinois.edu

The STRONG Kids Team includes Drs. Kristen Harrison, Kelly Bost, Brent McBride, Sharon Donovan, Diana Grigsby-Toussaint, Juhee Kim, Janet Liechty, Angela Wiley, Margarita Teran-Garcia, and Barbara Fiese.

Received May 11, 2017; revisions received August 3, 2017; accepted August 4, 2017
Associations Between Father Availability, Mealtime Distractions and Routines, and Maternal Feeding Responsiveness: An Observational Study

Jaclyn A. Saltzman, Salma Musaad, Kelly K. Bost, Brent A. McBride, and Barbara H. Fiese
University of Illinois at Urbana-Champaign

Responsive feeding and frequency of family mealtimes are related to healthier eating behaviors and weight outcomes in children and adolescents. Distractions at mealtimes are related to greater intake of unhealthy food and a less positive mealtime emotional climate. However, there is little understanding of the effects of routines and father availability on distractions at family meals, and there is limited research investigating the effects of distractions among all family members on maternal feeding practices in toddlerhood. This study aims to characterize distractions at family mealtimes and examine associations between father availability, distractions, and observed responsive feeding. Descriptive analyses, non-linear mixed models, and path analyses were conducted using observational (home-based family mealtimes) and self-report data collected from a subsample of families (n = 109) of 18- to 24-month-old children in the larger STRONG Kids 2 Study (N = 468). Between fathers, mothers, and children, families spent almost half of the mealtime distracted. Fathers and mothers engaged in about equal amounts of distractions, and children engaged in more technology-related distractions than parents. Fathers’ absence at the mealtime was associated with more child distractions and less maternal feeding responsiveness. Lower paternal total distractions, maternal non-technology-object-related distractions, and higher household income were significantly associated with more observed maternal feeding responsiveness. Future research should investigate how father availability and family mealtime distractions may be associated directly and indirectly with children’s eating behaviors and weight outcomes.
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- **SK2 Families**
- **PIs**: Kelly Bost, Barbara Fiese
- **STRONG Kids 2 Birth Cohort Team**: Kelly Bost, Barbara Fiese, Brent McBride, Sharon Donovan, Margarita Teran-Garcia, Soo-Yeun Lee
- **Research Team Leaders**: Alyssa Parsons, MA, Natasha Chong Cole, RD, PhD, Maria Pineros-Leano, PhD, MSW, MPH
- **Research Assistants**: Steve Tran, PhD, Samantha Iwinski, BA, Marisa Cullnan, BA, Valerie Sherman, Jocelyne Lopez, BS, Jacqueline Bellefontaine, BSW, McKenzie Martin, BA, and Bella Yu Tang
Discussion Questions

1) These studies were all conducted in home-based settings, but these behaviors can all be observed in a variety of contexts.
   ◦ How would you go about measuring these concepts in childcare?
   ◦ What challenges would arise unique to collecting observational data in the childcare context?

2) A component of the Head Start guidelines calls for family style meals to promote positive interpersonal interactions and socialization at mealtimes. What else could be done during mealtimes in childcare centers to promote healthy eating behaviors and outcomes?

3) What policy implications do these studies bring to mind?
Thank you!

Questions?

jaclyn.Saltzman@gmail.com

www.jaclynsaltzman.com