# Identifying Barriers to Quality Mother-Infant Interactions in the NICU through Naturalistic Systematic Observations

Christine Neugebauer, MS, MT-BC, LPC
Miranda Cox, BS
Melissa Deckert, BA, BSN, RN
Ann M. Mastergeorge, PhD

6th Annual Providence Nurse Conference, June 2022

# Disclosure Statement

No financial interest or affiliation concerning material discussed in this presentation

# Learner Objectives

1. Participants will identify barriers to quality mother-infant interactions in the NICU and develop potential mitigation strategies to address these barriers

2. Participants will learn how using systematic observational methods can be used to understand familial interaction processes in the NICU

# Background

- The NICU is a premature infant's first encounter with the social world
- Quality mother-infant interactions mitigate the short- and long-term risks to the preterm infant's development
- Maternal-infant relationship vacillates between closeness and separation
- Identifying the factors that may hinder or facilitate interactions between mothers and preterm infants can enhance developmental care practices in the NICU

# Purpose

To observe patterns of maternal proximity in the NICU and identify issues or activities that deter or disrupt focused dyadic engagement during context-specific social situations

# Pilot Data to Identify Social Interaction Contexts

1. Nurturing = holding infant; engaging in soothing/nurturing touch interaction (e.g., kiss, caress)
2. Routine Cares = diaper changes; swaddling; taking temperature; burping; cleaning the infant
3. Feeding = feeding the infant
4. Education = Nurse or other healthcare professional offering guided participation in learning cares, feeding, or other infant-care skills

# Research Questions

1. What are mothers doing when they are in proximity to their infant but not engaging with their infant?

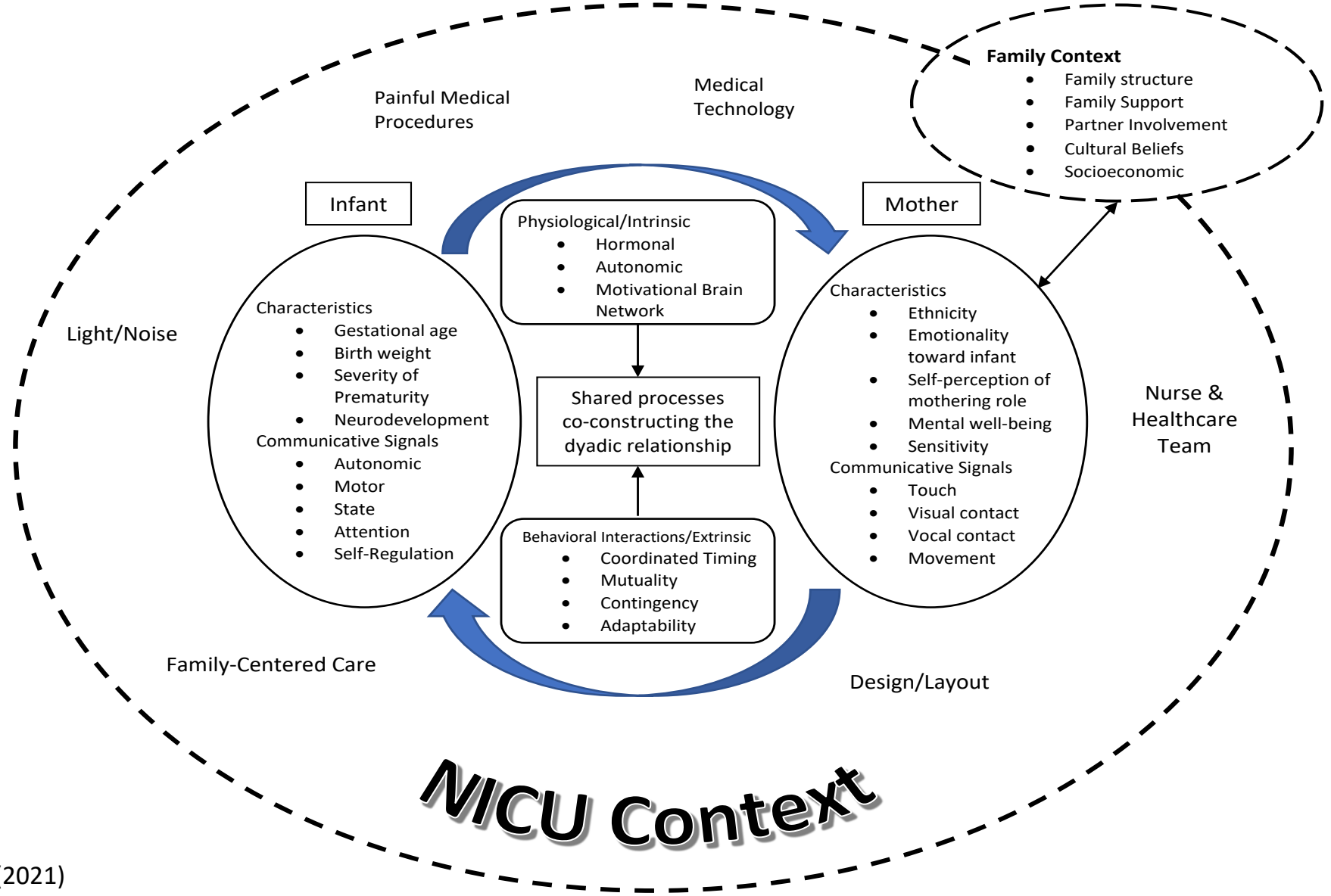
2.What specific issues or activities disrupt or interfere with focused mother-infant engagement in the NICU?

