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The Mother-Infant Dyad Study: A grounded theory inquiry into the day-to-day experiences, between first-time mothers and their infants, that influence feeding practices

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To the Graduate Council:

I am submitting herewith a thesis written by Jennifer Jean Helvey entitled "The Mother-Infant Dyad Study: A grounded theory inquiry into the day-to-day experiences, between first-time mothers and their infants, that influence feeding practices." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Katherine Kavanagh, Major Professor

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(Original signatures are on file with official student records.)

The Mother-Infant Dyad Study: A grounded theory inquiry into the day-to-day experiences, between first-time mothers and their infants, that influence feeding practices

A Thesis Presented for the
Master of Science Degree
The University of Tennessee, Knoxville

Jennifer Jean Helvey

August 2012

Dedication

To the fifteen mothers and their families:

Thank you for sharing your time, stories, and words of wisdom.

To my husband Alex:

Thank you for your constant support, love and encouragement, without which I would be lost.

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Dr. Kavanagh and Dr. Spence have been instrumental in the completion of my thesis. Their combined expertise in qualitative research as well as an intimate familiarity and understanding of the existing literature served as a valuable resource.

Katie Bower was gracious enough to agree to be my co-coder. She and I spent many hours discussing codes and developing the final model. Without her help, this project would not have been possible.

Jennifer Nicklas meticulously maintained the ICAN Lab database that allowed participant recruitment to move along quickly. In addition, she helped crunch the demographic and recruitment source numbers, which alone, would have been a daunting task.

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Abstract

Background: Inappropriate infant-feeding practices linked to excessive, rapid, early weight gain, are potentially powerful intervention points for reducing risk of later obesity.

Understanding how and why these behaviors begin is currently the topic of much research.

Because breastfeeding has been found to be somewhat protective against early rapid gain, and because low-income, Southeastern U.S. populations are significantly less likely to initiate and maintain breastfeeding, it is critical to focus efforts in these populations. Grounded theory methodology provides the optimal theoretical underpinnings for exploring development of these practices.

Research Objective: The objective was to explore, using grounded theory methodology, the set of interactions between mothers and infants that may influence development of feeding practices, and to do so among a low-income, primiparous sample in the Southeastern U.S.

Methods: A total of 15 interviews were included in the final sample. Using grounded theory methodology, participant responses to in-depth phone interviews were analyzed for major emergent themes and concepts and a theoretical model proposed. Per grounded theory protocol, recruitment, data collection, analysis, and model development occurred simultaneously throughout the course of the study.

Results: ‘Mother-Infant Communication Dynamic’ emerged as the central phenomenon. Main themes supporting the central phenomenon included: 1) ‘Perceived Infant Development and Communication Capability’; 2) ‘Primary Maternal Focus Driving Response’; and 3) ‘Resulting Feeding Practices’.

Discussion/ Implications for Nutrition Educators: The theoretical model captured the experiences, perceptions, and motivating factors influencing maternal response to infant cues and

behaviors. Constant comparative analysis and model development during the theoretical coding phase revealed supporting concepts that emerged temporally related to infant age and maternal perception of infant development and communication capabilities from birth to 12 months. The central phenomenon, illustrated with a visual model, suggests a communication pattern developed over the first year of life, culminating in the maternal perception of ‘Speaking the Same Language’. The mother-infant communication pattern swiftly becomes synced and potentially difficult to change. Importantly, this communication pattern, though synced, may not always be the result of *accurate* maternal interpretation of infant cues and behaviors. If communication patterns result in inappropriate infant-feeding practices, early intervention is likely to be of greatest benefit in reducing these behaviors and their associated negative health outcomes.

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Chapter 1: Literature Review

Infant Feeding Recommendations and Practices

There is clear evidence of the benefits of breastfeeding for both the mother and the infant. This evidence includes, but is not limited to, decreased infant and child morbidity/mortality, protection against commonly acquired childhood illnesses such as otitis media and upper respiratory infections, gastroenteritis, necrotizing enterocolitis, and reduced risk for other diseases such as obesity and hypertension (1). In addition, an association between breastfeeding and increased cognitive development in infants has been observed (1-2). Benefits for mothers include reduced risk of breast and ovarian cancers and reduced risk of type II diabetes and postpartum depression (1, 3). Breastfeeding has also been shown to improve bone density and enhance maternal self-esteem (1). Further, breastfeeding offers economic advantages such as fewer absences from work due to child illnesses and money saved by not having to purchase bottles and infant formula (1). Exclusive breastfeeding (no other foods or fluids offered to the infant) has been shown to be protective against the early introduction of solid foods (4-5), which is a risk factor for later development of obesity (6-9).

Currently, infant feeding recommendations put forth by the American Academy of Pediatrics (AAP), recommend exclusive breastfeeding for the first 6 months of life (1, 10-11). At the same time, the AAP recommends that the introduction of solid foods be delayed until 4-6 months of age; 6 months for exclusively breastfed infants and between 4 and 6 months for formula or combination (combination of formula and breast milk) fed infants (10). The recommendation is also made that breastfeeding continue for at least one year (1). These infant feeding guidelines are based on evidence of the benefits of engaging in the recommended feeding practices, as well as adverse health outcomes associated with not adhering to recommendations. However, although evidence is clear about the benefits of exclusive

breastfeeding, data related to the length of time *exclusive* breastfeeding should continue and when to introduce solid foods, remain inconclusive, which may lead to the seemingly mixed messages put forth by the Academy (10).

Recommendations regarding the timing and introduction of complementary foods are based on evidence indicating the nutrient requirements and developmental readiness of infants (10, 12). The AAP states that infants are ready for solids when they can sit up on their own and when they have good neuromuscular control of their head and neck; this generally occurs around 4-6 months of age for most infants (4). Early introduction of complementary foods (<4 months), is associated with increased risk for allergies (13), asthma (14), and diabetes (15). In addition, early introduction is associated with rapid infant weight gain that has been linked to an increased risk for later obesity (7-9, 16).

Despite the AAP's recommendations and supporting evidence, infant feeding practices in the U.S. are often contrary to recommendations, as changes in practice often lag behind changes in recommendations. According to the U.S. 2011 Breastfeeding Report Card, the United States, and more specifically, Tennessee, fall short of meeting the Healthy People 2020 Infant Care objectives related to breastfeeding rates (17-18). During the 1970s and 1980s, research related to infant feeding indicated that 50-75% of infants were introduced to non-milk liquids such as juice, and solid food such as infant cereal added to the bottle, as early as 1 month of age (19-21). Results from the 1988-1994 third National Health and Nutrition Examination Survey (NHANES III), revealed that approximately 25 % of parents reported the introduction of solids earlier than AAP recommendations and 53% of those were formula-fed infants (22). Currently many infants, and particularly infants of low-income families, are introduced to solids or non-milk liquids before 4 months of age (23).

The recent obesity epidemic in the U.S. has been demonstrated to impact young children, possibly even during infancy (24). For example, cross-sectional data from the National Health and Nutrition Examination Survey (NHANES) 2007-2008, determined that approximately 10% of infants and toddlers fell above the 95th percentile in weight-for-length, a triple fold increase over the past few decades (16, 25). This is concerning due to evidence that suggests that heavier infants are at greater risk for becoming heavier children and young adults (24). Cross-sectional data from the Centers for Disease Control and Prevention (CDC) Pediatric Nutrition Surveillance System indicated that infants, (0-11 months) who fell above the 85th percentile in weight-for-length, were at a 2.9-4.3 times increased risk of being overweight 1-4 year olds as compared to infants who fell below the 85th percentile (26). Of particular concern is the impact the increase in childhood obesity will have on later health outcomes, and attenuating this increasing rate has resulted in focused research in this area.

Infancy (birth to 12 months) may be a potentially critical time period for intervention (26). A recent (2006) cross-sectional cohort study examined whether rapid infant weight gain was associated with childhood overweight status and if this association was greater in certain ethnic groups (16). The investigators used a survey administered to eligible caregivers participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) program at various clinics in New York State. Surveys were written in both English and Spanish and were self-administered to eligible caregivers. After adjusting for potential confounders, investigators found that the rate of infant weight gain, weight at 6 months of age, maternal BMI, and Hispanic ethnicity were associated with significantly increased odds of the child being overweight (weight-for-length > 95% tile) or at risk for overweight (weight-for-length > 85 % tile) at 4 years of age (16). Statistical analysis determined that for each additional

100g/month weight gain between birth and 6 months of age, the odds of a child being overweight or at risk of overweight was 40% greater (16). Because extensive evidence supports that obese individuals are at increased risk of a myriad of other health problems, including cardiovascular disease, sleep apnea, hypertension, diabetes, and hyperlipidemia, stroke, and cancer (27), the link between rapid infant gain and later overweight/obesity warrants a great deal of exploration.

Although theories discussing the etiology of rapid infant weight gain are heavily geared towards biological explanations, theories taking a more psychological approach, including caregiver-infant feeding interaction, and self-regulation have become more prevalent in the literature (26).

In the U.S., the Southeast often lags behind the rest of the country, in regards to positive health changes and outcomes (24). Infant feeding behaviors appear to follow this pattern (24, 28-32). Understanding factors that influence this rate of change are critical to understanding how to intervene. In theory, early feeding practices lay the foundation for later eating behaviors and may influence future health outcomes (6, 16). Infant feeding practices are influenced by a variety of factors, and the reasons for early introduction of solid foods are varied and complex. Attitudes, cultural beliefs, or practices related to infant feeding can influence the initial feeding mode; i.e., breastfeeding, formula feeding, timing and introduction of solid foods, etc (16). In addition, the source of infant feeding advice most heavily relied on and the infant feeding beliefs and attitudes of close family and friends can influence the timing and introduction of solids (33). Self-efficacy specific to feeding mode, such as breastfeeding, can also influence adopted practices (33).

Finally events, either actual or perceived, can serve to modify infant feeding intentions or practices to differ from AAP recommendations (12, 28, 34-35). These factors ultimately work together to create a pattern of behavior. Currently, a nascent theoretical perspective exists about how mothers are interpreting and responding to infant cues and behaviors and, in turn, how these

responses or strategies affect feeding practices (12, 26, 28, 35-36). Understanding the connection of the mother-infant dyad, and its relationship with external factors, is imperative to understanding and building upon the current literature.

Attachment and Development

Attachment in children is defined by John Bowlby, the pioneer of attachment theory, as ‘a strong disposition to seek proximity to and contact with a specific figure and to do so in certain situations, notable when frightened, tired, or ill’(37). From a cultural perspective, behaviors that constitute a securely attached caregiver-infant dyad may vary across socio-cultural practices (38). For example, Western derived attachment goals focus on the advancement of the infant from reliance on the caregiver to provide a safe haven to individual exploration with the ultimate goal being the achievement of autonomy (38). In contrast, collectivist cultures may place more emphasis on mutual effort rather than individual achievement and self-reliance (38). For example, Minuchin proposed that infant or child attachment might not only revolve around a single caregiver but may also include other family members (39). More recently in the Western research setting, attachment has been defined as an infant’s or young child’s emotional connections to an adult caregiver, as indicated by the tendency to preferentially select a certain adult when the desire for comfort, support, nurturance, or protection exists (40). According to Zeanah and colleagues, infants are born unattached to a specific caregiver. As infant development advances, attachments develop parallel to predictable cognitive milestones. These occur between 2-3 months of age, 7-9 months of age, 18-20 months of age, and less significantly at 12 months of age (40). This behavioral system prompts the infant to exhibit attachment behaviors including crying, smiling, vocalizing, approaching, and following which allow for closer proximity to the caregiver, specifically when the infant is distressed (41). During the first

2 months of life, the infant has limited ability to differentiate caregivers and no preference is expressed (40). The 2 to 3 month time period marks the emergence of social interaction in the form of increased eye contact, smiling and cooing. Between 2 and 7 months the infant may start to differentiate caregivers but no significant preference is exhibited. The infant seems at ease among different adults and is interested in engagement (40). Between 7 and 9 months, the infant begins to show preference to one caregiver over other present adults and is uncomfortable with being separated from the preferred adult (40). Nine to 18 months marks the point at which a hierarchy of caregiver preference is evident, whereby the infant is familiar with and attached to multiple caregivers but prefers one over another and so on (40). Within this time frame, at approximately 12 months, the securely attached infant/toddler may start to exhibit the desire to explore away from the caregiver as well as the need to return to the caregiver for nurturance and support (40).

However, the achievement of these attachment milestones and a resulting secure attachment has been theorized to be contingent upon the quality of the caregiver-infant interaction pattern (42). It is important to note that although research supports that all infants become attached to a particular caregiver with whom they receive regular interaction, with the rare exception of some institutionalized children (42), not all attachments are considered secure (41). A securely attached infant is able to rely on the caregiver to respond to basic needs and to allow for safe exploration of the world, while the caregiver remains available to provide a safe base to which the infant can return during times of distress (43-45). Due to this potential link between quality interaction and attachment, much research has been devoted to determining the level at which maternal or caregiver sensitivity predicts attachment quality (46).

Maternal sensitivity, or cue sensitivity, is characterized by the accurate identification of individualized infant body movements and facial expressions and the subsequent appropriate response (2). Ainsworth and colleagues were the first researchers to explore the potential connection between parental sensitivity and security of attachment (47). They conducted observations of 26 mother-infant dyads in Baltimore during the first year postpartum. The researchers assessed a variety of dimensions related to maternal behavior and found that four specific dimensions were associated with security of attachment. These included sensitivity, acceptance, cooperation, and accessibility, of which, Ainsworth and colleagues described “sensitive responsiveness to infant signals and communications” to be the central emergent theme within each of the four associated dimensions (47). Following this advancement in the understanding of the major antecedents underlying the attachment relationship, subsequent research has largely continued to support Ainsworth et al.'s original suggestion that maternal sensitivity is a strong predictor of attachment (48-50).

Research conducted by Koren-Karie and colleagues added yet another concept to the sensitivity-attachment model, terming the concept ‘insightfulness’ (51). Insightfulness was used to describe ‘parent’s capacity to consider the motives underlying their children’s behaviors and emotional experiences in a complete, positive, and child-focused manner while taking into consideration their children’s perspectives’ (51). In this study, 129 mothers of 12-month-old infants were assessed on three dimensions – 1) Insightfulness, using videotaped observations of their infants and interviewing them about their opinion of their infant’s thoughts and feelings; 2) Maternal sensitivity was assessed during play sessions; and 3) Mother-infant attachment was determined with the Strange Situation procedure, an attachment assessment process developed by Ainsworth and colleagues, whereby infant behavior following a 3-minute separation from the

caregiver is organized into four categories of attachment (51). Mothers who were assessed as positively insightful were more sensitive and tended to have a more secure attachment with their children than mothers who were not insightful (51). Further, it was determined that insightfulness accounted for variance in attachment beyond the variance suggested by maternal sensitivity (51). These findings suggest that maternal sensitivity and insightfulness are linked concepts that impact on whether an infant becomes securely or insecurely attached to their caregiver (51).

Maternal Sensitivity and Feeding Outcomes

Recent studies have hypothesized that maternal insensitivity or misinterpretation of infant cues, specifically hunger and satiety cues, could be associated with perceived insufficient milk supply (PIM) and early weaning (35-36), as it is thought that inaccurate interpretation of cues leads to introduction of formula and other foods in an effort to compensate for the perceived lack in quantity of nourishment for the infant. In fact, PIM is a commonly cited reason for early weaning from breast milk and the early introduction of solid foods (36) and has been associated with decreased breastfeeding duration and exclusivity rates (36). Additionally, Anderson and colleagues found that feeding mode was altered from exclusive breastfeeding to exclusive formula feeding or to combination feeding as a response to the perceived needs of the infant (52). Mothers used infant cues and behaviors to determine readiness for solids (52). These findings suggests that perhaps interpretation of hunger and satiety cues and infant behaviors influence parental feeding motivation, thus affecting the timing and introduction of solid foods. The prevalence rate for PIM is unclear, as it ranges from 30% to 80%, it is estimated that PIM is the cause of weaning in 23% to 56% of cases (36). Due to the widespread prevalence of PIM, recent efforts have focused on gaining insight into how mothers determine they are not

producing enough breast milk to meet the needs of their infant. A recent review found that women who developed PIM concluded this secondary to the belief that the crying and fussiness their infant exhibited indicated they were still hungry and the breast milk provided was not enough to meet their needs (35-36). It is important to note that the actual prevalence of insufficient milk is thought to be very low, although this is frequently not measured due to the lack in feasibility of 24-hour testing and weighing, the validated method for measuring milk supply (35). This insight led to the hypothesis that perhaps misinterpretation of their infants' cues instead of an actual insufficient milk supply was contributing to the development of PIM, although none of the studies reviewed examined this specifically (36).

