THE SIESTA RESEARCH PROGRAM

Prevention Research Center seminar
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Psychology, and Pediatrics
Sept. 27, 2017
SIESTA, SIESTA-K, SIESTA-FF

- **Study of Infants’ Emergent Sleep Trajectories**
  - R01HD052809, funded 2009
  - Cole, Stifter, Rovine, Paul
  - Molly Countermine, Corey Whitesell, Renee Stewart, Proj. Coordinators

- **Study Investigating Emergent Sleep Trajectories – Kindergarten**
  - R01HD087266, funded 2016
  - Bierman, Buxton, Almeida, Mogle
  - Corey Whitesell, Proj. Coordinator

- **Study of Infants’ Emergent Sleep Trajectories – Family Foundations**
  - R01HD088566, funded 2017
  - Feinberg, Jones, Paul, Tikotzky
  - Morgan Loeffler, Proj. Coordinator
MY INTEREST IN THIS AREA...
FATHER OF THREE CHILDREN
WHAT CONSTITUTES PARENTING COMPETENCE AT BEDTIME AND DURING THE NIGHT?

• Bedtime/nighttime parenting poorly understood, rarely examined
• Not well-informed by any specific theory
• Many recommendations about the “right” thing to do, without clear empirical support
  • Recommendations based on cultural prescriptions, medical concerns, practical concerns
  • Case-in-point: Bedsharing/cosleeping
JUDGMENTS ABOUT COMPETENT PARENTING CANNOT BE MADE WITHOUT REGARD TO OUTCOMES

• Proposition: Bedtime/nighttime parenting is competent when it promotes quality child sleep.
  • Child sleep quality >>> daytime dysregulation in cognitive, emotional, social domains
  • Child sleep quality ~~internalizing, externalizing disorders
  • Child sleep quality rooted in sleep patterns established in infancy
PARENTING AND INFANT/CHILD SLEEP

• At the start of the SIESTA program, handful of studies of parenting bedtime practices (what parents do):
  • Close parent-infant contact >>> elevated infant night waking
  • Nursing infant to sleep >>> elevated infant night waking
  • Arousing/stimulating bedtime activities >>> elevated infant night waking
  • Quiet activities w/ infant >>> reduced infant night waking
  • Putting infant to bed while still awake >>> reduced infant night waking

No studies of parenting quality at bedtime.
No studies of coparenting quality and infant/child sleep
Only one lab prior to SIESTA made direct observations of parenting at night (Anders)
MAIN OBJECTIVES OF SIESTA:

• Understand how parenting, coparenting at bedtime/nighttime parenting impacts infant sleep

• Examine how parenting and infant sleep uniquely and interactively predict infant socioemotional development across the first two years.

• Examine bidirectional linkages between parenting, coparenting, parental psychiatric functioning, and child sleep
SIESTA - longitudinal study, measurement-burst design (1, 3, 6, 9, 12, 18, 24 mos) (N = 167 at recruitment, 149 completed study thru 12 months

- 7-day data collection bursts on infant, mother, and father sleep (actigraphy and sleep diaries) at each age point

- Single-point-in-time assessments obtained on
  - Marital adjustment (1, 12, 24 months)
  - Parental depressive, anxiety symptoms
  - Coparenting quality
  - Life stress, social supports
  - Household chaos (from direct observation)
  - Infant sleep arrangements
  - Parental bedtime practices and parenting quality (from video-recordings)
  - Parental nighttime bedtime practices and infant arousal states (from video-recording)
  - Salivary cortisol (4 times/day)
  - Infant emotional reactivity and regulation (6, 12, 18 months)
  - Infant attachment to mother at 12, 18, and 24 months (Attachment Q-Set, Strange Situation)
  - Infant behavioral competencies and problems (12, 18, and 24 months)
MAJOR FINDINGS FROM SIESTA:

Infant sleep arrangements are fluid, shifting from predominantly co-sleeping (room sharing, bed sharing, or combination) to predominantly solitary from 1 to 12 months:

