2018

The Effect of Infant Directed Lullaby on Maternal Attachment and Parenting Stress

Casie Esposito

University of the Pacific, Casie.Esposito@gmail.com

Follow this and additional works at: https://scholarlycommons.pacific.edu/uop_etds

Part of the Music Therapy Commons, and the Psychology Commons

Recommended Citation


This Thesis is brought to you for free and open access by the Graduate School at Scholarly Commons. It has been accepted for inclusion in University of the Pacific Theses and Dissertations by an authorized administrator of Scholarly Commons. For more information, please contact mgibney@pacific.edu.
THE EFFECT OF INFANT DIRECTED LULLABY ON
MATERNAL ATTACHMENT AND PARENTING STRESS

by

Casie Esposito, MT-BC

A Thesis Submitted to the
Graduate School
In Partial Fulfillment of the
Requirements for the Degree of
Master of Arts
Conservatory of Music
Music Therapy

University of the Pacific
Stockton, CA
2018
THE EFFECT OF INFANT DIRECTED LULLABY ON MATERNAL ATTACHMENT AND PARENTING STRESS

By
Casie Esposito, MT-BC

APPROVED BY:

Thesis Advisor: Eric G. Waldon, Ph.D., MT-BC
Committee Member: Feilin Hsiao, Ph.D., MT-BC
Committee Member: Rachelle Kisst Hackett, Ph.D.
Department Chair: Feilin Hsiao, Ph.D., MT-BC
Dean of Graduate School: Thomas Naehr, Ph.D.
DEDICATION

This thesis is dedicated to the families who have opened their hearts and given their valuable time to this project. Without them and their inspiring resilience, this study would not have been possible. Their continued inspiration pushes me towards finding new ways to support them and their infants.
ACKNOWLEDGMENTS

I’d like to thank my fiancée for his continued support in my work as a therapist and for dedicating many hours to listening to me read, out-loud, the many pages of this thesis.

Thank you to Dr. Waldon for his encouragement and enthusiasm in this project. His patience and guidance have helped me to love every moment of this experience.

Many thanks to the nurses, doctors, and other staff who opened their arms to me on their unit and allowed me to share music therapy with them and their patients.
The Effect of Infant Directed Lullaby on Maternal Attachment and Parenting Stress

Abstract

By Casie Esposito

University of the Pacific
2018

In this modified single-subject design study, the researcher sought to find whether eight parents who were taught to use lullaby evidenced a change in attachment and parenting stress regarding their infant’s hospitalization and into transition to home. Using repeated measures over a period of approximately two months, each parent was asked to use infant directed lullaby with their infants and keep track of its use with a calendar. The Maternal Attachment Inventory and the Parenting Stress Index provided measurement of self-reported attachment and stress. An adapted intervention rating profile was used to determine the parent’s perceived acceptance of infant directed lullaby.

Understanding possible connections between attachment and parenting stress with music, and as a music therapy intervention, is important for both researchers and clinicians in the field of music therapy. Teaching parents to use a simple and cost effective tool may provide families with more access to interventions similar to infant directed lullaby as well as provide support for families and their infants. Despite this study’s inconclusive findings, a new door for research in this settings has been opened regarding parent training and its effectiveness, which is important in that a therapist is not always able to be present to provide treatment particularly in the NICU setting and after they have been discharged home.
# TABLE OF CONTENTS

LIST OF TABLES ........................................................................................................ 9

LIST OF FIGURES .................................................................................................... 10

CHAPTER

1. Introduction ........................................................................................................ 11
   Personal Background ....................................................................................... 11
   Infant Benefits of Music .............................................................................. 12
   Parental Benefits of Music .......................................................................... 13
   Research Purposes ....................................................................................... 15

2. Review of the Literature .................................................................................... 17
   The Neonatal Intensive Care Environment ................................................. 17
   Attachment ................................................................................................. 18
   Parenting Stress .......................................................................................... 20
   Current Interventions .................................................................................... 22
   Music Therapy .............................................................................................. 24
   Infant directed Lullaby .................................................................................. 28
   Purpose of Current Investigation .................................................................. 30

3. Methodology ........................................................................................................ 31
   Setting and Participants ............................................................................... 31
   Equipment .................................................................................................... 32
   Research Design ........................................................................................... 32
   Measures ....................................................................................................... 33
   Attachment .................................................................................................... 33
Parenting Stress .............................................................34
Intervention Acceptability Rating .................................35
Infant Directed Lullaby ................................................35
Procedures ....................................................................36
4. Results......................................................................39
Participant Characteristics .........................................39
Family A ....................................................................39
Family B ..................................................................41
Family C ..................................................................41
Family D ..................................................................42
Family E ..................................................................44
Family F ..................................................................45
Family G ..................................................................46
Family H ..................................................................47
Research Purposes......................................................48
Research Purpose #1 ......................................................48
Research Purpose #2 ......................................................49
Research Purpose #3 ......................................................49
Research Purpose #4 ......................................................50
Research Purpose #5 ......................................................50
Research Purpose #6 ......................................................51
Research Purpose #7 ......................................................51
5. Discussion..............................................................53
Maternal Attachment....................................................53
LIST OF TABLES

Table

1. Family Characteristics ................................................................. 41
2. Frequency and Length of Time in Regards to IDL Use ........................53
LIST OF FIGURES

Figure

1. A Graphic Timeline of the Research Procedures ........................................ 39
2. Family C Results ....................................................................................... 43
3. Family D Results ....................................................................................... 44
4. Family E Results ....................................................................................... 45
5. Family F Results ....................................................................................... 47
6. Family G Results ....................................................................................... 48
7. Family H Results ....................................................................................... 49
Chapter 1: Introduction

Personal Background

Music and singing can provide neurodevelopmental enhancement and help parents develop positive interactions and connections with their infants (Stanley, 2012). The researcher witnessed this first-hand while working in the neonatal intensive care unit (NICU), where it was observed how music can help those even in the most fragile states. Lullaby, breath entrainment, and soft guitar playing were used to help crying infants fall asleep as well as the contingent use of nursery songs to support infant feeding by encouraging a steady sucking pattern when they previously needed a feeding tube. Parents, who often experience a tremendous amount of stress during this time, also benefit from music therapy in the NICU. As observed through personal experience, music can offer a way for parents to bond with their baby when other forms of interaction are ineffective or too stimulating. This results in meaningful improvements in overall health for the parents and infants.

I recall a case in which a couple’s baby was born full-term following a typical pregnancy. Unexpectedly, their baby was admitted to the NICU for difficulty breathing and problems with feeding. The mother and father were overwhelmed with their child’s condition and parent-infant interactions were reduced to silently standing by their baby’s crib. The parents were unable to support one another as they both struggled with their baby’s diagnosis and the stress of this affected the interactions that they had while visiting their baby. I met with these parents both separately and together during their crib-side visits and sang soft lullabies and playful songs together. During these moments, the parents made observations that their baby smiled and
looked towards the music, which they shared with the researcher. Their baby was given opportunities to experience a calm and loving environment and the parents were given a way to connect with their baby. Through this experience, it became obvious how music played an important role during these interactions, which inspired the foundation of the current study.

**Infant Benefits of Music**

Loewy (2015) identifies the significance of the parent’s involvement in choice of song and suggested that the “song of kin,” musical pieces of importance or a song passed down through the generations, improves infant stability (i.e. less frequent episodes of bradycardia and tachycardia, increased consistent respiration rate and oxygen saturation, and heart rate). Filippa, Devouche, Arioni, Imbertt, and Gratier (2013) found that maternal speech and singing significantly increased oxygen saturation, provided meaningful parent-infant interaction, and reduced risk of overstimulation.

Rock, Trainor, and Addison (1999) investigated whether infant responsiveness varied in the presence of lullabies (i.e., songs focusing on infant sedation or pacification) and playsongs (i.e., songs involving activities or movement). They discovered that infants focused attention on themselves during lullabies as opposed to directing attention to the caregiver during playsongs. Additionally, while infants vocalized (e.g., cooing or babbling) more during the lullaby condition, there were no significant differences between conditions with regard to movement, rhythmic behavior, or smiling. Garunkstiene et al. (2014) found that infants exposed to music evidenced longer and deeper sleep states compared to those in a recorded music condition. While both live and recorded music produced decreases in heart rate compared to a no-music control condition, changes were less significant in the presence of recorded music.
Parental Benefits of Music

The environment of the NICU is often unfamiliar to premature infants’ parents as they face challenges in their roles as caregivers. Music interventions can address both the infant’s and the parents’ needs by empowering parents to care for their infants as music therapists serve to provide family-based care. Loewy (2015) suggests that “song of kin” may be used to improve attachment between parents and infants. In a study of 272 neonates, “song of kin” and “Twinkle, Twinkle Little Star,” were sung with parent infant dyads and triads. The music therapist provided live music each morning and afternoon over a 2-week period while parents held their infants. For both the “song of kin,” and “Twinkle, Twinkle Little Star,” conditions, Loewy found a decrease in parenting stress, which suggests that live singing can support parent-infant affection while promoting parent resiliency during hospitalization. Similarly, Amon, Bauer, Diamant, Litmanovitz, Regev, Rivka, and Sirota (2014) found a significant reduction in maternal anxiety for mothers who implemented singing and humming while holding their babies. The mean change in state anxiety was significantly greater in mothers who implemented the music-based intervention compared to those who only held their infants (i.e., without singing).

Some researchers have compared the use of live and recorded music in the NICU with the majority of the evidence supporting the use of live music in certain clinical situations. Arnon (2011) suggests that singing is the most effective delivery method of live music particularly when sung by the mother because infants begin to differentiate and recognize voices as early as 24 gestational weeks. This is supported by Kisilevsky et al. (2008) who found that infants demonstrated a significant increase in heart rate when introduced to their mother’s speaking voice as compared to a stranger’s speaking voice which had no significant change. Increase in
heart rate indicates a novelty response, which was found only with infants exposed to their mother’s voice.