PIM is likely to be only one factor leading to early weaning or inappropriate infant feeding practices. Baughcum and colleagues investigated the timing and introduction of solid foods among women participating in the WIC Program in Kentucky and identified two major themes related to factors influencing early introduction and interpretation of infant cues and behaviors; 'My baby is not getting enough' and 'Using food to shape behavior' (53). The theme 'My baby is not getting enough' stemmed from the belief that infants were not being satisfied by formula or breast milk alone. This belief led to the introduction of solid foods, specifically infant cereal, as early as 3 days of life. In addition, frequent waking was used as the main indicator that their infants were not satisfied by breast milk or infant formula alone (53). The second identified theme was the practice of using food to shape behavior. Mothers, especially younger mothers, expressed that when their infants cry it must mean that they are hungry. Mothers talked mostly about using food as a strategy to soothe a fussy infant. When these same infants reached toddlerhood, unhealthy parental feeding practices continued, with mothers describing using food

as a bribe to solicit good behavior. This positively reinforced unhealthy feeding behaviors from both parent and child (53).

Overall, in this sample, mothers cited a variety of cues that indicated hunger, but crying was reported as the best infant hunger cue. In addition, if the infant reached for table or pureed food, regardless of the texture or type, this also indicated hunger. Mothers stated that they did not want to deprive their infants of perceived desired foods and explained that such signals indicated that infants "wanted" or were "ready" for solid foods if these infant cues and behaviors were exhibited, regardless of age (53).

These findings suggest that perhaps interpretation of hunger and satiety cues and infant behaviors influence parental feeding motivation, thus affecting the timing and introduction of solid foods. Taken together, this evidence indicates the need for development of educational materials that target accurate interpretation of infant cues and behaviors, independent of feeding mode. This approach may have a positive impact on feeding practices, bringing them into alignment with current recommendations.

Responsiveness and Self-Regulation

Currently, the theory that infants are born with the ability to self-regulate their food and caloric intake is supported (26). It is theorized that this ability extends on into early childhood but can be affected by several environmental factors including caregiver feeding style, behaviors modeled at home, and environmental stimuli (54). 'Responsiveness' has been defined as involving "prompt, contingent and developmentally appropriate responses to the infant's hunger and satiety cues" (26). Therefore, responsiveness has been identified as one dimension of caregiver-infant interaction that impacts the developed self-regulation ability of the infant (26). Due to the innate ability of the infant to self-regulate intake at birth (55), the quality of the

caregiver's ability to respond appropriately to the infant's needs may impact future self-regulatory ability of the infant into toddlerhood and potentially beyond (26).

Infant emotions are influenced by physical states, including temperature, sleep states, and hunger (26). Newborn infants are able to exhibit crying as a distress signal to caregivers related to their experienced physical state (26). Self-regulatory intake behavior begins to appear in infants as young as 3 months old. Behaviors such as turning the body or head away, arching of the back, and moving hands towards the head or mouth indicate hunger or satiety of the infant. Caregivers have the opportunity to encourage self-regulatory behaviors learned by the infant through prompt, appropriate response to infant cues, thus impacting the developed pattern of communication between the caregiver and the infant (26, 56). Importantly, accurate identification of infant hunger and satiety and the resulting appropriate response to those cues is complicated due to the fact that infants cry in response to a variety of different physical states. Therefore, the communication pattern established between caregiver and infant may be one in which, although the caregiver is responsive, the response may be the result of inaccurate interpretation of infant cues, thus resulting in inappropriate responses (26).

A review by DiSantis and colleagues includes a diagram (**Figure 1**) that visually represents the nature of this bidirectional interaction between the caregiver and the infant (26). The diagram depicts the hypothesis that suggests caregiver response to infant hunger and satiety cues, if incorrectly interpreted, can lead to overfeeding and over time, a decrease in the infant's ability to self-regulate intake due to a diminished capability to determine internal hunger and satiety cues. This in turn, is suggested to lead to rapid infant weight gain, increasing risk for later obesity and related adverse health outcomes (26). This interaction is described as being influenced by the socio-environmental context of feeding.

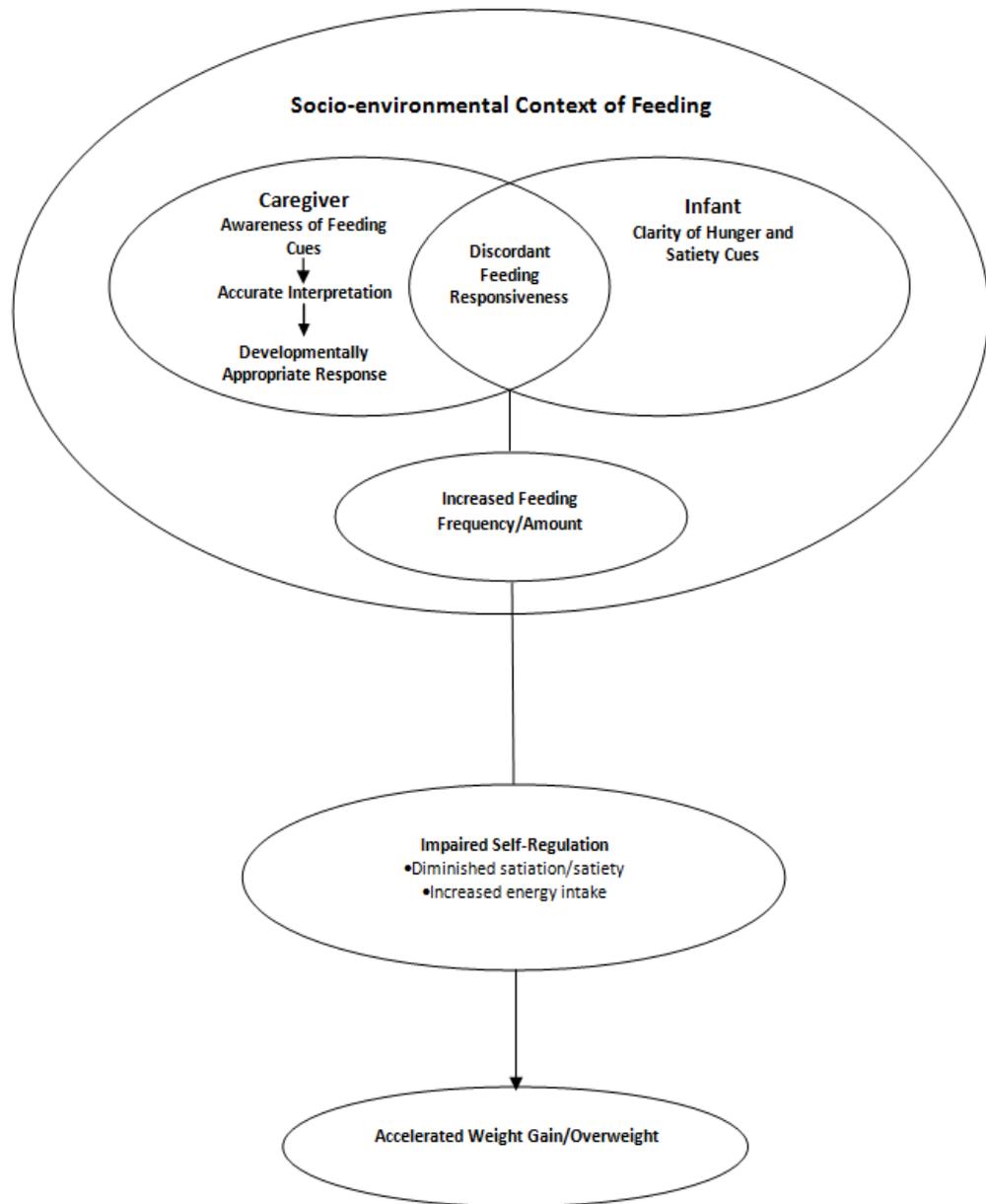


Figure 1: Socio-environmental context of feeding diagram, adapted from DiSantis et al. (26)

Factors such as cultural influences (e.g. race/ethnicity), current governmental policies (e.g. food assistance packages) and infant feeding recommendations (e.g. AAP and the World Health Organization), caregiver values and beliefs, and caregiver knowledge of infant development can influence resulting cue interpretation and responsiveness (26).

Perception of Infant Size

Caregiver perceptions about infant size, growth, and appetite have been determined to be key areas to explore in the prevention of childhood obesity (57). In the study conducted by Baughcum and colleagues described previously, mothers reported the belief that heavier infants were preferred due to the perception that weight was an appropriate indication of infant health and effective parenting (53). A later study by Baughcum and colleagues, using feeding questionnaires, assessed maternal beliefs and feeding practices concerning infants and pre-school children (58). The authors describe perceptions and feeding practices of high and low-income women. Low-income women were more concerned with their child's hunger, reported greater difficulty feeding their children, and were less likely to use food as a calming strategy than high-income women (58).

A study conducted by Redsell and colleagues examined parental beliefs and perceptions related to infant size, growth and feeding practices and weaning approaches (57). Six focus groups were conducted with a total of 38 parents of infants less than 12 months of age. Focus groups were audio-recorded and transcribed verbatim and thematic analysis was used to identify major themes. Five main themes captured participant responses including: 1) parental concern about breast milk, infant contentment and growth; 2) the belief that hunger is the main cause of infant distress and that this belief drives inappropriate feeding practices; 3) justification of larger infant size; 4) parental uncertainty about identifying and managing infants at risk of obesity; and

5) intentions and behavior related to a healthy lifestyle (57). These findings highlight the need for interventions that help caregivers to identify causes of infant distress unrelated to hunger as well as education related to age-appropriate feeding practices and the rationale behind these recommendations.

Perceptions of Infant Crying and Sleep Patterns

Infant crying is an early communication tool in which the infant can express distress, hunger, or pain (59). Infants, who are perceived by their caregivers to cry excessively, are viewed as more difficult to care for. In addition, infant sleep patterns are often perceived by caregivers to be difficult to manage due to frequent night waking and easy arousal once asleep (59). This perception can lead to a disturbance in the caregiver-infant dyad and can result in the establishment of a communication pattern that is mismatched. Alarming, though relatively uncommon, infants who are perceived to cry and wake frequently are at an increased risk for 'shaken baby syndrome' that can result in brain damage or death (59). A review of the literature related to parental perception of infant crying and sleep problems identified parents who perceived their infants to cry more than normal to be more likely to report this to their healthcare provider and seek a solution to this "problem" (usually in the form of switching infant formula) (59). These parents were concerned that their infants suffered from a food intolerance or gastrointestinal disorder, such as acid reflux, and this was the cause of excessive infant crying and sleep disturbances (59). Although parental perception of above average infant crying in general was determined to be accurate, infants who cried more frequently in the first 2 months were typically healthy, gained adequate weight, and did not suffer from long-term health-related disturbances (59). It is important to note that concern about frequent night waking during infancy largely reflects Western cultural norms and practices. This is understandable due to the

predominantly daytime work schedule and subsequent night time sleep schedule of most Americans (59).

St. James-Roberts and colleagues furthered their research and explored cultural differences in response to infant crying and sleep patterns (60). This cross-cultural study examined caregiver responses to infant crying longitudinally in three groups: London caregivers (considered to be comparable to Western parenting styles or schedule-led care), Copenhagen caregivers (who were assumed to be more responsive), and caregivers who chose prenatally to practice “proximal care” postnatally. Proximal care required caregivers to hold their infants \geq 80% of the time between 8 AM and 8 PM, breastfeed frequently, and respond rapidly to infant cries (60). The proximal care group had 50% more contact with their infants compared to the London group and the London group weaned earlier than the other groups. Copenhagen caregivers fell in between the London and Proximal care groups in terms of contact and care (60). These discrete approaches to caregiving accounted for differences in infant crying and night time behavior. For example, London infants cried on average 50% more than infants in either of the other two groups at 2 and 5 weeks of age. However, there was no difference between groups in uncontrollable infant crying or colic at 5 weeks of age. Interestingly, Proximal care infants were found to wake and cry at night more often than the other two groups at 12 weeks of age (60). The researchers concluded that the style of care used by the London group resulted in more frequent crying during the first 12 weeks of age but was followed by less frequent crying and night waking at 12 weeks, compared to Proximal care infants (60). This highlights that although differences in crying frequency and night waking were observed between groups, no difference in unsoothable crying or colicky crying were observed between groups (60). This suggests that educational efforts focusing on accurate cue interpretation and appropriate caregiver response,

instead of the promotion of one parenting style over another, may be more effective in any efforts to reduce crying or frequent night waking.

Until recently, the explanation of prolonged or frequent infant crying has been captured by the use of the term “infant colic” in the U.S. The cause of colic has traditionally been attributed to organic origins in the form of gastrointestinal pain, specifically gastroesophageal reflux disease (59). Although a commonly accepted explanation among American mothers, this causal relationship has not been supported by research (59). Although results remain inconsistent, prolonged or frequent crying has been suggested to be more commonly caused by non-organic factors such as behavioral characteristics inherent during infancy or a mismatched caregiver-infant communication pattern characterized by inaccurate infant cue interpretation followed by inappropriate caregiver response (59, 61).

Another commonly reported caregiver observation is the development of different infant cries that indicate various needs such as hunger, pain, or anger (59, 62). However, this concept of different cries or tones exhibited as the infant develops is now thought to signal the level of infant distress rather than the exact cause (59). This suggests that caregivers may be inaccurately determining what the perceived “different cries” of the infant means and thus, are responding inappropriately. Educating caregivers to rely on infant facial and body language cues, rather than the tone of exhibited crying, to determine and respond to infant needs, may be a critical tool in developing appropriate responsiveness from caregivers.

Summary

Rapid infant weight gain has been associated with an increased risk for later overweight and obesity, potentially increasing risk for subsequent adverse health outcomes. Infant-feeding practices that lead to rapid weight gain are currently the focus of extensive research. Findings

indicate that early weaning and introduction of solid foods results in increased risk of rapid weight gain and potentially stems from inaccurate interpretation of infant cues and subsequent inappropriate response. This warrants exploration of mechanisms that may enhance caregiver ability to accurately interpret and appropriately respond to cues. Concepts such as maternal or caregiver insightfulness, sensitivity, and responsiveness have been theorized to influence child-feeding practices. In addition, attachment theory has been used to describe the caregiver-infant relationship and recent research has incorporated the above concepts to further explain the process by which this relationship develops. However, at present, no research exists that specifically explores the development of the mother-infant feeding dyad in a primiparous, low-income, Southeastern U.S. population. Gaining a more in-depth understanding of the development of perceptions, beliefs and experiences of first-time mothers, from a population at elevated risk for inappropriate feeding practices, may provide important concepts upon which to build and test future infant-feeding interventions. Should such informed interventions prove effective in increasing the quality of caregiver-infant interactions, via accurate identification of and appropriate response to infant needs, significant improvement in compliance with infant-feeding recommendations may be possible. Because an in-depth inquiry into the processes and interactions related to development of the mother-infant feeding dyad is warranted, the primary objective of the following study was to learn about the day-to-day interactions, perceptions of these interactions, and responses based on these perceptions between a mother and her infant, and to do so in a primiparous, low-income, Southeastern U.S. population.

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Chapter 2: Article for Publication

Abstract

Background: Inappropriate infant-feeding practices linked to excessive, rapid, early weight gain, are potentially powerful intervention points for reducing risk of later obesity.

Understanding how and why these behaviors begin is currently the topic of much research.

Because breastfeeding has been found to be somewhat protective against early rapid gain, and because low-income, Southeastern U.S. populations are significantly less likely to initiate and maintain breastfeeding, it is critical to focus efforts in these populations. Grounded theory methodology provides the optimal theoretical underpinnings for exploring development of these practices.

Research Objective: The objective was to explore, using grounded theory methodology, the set of interactions between mothers and infants that may influence development of feeding practices, and to do so among a low-income, primiparous sample in the Southeastern U.S.

Methods: A total of 15 interviews were included in the final sample. Using grounded theory methodology, participant responses to in-depth phone interviews were analyzed for major emergent themes and concepts and a theoretical model proposed. Per grounded theory protocol, recruitment, data collection, analysis, and model development occurred simultaneously throughout the course of the study.

Results: ‘Mother-Infant Communication Dynamic’ emerged as the central phenomenon. Main themes supporting the central phenomenon included: 1) ‘Perceived Infant Development and Communication Capability’; 2) ‘Primary Maternal Focus Driving Response’; and 3) ‘Resulting Feeding Practices’.

Discussion/ Implications for Nutrition Educators: The theoretical model captured the experiences, perceptions, and motivating factors influencing maternal response to infant cues and

behaviors. Constant comparative analysis and model development during the theoretical coding phase revealed supporting concepts that emerged temporally related to infant age and maternal perception of infant development and communication capabilities from birth to 12 months. The central phenomenon, illustrated with a visual model, suggests a communication pattern developed over the first year of life, culminating in the maternal perception of ‘Speaking the Same Language’. The mother-infant communication pattern swiftly becomes synced and potentially difficult to change. Importantly, this communication pattern, though synced, may not always be the result of *accurate* maternal interpretation of infant cues and behaviors. If communication patterns result in inappropriate infant-feeding practices, early intervention is likely to be of greatest benefit in reducing these behaviors and their associated negative health outcomes.