<table>
<thead>
<tr>
<th></th>
<th>1 mos:</th>
<th>12 mos</th>
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</thead>
<tbody>
<tr>
<td>Room share</td>
<td>49%</td>
<td>11%</td>
</tr>
<tr>
<td>Bed share</td>
<td>12%</td>
<td>9%</td>
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<tr>
<td>Combo</td>
<td>14%</td>
<td>7%</td>
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<tr>
<td>Solitary</td>
<td>25%</td>
<td>73%</td>
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</tbody>
</table>
INFANT SLEEP FRAGMENTATION (ACTIGRAPHY) FROM 1 – 12 MOS

- Consistent solitary
- Early switch to solitary
- Late switch to solitary
- Consistent co-sleeping
- Inconsistent
MOTHERS’ SLEEP FRAGMENTATION (ACTIGRAPHY, 1 TO 12 MOS)

- Consistent solitary
- Early switch to solitary
- Late switch to solitary
- Consistent co-sleeping
- Inconsistent
DADS’ SLEEP WAS NOT RELATED AT ALL TO 1ST-YEAR INFANT SLEEP ARRANGEMENTS
COMPARED TO SOLITARY SLEEPING MOTHERS ACROSS INFANTS’ 1ST YEAR, PERSISTENTLY CO-SLEEPING MOTHERS (> 6 MONTHS OF INFANT AGE):

• Reported higher depressive symptoms
• Saw their infants’ sleep are more problematic
• Had more chaotic households (using the DISCORD: Descriptive In-Home Survey of Chaos—Observer Reported)
• Worried more about their infants’ night awakenings
• Reported higher levels of negative coparenting, and lower levels of positive coparenting
• Were less emotionally available (less sensitive, less structured, more hostile, more intrusive) with infants at bedtime (from video observation)
• Were criticized more by close family and friends about their persistent co-sleeping
• Findings appeared to hold regardless of whether co-sleeping was “proactive” or “reactive” (Fanton’s undergraduate fellowship study, summer 2017)
• Infants of emotionally available mothers at bedtime sleep better throughout the night than infants of emotionally unavailable mothers, especially when
  • high EA is combined with low levels of close contact,
  • High EA is combined with low amounts of arousing activities,
  • High EA is combined with more reactive infant temperament.
• Emotional availability at bedtime during 1st 3 mos >>> earlier establishment of a prototypical cortisol diurnial rhythm (Philbrook)
• Depressed/anxious mothers more likely than non-distressed mothers to go to their non-distressed infants during the night and awaken and spend time with them, and keep them up at night.
MATERNAL DEPRESSION AND INFANT NIGHT WAKING

• Long-standing link between maternal depression and infant night waking.

• What explains the link?

Model 1: Infant-driven model
AN ALTERNATIVE MODEL: MOTHER-DRIVEN

- Maternal depressive symptoms
- Maternal worries about infant sleep
- Maternal nighttime behavior w/ infant
- Infant night waking

SUPPORT FOUND FOR A MOTHER-DRIVEN MEDIATIONAL MODEL

- Maternal depressive symptoms
- Maternal worries about infant sleep
- Maternal presence with infant at night
- Infant night waking

* = p < 0.05
** = p < 0.01
*** = p < 0.001
MAJOR FINDINGS (CONT’D)

• Household chaos (DISCORD-Descriptive In-home Survey of Chaos, Observer-Reported), associated with poorer coparenting, poorer maternal EA at bedtime, poorer and more variable parent and infant sleep (Whitesell)
  • In high chaos homes, infants put to bed later, and their (and their parents’) sleep was more variable, across days.
VARIABILITY IN SLEEP DURATION (SD) IN HIGH VS. LOW CHAOS HOMES, CONTROLLING FOR MA (MOTHERS AND FATHERS) OR EA (INFANTS)
SLEEP FRAGMENTATION IN HIGH VS. LOW CHAOS HOMES, MA (MOTHER AND FATHER) OR EA (INFANT)
MAJOR FINDINGS (CONT’D)