Holditch et al. (2014) suggest that because of increased psychological distress among mothers of NICU infants, interventions that address the maternal role and decrease parenting stress may improve the mother-infant relationship. Holditch and colleagues assigned mothers to three groups: a multimodal sensory stimulation group, a kangaroo care group, and a non-music control group. Mothers in the experimental groups (i.e., multimodal and kangaroo care) reported a decrease in stress and worry significantly more than mothers in the control group. This suggests that learned interventions may be implemented by mothers to decrease parenting stress. In light of this, it would seem important to integrate parent training into standard medical care on the use of music to soothe both themselves and their infants.

Trainor (2015) investigated the inclusion of parents by music therapists in the NICU setting and the ways therapists addressed parents’ needs. Trainor found that music therapists working in the NICU provided assistance to families through education, counseling support, and helping parents relate to and understand their infants’ unique needs. Ettenberger, Odell-Miller, Cardenas, Serrano, Parker, and Llanos (2014) found that, while using lullaby, parents described interactions with their babies as “pleasant,” “relaxing,” and “beautiful,” (p. 17). Statements such as “…I learned how to get to know my baby better,” and “they helped me to get to know the expressions of my daughter,” suggest that music therapy helped them form a meaningful bond with their infants.

Investigating the effects of a mother’s singing on bonding and adjustment for both full and preterm infants, Cevasco (2006) studied the effects of a mother’s singing on bonding and
adjustment. She found that mothers in the music intervention group worried less about their babies and scored higher on the mother-infant bonding scale compared to those in a non-music group. Additionally, mothers in the music intervention group: reported more confidence in their ability to calm their infant; rated music more positively than mothers in the control group; evidenced less stress behaviors; and spent more time interacting with their infants in the NICU compared to parents who did not use music.

**Research Purposes**

Limited availability of music therapists and an increasing need for parent support in NICU, having a tool that is simple and accessible can be important to the health of both parents and their infants. There are few studies that examine the use of music interventions to facilitate bonding with parents and neonatal infants; this is particularly true of studies that follow parents after they return home from the NICU. Current literature describes infant responses to musical stimuli with limited research describing parenting stress and parent perception of the relationship with their infant. No current literature addresses teaching parents to use infant directed singing with premature infants. This research investigated the use of Infant Directed Lullaby (IDL) on maternal attachment and parenting stress. In the following study, the researcher looked to:

1. Identify the effectiveness of infant directed lullaby in a clinical environment on parent bonding as measured by the Maternal Attachment Inventory (MAI; Müller, 1994)
2. Identify the impact of infant directed lullaby on parenting stress as measured by the Parenting Stress Index (PSI; Feindler, Rathus, & Silver, 2003).
3. Identify differences in maternal bonding using the MAI as a function of delivery method (i.e., live versus recorded music).
4. Identify differences in parenting stress using the PSI as a function of delivery method (i.e., live versus recorded music).

5. Identify changes in maternal bonding using the MAI as related to frequency of IDL use.

6. Identify changes in parenting stress using the PSI as related to frequency of IDL use.

7. Identify parental satisfaction with IDL using the Intervention Rating Profile (IRP; Witt & Elliott, 1985).
Chapter 2: Review of the Literature

The Neonatal Intensive Care Environment

Neonatal intensive care units are sterile and quiet yet maintain a consistent movement as staff work quickly providing care from infant to infant. There is equipment making different sounds and alarms that go off intermittently. Screens that display heart rate and oxygen saturation beep and oxygen tubes produce a steady push of sound. This ambient sound has been measured as high as 75-80 decibels, which may increase the stress an infant experiences during treatment. Stress has been linked to an increase in cortisol, which can contribute to reduced growth in the brain (Standley & Walworth, 2010).

Families visiting their newborns must to learn about the special needs of their baby including equipment such as gastrointestinal tubes and tracheostomy tubes. Stress associated with the environment may be effected by music listening, which can reduce cortisol in adults who experience stress and parents who frequently use music have demonstrated improved bond and improved ability to comfort their baby (Standley and Walworth, 2010). Additionally, music assisted relaxation like music and imagery and listening to music for pleasure may also help parents reduce feelings of stress.

Attachment

Many psychologists believe that relationships in early infancy have an important influence on development (Mirechki & Chou, 2013; Lickenbrock & Braungart-Riekert, 2015; Hawkins, Madigan, Moran, & Pederson, 2015). Early relationships can have a lasting impact on
development throughout the lifespan including relationships in adulthood. Pennestri and colleagues (2015) define attachment as:

The emotional and enduring bond between infant and caregiver. Securely attached children are able to use their attachment figure as a haven of safety and a secure base to explore the environment contrary to insecurely attached children. Insecure-avoidant children tend to avoid proximity to their mothers and minimize the expression of the negative emotions, whereas insecure-ambivalent children show resistance as well as dependence towards their attachment figure.

The combination of parent sensitivity, involvement in care, and use of resources available can have an effect on the attachment children form with caregivers. When caregivers demonstrated all three of these characteristics it was more likely that their attachment to their child was secure (Lickenbrock & Braunart-Rieker, 2015; Hawkins, Madigan, Moran, & Pederson, 2015). Parent sensitivity has an important role in infant development and attachment as it demonstrates the parent’s ability to accurately read and respond to infants’ cues and can act as a protective factor in development of secure attachment. Much of this is shaped over time with repeated interactions with attachment figures (Hawkins, Madigan, Moran, & Pederson, 2015).

Cultural differences in attachment are important to note when addressing interactions between infants and caregivers. Families will each hold different values dependent on culture. Factors such differences in physical proximity and responses to distress will change attachment outcomes (Mirechki & Chou, 2013). The family’s worldview may be different from the therapist
including the kind of caregivers involved in the infant’s development. This might include mothers, fathers, grandparents, extended family, and even members of the community.

A higher percentage of infants who were admitted to NICU evidence insecure attachment compared to non-NICU infants who demonstrate a higher percentage of secure attachments (Pennestri et al., 2015). A strong relationship was found between organized and disorganized behaviors of infants when comparing NICU and non-NICU groups. Non-NICU infants experience significantly less disorganized behavior where NICU infants experience much higher disorganized behavior. Research suggests that disorganized attachment is associated with caregiver behavior and often fear behaviors and parent responses to their infant have an effect on an infant’s attachment.

It is suggested both kangaroo care (skin-to-skin) and a positive and supportive relationship with physicians and nurses has decreased parent stress and anxiety. Pennestri et al. (2015) proposes that when infants are placed in NICU, they are at a higher risk of disorganized attachment including confounding effects associated with prematurity. It would benefit parents and their infants to have interventions that can minimize the factors of fear and trauma to facilitate closeness.

Parent’s of NICU infants often experience feelings of fear and isolation and find visiting difficult and exhausting, as well as financially expensive (Cevasco, 2006). Separation of mother and preterm infants can occur over many months, delaying interactions and behaviors that facilitate bonding experiences. Mother’s who participated in music interventions and were surveyed six months after discharge reported less crying from their babies, more smiling, and faster transitions to sleep in response to music. This demonstrates improvement in parent
sensitivity and involvement in their infant’s care, which are described as characteristics that support attachment.

Parenting Stress

Parents may face interrupted daily routines and increased expenses associated with medical care. Research suggests that parents also experience anxiety and depression when an infant is admitted to NICU. Music may assist in balancing the needs of infants and their parents while enabling the relationship between them to develop (Ettenberger, 2017). Because of increased psychological distress among mothers of NICU infants as well as an interruption of the maternal role in infant development, interventions that address maternal role and distress can improve the mother-infant relationship (Holditch et al., 2014).

Castel et al. (2016) developed the intervention program Triadic parent-infant Relationship Therapy (TRT), which they found to significantly reduce maternal stress. Using the Parenting Stress Index (PSI), they found that both mothers and fathers experienced reduced stress between 3 and 18 months of their infant’s lives. Both groups, the intervention group and the control group, demonstrated decreased stress, with statistical significance for mothers in the intervention group showing lower PSI scores. Parent education and teaching parents to respond to their infant’s cues appropriately may reduce stress. Since TRT sessions took place in the parent’s home, this provides a familiar and consistent environment for both parent and infant.

Another study followed three groups: mothers who used Kangaroo care, mothers who used Kangaroo care with singing, and mothers who used no intervention (Amon et al., 2014). Kangaroo care is defined as skin-to-skin contact with mother and infant. Mothers who engaged in any type of intervention (Kangaroo care or singing) were shown to have a decrease in
parenting stress when compared to mothers who did not engage in an intervention. Parenting stress significantly decreased when the infant was discharged to home as compared to parenting stress when the infant was hospitalized. Singing significantly reduced mothers’ anxiety in combination with kangaroo care. Of 86 mother-infant dyads, there was a significant reduction of maternal anxiety with mothers who implemented humming and lullabies, though there were no statistical differences in the infants’ autonomic responses (e.g. heart rate, oxygen saturation, respiratory rate). It was also noted that infants remained in a “deep sleep” state during the sessions in both Kangaroo care and combination singing and Kangaroo care groups.

Ettenberger (2017) describes a case in which a mother displayed signs of pessimism and appeared reserved when visiting their daughter in the NICU. Her daughter required intubation and was placed on end-of-life care. The mother’s interactions with her daughter were limited and often included standing by the incubator watching her. The mother selected a song of importance stating that this song would give her daughter strength. Though the mother was not comfortable singing, the therapist supported her by singing her suggested song for her daughter. At the end of the session, the mother stood and approached the baby, demonstrating soft speaking and increasing the interactions shared with her. Other cases included parents leaving recorded singing for their babies when they were unable to be with them in the NICU, then continuing to use these when visiting their baby. Giving parents a sense of control in their baby’s care helped to mitigate the stress experienced while their baby was admitted.

Loewy (2015) identifies the significance of the parent’s involvement in choice of song, suggesting that “song of kin,” (musical pieces of importance or a song passed down generations) improves both infant stability and reduces parent anxiety. She suggests that “song of kin” may be used to improve attachment between parents and infants. In a comparative study, Loewy
played “song of kin” and “Twinkle, Twinkle” for parent infant dyads and triads. Played daily, live music was provided over a 2-week period. Loewy found a decrease in parental stress suggesting that live singing during music therapy can support parents in their interactions with infants and promote resiliency during hospitalization.