# Theoretical Framework

## Biobehavioral Model of Synchrony

**Behavioral –** includes parenting behaviors (e.g., touch, vocal, and gaze interaction patterns including position proximity)
Physiological – hormonal; autonomic functions; brain mechanisms
Temporal – rhythm & pacing of interactions over time
Philosophical – socially co-constructed process (cultural and environmental contexts in which these interactions occur)

Feldman (2012, 2014)




From: Neugebauer et al. (2021)


# Description of NICU Setting

- 43-bed Level-IV NICU
- Four open bay pods with 10 minimal stimulation rooms
- NICU care team model (interdisciplinary)
  - Clinical services include four neonatologists, music therapist, PT, SLP, ,mental health counselor, social worker, dietician, artist in resident, child life specialist, lactation specialist
- Developmental Care Committee
- Web-cameras for family viewing of infant
- Wee read program

# Methods: Participants

- Mother-infant dyads who were hospitalized in the open-bay and lower-acuity sections of the NICU
- Medically-stable infants requiring specialized versus intensive care
- Excluded from field observations:
  - Infants in minimal stimulation rooms
  - Dyads obstructed by use of a privacy curtain

Photo from: http://theconversation.com/reading-and-singing-to-preemies-helps-parents-feel-comfortable-with-their-fragile-babies-93352

# Methods: Design


- Systematic observations (Bakeman & Quera, 2011) consisting of in vivo episodic field visits over a period of four months
- Trained observers utilized a predefined coding scheme to record maternal presence, proximity, focused vs unfocused engagement, and dyadic social contexts (e.g., feeding, routine cares)
- Codes included both timed (onset/offset) and untimed events (frequency counts)
- Observers recorded descriptive notes of maternal activities when engagement did not occur

# Methods: Measures

## NICU CONTEXT

Characteristics including NICU design, demographic summary of population, NICU care team structure, and current neurodevelopmental and family–centered care practices

## DYADIC SOCIAL CONTEXTS

Nurturing, routine cares, education, and feeding contexts were coded as timed-events and transition contexts were coded as untimed events

## ALTERNATE BEHAVIORS TO ENGAGEMENT

Trained observers documented qualitative descriptions upon occurrences of maternal non- or unfocused engagement

# Methods: Coding Tool

Observation Week # _9.2__ Weekday: Morning Afternoon Evening Weekend: Morning Afternoon Evening Observer Initials: _MD____

| Baby __ CP | Onset | Offset | PWO | Alternate Activity | PE | Context | Comments | F | Onset | Offset | TO | VO | GA | UC | UF | Onset | Offset | Alternate Activity | OV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baby 1 | | | | | | | | | | | | | | | | | | | |
| 1 | 1:29 | | x | mom sitting bedside on phone | | | | | | | | | | | | | | | |
| | | | | | x | NU | baby in isolette, mom brief gaze | x | 1:32 | 1:32 | | | x | | | | | | |
| | | | x | bedside on phone | | | | | | | | | | | | | | | |
| | | | x | bedside, talking to nurse | | | | | | | | | | | | | | | |
| | | | | | x | NU | brief gaze | x | 1:45 | 1:45 | | | x | | | | | | |
| 0 | | 1:45 | x | mom left unit | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Baby 2 | | | | | | | | | | | | | | | | | | | |
| 1 | 1:29 | | x | mom sitting bedside on phone | | | | | | | | | | | | | | | |
| | | | | | x | NU | brief gaze | x | 1:54 | 1:54 | | | x | | | | | | |
| | | | x | bedside on phone | | | | | | | | | | | | | | | |
| | | | | | x | NU | baby fusses, extended gaze | x | 1:58 | | | | x | | | | | | |
| | | | | | | | touch to back, shushing | | | | x | x | l | | | | | | |
| | | | | | | | | | | 2:00 | l | | x | | | | | | |
| | | | x | bedside on phone | | | | | | | | | | | | | | | |
| | | | | | x | NU | gaze, taking picture | x | 2:14 | 2:14 | | | x | | | | | | |
| | | | x | bedside on phone | | | | | | | | | | | | | | | |
| | | | | | x | NU | baby fusses, hand to head | x | 2:17 | | x | | x | | | | | | |
| | | | | | | | | | | | l | x | l | | | | | | |
| | | | | | | | standing bedside, hand to head | | | | l | | x | | | | | | |
| | | | | | | | | | | | l | | | | x | 2:19 | 2:19 | talking to someone, not staff | |
| | | | | | | | brief glance | x | 2:19 | 2:19 | l | | x | | | | | | |
| | | | | | | | | | | | l | | | | x | 2:19 | 2:21 | continue talking | |

# Methods: Analysis

## Mixed-Method Approach

<u>Quantitative:</u>

- Calculated occurrences of maternal proximity and frequencies of dyadic social contexts during focused and unfocused engagement
- Calculated relative frequency and proportion for each category of alternate engagement and unfocused engagement