• Coparenting quality during early post-partum influenced by infant sleep quality (McDaniel)
  • Infant night waking >>> parent night waking >>> parental depressive symptoms >>> poor coparenting quality
• Development of the D-COP, a daily diary assessment of coparenting quality (McDaniel)
• Observed coparenting quality at bedtime (from video) >>> infant sleep quality, from actigraphy (McDaniel, Voltaire, others)
INFANT SLEEP DURATION AND COPARENTING SUPPORT AT BEDTIME
INFANT SLEEP MINUTES ACROSS THE NIGHT AND COPARENTING SUPPORT AT BEDTIME
INFANT SLEEP DURATION AND COPARENTING HOSTILITY AT BEDTIME

Infant sleep duration by observed coparenting hostility, 12 months
INFANT SLEEP MINUTES AND COPARENTING HOSTILITY AT BEDTIME

![Graph showing the relationship between infant sleep minutes and coparenting hostility at bedtime.](image)
• Ph.D.s “produced” from SIESTA:
  • Molly Countermine
  • Bo-Ram Kim
  • Brandon McDaniel
  • Lauren Philbrook
  • Mina Shimizu
  • Hye-Young Rhee (defense scheduled next month)
SIESTA-K

• Began as an interest (not realized) in following up the SIESTA cohort
• Catalyzed by discussions with Karen Bierman on what is known about children’s school transitions, and with Orfeu Buxton in BBH about sleep and sleep measurement in childhood
• Motivated by dearth of info on the role of sleep in children’s transition to kindergarten, and how sleep, parenting, and family functioning jointly predict school adjustment
SIESTA-K ANOTHER MEASUREMENT-BURST DESIGN

- Recruiting families in the York, PA area (3 school districts)
- 4 home visits to assess child and parent sleep (daily diaries and actigraphy), bedtime/nighttime parenting, family functioning:
  - Pre-K (summer), September, November, and April of the K year
  - Sleep assessed in terms of duration, quality, and lability
- 3 school visits to assess children’s executive functioning, school engagement, academic functioning, peer relationships
- Project period: 5 years
SIESTA-K PROGRESS REPORT

• In year 2 of 5-year project period.
• 105 families recruited to date. Recruitment goal: 225 by year 4 (25% - 30% minority families)
• Primary foci:
  • Role of sleep, parenting, and family functioning on initial quality of transition to K
  • On adjustment trajectories across the entire K year
  • On how sleep and family life changes in response to child’s transition to school
  • Whether sleep, in particular, is more important for some adjustment outcomes (e.g., Executive functioning, academic outcomes, school engagement) than others (peer relationships)
  • Whether sleep quality/lability is more important to adjustment in the presence of social and health disparities
Informed by the important role of coparenting as an index of family functioning, and as a predictor of infant sleep.

And by our discovery that coparenting quality at bedtime, from direct observations of SIESTA video, strongly correlates with:

- Quality of individual parenting at bedtime
- Family chaos
- Parental depressive symptoms

And by ongoing discussions with Mark Feinberg, the creator and developer of Family Foundations.

FF an evidence-based, transition-to-first time parenting aimed at promoting quality of coparenting, overall parental functioning, and child development.
SIESTA-FF IS AN RCT

• Three randomly assigned groups:
  • Original FF intervention. Delivers 5 prenatal sessions, 4 postnatal sessions
  • “Sleep-adapted” FF (FF+). Mirrors FF in delivery, but emphasizes coparenting around infant sleep contexts
    • E.g., choosing sleep arrangements, putting infant to bed, responding to baby during the night, on working together to promote each other’s sleep
  • Control (no intervention) group

• Recruitment goal: 72 families in each group, overall N = 216, all first-time parents, all partnered (not necessarily married)
  • Recruitment taking place in Hershey/Harrisburg area
FF AND FF+ TO BE DELIVERED TO GROUPS OF PARENTS (10-12 FAMILIES PER GROUP) BY TRAINED INTERVENTION TEAMS