**Current Interventions**

At birth, infants have the ability to distinguish between strangers’ voices and their mother’s voice as they have adapted to hearing mother’s voice while in utero. Mothers bond with their infants through eye contact, touch, and live singing. It is important to understand the inclusion of parents by music therapists in the NICU setting and how therapists are addressing parents’ needs including how eye contact, touch, and singing can be incorporated by the music therapist in their care (Trainor, 2015).

At the time of their infant’s admission, parents of NICU infants are given information about the unit, visiting, staff and equipment, as well as learning about their babies needs. This information may be overwhelming. Information and adjustment to change in the family dynamic, including financial and personal strains, can increase parenting stress. Past research indicates six ways staff can meet parent needs: emotional support, empowerment, a welcoming environment with supportive policies, and education and practice for new skills (Trainor, 2015). Additionally, parents are taught how to care for their premature infant such as taking their temperature, changing diapers, and bathing. Parents are often encouraged to talk to their babies and hold their babies when ever possible. One of the ways parents can hold their babies is skin-to-skin, or Kangaroo care. A significant reduction of maternal anxiety is found with mothers who implement singing and skin-to-skin simultaneously (Amon et al., 2014).
Music Therapists surveyed by Trainor (2015) identified parental recordings and counseling as the most used interventions with parents, and infant directed singing and developmental music-play interventions as the most common exercises for working with infants and parents simultaneously. Trainor (2015) identifies the most recurring parent concerns to be their own singing ability, difficulty choosing music, over stimulation, and the decibel levels. Music therapists surveyed responded that parent goals often include anxiety reduction, increasing normalization, facilitating coping, and improving quality of life. Additional goals included transition to home and bonding.

Trainor (2015) articulates that music therapists working in NICU provide assistance to families through education, counseling support, and helping parents to relate to and understand their infants’ unique needs. Music interventions may include not only the infant but the parents’ needs as well. Music may have the ability to empower parents to care for their infants as music therapists serve to provide family-based care.

Pölkki, Korhonen, and Laukkala (2012) found in a survey of caregivers (mothers and fathers) of NICU infants that 93% agreed that music could increase feelings of security in infants and 91% agreed that music could decrease the stress experience of infants. Parents also agreed at 94% that music could increase “coziness” and comfort in the ward, and 88% believed music could have a positive effect on their own mood. However, most parents also stated that they did not sing or hum to their infants while in the NICU and did not observe staff singing or humming. This finding is similar to one by Shoemark and Dearn (2008) who discussed the reluctance of parents to sing in the NICU, even though singing to their baby was considered to be “normal.” It is suggested that instruction and support may be a strategy to increase the comfort of using this intervention. Parents can feel unsure of their role as a caregiver when typical interactions are not
available including rocking and holding. Providing an alternative may increase confidence in caregivers.

Moments of joy and celebration may not occur as frequently as they would if the infant was not in NICU. Musical experiences facilitated by a music therapist may offer moments of joy and support to parents, as well as provide teachable interactive experiences that parents will be able to keep and use independent of the music therapist (Shoemark and Dearn, 2008). Courtnage (2001) observed, through interaction and conversation, that many of the parents of NICU infants asked how they could incorporate music and expressed little confidence in their skills to care for and interact with their infant. It was suggested that music therapists could facilitate interactions using music in the development of attachment.

**Music Therapy**

The current definition of music therapy as defined by the American Music Therapy Association states, “Music Therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program,” (American Music Therapy Association, 2018). Music therapists currently working in the NICU provide a variety of services that include Multimodal Neurologic Enhancement (MNE), Pacifier Activated Lullaby (PAL), breath entrainment, lullaby and “song of kin,” and parent support groups and trainings. Music therapists work alongside the hospital treatment teams to provide additional care that falls within the patient’s primary needs such as physical growth (weight gain) and neurologic development, breath support, feeding support, and bonding between parents and infants.

Parents described the use of wordless, gentile humming or toning with entrainment to infants’ heart rate or breath patterns with words like “pleasant,” “relaxing” and “beautiful”
(Ettenberger et al., 2014). Ettenberger and colleagues highlighted statements from parents such as “…I learned how to get to know my baby better,” and “they helped be to get to know the expressions of my daughter,” suggesting that music therapy helped to form a meaningful bond between the infant and their caregiver and improved caregiver sensitivity to infant needs.

MNE is a sequence of stimuli that incorporates auditory, tactile, visual, and vestibular stimuli to develop the infant’s ability to organize their environment. In response to MNE, Standley’s (2012) updated meta-analysis identified positive changes in infants including calming and pacification and the development of vocal responses and motor behaviors like reaching and grasping. Infant responses during MNE included snuggling, cooing, grasping and eye contact. Infants who received MNE left the hospital sooner, particularly female infants, and their tolerance to stimulation significantly improved over time.

Music is organized and predictable which makes it different than ambient sounds that premature infants are exposed to (Gooding, 2010). MNE incorporates developmentally appropriate stimulation such as stroking, rocking, and vocalizing (singing). For infants who are 30 gestational weeks or older, this can increase their tolerance to stimulation and in turn help them to discharge sooner. Parents who are taught to use MNE demonstrated less stress behaviors and more appropriate interactions.

The PAL is considered an effective method of training infants to use more prolonged sucking behavior (Standley, 2012). Prolonged sucking behavior helps an infant to take in more calories, which is important to their growth and ability to discharge home. Premature infants have poor feeding behaviors, which can lead to reduced oxygen saturation and weight loss with expended energy. Infants who used the PAL prior to feeding demonstrated improvement compared to infants who were not using PAL. The recorded music offered provides a contingent
response to the infants sucking, encouraging more consistent feeding behavior and increased weight gain.

In a study of ten premature infants by Courtnage (2001), heart rate, oxygen saturation, and respiratory rates were recorded before, during, and after infant directed singing. Though there was no statistical significance in oxygen saturation or respiratory rate change, there was a significant increase in heart rate when infants where held during singing as compared to being held without singing. The infants whose heart rate increased are noted to have entered a quiet alert state and a transition to sleeping state after returning to crib. Very few avoidance behaviors (e.g. hand halt, arching back, yawning) were observed during infant directed singing, indicating that the infants accepted the stimuli. Courtnage further notes that the “quiet alert” state is the optimal time for caregiver interactions as the infant is demonstrating eye contact and awareness to interactions.

Though Courtnage (2001) did not require parents or caregivers to provide the music stimuli, they were invited to observe the researcher doing so. Live singing provides interaction with the infant that can be modified to respond accurately to infant cues and assist the infant in regulating their environment. The music can respond to the infants’ cues and maintain a comfortable stimulation level. With recorded music, infants often respond with limited significance when attempting to transition to sleep though recorded music has been shown to be effective in supporting non-nutritive sucking through pacifier activated lullaby.

In a study of 272 premature infants, Loewy et al. (2013) found that live music and rhythm interventions lowered heart rate, affected sucking behaviors and sleep patterns, and improved caloric intake. Parental stress perception was also observed to decrease. Family interaction is an important aspect of an infant’s development and music, specifically live music, may be used to
support bonding and cohesion of family members. A “song of kin,” was assessed and used to support bonding.

Carolann, Barry, Gamble, Turner, and Mascareñas (2012) found that pregnant women experienced music emotionally with three themes: Beyond words, a balm for the soul, and music for facilitation of infant development. One participant’s account of becoming engaged in singing describes the change in meaning of the lullaby stating, “…it went from a melody with some nice words into a vocalization of some of the love of the relationship between us and the children we were due to have,” (p. 323). Some of the women also described experiences of singing post-partum, describing their infants reactions of turning eye gaze to the mother, responding to specific tunes and showing a preference. It was found that the women expressed deep emotion that was difficult to articulate verbally and all the women noted a reduction of stress and improved relaxation.

Cevasco (2006) recorded parents’ voices to play for infants when they were unable to visit the NICU. Mothers who used music worried less about their babies and did not cry as often in sadness. Mothers not using music reported high scores in the Month-Infant Bonding Scale while mothers using music indicated a higher mean score in ability to calm their infant. Mothers who were taught music most often used this during quiet time to calm fussy infants and indicated a greater belief in the importance of music.

Filippa, Devouche, Arioni, Imbert and Gratier’s (2013) use of live maternal speech and singing was implemented while observing the infants’ heart rate, oxygen saturation, and medically significant events such as hypoxia and bradycardia. Infants were tested over a period of six days, measuring baseline (with no stimuli), mother’s singing, and mother’s speech. Filippa et al. found that heart rate significantly increased when presented with both speech and
singing as well an increase in oxygen saturation. It was also seen that fewer medically critical events appeared during both speech and singing. Quiet awake states appeared higher during speech, and lower in baseline when exposed to silence. The findings suggest that maternal speech and singing can significantly increase oxygen saturation, and provide meaningful, stimulation to positively activate the infant. Mothers who were taught to use singing may prevent the risk of non-contingent overstimulation. It is also suggested that while maternal speech can induce quiet alert states in infants, maternal singing may maintain an active sleep state. These states are preferred as most of the infant’s physical growth and neurological development occurs during these states.

**Infant Directed Lullaby**

Infant directed speech (also known as *motherese*) is defined as specific vocal registers that caregivers use when speaking to infants (Edwards, 2011). These are typically characterized by slowed and elongated vocal contours, often in a higher register. Many caregivers will use this instinctively when interacting with infants. This distinction in pitch variation remains across cultures often to communicate specific meaning including encouraging arousal and to soothe. These same characteristics are used to described infant directed singing as they are applied to musical interactions. De L’Etoile (2006) found that infants who are between six and nine months old demonstrated increased attention and arousal with infant directed singing and decreased infant vocal behaviors. In the case of selecting infant directed singing versus the current topic, IDL, it is a matter of the elements of the music.