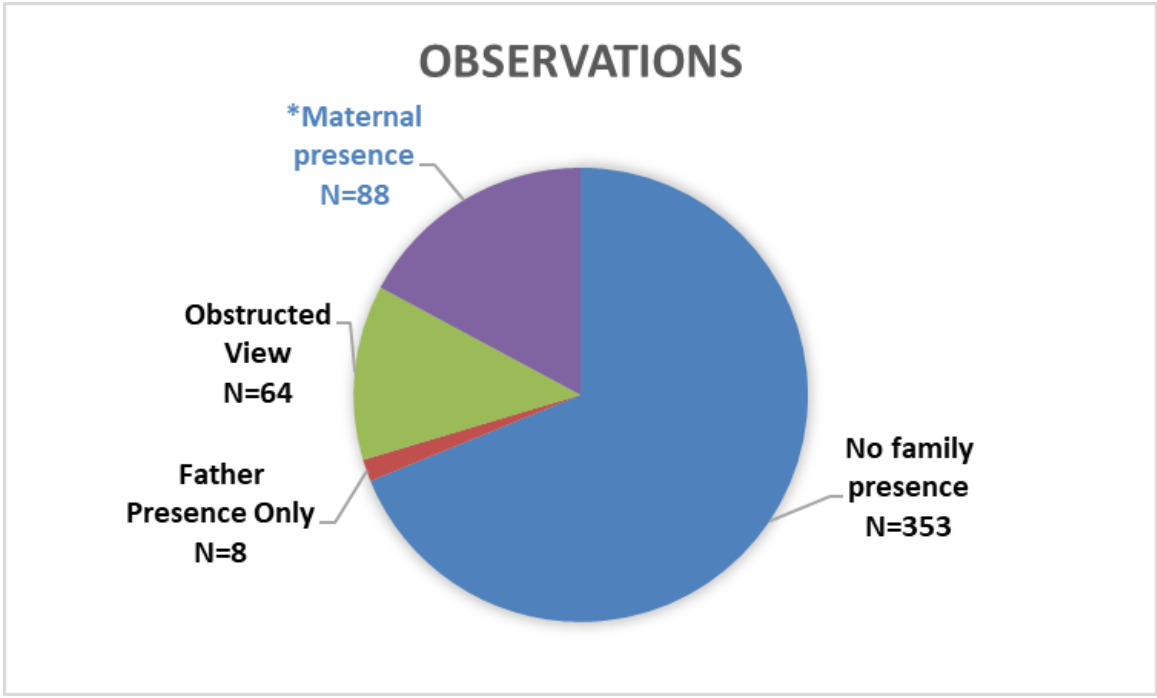
<u>Qualitative</u>:

- Descriptive notes were summarized and synthesized using an iterative approach to identify thematic categories of non-interaction and unfocused engagement

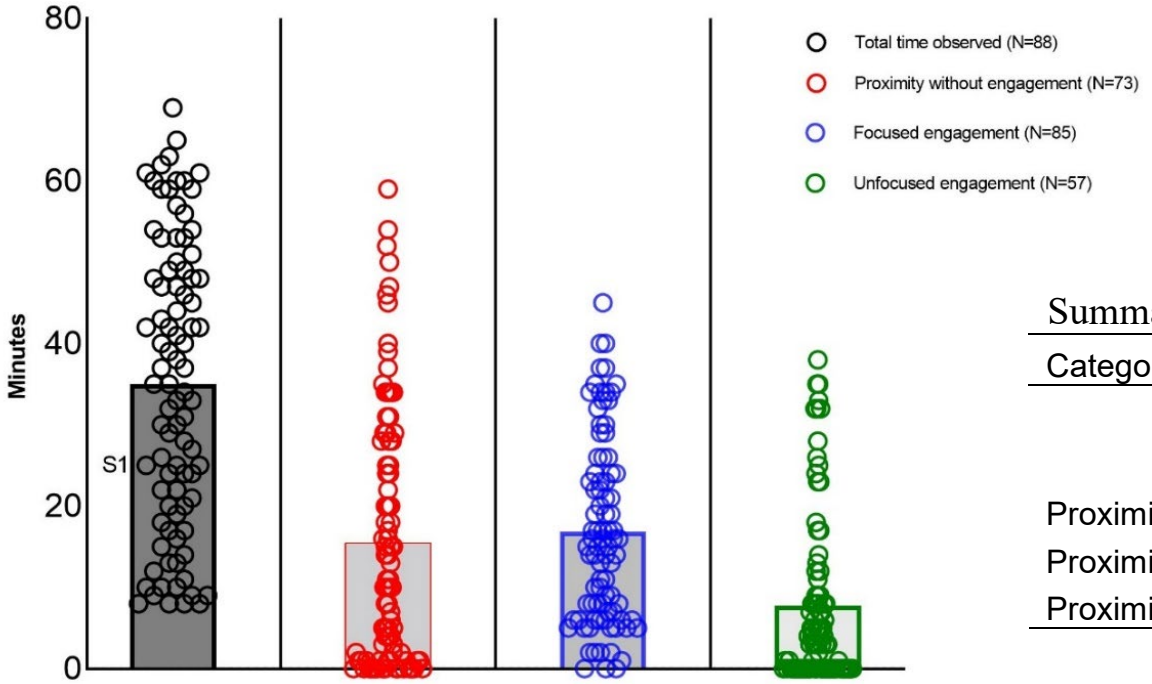
# RESULTS: Observation Summary

Summary of Observation Hours by Time Period and Day of Week

| Time Period of Observation | Weekday Hours | Weekend Hours | Total Hours |
|---|---|---|---|
| Morning (9:00am – 12:00pm) | 10 | 5 | 15 |
| Afternoon (12:00pm – 4:00pm) | 17.5 | 5 | 22.5 |
| Evening (4:00pm – 7:00pm) | 14.5 | 0 | 14.5 |