Introduction

The recent obesity epidemic in the U.S. has spurred much research regarding factors influencing this trend (1-3). Of particular concern is the increase in rates of overweight and obesity during childhood, as the associated co-morbidities of type 2 diabetes, cardiovascular disease, hypertension, etc, are occurring at increasingly younger ages (1). Data collected from the 2007-2008 NHANES determined that approximately 10% of infants and toddlers fell above the 95th percentile for weight-for-length, a triple fold increase over the past few decades (3-4). Infants above this percentile are considered to be carrying excess weight (4) and evidence suggests that heavier infants are at greater risk for becoming heavier children and young adults (3, 5, 6-7). For example, data from the Center for Disease Control and Prevention Pediatric Nutrition Surveillance System (CDC-PNSS) indicate that overweight infants (0-11 months) are at a 2.9-4.3times increased risk of becoming overweight 1-4 year olds, as compared to infants who fell below the 85th percentile in weight-for-length (7). Importantly, feeding patterns developed before 12 months of age have been identified as potentially critical intervention points, as several infant-feeding practices have been associated with excessive rate of infant weight gain (5, 7). The infant-feeding practices most strongly linked to excessive rate of gain include lack of breastfeeding and early introduction of solid foods (3, 5, 8), both of which are behaviors targeted by infant-feeding recommendations issued by the American Academy of Pediatrics (9).

Infant-feeding practices are complex and influenced by a myriad of factors. For example, the decision to breastfeed or offer infant formula is influenced by maternal age, education, income, marital status, self-efficacy and race/ethnicity, among other factors (10). Even region of

residence in the U.S. can greatly impact the likelihood that breastfeeding is initiated, as rates of breastfeeding initiation are lowest among mothers in the Southeastern U.S. (11-13). In addition, the source of infant feeding advice most heavily relied upon, and/or the infant-feeding beliefs and attitudes of close family and friends, can influence the timing and introduction of solids (13). Finally, actual or perceived events can result in infant-feeding practices differing from AAP recommendations (12, 14-16). Taken together, these factors create a pattern of behavior which may or may not support optimal infant growth and health. Understanding factors that influence this lack of compliance is critical to understanding how to intervene. Therefore, the aim of this study was to explore, using grounded theory methodology, the set of interactions between mothers and infants that may influence development of infant-feeding practices, and to do so among a low-income, primiparous sample in the Southeastern U.S.

Methods

Study Design

This was a qualitative study, using grounded theory methodology and in-depth one-on-one recorded phone interviews, to develop a theoretical model of the day-to-day experiences and interactions between mother-infant dyads that may contribute to development of infant-feeding patterns. The University of Tennessee Institutional Review Board approval was obtained prior to study implementation.

Eligibility and Recruitment

The study was open to English speaking, low-income, first-time mothers of infants ≤ 12 months of age, who were living in a pre-determined urban area and who had telephone access. Income-eligibility was determined using criteria from the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), which include annual income and household

size. Recruitment was conducted using: 1) a voluntary birth registry maintained by the University of Tennessee, Knoxville; 2) flyers and postcards distributed to organizations serving the study population, such as WIC; and 3) advertisements posted to two social media websites. Potential participants were either contacted by research assistants (e.g., birth registry members) and screened for eligibility, or were screened by research assistants when contacting the research lab (e.g., flyers, social media websites). Those eligible to participate were provided with study details and contact information was collected. If available, upon recording of verbal consent, participants were interviewed during the initial phone call. If an immediate interview was not feasible, a future phone interview was scheduled at the convenience of the participant and verbal consent was obtained at that time. Upon completion of the phone interview using the address provided by participants, a paper copy of the consent form and a \$10 gift card was mailed to each participant.

Phone Interview

Grounded theory methodology stipulates that an exhaustive review of the literature be delayed until the final theoretical model has been developed (17). This practice was followed to reduce further researcher assumptions that might result from the primary investigator maintaining an in-depth knowledge of the available literature. Therefore, the interview protocol was developed *a priori*, based on a brief review of the literature to identify relevant content areas. In keeping with grounded theory methodology, the interview protocol was permitted to evolve and change focus, allowing for exploration of emerging, developing themes and central concepts. All interviews were conducted by the primary investigator to provide consistency of interviews conducted.

Data Management/Analytic Strategy

Recorded interviews were transferred to a secure, password protected computer accessible only to study personnel. Interviews were transcribed, verbatim, by trained research assistants, using a transcription software program (Insqscribe, Inquirium, LLC, Campbell, CA). The co-coder was provided a coding orientation by the primary investigator whereby coding phases and steps to be administered during each phase, outlined by Kathy Charmaz, were discussed (17). Transcriptions were coded by two independent researchers and agreement was compared on a predetermined schedule. QDA Miner (version 3.2, Provalis Research, Salt Lake City, Utah) text-analysis software was used to manage the coding process. In keeping with the grounded theory approach, as described by Charmaz, coded transcripts were analyzed using constant comparison and other emergent techniques (17). These emergent techniques included maintenance of a reflexivity log, memoing, use of open-ended questions during the interview process, and theoretical sampling that facilitated identification of impending saturation. After each interview, and during model-development, the primary investigator recorded pertinent thoughts or suspected main concepts in the reflexivity log. Memoing, conducted by both coders, served to identify imminent category saturation as well as to compare data with data, data with category, category with category, and category with concept. This process allowed properties and dimensions of emergent categories and codes to develop. Once the central phenomenon was identified, a reflective coding matrix (**Table 1**) was developed to further identify and develop emergent dimensions and properties and other major themes and supporting concepts. Inter-coder reliability was assessed after the first interview and was determined to be 99.1%.

Table 1: Reflective Coding Matrix, modified from Scott (18)

Central Phenomenon: Mother-Infant Communication Dynamic

Properties	Process	Perception	Interpretation	Product	Purpose
Processes	Interaction	Development	Insightfulness	Coping	Communication
Dimensions	<ul style="list-style-type: none"> • Mom mimics infant noises and actions • Maternal Repetition of Communication Pattern • Infant Ways of Communicating 	<ul style="list-style-type: none"> • Exhibited Infant Cues/Behaviors • Weak Cues/Behaviors • Controlled Cues/Behaviors • Caring for Infant Easier with Age/Development • Low-self Efficacy with newborn • Observed Infant Sleep Pattern • Frequent Waking • Sleeping Through the Night 	<ul style="list-style-type: none"> • Projecting How Mom Would Feel onto Infant • Content After Eating • Feels Forgotten About • Fake Coughing for Attention • Fighting Sleep • Different Cries 	<ul style="list-style-type: none"> • Trying Different Things • Wants to Make Infant Happy • Wants Infant to Turn Out Well • Wants to do Everything Right • Wants to be Perceived as a Good Mom 	<ul style="list-style-type: none"> • Older Infant Easier to Understand • Bonding Actions • Better Bonding
Contexts	Bi-directional	Infant Age	Past/Life Experience	Negotiation	Unique Bond
Modes for Understanding the Consequences	Toward a Set Pattern	Schedule Helps to Establish Pattern	Trial and Error	Doing the Best You Can	Better Understanding and Self-Efficacy

Coders subsequently coded three interviews at a time, with occurrence of regular meetings to discuss code discrepancy and concepts captured in coder memos. Reliability of the final transcripts was 99.7% with a Scott's Pi of 0.24 indicating a high level of reliability. Upon identification of the emerging central phenomenon, model-development was initiated and the progression from initial, incident-to-incident, to focused coding began. Emergent themes identified during focused coding were then compared to each other and to the emerging central phenomenon to identify links and relationships between categories.

This process was used to advance model development and to allow for supporting concepts within identified main themes to emerge. Finally, theoretical coding was conducted to describe subcategories and relationships between categories. For example, the subcategory 'Points of Maternal Education', within the category 'Learned Coping/Insightfulness', emerged during this theoretical coding phase. At this point, main emergent themes were finalized and the overall model developed. Per grounded theory protocol, recruitment, data collection, analysis, and model development occurred simultaneously (17).

Results

Recruitment Sources and Participant Characteristics

From June 2011 to February 2012, a total of 253 mothers were screened for eligibility. Of those screened, 204 were determined to be ineligible, with 78 mothers reporting multiple ineligibility criteria. Of the 49 eligible mothers, 18 were unable to be re-contacted after the initial phone call, and this was primarily due to disconnected numbers or an inadequate amount of talking minutes available. Online and printed media were the primary source for contacts by potential participants. However, the majority of those eligible to participate were recruited from local community health programs. Twenty-two mother-infant dyads were eligible to participate.

However, three mothers were never interviewed, secondary to inability to re-contact to complete the interview. Three interviews were lost because of equipment malfunction and one interview was deemed to be unacceptable, secondary to limited maternal response. Therefore, a total of 15 interviews were included in the final sample. **Table 2** outlines demographic characteristics of the 15 participants. Participants were generally in their mid-20s and White, with most having at least a high school education. Infant ages ranged from 1 month and 6 days to 11.5 months.

A purposeful sampling strategy was employed and study recruitment continued until theoretical saturation (19) of data collected occurred. Saturation is generally expected to occur between the 9th and 12th interview (19), and this occurred during the twelfth interview. The remaining three interviews were used to validate emergent themes and supporting concepts.

Theoretical Model

The use of grounded theory methodology resulted in a model depicting a central phenomenon and three supporting main themes (**Figure 2**). The term “central phenomenon” describes the core concept of the emergent model, around which all other main themes and supporting concepts revolve. In this study, **Mother-Infant Communication Dynamic** emerged as the central phenomenon. Three main themes emerged: 1) *Perceived Infant Development and Communication Capabilities*, 2) *Primary Focus Driving Maternal Response*, and 3) *Resulting Feeding Practices*. Each theme encompasses several interrelated ideas which ultimately influenced the concepts described in the central phenomenon.

Central Phenomenon – Mother-Infant Communication Dynamic

The central phenomenon is built on several supporting concepts described by mothers. These concepts emerged interconnected to the three main themes.

Table 2: Participant characteristics of the final sample

Variables	Number (%) of Participants
Maternal Age (years) (mean=25.5; SD=3.95)	
20-25	8 (53%)
26-30	6 (40%)
31-35	1 (7%)
Infant Age (months) (mean=5.2; SD=3.30)	
Birth-2 months	4 (27%)
3-4 months	5 (33%)
5-6 months	2 (13%)
7-8 months	1 (7%)
9-10 months	2 (13%)
11-12 months	1 (7%)
Race/Ethnicity	
White	10 (67%)
Black/African American	5 (33%)
Highest Level of School Completed	
Less than High School	1 (7%)
High School Graduate	6 (40%)
Some College/Trade School	1 (7%)
Bachelor's Degree	4 (27%)
Graduate Degree	1 (7%)

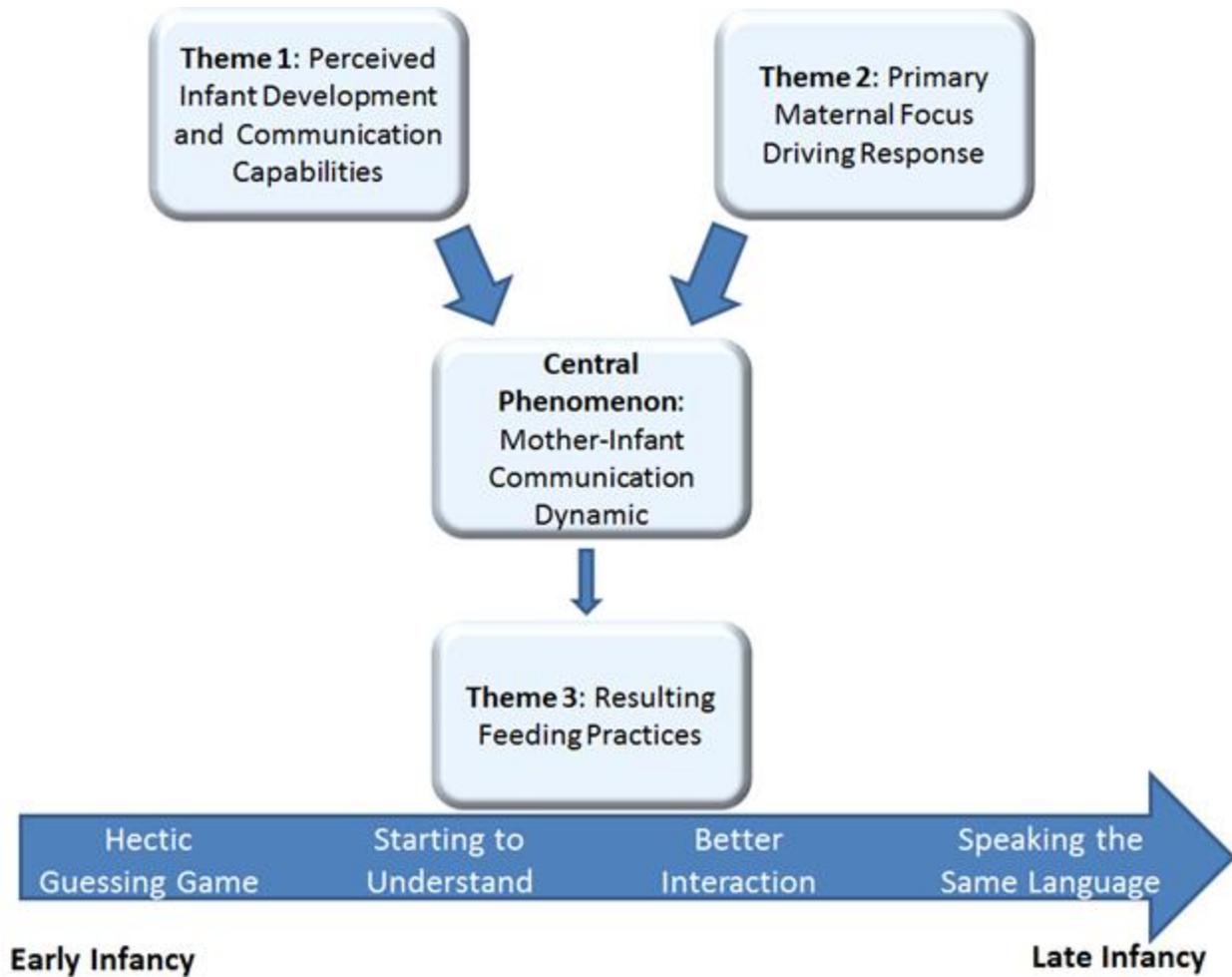


Figure 2: Theoretical model representing the mother-infant feeding dyad: birth to 12 months in a primiparous, low-income, Southeastern U.S. population

The first supporting concept, Hectic Guessing Game, emerged as mothers described the period during early infancy as a time of uncertain trial and error. For example, some mothers described an unsettling combination of novelty and great infant need. During this phase, mothers employed various coping strategies based on available information filtered through maternal insightfulness, allowing mothers to interpret infant need.

When infants exhibited the desired behavior, interpreted to occur as response to maternal actions, this served to positively reinforce the specific maternal action. These concepts are captured in the following quote:

"[I]t was very difficult ... probably more so for me than him [because] I would get so anxious and so upset when I didn't know what was wrong. I would call my boyfriend and ... I was like ... I just fed him, changed his diaper, I tried to give him (type of medicine) in case it's gas and he would just cry and... I didn't know what was wrong. So it's really stressful when you feel like you can't help them ... sometimes babies just cry....It was definitely difficult at first not knowing and not having any previous experience with a newborn..."

The second supporting concept that emerged is termed Starting to Understand. Mothers describe the ability to detect specific infant need or desire, via the detection of 'different cries':

"[D]istinctive crying is one I've noticed... when he's upset or when he's ... in pain he'll cry a certain way, if he's hungry, he'll cry a certain way."

As infant development increased the ability for mothers to understand infant needs, mothers began to report a preliminary transition into a communication pattern that was unique to each mother-infant dyad, resulting in a sense of "knowing" their infants. This can be seen in the following excerpt:

“[A]ll of a sudden it was just like it's weird but I just felt like one day I kind of knew. Um uh my guess and I'm trying to actually like think about it but would be between like 6 and 8 weeks. I know a lot changed about 6 weeks I don't know I was probably kind of figuring it out before that but I felt kind of like at 6 or 8 weeks like I actually I knew her. Like I felt like I wasn't constantly like let me try all four different things and you know it's okay that's the one it is. It's then it was just like oh she's this, she's this, she needs this.”

The third supporting concept of the central phenomenon was termed Better Interaction, and appeared sometime during middle infancy. Mothers described increased frequency of quality interactions with their infants that led to a sense of a deeper relationship with their infant. One mother described this:

“[B]ut as she got older, she smiled, she recognized you, ... you got to play with her, you get to hug on her. ...it just it seems like she loves you back where as in the beginning... you're the sole care provider and it was harder for me to get attached personally.”