Infant directed lullaby (IDL) is similar to infant directed singing and *motherese* in that it uses slow, elongated vocal contours but may vary in vocal register, resting in a moderate to high vocal range (varying based on a parent’s natural vocal range). Lullaby is defined by the
Cambridge Dictionary (July 9, 18) as “a quiet song that is sung to children to help them go to sleep,” and the purpose of the music is not to encourage arousal but to encourage rest. Additionally, “Lullabies are simple musical structures that infants can clearly differentiate, comprising lower pitch and slower tempo that are used and recognized across cultures,” (Arnon 2011, p. 184). Using the parent’s preferred language will offer comfort to the parent and provide consistency in language presented to the infant through their development.

Kisilevsky et al. (2008) found that fetuses demonstrated a significant increase in heart rate when introduced to their mother’s speaking voice as compared to a stranger’s speaking voice, which had no significant change. This suggests that fetuses remained alert in response to the mother’s voice once familiarized. Over an extended period of time, fetuses that were exposed to their mother’s voice demonstrated a significant increase in heart rate as compared to a stranger’s voice. Of Garunkstiene, Buinauskiene, Uloziene, and Markuniene’s (2014) three conditions, live music provided the most significant decrease in heart rate as well as infant behavioral states; infants remained longer in deeper sleep state. Though recorded music also trended in a decrease of heart rate, the change was less significant than that of live music. Both live and recorded music significantly reduced infant heart rates compared to a no music condition.

Arnon (2011) suggests that preferred delivery method of music is live singing, particularly by the mother as infants begin to differentiate and recognize voices as early as 24 gestational weeks. Live singing can be adjusted in the moment through volume and tempo as well as spontaneous incorporation of the infant’s name or breath entrainment. Because parents are not always able to be present in the NICU, the parents in this researchers current
investigation were offered three varying methods to use IDL: live singing, their recorded voice, or the researcher’s recorded voice.

**Purpose of Current Investigation**

The purpose of this study was to investigate the effectiveness of parent-delivered IDL on attachment and parenting stress. Additionally, differences in maternal attachment and parenting stress were observed through method of delivery and frequency of use as well as parent satisfaction with IDL. The researcher aimed to follow parents of neonatal intensive care infants over a period of time after teaching them to use the intervention infant directed lullaby (IDL). Repeated measures were used to determine change in level of attachment and parenting stress during infants’ stay in the NICU and through their transition home. The study seeks to shed new light on parent learning and independent implementation of infant directed lullaby (IDL). Bonding was measured using the Maternal Attachment Inventory (MAI) while parenting stress was measured using the Parenting Stress Index (PSI-SF) short form. Parent perceptions of the intervention were measured through the Intervention Rating Profile (IRP), adapted for use with parents of NICU infants and this specific intervention. Delivery method for the infant directed lullaby and the length of use (including date of use, start, and end times) were collected through parent-completed calendars provided at the start of the study.
Chapter 3: Methodology

Setting and Participants

The research took place in a small not-for-profit community hospital in an urban area with a 30-bed, level III NICU. NICU levels are determined by level of care needed ranging from one (minimal newborn nursery care) to four (complex surgical and subspecialty needs). Curtains separate cribs and isolettes and parents are given additional privacy using portable screens.

Participants were eight mothers over the age of 18 years with infants admitted to the NICU. Infants were at least 32 weeks gestational age or older and were required to be medically stable for parent participation and no parents of twins were admitted to this study. Caregivers were required to have consistent contact with the infant and spend a minimum of four days a week in the NICU with their infant. All families agreed to participate in the study and signed informed consent forms, including an agreement to be contacted after discharge and visited in their homes. Demographic information collected included mother’s age and number of children including the infant admitted to NICU. No fathers or other guardians participated in this study though some fathers were present during the initial meetings and learning of IDL.

Two participants completed only the first measures following the signing of informed consent. Both families terminated contact after their infant’s discharge from the NICU. These two participants completed the MAI and PSI initial measures and provided demographic information including age, number of children, and a method of delivery. Two participants concluded the study early due to a change in their infant’s medical status and transfer to another medical center. One participant completed two sets of measures, concluding the study early due to difficulty finding time to meet. Two of the three sets of repeated measures were taken for
these participants including the MAI, PSI, and the IRP and one of these participants submitted the intervention use calendar. Three participants completed the study in full including the measures MAI, PSI, and IRP and these three participants completed the intervention use calendar.

**Equipment**

Parents were given three methods of delivery (parent live singing, parent recording, and researcher recording), two of which required use of a CD player with a TTSAM mini portable 3.5 mm pillow dual speakers. The dual speakers were chosen to prevent the infant from turning to their side while music was provided. The GPX battery powered personal CD player was used to play recordings of either the therapist singing or the parent singing their preferred song. AA batteries were used to power the CD player. To assist families in selecting a lullaby, a booklet of songs was shared with them containing the following lullabies: “Twinkle, Twinkle Little Star,” “All The Pretty Little Horses,” “Mary Had A Little Lamb,” “You Are My Sunshine,” “Hush Little Baby,” “Lavender’s Blue,” “Arrorró My Nene,” “Las Mañanitas,” “Xiao Yàn Zi,” “月光, 照地堂,” and “Au Clair De La Lune.” The lullabies were selected based on their rhythmic and melodic simplicity. Recordings were made on a MacBook Pro using GarageBand and were burned to a blank CD using iTunes. All participants were provided a clipboard and pen, which was left with their infant’s crib. On one occasion this was misplaced due to changing of isolette to open crib where the clipboard was left with the isolette when the infant moved to a crib. This will be discussed in more detail in the discussion section.

**Research Design**

Modified single-subject design was selected because of the limited number of parents with NICU infants available. Medical needs of infants affected families’ ability to participate
and to what extent they were able to continue in the study. Single-subject design gives researchers the opportunity to observe individuals’ responses to interventions (like IDL) and then make reasonable cause-and-effect conclusions without needing to employ a large sample (McMillan & Schumacher, 2010). Following multiple single-subjects and using non-traditional repeated measures, changes from baseline, taken while admitted to NICU, were determined based on the parents’ attachment and parenting stress during their infants’ hospitalization and following their transition into the home.

In the current study, the use of IDL is considered the independent variable, the effects of which are studied with regard to maternal attachment and parenting stress (the dependent variables). Additionally, acceptability is being examined as a potential moderator of the effects of IDL on both maternal attachment and parenting stress. Maternal attachment and parenting stress was calculated through three repeated measures to determine a change over varying periods of time. Time depended on the families’ infant’s length of stay in the hospital plus four weeks following their infant’s discharge and families were encouraged to implement IDL as frequently as they desired. Frequency varied among participants, as there was no predetermined number of times given by the researcher to families regarding the use of IDL.

**Measures**

**Attachment.** Attachment was measured using the Maternal Attachment Inventory (MAI). This measure was designed to be a feasible and cost effective way for researchers to estimate affectionate attachment between a mother and her infant. Developed by Mary Muller (1994), the MAI is a 26-question, self-report questionnaire using a 4-point scale (almost always [4], often [3], sometimes [2], almost never [1]) with higher total equating higher attachment with a range in raw score from 26 to 104. Müller (1994) examined the MAI’s reliability (a gauge of
consistency and a measure’s relative freedom from error) using Cronbach’s alpha (a measure of internal consistency), which fell into the acceptable range (0.85). Validity (accuracy of measurement) found convergent evidence when compared to three other self-report measures, the HIFBN (How I Feel About my Baby Now), PPMAMA (postpartum version of the Maternal Attitudes and Maternal Adjustment Scale), and the MSAS (Maternal Separation Anxiety Scale). Correlation coefficients fell within acceptable limits (HIFBN, $r=.45$; MSAS, $r=.46$; PPMAMA, $r=.30$). No evidence was found for construct validity based on structure for the version of the MAI used in the current study; however, Shin and Kim (2007) conducted a factor analysis on the Korean version, which supported a three-factor structure ([1]desire for proximity, [2]feelings during interaction, and [3]identification of infant needs) as well as the total score. The strength in correlations demonstrates the validity of the MAI as an instrument to measure maternal affectionate attachment.

**Parenting stress.** The Parenting Stress Index- Short Form (PSI-SF; Abidin, 2012) was used to measure parenting stress. The PSI-SF is a 36-item self-report questionnaire of parenting stress with three subscales: Parental distress, parent-child dysfunctional interaction, and difficult child and a Total Stress scale with scores reported in percentiles (Mckelvey et al., 2009). The scoring is indicated through percentiles in that the higher the percentile score the more likely parenting stress is. Normative parenting stress percentiles fall within 15% to 80%. In general, items are scored using the following 5-point scale: (1) SA (Strongly Agree); (2) A (Agree); (3) NS (Not Sure); (4) D (Disagree); (5) SD (Strongly Disagree). Reliability based on internal consistency used Cronbach’s alpha to find coefficients at .91 for Total Stress, with subscales at .87 for parental distress (PD), .80 for parent-child dysfunctional interaction (PCDI), and .85 for...
difficult child (DC) (Abidin, 2012). Test-retest reliability was determined with correlation coefficients $r=.84$ in total score and $r=.85$ in PD, $r=.68$ in PCDI, and $r=.78$ in DC.

In determining validity, the PSI-4-SF has been found to correlate with the PSI-4 (full form) yielding a validity coefficient of .98. Validity in structure was determined using “a factor analysis with a varimax rotation and three factors specified for extraction was conducted on the PSI-4-SF items using the PSI-4 standardization sample,” (Abidin, 2012, p.62). Loadings for each factor ranged between .72 and .48 for PD, .71 and .41 for PCDI, and .72 and .42 for DC.

**Intervention acceptability rating.** The Intervention Rating Profile (IRP) is a measure designed to determine the effectiveness of an intervention based on participant self-report. The IRP was developed to extend research in treatment acceptability to educational treatments and make practitioners more aware of interventions considered acceptable by teachers (Martens, Witt, Elliott & Darveaux, 1985; Ozdemir, 2008). It consists of 15 items that are rated using a six-point Likert type format. The item scales range from 1 (strongly disagree) to 6 (strongly agree). Total scores are obtained by summing all items with higher raw scores indicating greater levels of intervention acceptability with a range of 15-90. According to Martens and colleagues (1985), the internal consistency of this instrument was reported to be .98 using Cronbach’s alpha. For the purpose of this study, the wording on items has been adapted to reflect IDL. A place for narrative comments was included on the IRP to provide participants with an opportunity to ask questions, voice concerns, or express thoughts regarding IDL.