# RESULTS: Levels of Engagement




Dyadic observations stratified by time duration

Summary of Observation Categories According to Level of Engagement

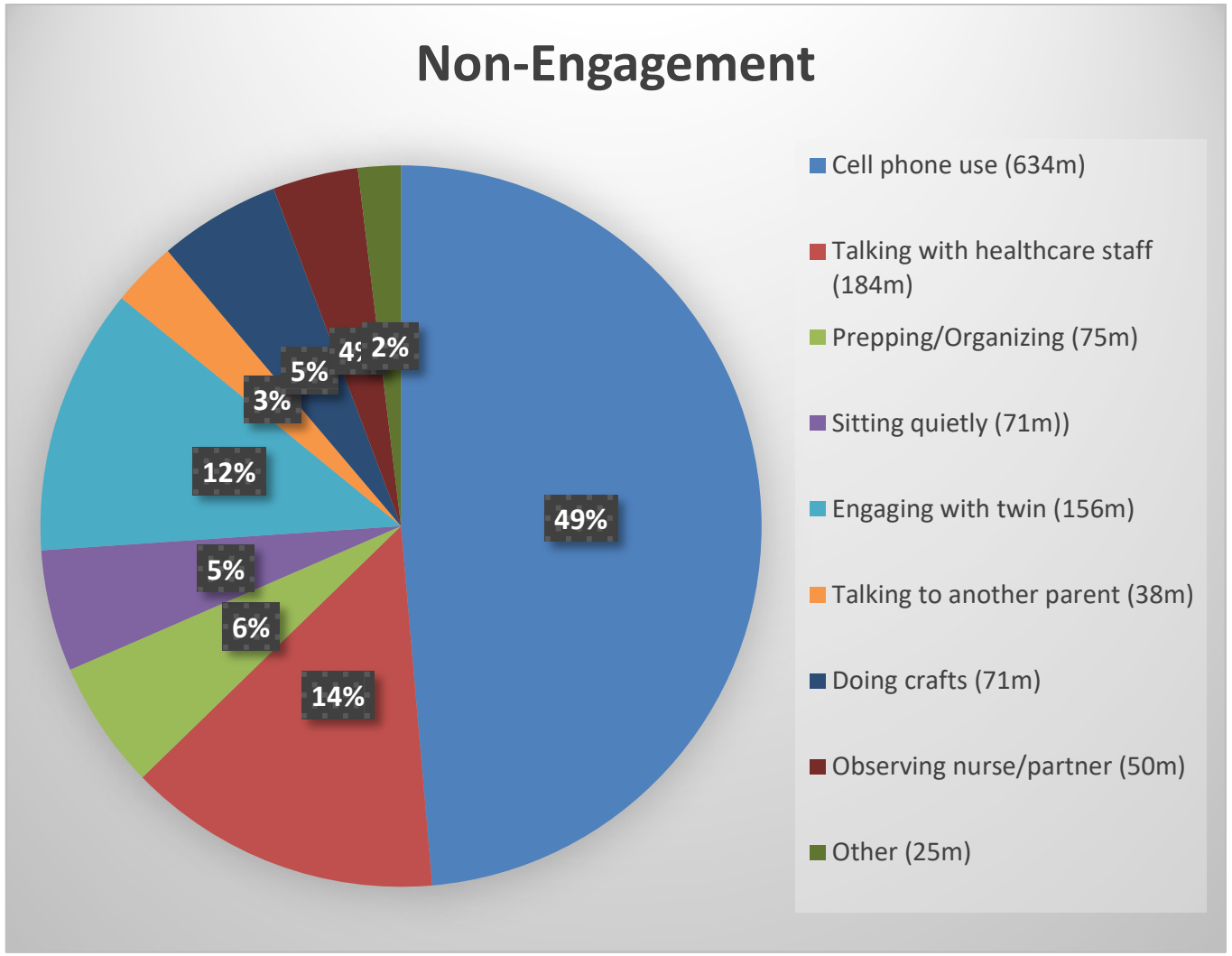
| Category of Dyadic Interaction | Dyads Observed | Total Occurrences | Total Minutes | Total Hours |
|---|---|---|---|---|
| Proximity without Engagement | 73 (83%) | 214 | 1304 | 21.7 |
| Proximity with Focused Engagement | 85 (97%) | 455 | 1479 | 24.7 |
| Proximity with Unfocused Engagement | 57 (65%) | 240 | 681 | 11.4 |

# RESULTS: Proximity without Engagement

Table 1. Summary Statistics on Alternate Activities for Proximity without Engagement