These supporting concepts of the central phenomenon emerged related to infant age and development stage, and were also interconnected to the 3 main themes. As maternal self-efficacy increases, perception shifts gradually away from the view that the newborn infant, exhibiting weak cues and waking frequently is difficult and confusing to care for, to a greater ease with the older infant. As development allows for cues and behaviors to become more controlled, mothers perceive a greater ability to identify and respond to infant needs, and to do so in the context of a unique communication pattern. This leads to the maternal perception of Speaking the Same Language. The following quote captures this perception:

“I think she's just excited that someone else can maybe understand her and somebody else is kind of talkin[g] to her. I think that she feels the bond ... and she's like oh I'm brought into this world and have no idea what's going on but somebody else understands me.”

Over the course of the first year of life, through a complex interaction of infant development and maternal perception of infant cues, behaviors, and needs, communication between mothers and infants is built and solidified.

Theme 1 – Perceived Infant Development and Communication Capabilities

Theme 1, *Perceived Infant Development and Communication Capabilities*, similarly emerged corresponding to infant age and developmental stage. Mothers describe infants as not being very interactive in the early weeks of life. During these early weeks, mothers reported feeling as though they were guessing what to do in response to infant crying. Mothers describe infant cues/ behaviors and infant sleep patterns as weak or confusing. Frequent night waking or inconsistent sleep patterns were especially problematic. The following quotes capture these concepts:

“[I] mean he just basically slept. He wouldn't, he didn't really do anything. He liked to just sleep and eat and use the bathroom; there was really no interaction”.

“[W]hen they're newborns, they're not like, they can't do much body language or um, you just don't, you like don't, you jus[t] like so new at it, you don't understand what cry is which...”

As infants developed, and communication capabilities advanced, mothers described more “active” infants and reported the emergence of a “routine” between themselves and their infants.

This concept emerged as infants begin to sleep for longer periods at night and the interpreted detection of “different cries” emerges. One mother reflected on her experience, “[A]t first I thought, like he doesn't do anything but eat. But now, he is very active.” Another mother described this development, “[A]s they get older, I guess you get used to it and into a routine of... things.”

As infant development progressed, mothers reported infants sleeping through the night and exhibiting more controlled cues/behaviors, such as pointing at objects, rubbing their eyes, and intentional smiling. Mothers of infants who began walking prior to the phone interview, reported their infants being able to bring objects to them, the ability to self-feed, and indicate desires and needs in a way that is easily understood by mothers. This perception of the ability to understand infant cues/behaviors during different stages of development worked in cadence with Theme 2 to impact the resulting mother-infant communication dynamic.

Theme 2 – Primary Maternal Focus Driving Response

Theme 2, *Primary Maternal Focus Driving Response*, emerged in this same temporal pattern in which response was driven by different foci depending on the age and developmental stage of the infant. Supporting concepts evolved as infant age and development advanced. For example, during early infancy, the supporting concept for Theme 2 was that of Survival/Growth. This supporting concept characterized a maternal response that was primarily motivated by infant survival and perceived adequate growth. During this time frame, maternal response to promote survival/growth included switching of infant formula to reduce gas or the adding of infant rice cereal to the bottle to reduce spit-up. In addition, if breast milk was perceived to be inadequately sustaining infants, supplementation with infant formula or early weaning could occur to ensure perceived adequate growth and infant survival.

As infant development and communication capabilities advanced, the supporting concept for Theme 2 termed Happiness/Gross Motor Development emerged and describes maternal responses motivated by a desire to increase infant happiness. Importantly, mothers appear to no longer be primarily concerned with infant survival, but to focus instead on infant happiness and development. For example, if mothers believed that early introduction of solid foods would result in infant happiness; these inappropriate feeding practices were more likely to occur. Mothers described the process by which they determined infant readiness for solid foods. Such signs included staring at adult's food during meal times, leaning towards food and, if food had been previously introduced, the perception of infant desire for solid foods served to positively reinforce this feeding practice regardless of infant age and developmental readiness. Mothers described a desire to make their infants happy, indicated by infant smiling, and interpreted excited gestures including infant screeching and flapping of arms as indicators of happiness. At the same time, mothers of infants in this age category described a shift in interest from survival/growth to infant achievement of gross motor development milestones. Mothers reported that crawling, sitting up independently, and rolling over were types of activities they were interested in their infants achieving.

Intellectual Development emerged as the final supporting concept within Theme 2, during late infancy. Mothers describe a desire to produce a smart or intellectually advanced infant, and mothers of infants in this age category describe engaging in activities designed to stimulate this type of development. Activities such as reading to their infants, singing educational songs such as the 'ABCs' and counting were frequently reported.

Theme 3 – Resulting Feeding Practices

As depicted in the above theoretical model, maternal perception of the infants' developmental and communication capabilities, coupled with the primary maternal focus driving response, served to influence the resulting mother-infant communication dynamic. This unique dynamic in turn impacted feeding practices and the Theme 3, *Resulting Feeding Practices*, emerged. Mothers described early infancy as a period of uncertainty whereby their main focus was on the survival and perceived adequate growth of the infant. If mothers received positive feedback from the current feeding regimen in the form of adequate infant growth, reduced fussiness, or perceive adequate sleep duration, these practices were continued. However, if mothers received negative feedback in the form of perceived inadequate growth, no change in or increased fussiness, frequent or voluminous spit-up, or perceived inadequate sleep duration, then coping mechanisms intended to alleviate these issues were employed. These coping strategies were either congruent with or outside of current feeding recommendations. The following quote describes the mother-infant communication dynamic that impacted feeding practices:

“When she was first born she woke up probably every hour and a half like consistently. She never slept through the night, not even close, until about six months and then she'd wake up 2 times a night so it just took her a long time to sleep through the night; nothing, no cereal, no solid foods, none of that helped.”

Discussion and Implications

In the final model, supporting concepts functioned, through three main emergent themes, to support the central phenomenon. As infant development becomes more apparent, maternal motivation increasingly focuses on factors corresponding to infant behavioral and communication capabilities. From the Hectic Guessing Game phase of early infancy, to the

perception of Speaking the Same Language of late infancy, mothers and infants are ultimately creating a unique communication system. Putting these findings in the context of compliance with infant-feeding recommendations may provide critical pathways to targeted, successful intervention to reduce risk of later overweight/obesity.

Early Weaning and/or Overfeeding

Infancy is recognized throughout the literature as a sensitive period for the establishment of health promoting behaviors (15, 20-21). These early days are an especially vulnerable period for maintenance of breastfeeding behaviors (10), and maternal self-efficacy has been shown to be an important supportive factor (22-24). Uncertainty in the ability to breastfeed, combined with a focus on infant survival and growth, may create optimal circumstance for early weaning.

Lucarelli and colleagues identified that infant feeding mode, whether bottle- or breastfeeding, influenced maternal perception of adequate intake (25). Breastfeeding mothers with low maternal self-efficacy may not only be at increased risk of supplementing with infant formula, but also for participation in inappropriate feeding practices due to inaccurate interpretation of infant cues/behaviors (7, 25). Mothers in this sample exhibited this vulnerability and lack of confidence, lending support to initiatives calling for health professionals and nutrition educators' focus on more concrete examples of adequate breast milk, such as number of wet/soiled diapers (26), or intensive education regarding infant satiety cues. These maternal factors combined with cues and behaviors exhibited by the infant may influence maternal perception of infant needs.

In the early days and weeks after birth, infants are confusing, high-need, individuals, and this combination results in first-time mothers feeling as if their infants speak a foreign language. Because cues in young infants are weak, or possibly due to lack of understanding of these cues, and because sleep patterns of young infants are perceived as erratic, mothers feel infants are

difficult to care for and extremely vulnerable. During this time period, mothers are primarily concerned with safety and survival of their infants. In this sample of first-time mothers, a hectic guessing-game strategy was employed, with responses to maternal actions reinforcing subsequent maternal actions (e.g., the infant survives and grows after being offered infant rice cereal in the bottle). This bidirectional interaction between caregiver and infant is supported by a great deal of literature (27-28), but has only recently been explored in the context of infant-feeding practices (7, 24, 29-30). For example, DiSantis et al., hypothesize that caregiver response to infant hunger and satiety cues, if interpreted incorrectly, may lead to overfeeding of the infant. If this ‘cue-incorrect interpretation and response-cue’ cycle, in the context of overfeeding, becomes a chronic behavioral loop, it may result in a decreased ability for self-regulation of energy intake (7). This is hypothesized to be one of the mechanisms behind rapid infant weight gain, which has been linked to later obesity (3, 5-7).

Early Introduction of Solid Foods

Introduction of foods, other than breast milk or infant formula, prior to 4 months of age is recommended against by the AAP (9). However, this behavior is not uncommon, and mothers in the Southeastern U.S. are significantly more likely to introduce solids before recommendations, as compared to other regions of the U.S. (11-13). Research indicates that behaviors such as infants staring at adults’ food during meal times or leaning toward a feeding utensil when offered are consistently interpreted by mothers as infants being ready for solid foods (30). Mothers in this sample reported similar interpretations. As infants progress out of the neonatal period, maternal response is increasingly influenced by a desire to please the infant and with achievement of gross motor development milestones. If maternal perception is that the infant would, or does enjoy solid foods, then these foods are introduced or continued, regardless of

healthcare provider recommendations. In addition, if maternal response is driven by achievement of gross motor development milestones, inappropriate feeding practices meant to encourage this development may occur. The concept that mothers can understand the meaning of different cries has been reported in previous literature (31-32), but it is likely that any detectable difference in crying is signaling increased infant distress, rather than indicating a specific need (33). However, mothers in this sample believe that understanding these “different cries” increases the ease of infant –management, and appears to result in a feeling of increased self-efficacy. That this perception parallels normal advancements in infant development, such as increased ability to control cues and behaviors and lengthening sleep cycles, is important and warrants further exploration. Understanding that mothers, as they move from the very early weeks of life, begin to focus on infant happiness and development may assist with creation of successful interventions to delay early introduction. During this time, information about infant sleep patterns couched in messages related to gross motor development milestones may serve to delay or eliminate early introduction of solid foods.

Fostering Healthy Eating Habits

Due to the bi-directional nature of the established mother-infant interaction pattern, the promotion or modeling of healthy eating behaviors has the opportunity to be instilled in infants. From 6 to 12 months, maternal perception is that it is easiest to care for basic infant needs, and maternal self efficacy is likely at its highest. At this stage, the mother-infant dyad has formed a bonded communication pattern that is perceived by mothers to be unique and special. Mothers report their infants’ are no longer largely oblivious to their caregiver, but now clearly demonstrate preference to be cared for by their mothers. This preference is supported by research

exploring infant attachment that describes an attached infant seeking one adult caregiver over others during times when the infant desires comfort, nurturance, or protection (34).

This theoretical model suggests a communication pattern developed over the first year of life, resulting in the maternal perception of Speaking the Same Language. The mother-infant communication pattern swiftly becomes synced and potentially difficult to change. Importantly, this communication pattern, though synced, may not always be the result of *accurate* maternal interpretation of infant cues and behaviors. Infants are born with the ability to self-regulate their intake (35) based on their internal hunger and satiety cues, and mothers have the ability to foster the maintenance of this ability with the adoption of recommended feeding practices. If communication patterns result in inappropriate infant-feeding practices, early intervention is likely to be of greatest benefit in reducing these behaviors, and the related subsequent negative health outcomes.

Strengths and Limitations

This study had several strengths. First, because all interviews were conducted by the primary investigator, consistency in protocol delivery was more likely than had multiple investigators conducted interviews. Second, using systematic strategies outlined by Charmaz (17), inter-coder reliability was high. Third, due to the use of a purposeful sampling strategy, a homogenous sample was achieved lending strength to findings specific to low-income; first-time mothers urban mothers in the Southeastern U.S. Fourth, due to the selected grounded theory methodology, a rigorous and systematic analysis was applied that incorporated emergent techniques. As a result, the authors feel confident that the final theoretical model is grounded in the experiences and perceptions of the sample and reflects relevant concepts to inform future research efforts. A limitation of this study was that the sample included only Southeastern White

and Black mothers and results may not reflect the perceptions or experiences of mothers from different racial or ethnic backgrounds, or from regions of the country that are more likely to report higher compliance with infant feeding recommendation.

Conclusion

The mother-infant dyad is influenced by many factors that serve to create a unique communication pattern. Mothers respond to the perceived needs of their infants based on their particular focus at the time. During the first months of infant life, mothers are concerned about the health and well-being of their infants, and may be highly vulnerable to participating in inappropriate infant-feeding practices, such as early weaning and over-feeding. As infant development progresses and the mother-infant communication pattern mature, mothers are increasingly motivated by a desire to make their infants happy as well as with the achievement of gross motor development milestones. Early introduction of solid foods is likely to occur in this phase, as it is thought to increase or support infant happiness. Further infant development and increased maternal self-efficacy creates a unique dynamic between mother and infant that is difficult to intervene once a synced communication pattern has been established. If this communication pattern results in inappropriate feeding practices, it may be difficult to reverse these habits. It is therefore important for educators and health professionals to focus on early interventions to foster the development of communication patterns that result in health promoting behaviors.

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Chapter 3: Conclusion

Conclusion

The mother-infant dyad is influenced by many factors that serve to create a unique communication pattern. Mothers respond to the perceived needs of their infants based on their particular focus at the time. During the first months of infant life, mothers are concerned about the health and well-being of their infants, and may be highly vulnerable to participating in inappropriate infant-feeding practices, such as early weaning and over-feeding. As infant development progresses and the mother-infant communication patterns mature, mothers are increasingly motivated by a desire to make their infants happy as well as with the achievement of gross motor development milestones. Early introduction of solid foods is likely to occur in this phase, as it is thought to increase or support infant happiness. Further infant development and increased maternal self-efficacy creates a unique dynamic between mother and infant that is difficult to intervene once a synced communication pattern has been established. If this communication pattern results in inappropriate feeding practices, it may be difficult to reverse these habits. It is therefore important for educators and health professionals to focus on early interventions to foster the development of communication patterns that result in health promoting behaviors.

Appendices

Appendix A: Expanded Methods

Interview Protocol Development

A general interview protocol was developed based on a brief review of the literature and after consulting a researcher in the field, Dr. Katherine Kavanagh. Additional input about protocol development was gathered from the co-coder after conducting each of three practice interviews. This was done in an effort to ask open-ended questions that would allow for rich, in-depth responses. The protocol was used to guide each interview and was modified as new themes and concepts emerged. As new ideas were offered by participants, the primary investigator followed these new directions. Questions were added to the protocol that would allow emerging concepts to mature and fully evolve. As categories became saturated, questions specifically geared towards exploring these categories were reframed to allow other concepts to develop. This strategy of intensive interviewing is described by Kathy Charmaz as being an appropriate data collection approach for use in grounded theory inquiries (1).

Data Collection

Screening and Eligibility

A purposeful sampling technique was used for sample selection whereby individuals were recruited based on characteristics that allowed for the outlined research objective to be achieved. The characteristics of the targeted study sample included urban, low-income, first-time mothers of infants less than 12 months of age. These parameters were selected due to their application and appropriateness for this outlined investigation. Previous research with a similar purpose and approach targeted the rural, low-income southeastern population (2). As such, an urban sample was selected to provide insight into the nuances unique to this population.

The U.S. Census Bureau defines 'urban' using the urbanized area concept. This concept includes areas with a population of 50,000 persons or more, as well as unincorporated, suburban areas with 2,500 persons or more (3). Therefore, the cities of Knoxville, Chattanooga, and Johnson City and the 58 corresponding zip codes were used to determine eligibility for this criterion (**Appendix H**). The WIC eligible, low-income population was targeted due to the need for a theoretical perspective grounded in the data collected from individuals representative of this population. Participation in the WIC program, receipt of food stamps, or having a household income less than or equal to 185% of the US Federal Poverty Level (4), was used to determine income eligibility. In addition, interpretation of infant cues and behaviors may be different or more advanced in mothers of more than one child, and therefore, being a first-time mother was designated as an inclusion criterion in an effort to increase sample homogeneity.

General demographic data were collected for each potential participant, including age of the mother, age of the infant, ethnicity/race, income, maternal parity, zip code of residence, highest level of education achieved and infant feeding mode (breast, bottle, or combination feeding). These data were used to screen interested persons for eligibility (**Appendix F**). Once eligibility for the Mother-Infant Dyad (MID) study was determined, mothers were read a brief explanation of the project (**Appendix G**) and asked if they were interested in participating. A one-on-one, audio-recorded phone interview was scheduled at the interested, eligible participant's earliest convenience.

Recruitment

Various recruitment strategies were used to access the targeted population. Major recruitment sources included the East Tennessee Participant Database (ETPD), various

community health programs, local businesses, health professional offices, online and print advertisements, and through word-of-mouth (See **Appendix I**).

The East Tennessee Participant Database (ETPD)

The ETPD is a research database utilized and maintained by the Psychology, Child and Family Studies, and Nutrition departments at the University of Tennessee, Knoxville. Letters containing postage paid, return postcards are distributed to mothers who have recently given birth to an infant in the East Tennessee region. The letter informs caregivers that their return of a completed postcard demonstrates their agreement to be contacted for potential future studies. Postcards include contact information that can be used to inform potential participants of their eligibility in various current or future studies in each of these three included departments. Information about infant birth date, name, and sex is also provided on the postcard.