**Infant Directed Lullaby**

IDL is described as lullaby used in direct interaction with an infant with the following characteristics: raised pitch, increased emotional quality in the voice, and a slowed tempo. The researcher modeled to the parents facing their infant either while holding or while the infant lays
in their crib with consistent eye contact while providing IDL. The intervention, IDL, is designed to be used specifically by parents either in a live format with the parent singing, a recording of the parent’s voice, or a recording of a clinicians voice that it played by the parent during parent and infant interactions. The variety in method of delivery provides parents with a choice in how they would best wish to interact with the infant.

The song choices provided to parents, listed in equipment (pg. 35) were selected for their simplicity, including a melody with step-wise movement between intervals and simple rhythms. This reduces the risk of overstimulation to the infant and also provides simplicity to families incorporating the music, particularly those who are using live singing. The intention of having options in varying languages was to offer the opportunity for families to incorporate their preferred language as infants’ hearing development between 30 and 35 weeks gestational age will begin to differentiate between familiar languages (Gooding, 2010).

**Procedure**

The researcher met with the families for an initial screening and determined a lullaby, a method of delivery (live parents voice, parent’s voice recorded, researcher’s voice recorded), completed two study measures (MAI, PSI), and provided a calendar for families to complete (including dates and times) for delivery of the intervention. While using IDL, families were trained to either hold their infant while facilitating eye contact or use eye contact and touch if the infant in laying in a crib. The families were asked to use this calendar to record when they used IDL with their infant and were not given a specific frequency or length of time to use the intervention outside of a note suggesting no more than 30 consecutive minutes and no more than three times a day to reduce the risk of overstimulation. In both the first and second meetings, the researcher taught and reviewed the families’ use of IDL while using their selected lullaby. When
a recording was chosen for method of delivery, the researcher showed mothers how to set the volume to an appropriate decibel level and assisted them in setting the speakers at the infant’s shoulders. All lullabies were implemented a cappella (live and recorded). During subsequent meetings, the families was asked to demonstrate using the lullaby while the researcher observed and provided feedback on implementation. This observation was done casually to promote a feeling of comfort for the mother. These meetings occurred as frequently as necessary or when the mother requested.

Prior to expected discharge (as close to discharge as possible), the researcher re-administered the MAI and PSI and administered the IRP. Timing varied between the first and second set of measures as each family’s length of stay in the NICU varied. A table can be found in Appendix I showing the varied length of time between measures for each family. Because of various time constraints, families were given the option of completing the forms verbally over the phone or in an in-person meeting. This occurred when an infant was discharged before the second measures were completed or mothers had difficulty meeting either in the NICU or at home. Families were encouraged to continue to use infant directed lullaby after discharge and were encouraged to continue to record the intervention use through the calendar given. The researcher followed up with families in their home approximately four weeks after discharge to re-administer the MAI, PSI, and IRP. Following the completion of the third measures, the participants were finished with the study. A graphic timeline is presented in the Figure 1 below.
Figure 1. A graphic timeline of the research procedures

- **Initial meeting**
  - MAI, PSI completed
  - Teaching of IDL occurred
  - Parents are given use calendar

- **Subsequent meetings took place**
  - Check-in and observation of IDL use

- **Meeting at infant's discharge**
  - MAI, PSI, IRP completed

- **Final meeting approximately four weeks after discharge**
  - MAI, PSI, and IRP completed
  - Collection of use calendar
Chapter 4: Results

Working with different families provided a unique opportunity for the researcher to observe different variations in family structure and circumstances that point to differences in perception of attachment and perceptions in parenting stress. The families described below demonstrated variations in many aspects of use with IDL including their perceptions of attachment, stress, and acceptance of the intervention. Scores for the MAI and IRP are the families’ raw scores and PSI scores are reported in percentiles. For score ranges, consult the instrumentation section found within chapter three.

Participant Characteristics

Of the eight families that consented to participate, three completed the study in full. Two families ended participation following the initial meeting and three families completed the second set of measures before ending participation. All participants were mothers between the ages of 20 and 40 years and all the mothers spoke English. While some mothers demonstrated an understanding and use of other languages, all selected English language lullabies. Number of children ranged from one to four and method of delivery varied between families as well. Refer to characteristics in Table 1 for more information about the participating dyads.

Family A. This mother completed the forms during the first meeting, following the signing of the informed consent. The first meeting took place at the infant’s bedside in the NICU. This mother (23 years old) stated that this was her first baby. Family A selected parent singing as method of delivery and requested to practice multiple songs with the researcher. When presented with a book of eleven songs, Family A chose three (“Twinkle, Twinkle, Little Star,” “Hush Little Baby,” and “You Are My Sunshine”) and engaged in singing with the
Table 1.

*Family Characteristics*

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Gender (n = 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>100%</td>
</tr>
<tr>
<td>Age Category (n = 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 to 23 years</td>
<td>1</td>
<td>12.5%</td>
</tr>
<tr>
<td>24 to 28 years</td>
<td>3</td>
<td>37.5%</td>
</tr>
<tr>
<td>29 to 34 years</td>
<td>2</td>
<td>25%</td>
</tr>
<tr>
<td>35 or more years</td>
<td>2</td>
<td>25%</td>
</tr>
<tr>
<td>Number of Children (n = 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 child</td>
<td>5</td>
<td>62.5%</td>
</tr>
<tr>
<td>2 children</td>
<td>2</td>
<td>25%</td>
</tr>
<tr>
<td>3 or more children</td>
<td>1</td>
<td>12.5%</td>
</tr>
<tr>
<td>Method of Delivery (n = 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>parent live singing</td>
<td>4</td>
<td>50%</td>
</tr>
<tr>
<td>parent recording</td>
<td>1</td>
<td>12.5%</td>
</tr>
<tr>
<td>researcher recording</td>
<td>3</td>
<td>37.5%</td>
</tr>
<tr>
<td>Number of Times Measures Completed (n = 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (MAI, PSI)</td>
<td>2</td>
<td>25%</td>
</tr>
<tr>
<td>2 (MAI, PSI, IRP)</td>
<td>3</td>
<td>37.5%</td>
</tr>
<tr>
<td>3 (MAI, PSI, IRP)</td>
<td>3</td>
<td>37.5%</td>
</tr>
<tr>
<td>Lullaby Selected (n = 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“You Are My Sunshine”*</td>
<td>6</td>
<td>75%</td>
</tr>
<tr>
<td>“Twinkle Twinkle Little Star”*</td>
<td>1</td>
<td>12.5%</td>
</tr>
<tr>
<td>“All The Pretty Little Horses”</td>
<td>1</td>
<td>12.5%</td>
</tr>
<tr>
<td>“Hush Little Baby”*</td>
<td>1</td>
<td>12.5%</td>
</tr>
<tr>
<td>“You Have Won The Victory”</td>
<td>1</td>
<td>12.5%</td>
</tr>
</tbody>
</table>

*Family A selected three lullabies

researcher. Following singing each song one time, this mother stated that she felt comfortable continuing on her own. This mother completed one set of measures. Regarding the MAI, the mother finished the measure completely (MAI=102/104) including incorporating her own
answers to questions such as "most proud mama," "[being a parent is] the best thing ever," and "[I watch my baby sleep] for hours." The PSI results (PSI=48) placed this mother within the 8th percentile for parenting stress. On this measure, the mother declined to respond to one question. When asked to count the number of things their baby does that bother them, she stated none and handwrote “0.” The IRP was not completed by this mother and no additional comments were provided. The intervention use calendar was not completed by Family A and frequency of use is unknown. Following their infant’s discharge from the NICU, attempted communication via phone call was not answered or returned.

**Family B.** These parents met with the researcher as a dyad. The mother (28 years old) completed one set of measures in the presence of the father and shared that this was their first baby. The first meeting took place at their infant’s bedside in the NICU. Together they discussed a personally selected song (“You Have Won the Victory”), which they requested as a therapist recording for method of delivery. The MAI was completed (MAI=98/104) and PSI (PSI=90) fell within the 72nd percentile. This family did not complete the IRP. The family was given the intervention use calendar, which was collected following their infant’s discharge without being completed. In following up with this family after their infant’s discharge, the researcher attempted communication via phone call. Phone calls were not answered or returned.

**Family C.** Family C completed two of the three sets of measures. The first meeting took place at the infant’s bedside in the NICU. The mother (26 years old) completed the forms and selected therapist recording of “You Are My Sunshine,” as the method of delivery. This was the mother’s fourth child. Regarding the MAI and PSI, two measures were taken and are presented in Figure 2.
Figure 2. Family C Results.
PD as parental distress, P-CDI as parent child dysfunctional interaction, DC as difficult child

The second set of measures was administered over the phone as this mother expressed difficulty finding a time to meet in person. It is noted that both scores from the PSI were observed as defensive responding and placed the mother within the 6th percentile of parenting stress and scores from the PSI remained stable with small decrease in the PD subscale. The IRP indicated a score of 84 in relation to acceptance of the intervention. This mother made the following comment in regards to the music: “You are amazing! He loves it.” This mother did not return the intervention use calendar.

Family D. These parents completed two of the three sets of measures. The mother (31 years old) completed the forms with the father present while at their infant’s beside in the NICU and stated that this was their first baby. The mother selected parent recording of “You Are My Sunshine,” and both parents were present while learning to use the intervention. The mother’s
voice was recorded while holding the infant. Regarding the MAI and PSI, two measures were taken and are presented in Figure 3.