• Three teams, each composed of one female, one male facilitator

• Intervention sessions to be delivered in community spaces (e.g., Giant Foods community rooms)

• Intervention sessions:
  • commence mid-2\textsuperscript{nd} trimester – early 3\textsuperscript{rd} trimester, 5 prenatal sessions, every 1-2 weeks
  • Continue after birth, 4 sessions, across first few months
SIESTA-FF DATA COLLECTION SCHEDULE:

• Pre-Intervention (baseline)
• 1 month post-partum
• 3-4 months PP
• 6 months PP
• 12 months PP

• DATA COLLECTION TEAM SEPARATE FROM INTERVENTION TEAMS
<table>
<thead>
<tr>
<th>Table 1. Timeline of assessments</th>
<th>Pre-Intervention</th>
<th>1 mos</th>
<th>3-4 mos</th>
<th>6 mos</th>
<th>12 mos</th>
<th>Post-Intervention</th>
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<tr>
<td><strong>Single-point-in-time assessment</strong></td>
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<td>Anxiety symptoms</td>
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<td><strong>Week-long (daily) assessment – 8 consecutive days</strong></td>
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<td>Parent sleep - both parents, 8 consecutive days</td>
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<td><strong>12-month infant assessment</strong></td>
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<td>Infant-mother and infant-father attachment</td>
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<td>Infant behavioral problems</td>
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<td>Infant behavioral competencies</td>
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Each parent completes separately; "Independent assessment; "Both parents work together"
ACKNOWLEDGING SIESTA GRADUATE STUDENTS AND STAFF

- Brian Crosby – technical support par excellence!
- Bo-Ram Kim – took major responsibility for scoring emotional availability, with me, for the entire SIESTA project
- Molly Countermine – worked with me in piloting the video procedures that became a signature feature of SIESTA
- Gail Mayer
- Lauren Philbrook – instrumental in linking bedtime parenting data, from video observations, with infant stress reactivity
- Hye-Young Rhee
- Brandon McDaniel – led efforts to develop coparenting measurement in SIESTA, and to understand its importance
- Ni Jian
- Mina Shimizu – demonstrated that quality of family functioning, not sleep arrangements, ultimately predicts infant socioemotional development
- Jon Reader – began work with SIESTA as an undergraduate, instrumental in linking parenting cognitions about infant sleep with coparenting quality
- Corey Whitesell – Project coordinator par excellence. Instrumental in developing measurement of household chaos in SIESTA (the DISCORD).
- Cori Reed
- Renee Stewart – Project coordinator of SIESTA at the Hershey site
- Alexia Hozella – worked tirelessly with Rob Bonneau at Hershey Medical Center to assess salivary cortisol levels in infants, mothers, and fathers
- Alex Dusel
- Katie Pollom
- Liesbeth Gudde
ACKNOWLEDGING SIESTA GRADUATE STUDENTS AND STAFF (CONT’D)

• THE NEXT GENERATION (SIESTA-K, SIESTA-FF)
  • Sabrina Voltaire – taking major responsibility for undergraduate training, and for examining linkages between early parenting and infant sleep trajectories across the 1st year
  • Kaitlin Fronberg
  • Liu Bai
  • Ulziimaa Chimed-Ochir
  • Angela Spangler – data collector, SIESTA-K
  • Dee Ann Bankert – data collector, SIESTA-K
  • Morgan Loeffler – Project coordinator of SIESTA-FF
  • Bethany Gruskin – data collector for SIESTA-FF
• SIESTA-FF interventionists
  • Jim Rowell
  • Frani Battista
  • Lisa Dickerson
  • Chris Fegley
  • Justin White
  • Mary Hickok
ACKNOWLEDGING UNDERGRADUATE ASSISTANTS

• Too many to list!
  • 20+ undergraduates in the SIESTA lab just this semester.
  • This past summer, several UG students were funded by College or Departmental endowment funds to work in the SIESTA lab.
    • Each developed her own research project that represented significant contributions to the project
THANK YOU!