Community Health Programs

Research assistants and volunteers in the Infant, Child and Adolescent Nutrition (ICAN) Lab distributed recruitment flyers and postcards to various health programs throughout the community where the targeted population was likely to be accessed (**Appendix E**). These programs included WIC, The Helen Ross McNabb Center, Hope Resource Center, and Catholic Charities' Pregnancy Help Center. Flyers and postcards contained the ICAN contact information and encouraged mothers or caregivers to call the lab to be screened for eligibility.

Local Businesses

Additionally, flyers and postcards with ICAN Lab contact information were distributed to various local businesses throughout East Tennessee. These included local libraries, the Duck, Duck Goose Consignment event, grocery stores, and consignment stores. Interested individuals were encouraged to contact the ICAN Lab for eligibility screening.

Health Professional Offices

Upon obtaining permission, recruitment flyers and postcards were distributed to various medical offices, The Lisa Ross Birthing Center, The Women's Center, and UT Medical Center. Interested individuals were encouraged to contact the ICAN Lab.

Online and Printed Advertisements

Online advertisements using various websites included knoxmoms.com, ICAN Lab Facebook page linking interesting individuals to the online eligibility screening form, and Craigslist. Additionally, recruitment flyers were posted around the University of Tennessee campus.

Word-of-Mouth

Upon calling the ICAN Lab for eligibility screening, individuals were asked how they heard about our lab and the various projects going on. Individuals citing that a friend or person from church informed them of our lab were recorded as recruitment efforts via friend/word-of-mouth in the ICAN Lab specific database.

Phone Interview

This study gathered participant responses to open-ended questions using an intensive interviewing method. This method of data collection fits succinctly with the grounded theory approach and outlined theoretical perspective and allowed for rich, in-depth data collection (1). All interviews were conducted by the primary investigator to provide consistency in the way questions were asked, as well as to highlight impending saturation of categories. Phone interviews were audio-recorded using an audio-recording device to document verbal consent and allow for verbatim transcription. Interviews lasted approximately 30 to 45 minutes. The final interview protocol can be found in **Appendix D**.

At the beginning of each interview, the primary investigator reviewed the consent form with each participant and obtained audio-recorded verbal consent (**Appendix J**). Once consent was obtained, open-ended questions were asked directed towards understanding the communication pattern through the eyes of the participants. Participants were asked questions related to their perceptions and experience of day-to-day interactions with their infants. At the end of each interview, participants were informed that they would be mailed a hard copy of the consent form for their records as well as a \$10 gift card as compensation for their time. The primary researcher conducted three practice interviews to become familiar with the art that is intensive interviewing in terms of when and how to probe further, and how to respond to participant answers to questions, to allow for rich information grounded in participant experiences. Interviewing is a flexible, emergent technique that allowed for new ideas and directions to emerge. Interviews were transcribed verbatim by trained research assistants; subject names were replaced with study identification numbers and uploaded into a data analysis software program for systematic analysis.

Data Coding and Analysis

This study followed a grounded theory approach to data analysis and used a constant comparative approach, memo-writing, and maintenance of a reflexivity log (**Appendix O**) to ensure the *reliability* of the generated categories and subsequent theory. Two coders, the primary investigator and one other qualified and trained investigator, analyzed the data. The co-coder was provided a coding orientation by the primary investigator whereby coding phases and steps to be administered during each phase, outlined by Kathy Charmaz, were discussed (1). Transcripts were uploaded into QDA Miner text analysis software program (version 3.2, Provalis Research, Salt Lake City, Utah). QDA Miner was used to organize transcripts, maintain the developing

codebook and calculate inter-coder reliability and Scott's Pi. For each transcript, the primary investigator coded first, and the working, developing codebook was generated. The co-coder then coded the same transcript or set of transcripts using codes generated by the primary investigator, as well as generating new codes as desired. Primary investigator-generated codes, descriptions of codes, and memos could be viewed by the co-coder, but the co-coder was blinded to code placement. The codebook was generated in this manner for each transcript and the primary investigator was additionally blinded to code placement of the co-coder. Each coder underwent the steps outlined by Charmaz of initial, focused/axial, and theoretical coding for each of the transcribed interviews (1). The *unit of analysis* that was used for coding was incident-to-incident, versus line-by-line or word-by-word. Incident-to-incident coding occurs whereby an entire thought, incident, or experience of the participant was coded by each investigator (1). Constant comparative analysis between incidents took place as each coder moved from initial to focused/axial to theoretical coding. Memo-writing was completed by each coder in order to identify perspectives between coders as well as to highlight areas in need of further saturation. Inherent to grounded theory research, recruitment, data collection and analysis occurred simultaneously until theoretical saturation of the data was achieved (1).

Theoretical saturation refers to the point at which gathering more data about a theoretical category reveals no new properties nor yields any further theoretical insights about the emerging grounded theory (1). This was systematically monitored using memos as well as a reflexivity log maintained by the primary investigator in order to record important thoughts of the researchers to serve as an alert system to impending saturation. If no new information under a particular category was presented in the previous two interviews that provided new insight into the emerging theory, that category was considered saturated (5).

Initial Coding

During initial coding, both researchers were required to code the data in a way that applied action coding terms to each contained incident as described by Kathy Charmaz (1). This meant that each coder followed several systematic steps in an effort to “run the data open” (1) and included: 1) remaining open; 2) staying close to the data; 3) keeping codes simple and precise; 4) constructing short codes; 5) preserving actions; 6) comparing data with data; and 7) moving quickly through the data (1). This stage of coding and analysis provides two major advantages to a grounded theory study: relevance and fit (1). Coding fits when it accurately describes and captures participant experiences and perspectives (1). Coding has relevance when the developed analytic framework is effective at interpreting what is occurring by making relationships and connections between identified processes (1).

Focused Coding

The next step in the coding process described is focused coding. During this stage, codes become more specific, selective, and conceptual rather than the incident-by-incident description that occurred during initial coding (1). This process begins once preliminary analytic categories and concepts have been identified through incident-by-incident coding and memoing. Focused coding uses patterns identified during initial coding to identify the most significant codes to determine the appropriateness of codes developed (1). This is not completely a continuous process, however. This phase marks the advancement from implicit to explicit coding and understanding of the preliminary emerging central phenomenon (1). These insights led to both coders revisiting earlier coded data to confirm emerging concepts and categories.

Axial Coding

Axial coding is described by Charmaz as a process by which the coder “relates categories to subcategories, specifies the properties and dimensions of a category, and reassembles the data that has been fractured during initial coding to give coherence to the emerging analysis” (1). This approach to coding was conducted by both coders through memoing as well as scheduled meetings. During these meetings, developing categories and concepts were identified and discussed as they related to other emergent concepts. This process began the initial phases of theoretical model development.

Theoretical Coding

Theoretical coding is the final stage of the coding process. At this point, codes determined during the focused coding stage, and further restructured during axial coding, were used to develop a visual model delineating emergent themes and concepts. This process developed coding families into a temporal ordering that allowed for rich description of maternal processes and coping strategies during specific stages of infant development. These concepts fully emerged during this phase of coding and are visually represented in the final theoretical model.

Inter-Coder Reliability

Inter-coder reliability was determined using the software program QDA Miner (version 3.2, Provalis Research, Salt Lake City, Utah). QDA Miner includes four categories of inter-coder reliability: 1) segments must overlap; 2) code importance; 3) frequency of codes in case; 4) presence of absence in code. Each of these reliability categories was calculated using Scott's Pi to reduce the occurrence of agreements by chance (6). The first interview was coded by both coders and reliability under each category was determined. Per proposed protocol, once

reliability reached at least 70% under the most stringent of categories, segments must overlap, the coders would then be able to code three interviews at a time before meeting to discuss codes and determine reliability. The initial interview reliability under the most stringent category was determined to be 99.1% with a Scott's Pi value of 0.49. The final inter-coder reliability under the same category was determined to reach 99.7% with a Scott's Pi value of 0.24. The most stringent (segments must overlap) inter-coder reliability scores can be found in **Appendix K**.

Theoretical Model Development

The process of moving through the described coding steps allowed for several coding families and corresponding sub-codes to emerge (**Appendices L-N**). During focused coding, codes generated during initial coding were analyzed to identify patterns between codes. Select codes that were used repeatedly were highlighted to be further examined during axial coding. Axial coding, as it was used here, was more of a latter step in focused coding in which identified codes were compared to other categories and sub-codes to develop a rich description of the contained properties of a code. Theoretical coding marked the point at which selected main concepts and themes and their corresponding codes were condensed and renamed to apply inferential descriptions. Code names were used that applied interpretation to processes and experiences expressed during phone interviews. Theoretical sampling was used to develop properties and dimensions of categories and emerging concepts as well as to saturate categories. According to Charmaz, the purpose of theoretical sampling is to obtain data to elucidate emerging categories and corresponding concepts. By modifying the interview protocol to reflect open-ended questions that addressed emerging themes and ideas, this grounded theory strategy of theoretical sampling was accomplished.

Theoretical model development consisted of a series of preliminary models (**Appendix P**) as the final model and contained themes and concepts evolved. This process began during the focused and axial coding phases in which the central phenomenon was beginning to be solidified. Co-coder memos, as well as the primary investigator's reflexivity log, moved model development forward systematically and allowed for rich discussion between researchers during scheduled meetings about the emerging theory. Early preliminary models did not contain the temporal flow of the themes as they were emerging and all researchers agreed that this emergence was an important concept to visually represent. After the proposal and discussion of these preliminary models, a final model was agreed upon between the two co-coders and the primary investigator's thesis committee. The final model consisted of three main themes and the central phenomenon with corresponding supporting concepts.

Appendix B: Definitions

Categorizing: *"the analytic step in grounded theory of selecting certain codes as having overriding significance or abstracting common themes and patterns in several codes into an analytic concept. As the researcher categorizes, he or she raises the conceptual level of the analysis from description to a more abstract, theoretical level. The researcher then tries to define the properties of the category, the conditions under which it is operative, the conditions under which it changes, and its relation to other categories. Grounded theorists make their most significant theoretical categories into the concepts of their theory" (1).*

Coding: *"the process of defining what the data are about. Unlike quantitative researchers, who apply preconceived categories or codes to the data, a grounded theorist creates qualitative codes by defining what he or she sees in the data. Thus, the codes are emergent—they develop as the researcher studies his or her data. The coding process may take the researcher to unforeseen areas or research questions. Grounded theory proponents follow such leads; they do not pursue previously designed research problems that lead to dead-ends" (1).*

Constant comparative method: *"a method of analysis that generates successively more abstract concepts and theories through inductive processes of comparing data with data, data with category, category with category, and category with concept. Comparisons then constitute each stage of analytic development" (1).*

Grounded theory: *"a method of conducting qualitative research that focuses on creating conceptual frameworks or theories through bulking inductive analysis from the data. Hence, the analytic categories are directly 'grounded' in the data. The method favors analysis over description, fresh categories over preconceived ideas and extant theories, and systematically focused sequential data collection over large initial samples. This method is distinguished from*

others since it involves the researcher in data analysis while collecting data—we use this data analysis to inform and shape further data collection. Thus, the sharp distinction between data collection and analysis phases of traditional research is intentionally blurred in grounded theory studies" (1).

Memo-writing: *"the pivotal intermediate step in grounded theory between data collection and writing drafts of papers. When grounded theorists write memos, they stop and analyze their ideas about their codes and emerging categories in whatever way that occurs to them. Memo-writing is a crucial method in grounded theory because it prompts researchers to analyze their data and to develop their codes into categories early in the research process. Writing successive memos keeps researchers involved in the analysis and helps them to increase the level of abstraction of their ideas" (1).*

Mother-infant Feeding Dyad: *"the collective interactions between a mother and her infant as they relate to the reported feeding practices" (7).*

Pragmatism: *"an American philosophical tradition that views reality as characterized by indeterminacy and fluidity, and as open to multiple interpretations. Pragmatism assumes that people are active and creative. In pragmatist philosophy, meanings emerge through practical actions to solve problems, and through actions people come to know the world. Pragmatists see facts and values as linked rather than separate and truth as relativistic and provisional" (1).*

Process: *"consists of unfolding temporal sequences that may have identifiable markers with clear beginnings and endings and benchmarks in between" (8).*

Symbolic interactionism: *"a theoretical perspective derived from pragmatism which assumes that people construct selves, society, and reality through interaction. Because this perspective focuses on dynamic relationships between meaning and actions, it addresses the active processes*

through which people create and mediate meanings. Meanings arise out of actions, and in turn influence actions. This perspective assumes that individuals are active, creative, and reflective and that social life consists of processes" (1).

Theoretical Sampling: *"a type of grounded theory sampling in which the researcher aims to develop the properties of his or her developing categories or theory, not to sample randomly selected populations or to sample representative distributions of a particular population. When engaging in theoretical sampling, the researcher seeks people, events, or information to illuminate and define the boundaries and relevance of the categories. Because the purpose of theoretical sampling is to sample the theoretical categories, conducting it can take the researcher across substantive areas" (1).*

Theoretical saturation: *"refers to the point at which gathering more data about a theoretical category reveals no new properties nor yields any further theoretical insights about the emerging grounded theory" (1).*

Appendix C: Interview Protocol Content Areas

- (1)** Maternal communication
- (2)** Infant communication and maternal perception
- (3)** Maternal perception of infant development
- (4)** Maternal response to perceived infant cues/behaviors
- (5)** Triggers for early introduction of solid foods and feeding practices outside of recommendations
- (6)** Sources of support

Appendix D: Final Interview Protocol

Opening

- 1) When you think about your baby, what comes to mind?

Topic 1: Maternal communication

- 2) How do you bond with your baby?
- 3) What are some ways you communicate with your baby?
- 4) Can you think of any body language or facial expressions you use to communicate with your baby?

Topic 2: Infant communication and maternal perception

- 5) What are some ways babies tell you what they need or want?
- 6) What are some ways that your baby tells you what he/she wants or needs?
- 7) What are some facial expressions or body language that your baby uses to tell you what they need or want?
- 8) When you hear a baby cry out in public, how do you feel? What emotions does it arouse in you?
- 9) When your baby cries out in public, how do you feel? What emotions does it arouse in you?
- 10) What are some reasons your baby might cry?
- 11) What seems to be the most common reason that your baby will cry?
- 12) What do you do to figure out what is making your baby cry?
- 13) How did learn how to recognize what your baby needs?

Topic 3: Maternal perception of infant development

- 14) When your baby was newborn, how did you recognize when your baby was hungry, what are some body movements or gestures he/she uses to let you know it's time to eat?
- 15) How about when your baby had had enough to eat?
- 16) How about when your baby is ready for a nap or it's bedtime?
- 17) How has that changed now that your baby is a little older?
- 18) What are some ways your baby lets you know that he/she is hungry, full, or ready for a nap?

Topic 4: Maternal response to perceived infant cues/behaviors

- 19) What does your baby look like when he or she is happy? What do they do to let you know?
- 20) What are some things that you have found make your baby happy?
- 21) What are some ways that a baby could become spoiled?
- 22) Can you describe an experience that you had with your baby when they were first born and compare that experience to how you feel now or what you would do now?
- 23) From your experience as a new mom, how do you react when your baby cries?
- 24) What is it like to be a new mom?

Topic 5: Triggers for early introduction of solid foods and feeding practices outside of recommendations

- 25) If feeding solids: How did you recognize that your baby was ready for solid foods?
- 26) If ever BF but no longer: What were some reasons you stopped breastfeeding?
- 27) If never BF: How did you decide how you would feed your infant?

28) What is the environment or atmosphere like when your baby has a bottle or is eating solid foods?

Topic 6: Sources of support

29) Does anyone help or support you with taking care of the baby?

30) How about your mother, how has she helped with the baby?

31) How have other family members or friends supported you?

32) How has the WIC program helped or supported you?

33) As a new mom, how do you handle stress?

Closing: Final thoughts to inform future interventions

34) What advice would you give to other new moms? Like, what would you have liked to have been told?

35) Is there anything else that you would like to share?

Appendix E: Recruitment Postcard



Would you like to help us learn more
about feeding babies?
Eligible moms and dads can earn gift cards!
If interested, please call (865) 974-2109
or email ican@utk.edu



IRB: 7234B, 8136B, 8493B

Appendix F: Screening Form

Date: _____ Screener Initials: _____ or Online Form

Name: _____ Phone #: _____

Relationship to infant? _____ Email address: _____

Contact preference: Phone (0) Email (1) Either/Both (2)

When potential participant contacts our lab, ask the following questions to determine eligibility:

1. How did you hear about our study? _____

2. What ZIP code do you live in? _____

3. What is your date of birth? _____
mm dd yyyy

4. Do you have a baby or are you expecting?

Baby (0) Pregnant (1) → What is your due date?