![Figure 3: Family D Results](image)

The second set of measures was taken at the bedside in the NICU prior to their infant’s transfer to a secondary hospital. The scores from the PSI placed the family in the 54th percentile (T1) and 46th percentile (T2). The IRP indicated a score of 72 related to acceptance of the intervention. The family ended the study early because of a change in their infant’s medical status and a transfer of their infant to a secondary hospital. When asked to comment on the intervention the mother stated, “I really enjoyed the lullaby study. When I couldn’t be here with him, it was nice to know they could play that [CD] and he would still be able to hear my voice.” Through the intervention use calendar, this family tracked use seven times totaling 230 minutes of music.
Family D also provided some comments. This information is shown in Appendix D. The final set of measures was not completed. Family D’s infant was transferred to another hospital and chose to end participation in the study at that time.

Family E. Family E completed two of the three sets of measures, the mother (36 years old) completed all forms. This infant was the second of two children. In each meeting with the researcher only the mother was present including during the teaching of IDL. This mother selected parent singing of “You Are My Sunshine,” as method of delivery and engaged in learning and demonstrating IDL use during the first and subsequent meetings following. Regarding the MAI and PSI, information is presented in Figure 4.

![Figure 4. Family E Results](image)
This family had the longest period between measures (65 days). Their infant remained admitted to NICU for the duration of the study and the family chose to end participation early as their infant was transferred to a different hospital due to a change in medical status. The second set of measures was taken over the phone following the infant’s transfer. The PSI percentiles showed an overall decrease, remaining within the normative percentiles with the largest decrease in the DC subscale. The IRP indicated a score of 90 in relation to acceptance of the intervention with the mother stating in the optional comment section, “It was very beneficial. They raved in [the new hospital] about how social she was. Music really helped that. I appreciate it.” The intervention use calendar was completed but was not returned to the researcher due to being misplaced during their infant’s transfer.

**Family F.** This family completed all three sets of measures. The mother (35 years old) completed all forms and was the only parent present for learning IDL and implementing the intervention at their infant’s bedside in the NICU. This infant was the second of two children. The second set of measures, the shortest time of the six families at 10 days, was completed over the phone and the third set of measures was completed in the family’s home. This mother selected parent live singing of “You Are My Sunshine,” as method of delivery. Regarding the MAI and PSI, the three measures taken are presented below in Figure 5.

Scoring of the PSI indicated this mother to be in the 50th percentile (T1), 60th percentile (T2), and 68th percentile (T3), with an increase in overall percentile scores and the subscales P-CDI and DC. The IRP indicated a score of 83 initially to a final score of 88 in relation to acceptance of the intervention in the final measures. On the initial IRP this mother stated, “Cool research. Totally agree with it,” in the comments section provided. On the final IRP completed, Family F stated, “I sang to him at least four to six times a day. Great intervention.” This mother
had stopped using the intervention use calendar after her infant was discharged from the hospital and included the comment. During Family F’s time in NICU, it was reported that IDL was used eleven times totaling 36 minutes. This information is presented in Appendix E.

**Family G.** The mother and father were both present during the initial meeting and were given the opportunity to learn implementation of IDL, which took place at their infant’s bedside in the NICU. The mother (28 years old) completed all forms during their participation, and selected therapist recording of “All The Pretty Little Horses,” as method of delivery. They indicated that this was their first child. Regarding the MAI and PSI, all three sets of measures were taken and can be seen in Figure 6.

The second and third set of measures was completed in the family’s home with PSI percentiles remaining in a normative range and showing a small decrease in overall parenting
stress percentiles. The initial IRP indicated a score of 81 with an increase to 88 on the final measure. Family G chose to comment on the final IRP measure, stating, “If you play it enough, it gives them [infants] a sense of comfort.” The intervention use calendar was completed and returned to the researcher indicating a use of eleven times and a total of 196 minutes. Comments and detailed dates and times can be found in Appendix F.

**Family H.** For this family, both the mother and father were present at the time IDL was introduced and both parents were given the opportunity to learn the intervention. The mother (31 years old) completed the measures as well as shared that this was their first baby. These were completed at their infant’s bedside in the NICU. She selected parent live singing of “You Are My Sunshine,” as method of delivery. The second set of measures was taken in their infant’s bedside in the NICU and the third set of measures was completed in the family’s home. Regarding the MAI and PSI, all three sets of measures were taken and can be seen in Figure 7.
The initial IRP score was 85 with an increase to 89. On the initial IRP, Family H wrote the following: “When we were playing lullaby for her when she seems fussy, it would stop her and you could see she was listening.” This family chose not to comment on the second IRP. The completed intervention use calendar demonstrated use of the intervention sixteen times with a total of 295 minutes. Comments with corresponding dates and times can be found in Appendix G.

Figure 7. Family H Results

**Research Purposes**

Research purpose #1. Identify the effectiveness of IDL in a clinical environment on parent bonding as measured by the Maternal Attachment Inventory. The first research
purpose involved exploring the effectiveness of IDL in terms of maternal attachment using the MAI. Trends in the data showed two families with small increases in attachment and one family with small decrease in attachment. There was not a consistent trend observed across the three families for whom data from all three measures were available. The trend in the data regarding families who completed only two of the three measures were similar to families who completed the three measures. Two families showed small increases in attachment and one family showed a small decrease in attachment.

Research purpose #2. Identify the impact of IDL on parenting stress as measured by the Parenting Stress Index. This research purpose related to how IDL impacted parenting stress as measured by the PSI. Trends in data show that a majority of parent participants fell within typical parenting stress percentiles. Of the three families that completed all three measures, one family evidenced defensive response style at the second and third measures and one family demonstrated defensive responding at the third measure. Defensive responding may indicate a family’s attempt to minimize stress, indicate that they may not be as invested in their role as a parent, or indicate perceived competency in handling parenting responsibilities and relationships (Abidin, 2012). Of the three families that completed two of the three measures, one family demonstrated defensive scoring in both measures falling within the 6th percentile for both scores.

Research purpose #3. Identify differences in maternal bonding using the MAI as a function of delivery method (i.e., live versus recorded music). This research purpose involved identifying differences in attachment when compared to the function of delivery. Of the eight families that participated four of the eight (50%) selected live parent singing, three of the eight (37.5%) selected therapist recording, and one of the eight (12.5%) selected parent
recording. Trend in data is varied for the three families who completed all measures. Two families selected parent live singing and one therapist recording. Of the three families that completed two of the three measures, each selected a different function of delivery. The two families who selected therapist recording differed in MAI scores with one decreasing and one increasing. Only one family selected parent recording and demonstrated a small increase in MAI scores. Of the three families who selected parent live singing, one mother evidenced a decrease while two reported small increases. The data collected on this variable did not indicate much change is not necessarily meaningful in IDL’s support of attachment.

**Research purpose #4. Identify differences in parenting stress using the PSI as a function of delivery method.** This purpose involved examining parenting stress as a function of delivery (live versus recorded music). Of the eight families that participated four of the families (50%) selected live parent singing, three of the families (37.5%) selected therapist recording, and one of the families (12.5%) selected parent recording. Outcomes for families that completed two and three measures evidenced outcomes suggesting that a greater number of families who used either live singing or their own recording (3/6) showed a small decrease in parenting stress. Conversely, one family using live singing showed an increase in parenting stress. Data is not necessarily meaningful regarding method of delivery as not much change was indicated and there was much variation between families.

**Research purpose #5. Identify changes in maternal bonding using the MAI as related to frequency of IDL use.** This research purpose involved examining maternal attachment as it relates to frequency of IDL use. Families used IDL an average of 11.25 times for an average of 18.09 minutes each time. Four of the eight intervention calendars were returned. Small increases in attachment were observed in Family D who used IDL seven times for a total
230 minutes, Family G who used IDL eleven times for a total of 196 minutes, and Family H who used IDL sixteen times for a total of 295 minutes. A small decrease in attachment was seen in Family F who used IDL eleven times for a total of 36 minutes.

**Research purpose #6. Identify changes in parenting stress using the PSI as related to frequency of IDL use.** The next research purpose involved identifying differences in parenting stress related to family-reported use of IDL. Families used IDL an average of 11.25 times for an average of 18.09 minutes each time. Family D and Family H reported a decrease in parenting stress while increases were observed for Family F and Family G. Families F and G both indicated they used the intervention eleven times with variation in number of minutes used. There was no direct correlation between frequency of use and changes in parenting stress. Frequency and length of time is shown in Table 2.

**Research purpose #7. Identify parental satisfaction with IDL using the IRP.** The last purpose involved exploring parental satisfaction with IDL using the IRP. The IRP was adapted to reflect satisfaction with IDL and included a section for written comments. Family scores ranged from 72 to 90 and are presented with comments made by the families in Appendix H. Families whose attachment increased and parenting stress decreased showed different levels of acceptance. Comments varied from families and some families spoke about the study itself stating, “I really enjoyed the lullaby study.

When I couldn’t be here with him it was nice to know they could play that and he would still be able to hear my voice,” and “Cool research. Totally agree with it.” Other families stated, “If you play it enough it gives them a sense of comfort,” and “When we were playing lullaby for her when she seems fussy, it would stop her and you could see she was listening.”
Table 2.

*Frequency and Length of Time in regards to IDL use*

<table>
<thead>
<tr>
<th>Family</th>
<th>Frequency of Use</th>
<th>Minutes of Use</th>
<th>MAI Time 1</th>
<th>MAI Time 2</th>
<th>MAI Time 3</th>
<th>PSI Percentiles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time 1</td>
</tr>
<tr>
<td>Family D</td>
<td>7</td>
<td>230</td>
<td>102</td>
<td>103</td>
<td>54</td>
<td>46</td>
</tr>
<tr>
<td>Family F</td>
<td>11</td>
<td>36</td>
<td>103</td>
<td>102</td>
<td>99</td>
<td>50</td>
</tr>
<tr>
<td>Family G</td>
<td>11</td>
<td>196</td>
<td>103</td>
<td>104</td>
<td>104</td>
<td>6</td>
</tr>
<tr>
<td>Family H</td>
<td>16</td>
<td>295</td>
<td>99</td>
<td>99</td>
<td>101</td>
<td>34</td>
</tr>
</tbody>
</table>
Chapter 5: Discussion

The purpose of this study was to determine the effectiveness of IDL on a clinical population of parents of NICU infants. Using a modified single-subject design, the families were trained to use IDL independently over a period of time with repeated measures occurring just prior to their infant’s discharge from the hospital and then again four weeks after their return home. Of the six families implementing IDL, three evidenced changes in maternal attachment and parenting stress in the desired therapeutic direction while two changed opposite of the desired change and one remained the same in measures. The following elaborates on some of the differences between families that participated in this study and describes possible threats to validity that may have affected the study’s outcome.