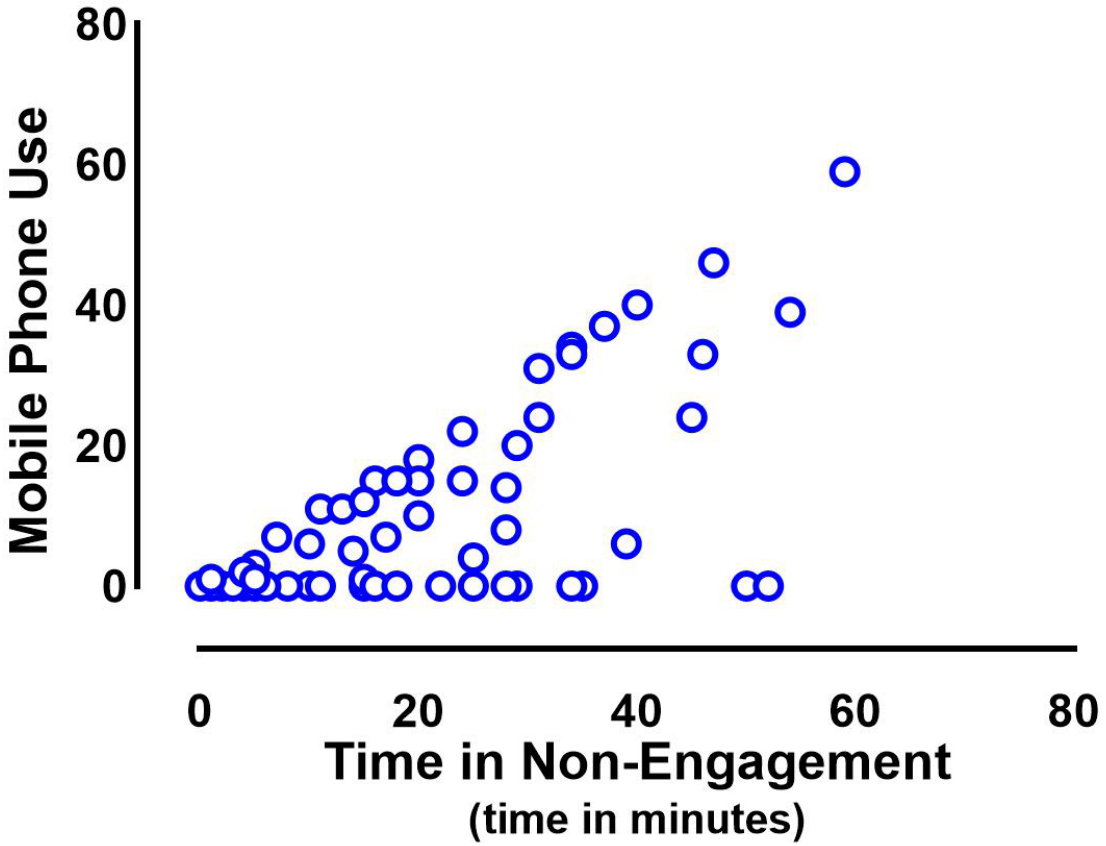
| Alternate Activity | N | Relative Proportion | Frequency Observed | Relative Frequency | Cumulative Minutes | Mean Minutes | Range Minutes |
|---|---|---|---|---|---|---|---|
| Using cell phone | 36 | .49 | 70 | .33 | 634 | 8.7 | 0-59 |
| Talking with healthcare staff | 33 | .45 | 48 | .22 | 184 | 2.5 | 0-29 |
| Prepping/Organizing | 21 | .29 | 22 | .10 | 75 | 1.1 | 0-19 |
| Sitting quietly | 12 | .16 | 17 | .08 | 71 | 1.0 | 0-14 |
| Engaging with twin | 8 | .11 | 22 | .10 | 156 | 2.1 | 0-35 |
| Talking to another parent | 8 | .11 | 11 | .05 | 38 | 0.5 | 0-9 |
| Doing crafts | 6 | .08 | 6 | .03 | 71 | 1.0 | 0-34 |
| Observing nurse/partner | 5 | .07 | 5 | .02 | 50 | 0.7 | 0-23 |
| Other | 13 | .18 | 13 | .06 | 25 | 0.4 | 0-9 |

(N=73)




Relative proportion of time spent in activities during proximity without engagement

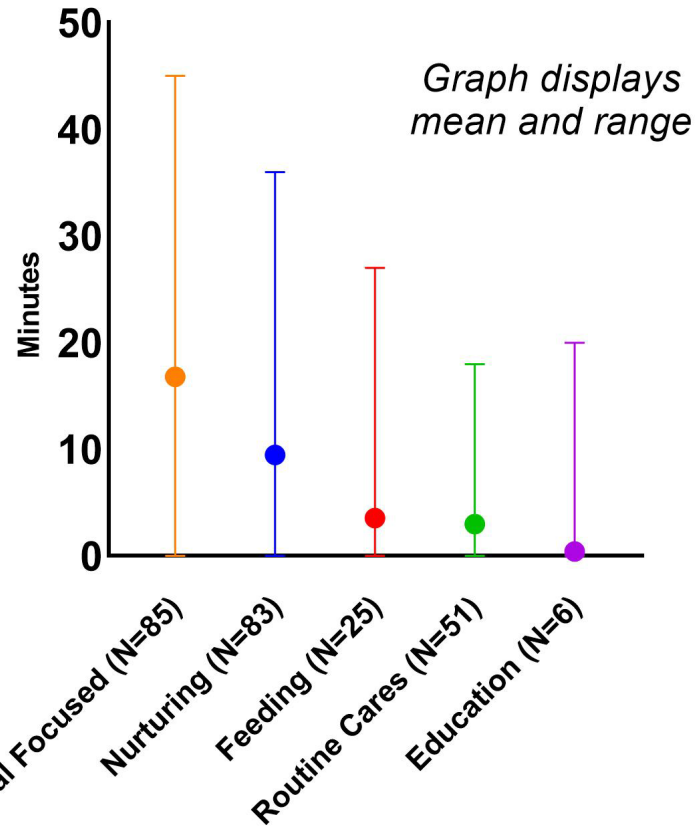
# Mobile Device Use during Occurrences of Proximity without Engagement