_____/_____/____

mm dd yyyy

5. Is this your first baby? No (0) Yes (1)

If "PREGNANT", skip to question 12

6. What is your baby's birth date? _____
mm dd yyyy

6a. Age of baby in days/months: _____ (Screener calculates)

6b. Is baby > 77 days (~2.5 months) old? No (0) Yes (1)

BABY MINE EXCLUSION CRITERION: If YES, check box

7. Is your baby a boy or a girl? M (0) F (1)

8. How much did your baby weigh at birth? _____ lbs, _____ oz. (_____ kg, _____ g)

8a. Was infant \geq 5 lbs, 8oz at birth? (2.5 kg or 2500 g) No (0) Yes (1)

TERM

BABY MINE EXCLUSION CRITERION: If NO, check box

9. Does your baby have, or has he/she had any chronic health conditions since birth?

(prompt to parent: “such as kidney problems, heart problems, etc”.)

No (0) HEALTHY Yes (1)

BABY MINE EXCLUSION CRITERION: If YES, check box

10. Is your baby currently breastfeeding or using formula, or both?

Formula only (0) Breastfeeding only (1) Both (2)
 Neither (3)

If “Both”, ask: 10a. How many times do you nurse a day? _____

BABY MINE EXCLUSION CRITERION: If > 2/day, check box

11. If offering formula:

Are you using powdered, from-concentrate, or ready-to-feed formula?

Powdered (0) From-concentrate (1) Ready-to-feed (2) Not offering
formula (3)

12. Do you participate in the WIC program? No (0) Yes (1)

If “no,” continue to question 13.

If “yes,” continue to question 14.

13. Do you receive Food Stamps? No (0) Yes (1)

If “no,” ask:

13a. How many people are in your household? _____

13b. Based on the number given in 13a, find and circle the annual income on the chart.

Effective July 1, 2011 through June 30, 2012

Size of Family Unit	185% of Poverty
1	\$20,147
2	\$27,214
3	\$34,281
4	\$41,348
5	\$48,415
6	\$55,482
7	\$62,549
8	\$69,616
*For family units with > 8 members, add \$7,067 for each additional person	

13c. Ask: Is your household income less than or equal to _____?

- Less than (1) Equal to (1) Greater than (0)

BABY MINE EXCLUSION CRITERION: *If greater than, check box*

14. What is the highest grade of school you have completed?

15. What is your ethnicity or race? _____

16. Do you have internet access? No (0) Yes (1)

If INELIGIBLE:

Thank you so much for your time today. It looks like you are not eligible for any of our current projects. Our lab is part of the Child Development Research Group here on campus and we keep contact information in a secure and confidential database for future studies. Would it be okay to keep your information on file and to call you if you become eligible for other studies in the future?

- No (0) DO NOT ENTER IN DATABASE Yes

Appendix G: Eligibility Script

ICAN Lab Mother-Infant Dyad Study

Database #

Version July 22, 2011

Subject ID:

If **ELIGIBLE** for **Mother-Infant Dyad Study (Jennifer H.):**

I really appreciate your time spent answering these questions. Based on your answers, you are eligible to participate in one of our projects. Now I'd like to briefly explain what participating in this study means:

Your participation will help us learn more about the day-to-day experiences between a mother and her infant. If you agree to participate in this study, you will be asked to answer a few questions about these experiences over the phone at the earliest convenient time for you. This phone interview will last about 30 minutes and will be audio-recorded to make sure we do not miss anything. All information shared will remain confidential. There is no cost to you to participate, and you will receive a \$20 gift card if you can complete the phone interview.

Would you be interested in participating in this study? yes no

If **YES:**

Would now be a convenient time for you to participate (Only ask this if the **primary investigator** is the person completing the screen form. **Other screeners**, please schedule the earliest convenient time for mom to participate)?

What day and time works best for you?

We will confirm your phone number and give it to the graduate student who is completing this project. Her name is Jennifer and she will give you a call back at that time. Thank you for your interest in our study.

Best number to call: _____

May we leave a message at this number? Y N

Alternative phone number: _____

May we leave a message at this number? Y N

If **NO:**

Could you please tell me why you don't wish to participate? This helps us to better design studies in the future.

Would you like us to keep your name in our database for future projects?

NO YES (Keep in database)

Thank you so much for your time today. We appreciate your answering these questions and wish the best for you and your baby.

Appendix H: Eligible Zip Codes

37401	37402	37403	37404	37405	37406	37407
37408	37409	37410	37411	37412	37414	37415
37416	37419	37421	37422	37424	37450	37601
37602	37604	37605	37614	37615	37901	37902
37909	37912	37914	37915	37916	37917	37918
37919	37920	37921	37922	37923	37924	37927
37928	37929	37930	37931	37932	37933	37934
37938	37939	37940	37950	37995	37996	37997
37998						

Appendix I: Recruitment Tables

Table I-1: Reasons for Ineligibility

Reason for Ineligibility	Number of those Ineligible (n=204)
Infant > 12 months	32 (11%)
Location outside of predetermined eligibility area	99 (33%)
Multiparous	119 (40%)
Income > 185% federal poverty level	30 (10%)
Pregnant	4 (1%)
Pre-term	9 (3%)
Health conditions	3 (1%)
Incomplete screen	1 (<1%)
Participation in concurrent research study	1 (<1%)
Father	1 (<1%)

Table I-2: Recruitment Sources of those Screened and Participants

Recruitment Sources	Those Screened (n=253)	Participants (n=15)
ETPD*	3 (1%)	0 (0%)
Health Care Provider Office	18 (7%)	0 (0%)
Local Community Health Programs	61 (24%)	9 (60%)
Local Businesses	14 (6%)	1 (7%)
Online and Printed Media	140 (55%)	4 (27%)
Friend/Word of Mouth	17 (7%)	1 (7%)

*East Tennessee Participant Database

Appendix J: Consent Form

INFORMED CONSENT STATEMENT

University of Tennessee Infant-Feeding Interview Study

INTRODUCTION

You are invited to participate in a research study. The purpose of this study is to learn more about how babies are fed.

INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY

We will be recruiting parents or other caregivers of infants less than 12 months old. If you decide to volunteer, we will ask you to participate in the following activity:

You will be asked to participate in one audio-recorded discussion of how parents and others feed babies who are less than 12 months old. This conversation will occur one-on-one over the telephone. .

RISKS

There are no risks to you for participating in this study.

BENEFITS

You will not personally benefit from this study, however this information will help us to understand more about how parents and other caregivers in East Tennessee interact with their babies and will be beneficial to future parents and their children.

CONFIDENTIALITY

The procedures for audio-taping include no identifying information to link you with the resulting audiotape or electronic text files. Your confidentiality will be maintained on the audiotapes and electronic files; therefore, because there will no way we can learn your identity from the data collected. The project-related materials, including the audiotapes without identifiers, will be stored in a locked office on the UT campus. Only project staff will have access to data from the project. All audiotapes will be destroyed after 10 years.

Any information obtained in connection with this study will be used in a manner that does not publicly disclose your identity and will be kept confidential. Data will be stored securely and will be made available only to persons conducting the study unless participants specifically give permission in writing to do otherwise. No reference will be made in oral or written reports which could link participants to the study.

COMPENSATION

There is no cost to you to participate in this study. Participants will be compensated for their time and effort with a \$10 gift card to a local department store. Compensation will be mailed to the participant after the interview has been completed.

EMERGENCY MEDICAL TREATMENT The University of Tennessee does not "automatically" reimburse subjects for medical claims or other compensation. If physical injury is suffered in the course of research, or for more information, please notify the investigator in charge, Katie Kavanagh, at 865-974-6250.

_____ Participant's initials

CONTACT INFORMATION

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, Katie Kavanagh, at 229 Jessie Harris Building, and 865-974-6250. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

_____ Participant's initials

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

CONSENT

I have read the above information. I certify that I am 18 years of age or older. I have received a copy of this form. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

This consent form will be stored for three years past the completion of the study.

Appendix K: Inter-Coder Reliability

<i>Meeting #</i>	<i>Subject ID</i>	<i>Code Overlap</i>	<i>Scott's Pi statistic</i>
1	MID 2	99.1%	0.49
2	MID 4, 6, 9	99.6%	0.26
3	MID 10, 11, 5	99.7%	0.22
4	MID 12, 14, 19	99.7%	0.22
5	MID 20-24	99.7%	0.24
Average Reliability		99.6%	0.29

Appendix L: Initial Coding and Resulting Categories

Initial Coding	
Categories	
<ol style="list-style-type: none"> 1) Baby Development 2) Mom Communication 3) Mom Interpretation 4) Mom Response to Fighting Sleep 5) Reasons for Fighting Sleep 6) Type of Support Valued by Mom 7) Reasons for Weaning 8) Reasons for Crying 9) Mom Response to Baby Crying 10) New Mom Experience 11) New Mom Advice 12) Dealing with Stress 13) Feelings Toward Baby 14) Bonding 15) Baby Communication 16) Support System 17) Infant Feeding Modes 18) Breastfeeding Troubleshooting 	<ol style="list-style-type: none"> 19) Things that Make Baby Happy 20) Eating Time Environment 21) Reasons for Breastfeeding 22) Timing of Solid Foods 23) Ready for Solids 24) Formula Feeding Experience 25) Reason for Formula Supplement 26) Solid Foods Given 27) Expectations 28) Points of Maternal Education 29) Health Professional Infant Feeding Advice 30) Intended Feeding Mode 31) Breastfeeding Experience 32) WIC Experience 33) Reasons for Solid Food Introduction 34) Mom Preferences 35) Spoiling Baby
Emergent Concepts	
<ol style="list-style-type: none"> 1) Maternal interpretation of infant cues/behaviors tied to projections onto infant 2) Maternal response to infant influenced by learned coping strategies 3) Maternal feeding strategies and practices influenced by maternal perception of infant growth 	

Appendix M: Focused/Axial Coding and Resulting Dimensions and Central Phenomenon

Focused/Axial Coding
<p style="text-align: center;">Dimensions</p> <ol style="list-style-type: none">1) Exhibited Infant Cues/Behaviors2) Mom mimics infant noises and actions3) Maternal Repetition of Communication Pattern4) Fighting Sleep5) Different Cries6) Trying Different Things7) Low-self Efficacy with newborn8) Caring for Infant Easier with Age/Development9) Projecting How Mom Would Feel onto Infant10) Observed Infant Sleep Pattern11) More Confident as Infant Develops12) Older Infant Easier to Understand13) Wants to Make Infant Happy14) Wants Infant to Turn Out Well15) Wants to do Everything Right16) Wants to be Perceived as a Good Mom
<p>Central Phenomenon Trained or Synced Mother-Infant Communication Pattern</p>

Appendix N: Theoretical Coding and Resulting Codes

Theoretical Coding	
Central Phenomenon, Supporting Concepts & Related Codes	
<p><u><i>Hectic Guessing Game</i></u></p> <ul style="list-style-type: none"> •Playing games •Trying different things •Immediate response •Afraid to do something wrong •Guessing Game •First instinct •Lot of responsibility and pressure on mom <p><u><i>Starting to Understand</i></u></p> <ul style="list-style-type: none"> •Reasons for crying •Easier to understand baby •Different Cries •Different tones 	<p><u><i>Better Interaction</i></u></p> <ul style="list-style-type: none"> •Time for Bonding •Better Bonding •Playing with baby •Read to baby •Spend time with baby •Feeding baby •Quiet time •Holding baby •Cooing to baby •Rocking baby •Comforts baby when sick •Watch TV with baby •Breastfeeding <p><u><i>Speaking the Same Language</i></u></p> <ul style="list-style-type: none"> •Trained Communication •Easier to Understand Infant •Established Routine •Baby’s ways to communicate •Mom’s ways to communicate •Bonding actions •Shared expressions

Appendix O: Reflexivity Log

Presented in Order of Date Conducted

MID #2

Interview conducted 4:15pm, 8/2/11

First five minutes- Questions still not soliciting the type of rich description I was hoping for. Actually went much better the second part of the interview. Ask race/ethnicity question at the end of the interview? Major Professor says no, will add to screening form. With this mom I asked after she mentioned that she stopped breastfeeding after 2-3 months why she stopped. I think this is a really good route to go to find out where moms are in the beginning (when the baby is a newborn) at interpreting or even identifying cues. For example, this mom stated that she didn't think she was producing enough milk but then cited examples unrelated to that reason and it really turned out that returning to work was why she stopped. Sources of support I think is really interesting. This mom talked about how her support needs changed from feeding advice (WIC while she was breastfeeding) to is her baby on track developmentally (referred to some sort of "healthy baby" case worker for this advice). Used WIC less now for feeding advice as she is not as concerned with this. Mom also talked about how types of communication changed from the newborn stage to the 8-9 month stage. She talked about how her baby was more vocal now, potentially touching on the idea that as the baby's communication pattern more closely mimics that of mom's or of an adult, she's more likely to pick up on strong cues and behaviors versus the more (perceived) subtle cues and behaviors that newborns exhibit.

MID #5

Interview conducted 8/18/11

Very interesting new theme is perhaps emerging about as the baby gets older and starts exhibiting body language that more closely mimics that of an adults', the easier the mom

perceives it to be to identify and respond to infant cues and behaviors. Also, could look at trend between race/ethnicity and primary support/advice source or maybe that first-time moms seem to rely on their mothers more instead of significant others. Also, mom talked about not knowing to know what baby needed when he was first born and just did like a process of elimination to figure out why baby was crying. Could absolutely be a good point to insert cue/behavior identification education into classes about infant feeding!

MID #4

Interview conducted 2:30pm, 8/20/11

This mom mentioned talking to her baby like an adult. This could link to identification of cues like that of an adult. Fussing is described as not a cry but a whine by this mom. She described that when her baby is hungry she will suck on her bottom lip and this lets mom know that she wants a bottle. The concept “fighting sleep” was discussed during this interview. Atmosphere during feeding and having the TV on while feeding was taking place was mentioned here. This mom said that her baby likes cartoons and so she leaves the TV on while she has a bottle. This mom described having her baby on a schedule the first couple of months. Very interesting about new moms putting baby on schedule at first and then talking about how their baby decides what and how much to eat. So it moves from schedule-led feeding because they don’t know what they’re doing yet, to infant-led. This mom said that she was only offering formula because if she introduced solid foods too early that this would cause diaper rash. This mom talked about relying on her motherly instinct in terms of caring for her baby’s basic needs (diaper changes, feeding, burping, putting to sleep). She mentioned that she would have liked to have known what she could expect developmentally with her infant. Almost sounds like behavior wise and milestone wise, mom would have like to know what to expect.

MID #6

Interview conducted 11am, 8/26/11

Fighting sleep? Mom thinks that it's strange that her baby is almost a year old and doesn't sleep through the night. Says some of her friends' babies were sleeping through the night by 6 months. This concept of infant sleep I think is the most confusing thing for moms. This mom even read books and searched the internet if she had feeding questions but didn't seem to think to do that about sleep. I don't think it dawns on new moms that there is even a possibility that infants might sleep differently than adults. Mom even said she thought it was her fault that her infant didn't sleep through the night because she will nurse her back to sleep and maybe she should be letting her cry or get used to the idea of sleeping through the night. Very interesting!

MID #9

Interview conducted 11am, 9/8/11

Mom stated similar issues as far as different advice from health professionals compared with her grandmother (so baby's great grandmother). Baby's doctor said 4 months for solids, but WIC's food package doesn't include baby foods until 6 months regardless of whether an infant is formula fed or breastfed. This sends a conflicting message especially to vulnerable first-time moms who are already unsure of what to do. This mom ended up relying on her grandmother most of the time for advice about how to care for her infant. Fighting sleep – saying the same things as other moms; baby doesn't want to go to bed, wants to see what's going on. Feeding a little bit of a bottle to the baby will help the baby fall asleep when he's "fighting his sleep". So to me, this is just a coping mechanism to soothe her baby even if he's not hungry so could lead to overfeeding. Mom did say her baby is a "little piggy" and will eat food (rice and fruit) after a bottle but may seem distracted if he's full. Wasn't clear if mom keeps feeding him or not plus it

wasn't clear why she thinks baby is a "little piggy" besides that he eats a lot in her opinion. She did say she wasn't sure how much baby food to give him in addition to formula. This mom talked about when she was pregnant that she wanted to exclusively breastfeed but baby ended up losing a lot of weight (2 pounds in the first several weeks). This led her to state that she would not even try to breastfeed any future children she might have. She would formula feed her next baby.

MID # 10

Interview conducted 11am, 9/12/11

Central phenomenon seems to be that as cues become more adult-like, mom begins to pick up on cues as they become more like what they would do if they were tired, hungry, or full. In addition, mom's response and approach to interacting with her baby is to put herself in her baby's shoes and try to figure out, "if that were me, I would feel..." So mom isn't really considering that her baby may not process events or experiences in the same way that an adult might and therefore, is responding to cues and behaviors perhaps inappropriately. Second main theme of this interview is the discussion about differing advice from 3 different lactation consultants and the resulting frustration BF experience that ultimately led to the mom giving up after 48 hours and giving the baby formula. Mom switched formulas from Gerber Plus to Gerber Protect, tried rice cereal in the bottle around 2 months, which she "didn't take" so then she started on spoon fed oatmeal at 3 months. When I asked mom how she knew her baby was ready for solids she said she went through a checklist with her doctor that included: 1) baby leaning towards spoon; 2) baby getting "more hungrier"; and a 3rd criterion that the mom couldn't remember. This does seem to fall in the category (taken together) of conflicting advice or help from health professionals that led mom to rely heavily on advice from her mom and grandmother. This mom also talked about

creating habits with her baby such as sitting in a computer chair and rocking back and forth to get baby to sleep as well as using a bottle to help baby fall asleep.