Maternal Attachment

Findings in attachment for mothers using IDL did not demonstrate change in a way that was anticipated by the researcher. Attachment scores began high and remained at this level. There is a possibility that high attachment scores were identified because parents were healthy adults. Healthy adults may provide higher scores at baseline with little room for improvement when introduced to treatment. This is also known as a ceiling effect, in which there is a limited range of possible change and the maximum level of effect has been reached. Had the study included families at risk of developing disorganized attachment there may have been more variation in the repeated measures. Findings were inconsistent in regards to method of delivery though data suggests that parents who used either live singing or a recording of their own voice increased in attachment more frequently than those who selected a therapist recording.

Maturation also needs to be considered when discussing attachment. As a mother spends time
with their baby following the infant’s birth, there is a naturally occurring bond. This bond is strengthened with the naturally increasing time a mother spends with their baby (Mirecki & Chou, 2013). As the infant develops, their needs will change, as will the parent’s responses to these needs. Families that evidenced lower attachment with trends towards increased attachment may have had this change occur naturally through maturation and not because of the effect of IDL. Should research choose to measure attachment, use of a randomized controlled trial design or a staggered baseline should be considered to control for naturally occurring maturation.

The measure used was self-report and would vary based on the family’s perspective of their attachment to their infant, not necessarily the behaviors that were occurring. The families’ perspectives may be skewed by their own judgment. Social desirability, an individual’s propensity to answer questions in a way that appears desirable to others, may have played a role in family responses to the MAI in order to look normal or appear to be good parents. Additionally, Family A included supplementary comments when completing the MAI. When asked to number what their child does that they dislike they declined to select a response as none of the possible items included zero. There is concern that the family did not respond in a frank manner, which could be due to issues in instrumentation or subject effects. It should be noted that this was Family A’s first child and they may have wanted to appear competent to the researcher and the NICU staff. Cevasco (2006) found that mothers who were in the experimental group reported similar scores in attachment when compared to mothers who were in the control group. Mothers who were in the experimental group demonstrated higher scores in nurturing their infant while control group mothers reported a high overall score in attachment. These findings are similar to the findings in the present study in that there was little difference between experimental and control groups and mothers scored themselves high on the Mother-Infant
Bonding Scale. Changes to the intervention, including length of time spent with parents teaching and assisting should be considered. Parents required different levels of assistance in learning their selected lullaby. Using a different measure should be considered when replicating this study. The MAI provides an accurate description of maternal affectionate attachment though healthy mothers will typically score higher providing little room for improvement. Incorporating a measure that uses behavioral observation may be more effective in identifying maternal attachment. Cevasco’s incorporation of personalized lullabies should be considered in further supporting attachment. She found that parents who used personalized CDs may offer more meaningful interaction between mothers and infants such as Loewy’s (2015) findings that indicated “song of kin” and familiar melodies are helpful to parents in identifying meaningful experiences.

**Parenting Stress**

There was some variability in parenting stress with scores both decreasing and increasing over time, which may be due to any number of factors (e.g. discharge to home, change in medical status, return to work, etc.). Families D and H both evidenced a decrease in parenting stress and were the families to report the highest length of time IDL was used. Families E and H demonstrated a decrease in parenting stress score within the repeated measures which shows similarity in results to Loewy (2015), who found that after using a preferred lullaby or “song of kin,” parents demonstrated a decrease in stress. Some families experienced an increase in stress such as Family G who began to decrease in parenting stress scores from measures one to two then increased in stress with measure three. One possibility for this outcome might be the transition from hospital to home occurring between measures two and three. Family F demonstrated a unique visual relationship between the MAI and PSI scores. As parenting stress
increased for this maternal attachment decreased. The opposite occurred for Family D within the two completed measures. When parenting stress decreased, attachment increased. It is noted that movement in scores was small and the trend in the visual relationship showed no significant change. One family’s unique response was also indicated. Family A declined to respond to one of the questions on the PSI. The question asked the family to indicate the number of things their child does that bothers them but they instead chose to write in their own answer of “0” as the options available ranged from 1 and up.

One of the most notable trends among subscales in the PSI was parental distress. With the exception of Family F, parental distress (PD) decreased with each time of measurement. Improving the psychological health of mothers may improve their relationship with their infant (Holditch et al., 2014). This might suggest that IDL was more effective in changing PD than overall parenting stress and the other subscales. Reducing the risk of a mother’s distress may reduce the infant’s distress as well as improve the relationship between them.

Many families commented on the questions on the PSI. Some of the questions were generalized towards behaviors of older children and did not necessarily reflect behaviors that would occur in infants. Families were told to answer to the best of their ability, however, families who had older children answered many questions in a way that reflected their older children and not their NICU infant while those who only had one child were unable to do so. Researchers hoping to use this measure should consider the age of the children that parents are reporting on, as some questions may not accurately represent the developmental stage for the families’ children.
Intervention Acceptability

Many families rated IDL high in acceptability. Comments made about the intervention were positive overall. One family rated the intervention with acceptance of 90. This rating is important to note as this family, Family E, demonstrated increased attachment and decreased parenting stress but the researcher suggests caution in relating this to anything regarding frequency of use or length of time used as frequency of use was unknown with Family E since the calendar was not returned to the researcher. Family D, however, scored a 72 on the IRP and also experienced increased attachment and decreased parenting stress, which follows a similar trend as Family E. Family D also was the only family to select parent recording as method of delivery, which could indicate that families’ responses were influenced by something outside the control of the researcher or that the perspectives of acceptance vary from person to person.

Families that used live singing (Families E, F, and H) rated IDL the highest (90, 83, 85) of the six families that completed the IRP. Families that used the therapist recording (Families C and G) scored 84 and 81 in acceptance. There was an average of 6.33 point increase in acceptability with families that completed the IRP two times. While this may not be a significant finding, it could indicate a trend towards more acceptance of IDL when there is increased use.

Individual items on the IRP might be considered for differences among families. Most families indicated that they would be willing to incorporate IDL at home and felt that IDL was effective in calming their baby. Differently, Family G indicated a change from “strongly agree,” in the second set of measures to “slightly agree,” in the third set of measures when asked if IDL effectively calmed their baby. Since the first IRP for Family G was taken prior to their infant’s discharge and the second was taken at home, it is possible that the change in environment had an effect on the mother’s engagement and the infant’s responses. Both families F and G indicated
that they felt more stress using IDL the first time they completed the IRP with the second time stating that they did not feel stress when using IDL. This is interesting in that Family F’s scoring on the MAI and PSI moved opposite of what was expected by the researcher. There is a possibility that Family F continued to experience some stress when using the intervention, which effected their attachment and parenting stress scores as well as prevented them from using IDL more frequently.

Adherence to the intervention use calendar might indicate a clearer relationship between frequency of use and length of time use as we as support a connection to maternal attachment and parenting stress. Coupling of intervention acceptability and frequency of use may also provide insight into intervention acceptance as frequency of use could provide a truthfulness check on acceptability. It is suggested that future researchers and clinicians provide more specific instruction on length of time for using IDL and similar interventions. The varying lengths of time shown in appendices D, E, F, and G suggest that there may have been uncertainty in families understanding of how long to provide IDL. This could specifically pertain to Family F in that they used the intervention for less length of time than other families. Providing a clear length of time may also improve a family’s adherence to IDL when expectations are more plainly established. More research is needed to understand this relationship.

**Method of Delivery**

Of the eight families that participated, three selected live singing, two selected researcher recording, and one selected parent recording. When presenting the options to families during the initial meeting, most parents were apprehensive to select live singing even though this was the majority chosen. They often expressed concern over their ability to sing and what this might do to their infant. Families E and H both selected live singing and both demonstrated an increase in
attachment and a decrease in parenting stress. Family F, however, trended in reverse, though they also selected live singing. Families that selected therapist recording differed than those who selected live singing. Those that chose researcher recording both increased (Family G) and decreased (Family C) in attachment and either increased (Family G) or remained the same (Family C) in parenting stress. Family D, who selected a parent recording, trended in data similarly to two families who selected live singing (Family E and Family H). This may suggest that active engagement in the music, either through live singing or creating a recording of their own voice, was more effective in increasing attachment and decreasing parenting stress than the researcher recording. Implications from these findings may encourage clinicians to engage families more frequently in lullaby with their NICU infants. Facilitated interactions may provide families with confidence in their interactions and offer increased opportunity for bonding experiences. More research is needed to identify variation in parent recorded voices and singing as opposed to live singing with their infant.

**Frequency of Use**

Four intervention use calendars were returned. Family A and Family B never completed the calendars. Family C did not return the calendar during the final meeting and Family E completed the calendar, which was misplaced during their infant’s transfer to a new hospital. This was an unforeseen occurrence, as infants changed from isolette to open crib or were moved to a different pod. Often, clipboards and materials were found and were returned to families without interrupting IDL use. In the instance of Family E, they were able to use the calendar but unable to share the frequency following the misplacement of the document. When discussing IDL with families during the final meeting, Family D shared that at first they used the intervention every day but when there was a change in their infant’s medical status it became
more difficult. This was the same family who scored 72 on acceptance. Also important to note, Family H presented as most frequently using IDL and demonstrated the most decrease in parenting stress. This could indicate that frequency has a small effect on parenting stress in regards to IDL though life events that cause abrupt changes may disrupt the family’s ability to use IDL consistently. The difference between Family D and Family H was in method of delivery where Family D selected parent recording and Family H selected live singing. Though Family D indicated a comfort in having the ability to have staff play the recording of their singing, this may have also prevented them in their ability to implement consistently. If there was limited access to the equipment required to play the recording this would limit the frequency that IDL was used where as parents using live singing do not require any additional equipment besides their voice.