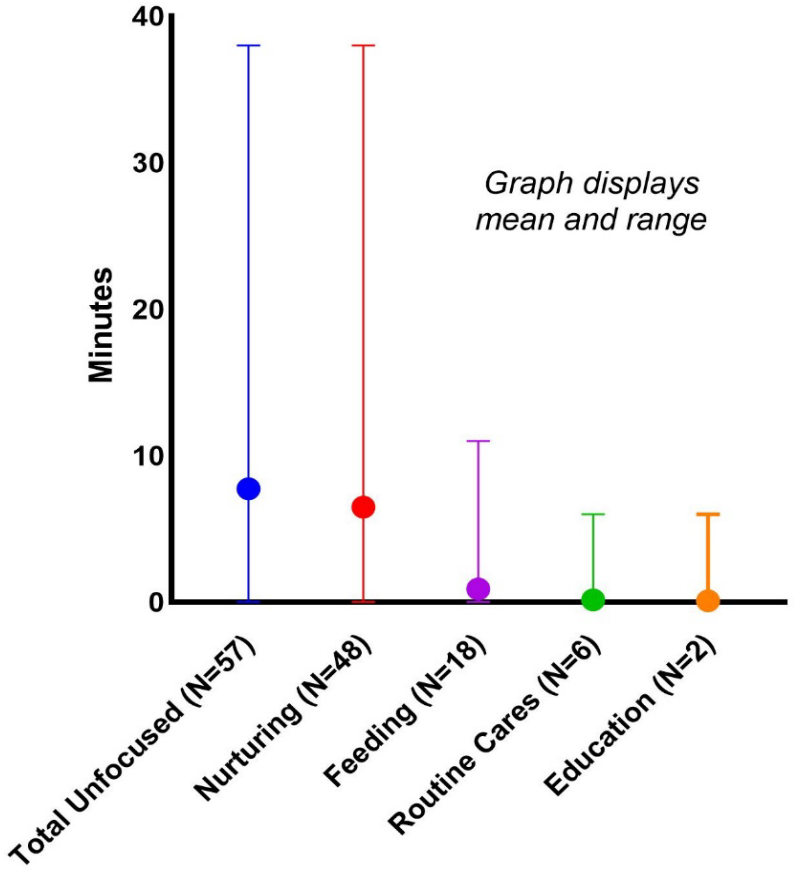

(N=36)

# RESULTS: Engagement by Social Context

Focused Engagement (N=85)