MID #11

Interview conducted at 11am, 9/15/11

Major theme with this mom was lots of advice from a lot of different people. She seemed very independent and didn't really want help with her baby but instead want help with her type of stuff (e.g. making meals, cleaning, etc.). Also, mom equated baby being happy to being a good mom. Mom described not understanding why baby wasn't smiling more when she was first born and that mom thought this might mean she was doing something wrong. Again, adult-like cues (smiling) = happy baby = good mom. This mom showed interested in developmental changes that she could expect with her baby. She wanted to know when she could expect her baby to start sleeping through the night. She reported that she goes with the flow in terms of feeding her baby. To me this was interesting because she said that she just fed her baby when she was hungry but how did she determine these assumingly weak cues when the baby was first born. This mom also talked about bundling her baby so that she will sleep longer.

MID #12

Interview conducted at 3pm, 9/16/11

Major themes:

Mom has baby on schedule that "takes out the guess work" of why her baby is crying and makes it so that mom doesn't have to rely on interpreting what seems like a foreign language (infant cues). Until behaviors/cues become more adult-like, babies are put on a schedule. First-time moms are bombarded with information combined with maybe fears about being a good mom. This leads eventually to baby being put on a schedule. Other theme that arose previously and in

this conversation as well is the idea that expectations about what the baby will actually be doing activity wise may not be realistic. This mom talked about how what her baby was doing when he was first born (e.g. sleeping, eating, pooping) was boring. She was excited when he started to do more and perhaps when he started exhibiting cues that were more adult-like (clapping, smiling, laughing) reassured mom that she was doing a good job whereas before she maybe wasn't sure.

MID #14

Interview conducted at 10am, 9/30/11

This mom seemed really tired and wasn't very talkative. This interview under 20 minutes. Mom did mention themes that have been emerging such as once infant cues become more controlled or adult-like, moms perceive their babies not to be on a schedule. In the beginning, this mom said her baby was on a schedule until he was two months and then he started eating more frequently (every 2 hours) and she said that he wasn't on a schedule anymore. This was confusing to me but mom did say that she started recognizing when her baby was hungry better and that he became more vocal in his request for food. So perhaps this still is in line with what I have been learning about how when babies are younger, their cues are weak and mom is new at being a mom so she puts the baby on a schedule so that she doesn't have to guess or trial and error her way to the right answer as to why her baby is crying.

Primary Investigator Notes 10/1/11

When I wrote my proposal, I thought the central phenomenon was going to be maternal interpretation of infant cues. Now that I have been collecting and simultaneously analyzing the data, the central phenomenon is more clear and appears to be more about maternal awareness of infant cues. What I have been finding is that moms don't understand the weak (or younger) cues of a newborn infant and therefore put their infant on a schedule, feeding and otherwise to help

them decipher why their infant is crying. It isn't until their infant starts exhibiting more controlled (or adult-like) cues, that moms are even aware that their infant is able to communicate their needs or wants. I went in as a researcher with the assumption that moms were aware that infants exhibited cues and behaviors indicating their needs from the beginning. Because of this assumption, I thought that I would find that moms were misinterpreting these cues and their responding inappropriately; leading to overfeeding or early introduction of solids. Instead, moms don't seem to be aware of cues until about 2 months and at that point, the infant starts displaying more controlled cues, smiling, smacking lips, balled up fists, etc. At this point moms seem to be aware of cues and are more comfortable "winging it" or taking the infant off a schedule as they have become more confident in their ability to decipher the needs of their infant before crying commences. I know "fighting sleep" and "different cries" fits in the revelation somewhere, perhaps as cues become more controlled moms start assuming that their infants' desires are identical to what theirs as an adult would be. For example, if their infant is staring at their food while they are eating it must mean that they want it or are ready for solid foods. Another example would if they (moms) were bored by eating (or drinking in the case of formula) the same food all the time then so must their baby be of drinking formula. Moms will start infant on solid foods to "give them a different flavor" or add cereal to the bottle to keep them full because formula must run right through them. It may not occur to moms that what they can digest or handle as adults may not be the same for their infants.

MID #19

Interview completed at 10am, 1/8/12

This interview was really interesting. Mom talked about spoiling her child by holding her too much and letting baby sleep with her but said that she is a single mom so she wasn't going to

stop doing that. Mom (I feel like) saturated the “fighting sleep” category. Also, categories about recognition of infant hunger and satiety cues were (I think) saturated. Mom interestingly talked about other moms looking like they’re “good moms on paper” but behind the scenes they fight with their spouse and don’t give their baby their undivided attention. This mom talked a lot about how you need to be present with your child and spend time with them to be considered a good mom. Also, this mom was still breastfeeding and seemed to have an enormous amount of help and support from her own mom. She talked about being terrified when she found out she was pregnant that she wouldn’t get any sleep. But, was pleasantly surprised to discover that her baby is “very calm and sweet” and doesn’t cry a lot. Mom says she learned how to recognize cues by spending time with her baby.

MID #21

Interview completed at 5pm, 1/27/12

This mom’s baby was a little over 2 months old at the time of the interview. This mom confirmed previous emergent themes related to maternal response and infant development. This mom’s main concern was her baby’s development. She also talked about being concerned with her baby being smart. She reported that since she and her husband suffered from ADHD, that her baby also had this condition. She discussed having to put forth a lot of effort to engage her baby because he was so easily distracted. This really speaks to the misunderstanding and potential misinterpretation of infant cues and behaviors. It sounds like this baby may have been sending mom disengagement cues that she was interpreting as her baby being distracted. Again, this confirms the emergent concept that moms project how they would feel onto their infants and respond according to these interpretations and projections. This mom confirmed other emergent concepts that her main focus when her baby was first born was on his survival and perceived

adequate growth. This mom discussed how her and her baby have their own sort of language and that he now prefers to be held by her over anyone else. She speculated that this was because he knows she understands him. This mom also said that when her baby smiles it means that he is happy and that she must be doing something right.

MID #20

Interview completed at 8am, 1/28/12

This mom talked a lot about the timeline of when things got easier in terms of caring for her baby. She said that it was more of a “trial and error guessing game” in the beginning that morphed into a trained communication pattern between mom and baby. This mom, like others, stated that this transition from the guessing game to the trained communication pattern took place starting at around 2 months. At this point, mom started recognizing different cues and cries and making a judgment (based on past experience and projections onto infant) as to what the baby’s needs are and how best to respond to those needs. In the first 2 months, mom’s response to baby is driven by a concern primarily for survival, keeping baby safe and making sure baby is growing (gaining wt/length) properly. At around the 2 month mark, mom’s responses are primarily driven by a desire to make baby happy, and in some cases, smart. Mom is more focused now (after 2 month mark) on how her baby is developing intellectually and gross motor wise versus weight and length (growth) concerns. This can result in feeding practices that are outside of recommendations in an effort to keep the baby happy. When baby is perceived as being happy by mom, mom feels as though she is doing a good job and is a good mom. If her baby leaned forward, stared at food or made excited screeches during meal time, mom perceived this as baby is ready for solid foods and wants them. Therefore, they would be introducing prior to recommendations. At this point, this is done in an effort to make baby happy (after 2 months).

Before 2 months, inappropriate feeding practices occur due to mom feeling as though her baby is not getting enough food and is not growing properly or quick enough. This is the phase in which baby's survival is the main focus and so mom's responses related to feeding are to push volume over type of food introduced. This is seen in the practice of adding infant cereal to the bottle, or if breastfeeding, supplementing with infant formula, or introducing juice, yogurt, and other baby foods during the first 2 months. Again, this is due to the need of mom to have baby grow at her perceived appropriate rate. This is independent of what is recommended by the baby's pediatrician and in some cases what other family members advice, depending on the relationship established with said family member. Mom learns to rely on herself to make the final judgment call in a statement that captures the idea of mother's intuition or mother knows best, or being a good mom comes natural.

MID #24

Interview completed at 9am, 2/4/12

Models 2/3 have been developed so I wanted to test some of the emergent concepts out on this mom. She confirmed that survival of her infant was the main focus when her baby was a newborn and that now that her baby is ~11 months; her main focus is her baby's intellectual development. She also confirmed that her perception was that it was hard to care for her baby's basic needs due to a lack of maternal self-efficacy combined with weak/subtle cues and behaviors exhibited by the baby. She confirmed that as her baby's development progressed, so too did maternal self-efficacy and this idea of "trained communication" in which this mom labeled "better bonding." This mom highlighted that at 6 months her baby started sleeping through the night and that this allowed for "better bonding" and more quality mother-infant interactions because mom wasn't so tired from getting up every couple of hours to care for her

baby. This mom highlighted that she wants her baby to be “healthy and happy” and that these remain her focus.

MID #22

Interview completed 1pm, 2/4/12

This mom again confirmed some key concepts theorized in model 3. This mom’s infant was ~ 2 months old and this is the phase (as outlined by the model) that mom is still mostly concerned with baby’s well-being and survival but is starting to transition into the phase (2-6 months) where maternal response is driven by baby’s happiness and increasing gross motor development. Mom also confirmed the concept that at birth, mom doesn’t know what to expect in terms of what it will be like to care for her baby and so her self-efficacy is low. This mom also confirmed that her perception during this phase (birth-2 months) was that it was hard or difficult to care for baby’s basic needs due to this low competency and therefore low maternal self-efficacy. This mom expected to get little sleep but reported that her baby sleeps about 6 hours at night. She reported that she had heard that babies can be on different schedules where they sleep during the day and are awake at night. She reported that her baby was “on the right schedule” and sleeps at night. This mom did report that as her baby has gotten older, her perception is that it is easier to care for her baby’s basic needs. This mom’s advice to other moms was to trust their instincts and she referred to her ability as “mother’s intuition.”

MID #23

Interview completed 1:10pm, 2/5/12

This mom again confirmed emergent concepts outlined in model 3. This mom’s infant is ~ 31/2 months old and at this phase, (as outlined by model 3) this mom’s response is now driven by making her baby happy and gross motor developmental milestones. This mom talked a lot about

how it was a guessing game in the beginning when her baby was first born in terms of trying to figure out what she needed. This mom did describe that at the 6-8 week range was when she started picking up on “different cries” that her infant would employ as a means of communicating her needs. This mom also talked about her infant “fighting sleep” but that it is a relatively new phenomenon within the last few days. I thought this was interesting as I’m curious what the literature says about maternal perception of infant sleep patterns and development. Overall, this mom further confirmed the accurate interpretation of the developed model 3 in terms of identification of emergent key categories and concepts.

Appendix P: Preliminary Models

Figure P-1

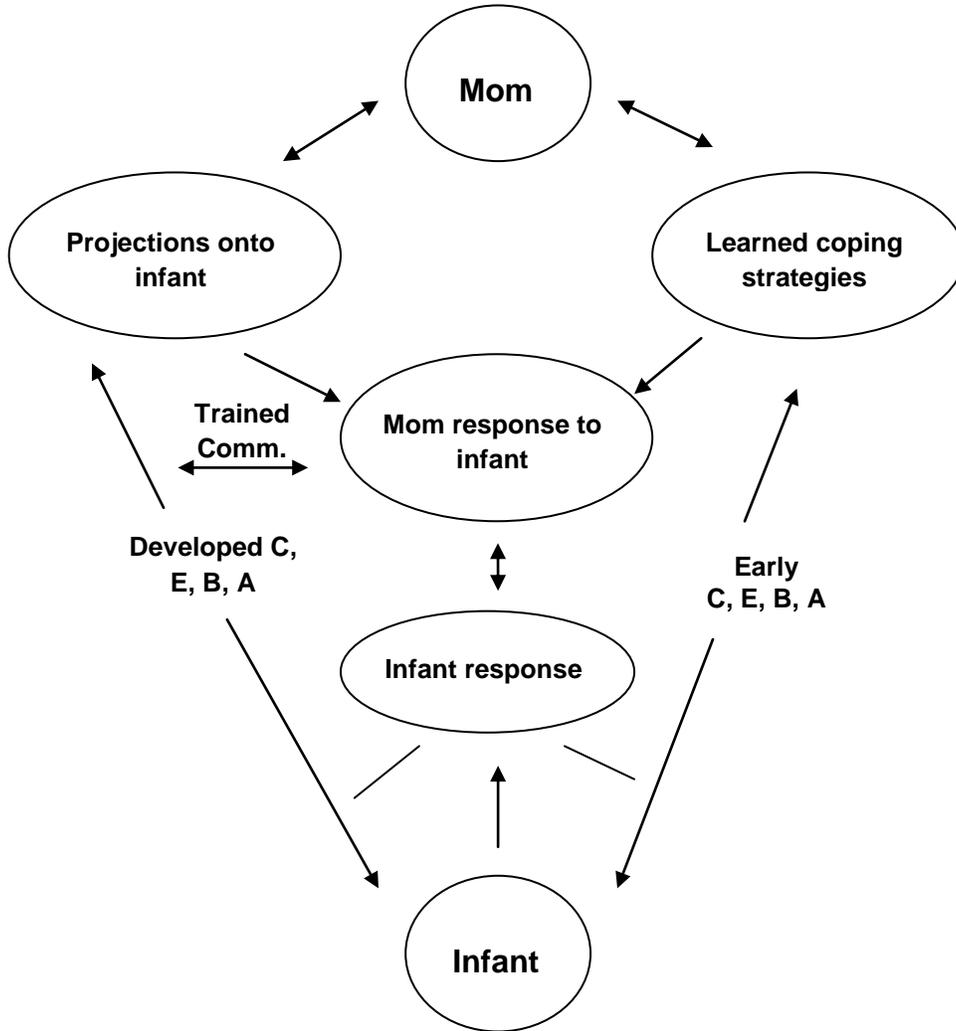


Figure P-2

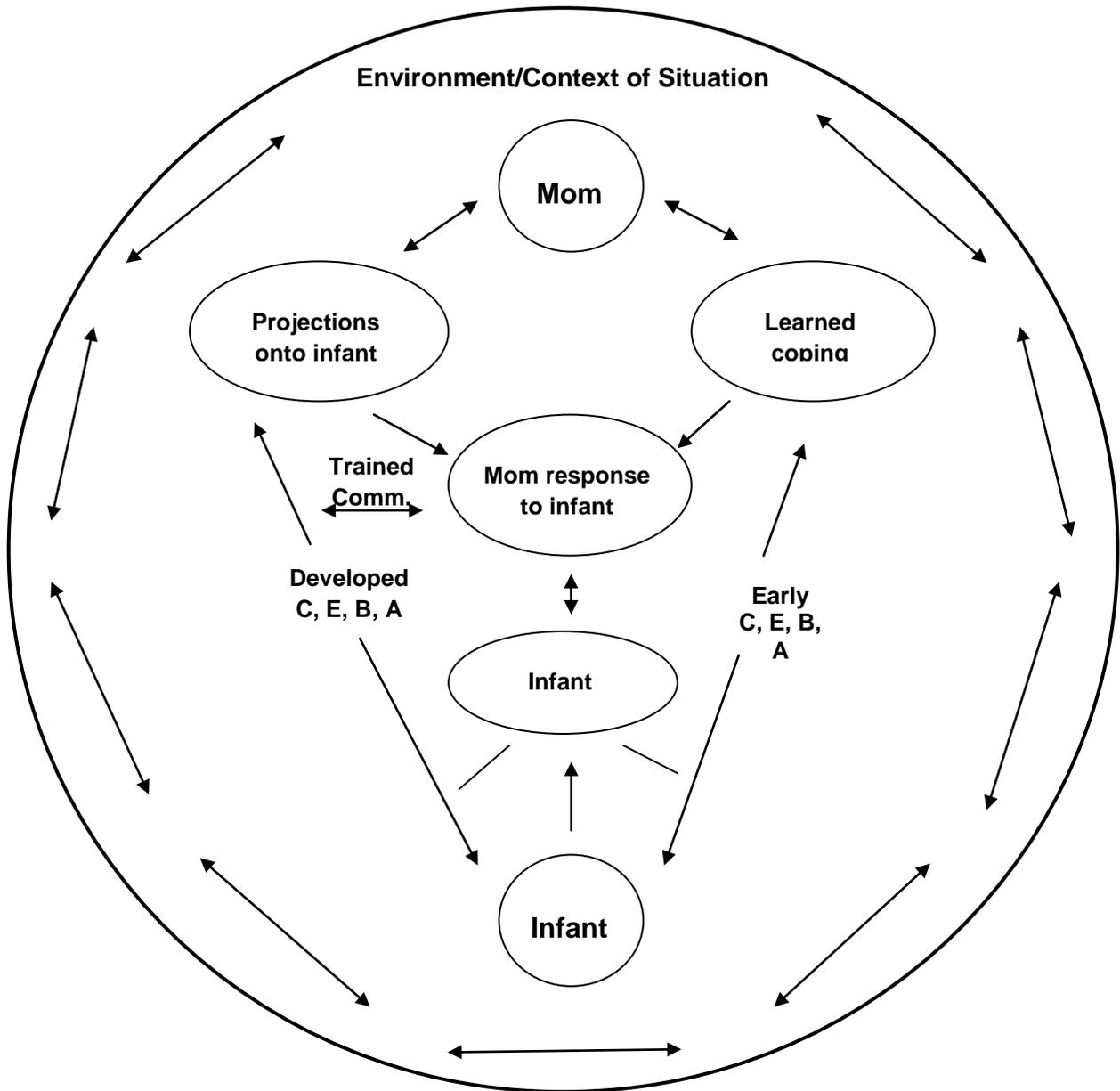


Figure P-3

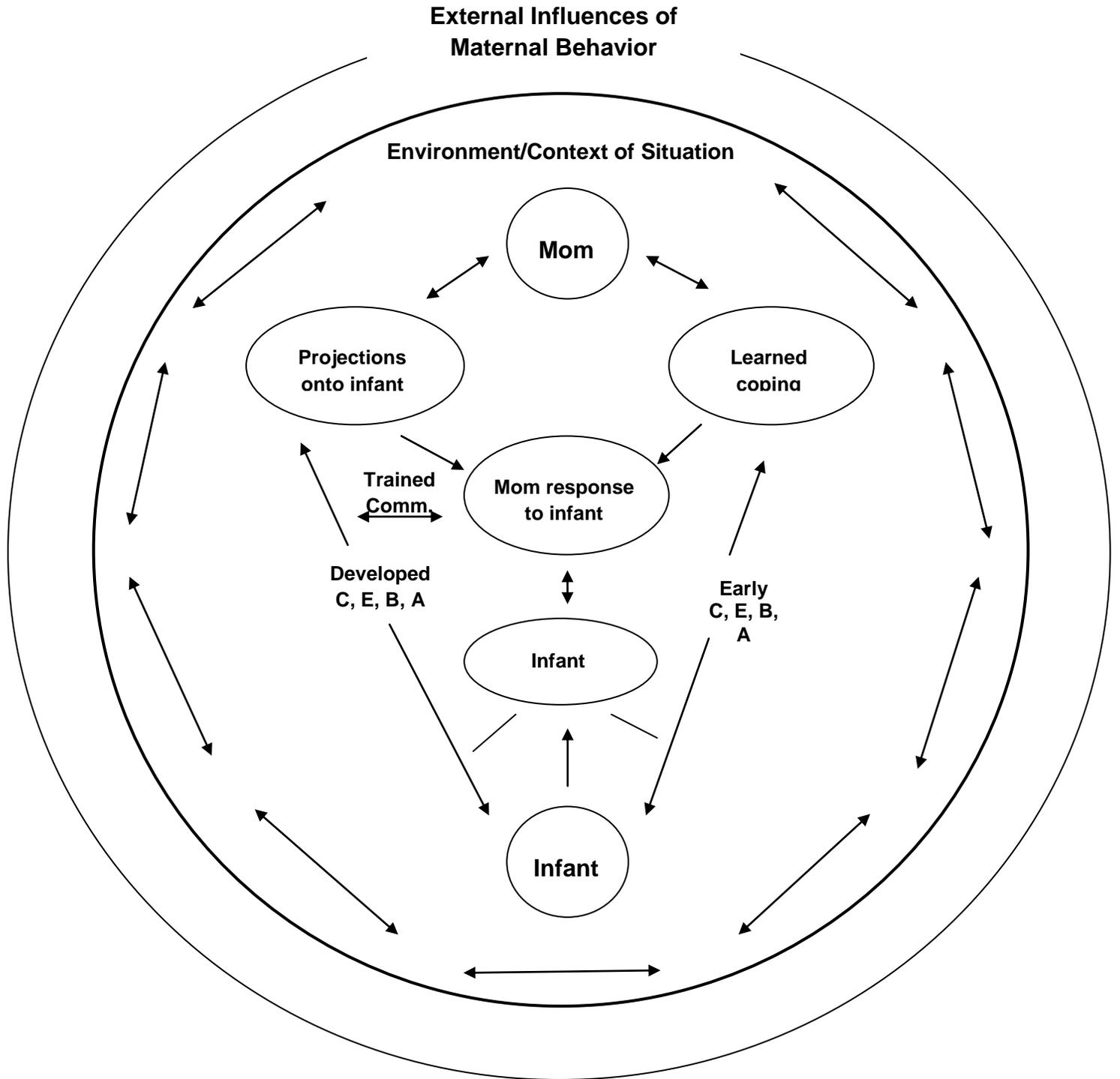


Figure P-4

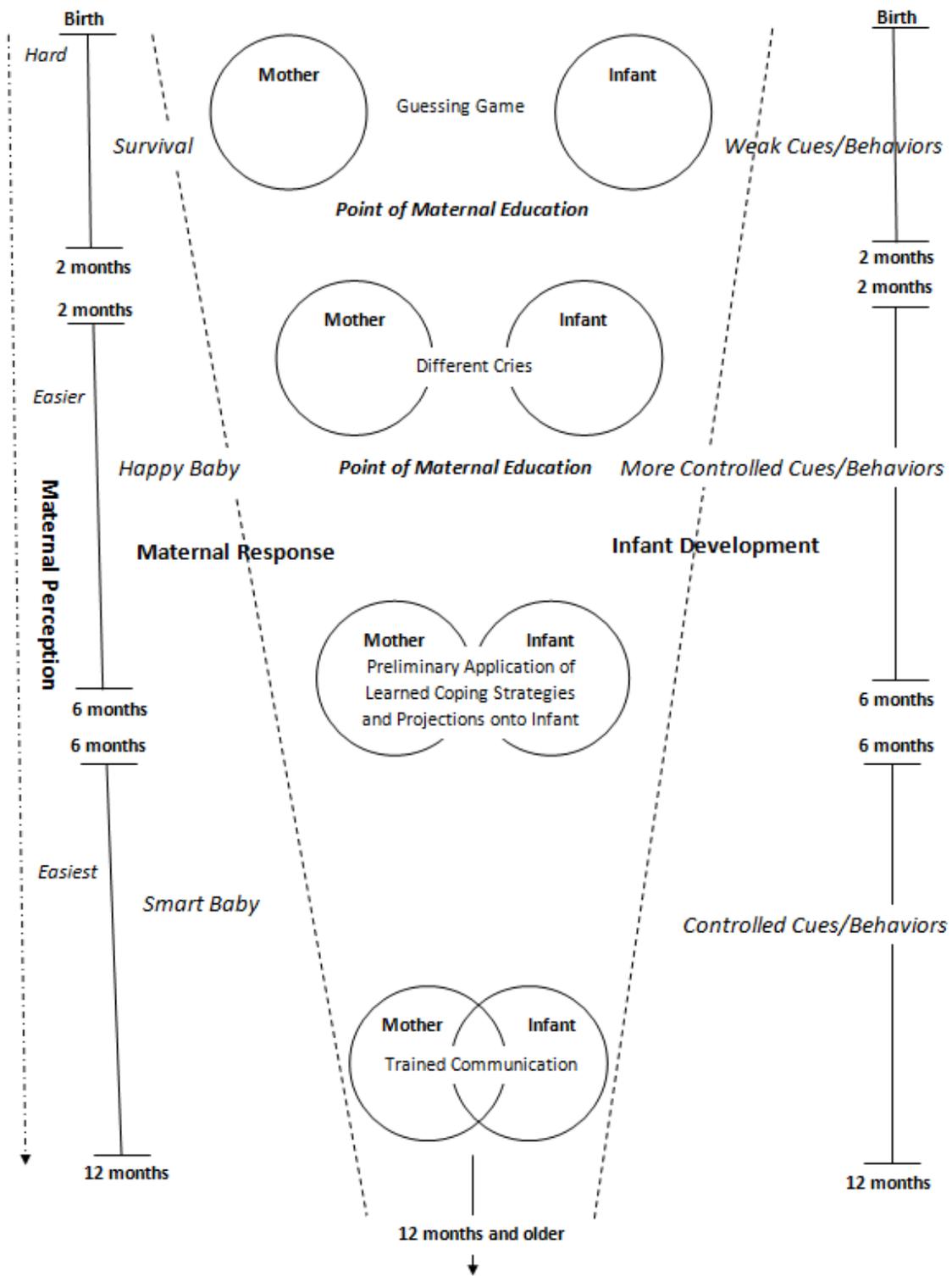


Figure P-5

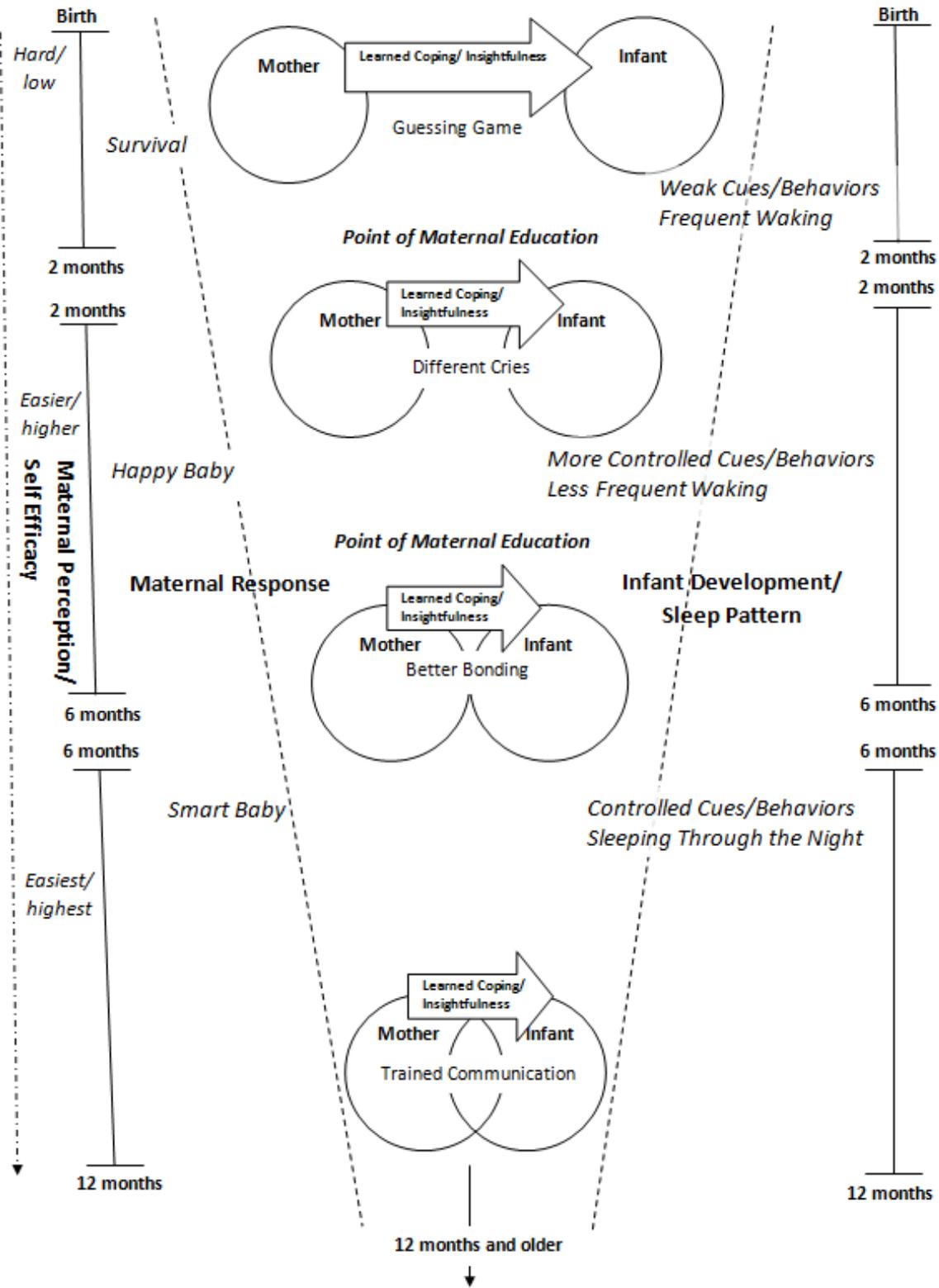
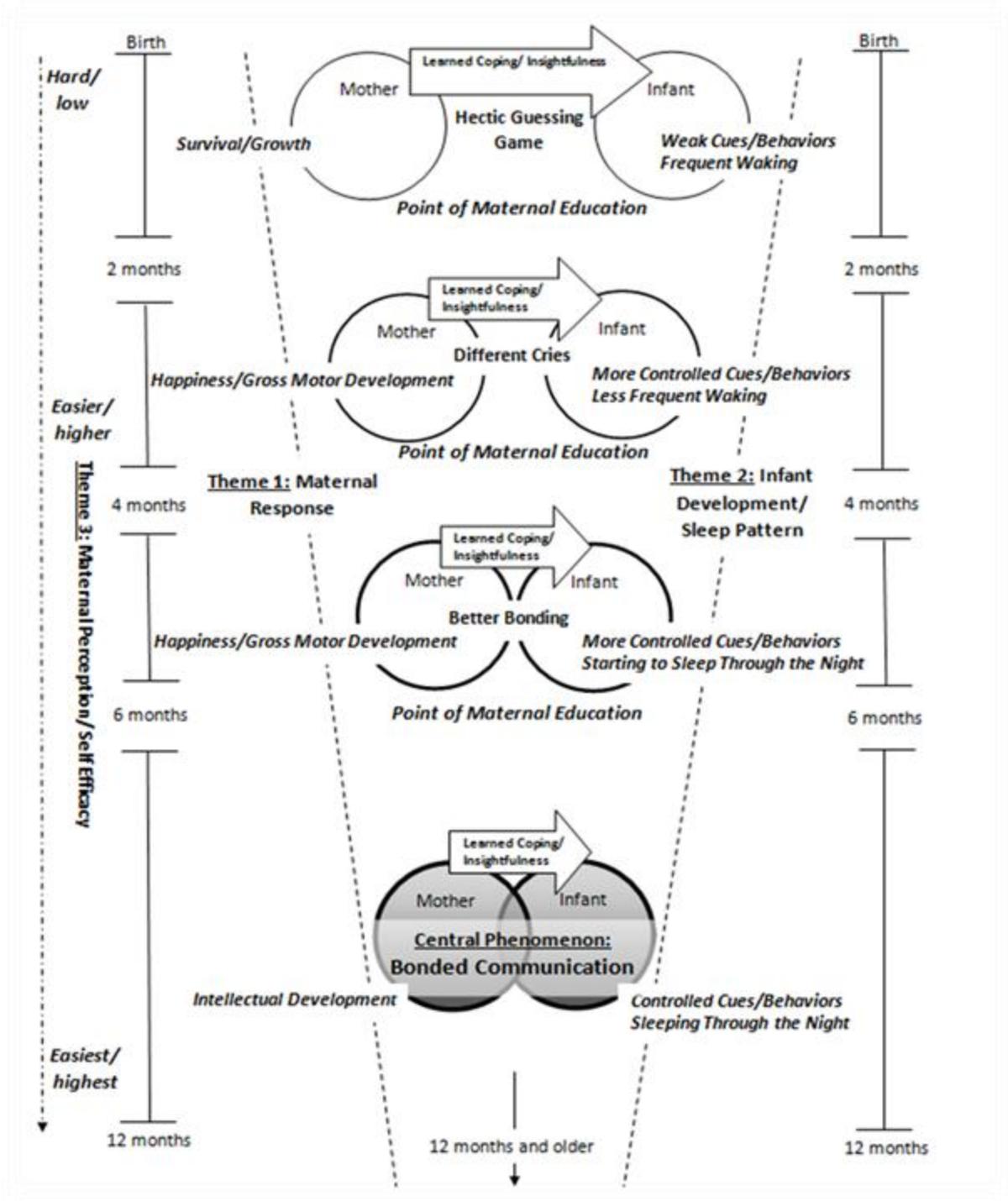


Figure P-6



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Vita

Jennifer was born in Florida to her parents, Clete and Barbara. After graduating high school, she went on to pursue her Bachelor's degree in Nutrition and Dietetics at the University of New Mexico. While working for the state of New Mexico, Jennifer met her husband who was transferred for work to Tennessee. Jennifer applied and was accepted to the Masters and Dietetic Internship program at the University of Tennessee, Knoxville. Jennifer received a part-time graduate research assistantship with the Infant, Child, and Adolescent Nutrition Lab (ICAN) funded by a grant received by her major professor. In the future, Jennifer hopes to continue to work with the maternal, infant and child population either through clinical work or through working in the schools.