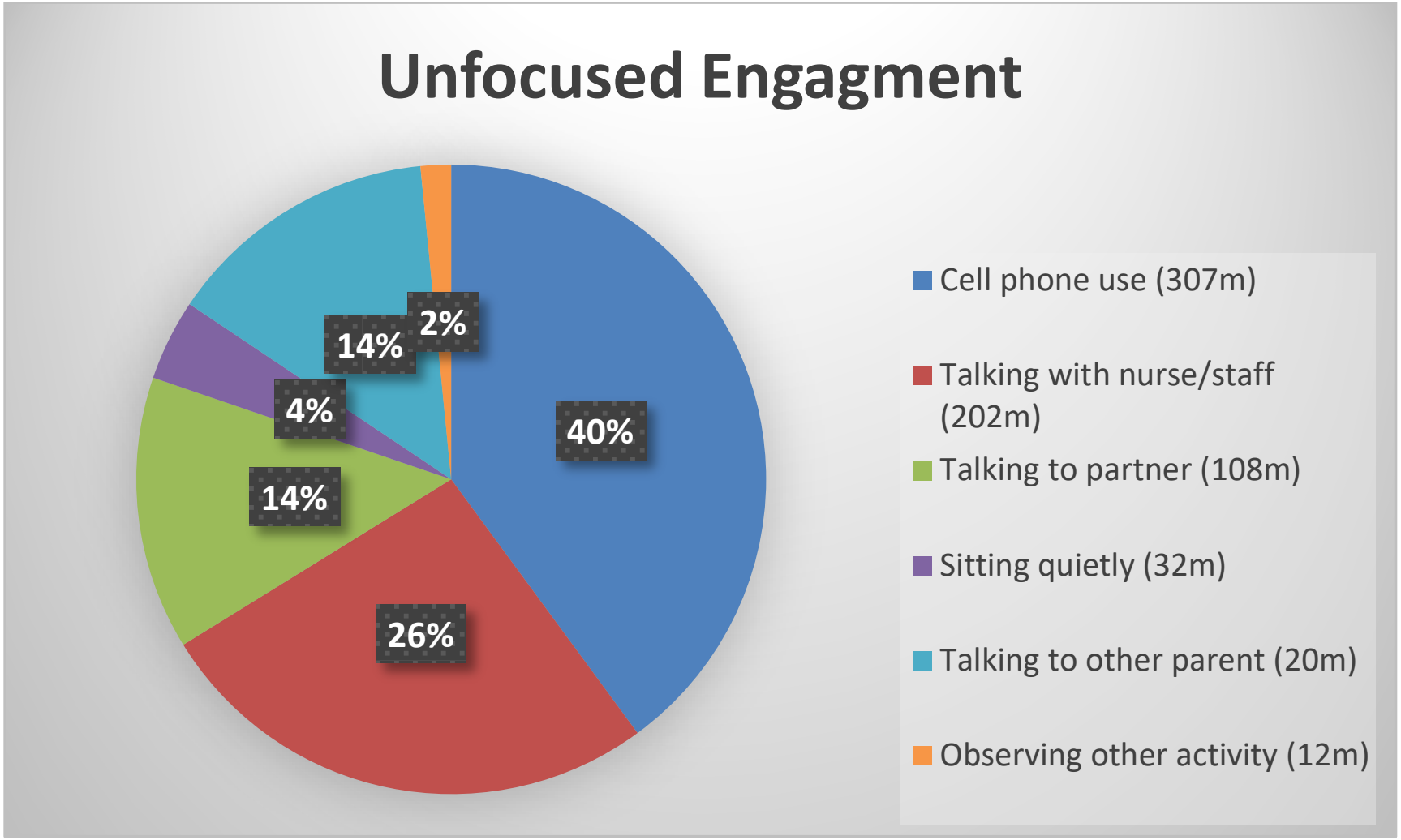

Unfocused Engagement (N=57)



# RESULTS: Unfocused Engagement

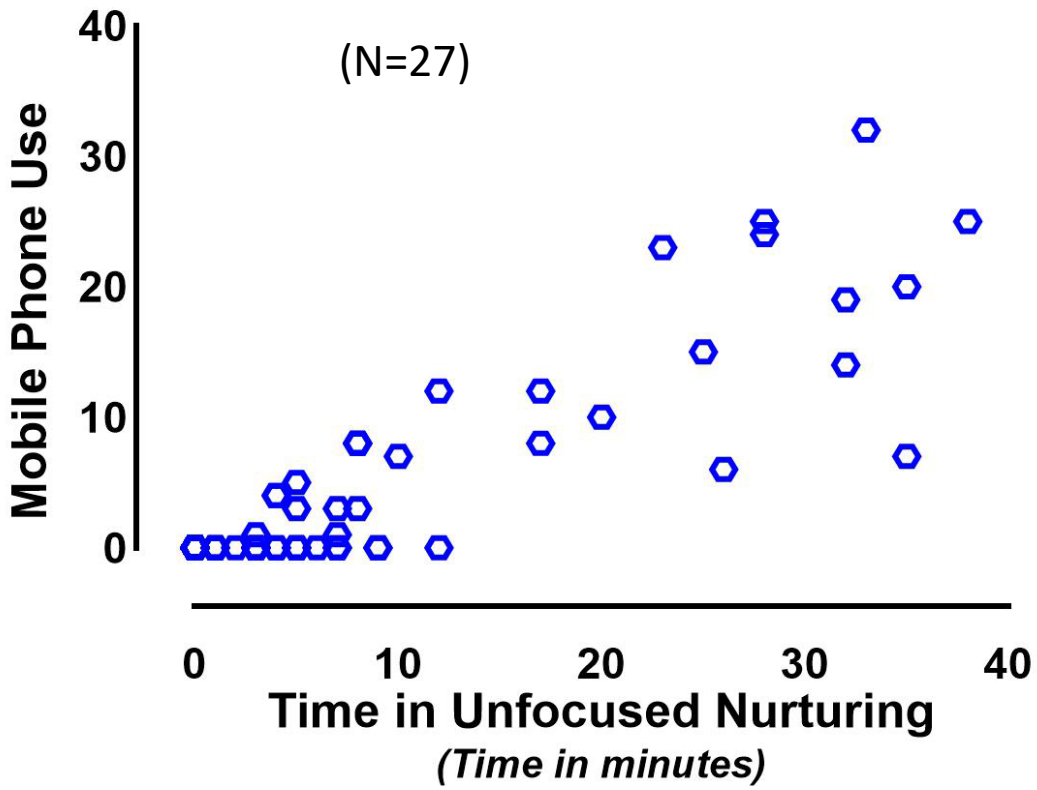
Table 2. Summary Statistics on Alternate Activities during Unfocused Engagement

| Alternate Activity | N | Relative Proportion | Frequency Observed | Relative Frequency | Cumulative Minutes | Mean Minutes | Range Minutes |
|---|---|---|---|---|---|---|---|
| Using cell phone | 27 | .47 | 71 | .30 | 307 | 3.50 | 0-32 |
| Talking with healthcare staff | 38 | .67 | 90 | .38 | 202 | 2.30 | 0-28 |
| Talking to partner | 21 | .37 | 46 | .19 | 108 | 1.23 | 0-13 |
| Sitting quietly | 7 | .12 | 15 | .06 | 32 | .40 | 0-10 |
| Talking to another parent | 3 | .05 | 5 | .02 | 20 | .23 | 0-13 |
| Observing other activity on unit | 3 | .05 | 13 | .05 | 12 | 1.40 | 0-10 |




Relative proportion of time spent in alternate activities during unfocused engagement

# Disruptions to Mother-Infant Interactions during Nurturing Contexts



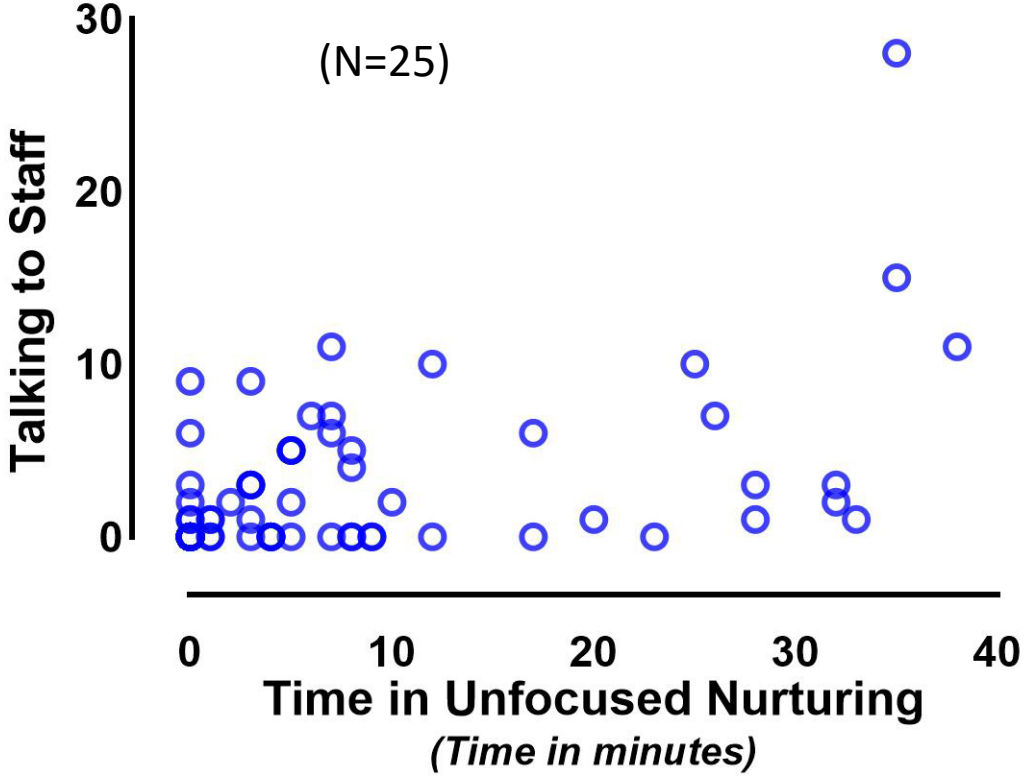



Photo from: https://medicine.wustl.edu/news/nicu-study-highlights-need-to-reduce-loud-noises-boost-beneficial-sounds/

# Discussion

**Strengths**

- Nearly all dyads were observed engaging in nurturing interactions at least once during the observations
- Most disruptions to focused engagement were brief in duration

**Concerns**

- Most infants did not have a familial caregiver present during the times when the observers were present
- Barriers to intentional nurturing interactions with infants most frequently involved personal mobile device or conversations with nurses/medical care team members
- Approximately one third of mothers were absorbed for extended periods of time in using their mobile devices

# Cell Phones, Parenting, and NICU

- **Disrupts parent responsiveness** (Braune-Krickau et al, 2021; Elias et al., 2021; Vanden Abeele et al., 2020)
  - –Lowered awareness & parenting sensitivity
  - –Fewer verbal and nonverbal interactions
  - –Lowered response time and interaction quality
- **Cell phone use may be linked to parenting stress & depression (**McDaniel, 2019; Newsham et al., 2020)
- **Potential benefits of cell phone use** (Knitter & Zemp, 2020)
  - –Family Connection
  - –Documenting the family's NICU journey

# Clinical Implications

- Develop strategies to increase maternal focused engagement
  - –Family education
  - –Staff education
- Develop policies and education on mobile device use
  - –Parent education
  - –Staff education

Picture from: http://www.utsouthwestern.edu/life-at/features/kangaroo-care-stpaul.html

# Limitations

- Findings are specific to this NICU context
- Excluded obtaining information on demographic or clinical factors
- Findings are limited to the frequency and duration of those behaviors observed at the time the field observers were present in the NICU
- Were unable to include infants who had maternal proximity but were utilizing privacy curtains

# Future Directions

Photo from: https://emfacademy.com/babies-phone/

## EXPLORE REASONS FOR CELL PHONE USE

Boredom? Avoidance? Depression? Anxiety? Habit?

## IMPACT OF TECHNOFERENCE VS ABSORPTION

Short and long-term impact on sensitivity and attachment

## PATERNAL & TRIADIC ENGAGEMENT PATTERNS

How are these patterns similar or different?

## OTHER CULTURAL AND NICU CONTEXTS

How are these patterns similar or different?

# Acknowledgements

Thank you to our NICU families at Covenant Children's

&

TTU HDFS RedLab for

assisting with this project

Email: Christine.Neugebauer@stjoe.org