During check-ins, families would talk about what it was like using IDL and other stressors that were occurring. Many of these additional stressors included older children that they were caring for at home, changes in medical needs for their infant, and plans for discharge. This might mean that the presence of the music therapist may provide encouragement and act as a reminder for families to use the tool they have been taught. The researcher recommends that clinicians using IDL or self-administered interventions provide consistent contact with families to support their use in any intervention to ensure effectiveness and frequency.

Families appeared confident in the presence of the researcher when demonstrating the intervention and this appeared to translate from the IRP as evidenced by their willingness to sing independently in the presence of the researcher. Regarding frequency of use, intervention fidelity may be improved through increased frequency of use in the company of a clinician with feedback provided or visual checklists that families can use. Future researchers should compare
specific levels of frequency in order to understand at what point effectiveness begins. Treatment integrity can always be considered through casual discussions of the intervention as well as active observation of the intervention’s use in which the family and clinician engage in the intervention simultaneously providing the family with a clear example of its use. It is also suggested that a debriefing follows this active observation with the family to make any additional clarifications that might be needed. Blinded participation may provide a more realistic picture of how the intervention is being carried out.

**Limitations**

It is important for researchers to identify limitations within their study. These limitations may weaken the internal and external validity of a study. Internal validity looks for causal links between variables (dependent and independent) while external validity involves the generalizability in this case to parents of NICU infants (McMillan & Schumacher, 2010). Studies weak in internal validity are difficult to generalize as extraneous variables may have influenced the outcome instead of the independent variable. If the information is not generalizable due to weak internal validity then the external validity is affected. Sample size is considered a limitation in regards to this study as there were only eight participants. Though this was a modified single-subject and families were compared within themselves, having a larger sample as well as a control group would provide a clearer picture of IDL’s effectiveness and should be considered when replicating this study.

**External validity.** Generalization of results is cautioned. All participants were female whose ages ranged from 23 to 36 from varying economic backgrounds. Therefore, these results may not represent mothers over 36 or under 23 or those who identify outside of the gender. Also, because participation was voluntary, certain characteristics may apply for those who chose
to participate over those who did not. It should be noted that the results of this study can only reflect the characteristics of the individuals that participated. This includes the number of children each family had.

There may also have been a threat to ecological external validity (i.e., Hawthorne effect). Families were not blind to the study’s purpose and were given this information during informed consent. It is also noted that the researcher both discussed participation and administered the measures for all families that participated. This information and the families’ anxieties about appearing capable with their infant may have influenced the responses that families provided on the measures.

**Population.** This threat is specific to the way families were selected for participation. Participation was limited to those families whose infants were admitted to the hospital where the research took place. This limited the sample geographically to an urban setting. Families were not selected randomly and each family acted as their own control in the form of single subject. Because all families received IDL there was no separate control group for comparison. These families were also selected with purpose as they all had infants currently admitted to the hospital’s NICU. Families volunteered to participate, which meant only those with a preexisting interest in the intervention would agree to sign the consent. This may have affected the IRP in that families who may not have felt IDL was important would not have agreed to participate in the research.

**Internal validity.** Threats to internal validity are social desirability, selection, and maturation. The experiences that occur for families outside of the research should be considered when applying the research to generalized practice. This includes older children to care for,
changes in medical needs for their infant or other children, and major life events like deaths, marriage, or moving.

**Social desirability.** Social desirability, families responding in a way that they perceive as more socially accepted by the researcher, can occur in both internal and external validity. This means that the family would select an answer on the MAI, PSI, or IRP that they think is more socially accepted. Families that responded to the MAI may have felt the need to over report their attachment or under report their parenting stress. It is possible that in an attempt to appear more competent as a parent or to please the researcher or the NICU staff, they responded in a way that aligns with an ideal rather than that which corresponds with their experience. This may have been the reaction on the PSI with Family A, who declined to respond to a question, though this case is not know for certain. Families were aware of the purpose of the study as this was included in the informed consent.

**History.** Threats of concurrent events may have influenced parent attachment including transitioning from NICU to home, changes in their infant medical needs, or changes in living (e.g. finances, housing, etc.). Threats of concurrent events, or history, are “uncontrolled events or incidents that affect the dependent variable,” (p.109, McMillan & Schumacher, 2010) which poses a threat to internal validity.

**Construct validity.** Mono method bias should be considered within the present research as only one measure was used to determine maternal attachment and only one measure was used to determine parenting stress. To strengthen the construct validity of this research, additional measures to determine both maternal attachment and parenting stress can be implemented.
Conclusion

Additional interventions, including IDL, that are simple and accessible can be used by clinicians when addressing both infant and parent needs. Exploring possible connections between attachment and parenting stress with music, as a music therapy intervention is important for future researchers to continue to pursue. This is especially the case for teaching parents to use music independent of a therapist. Because of the limited availability of therapists, having a tool that is available to parents is important as well as something that is cost effective, particularly for those parents of NICU infants and could be implemented into clinicians every day practice. In a clinical setting, therapists can incorporate parent training into interventions in order to provide support not only for the infant, but for the parent as well. In the case of measuring attachment, researchers should consider implementing both self-report and observation scoring of attachment to decrease the improve construct validity through minimizing mono-method bias threat of social desirability as well as. It is also suggested that future research implement a randomized controlled trial, which offers delayed treatment to individuals in the control group. This will provide more substantial statistical evidence as would increasing the sample size. There appears to be more to understand in terms of attachment and IDL and how this specifically affects parents of NICU infants. Despite this study’s inconclusive findings, a new door for research in this settings has been opened regarding parent training and its effectiveness, which is important in that a therapist is not always able to be present to provide treatment particularly in the NICU setting and after they have been discharged home. Having a tool that is simple and accessible to parents may provide support with maintaining the attachment relationship and decrease parenting stress.
References


Courtnage, A. (2001). The effect of live infant directed singing on the heart rate,


Pennestrì, M. H., Gaudreau, H., Bouvette-Turcot, A. A., Moss, E., Lecompte, V.,


CONSENT TO PARTICIPATE IN A RESEARCH STUDY

TITLE: Infant-Directed Lullaby to Facilitate Bonding Between Parents and Neonates
SHORT TITLE: IDL and Bonding
PROTOCOL #: SAC-2017-305
PRINCIPAL INVESTIGATOR: Casie Esposito, MT-BC
SUB-INVESTIGATORS: Sharyl Stanton, RN, MSN
RESEARCH SITES: St. Joseph’s Medical Center, Stockton CA
PHONE NUMBER: (916) 664-7425

INTRODUCTION

You are being asked to take part in a research study. Your participation is completely voluntary. Please take your time to make your decision. You may take home a copy of this consent form to think about or discuss the research study with family and friends before making your decision. You can also discuss it with your personal doctor(s). This form may contain words that are not familiar to you. Please ask the study staff to explain any words or information that you do not understand. Once you feel all your questions have been answered, if you choose to take part in the research study you will be asked to sign and date this consent. You will be given a copy of the signed and dated consent form.

A. WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this study is to provide information on a music intervention, infant-directed lullaby (IDL). During your time in the study you will be asked to keep a calendar of when you use the lullaby. This calendar will be provided to you by the researcher. You will also be asked to fill out short surveys about your thoughts on your baby, your stress, and about using the lullaby. Your participation in this study will last until your infant’s discharge from the hospital with one follow up four weeks after discharge with a meeting at your home. With this research, we hope to determine different levels of bonding from your perspective as a parent, different levels of stress you might experience, and your experience with using lullaby with your baby.

B. WHY AM I BEING ASKED TO PARTICPATE?

You are being asked to take part in this study because you are a parent or guardian of an infant currently admitted to St. Joseph’s Medical Center’s neonatal intensive care unit, your infant is 32
weeks gestational age or more, and you are willing to use a lullaby either by singing or recording yours or the researchers singing to play for your baby.

C. HOW MANY PEOPLE WILL PARTICIPATE?

About 30 participants will take part in this study.

D. HOW LONG WILL I BE IN THIS STUDY?

If you agree to take part in this study, your involvement will last for a maximum of 3 months. A total of 3 meetings are predetermined with the researcher throughout the 3 months, with each meetings taking up to an hour. The first meeting will occur at the beginning of the study, the second meeting will occur before your infant leaves for home, and the third and final meeting will be 4 weeks after leaving the hospital. More meetings can be requested at any time for any questions you might have throughout your participation.

E. WHAT WILL HAPPEN TO ME DURING THIS STUDY?

If you choose to take part in this study, the study staff will meet with you for an initial meeting and determine a lullaby, method of delivery (your voice live, your voice recorded, researcher voice recorded), complete the surveys, and provide a schedule (including dates and times) for tracking the lullaby. You will be asked to use this schedule as a journal to record when you use the lullaby with your baby. The researcher will teach you how to use your lullaby. The researcher will show you volume settings for recorded music and will how to set up speakers for the baby to listen (approximately 4 inches above the crown of the head). During any additionally requested meetings, the researcher will assist and observe you in implementing the lullaby. You will be asked to demonstrate using the lullaby. Before you leave the hospital with your baby, you will complete the surveys again and return the schedule. You are encouraged to continue to use lullaby after discharge and will be provided a new schedule to record lullaby use. The researcher will follow up with you in your home four weeks after you leave the hospital to complete the surveys a final time.

F. WHAT ARE THE RISKS OF THIS STUDY?

While in this study you will be watched for any potential adverse reactions. There are no indications that risks will be serious or long lasting, however all reactions possible are unknown. Possible risks include increased stress or fatigue related to using music on your own and completing surveys periodically.

Risks related to the intervention include:

**Likely**
- Discomfort related to length of time filling out surveys for example loss of time and sitting in one location for a period of up to 50 minutes.
Less Likely
- Stress related to tracking when the lullaby is used
- Stress related to singing when other people are near
- Physical discomfort
- Discomfort singing: embarrassment from singing, psychological discomfort related to memories tied to songs

You should talk to the researcher with any questions or concerns about potential side effects. You may contact the researcher by phone at (916) 664-7425 or email C_Esposito@u.pacific.edu.

G. WHAT ARE THE POTENTIAL BENEFITS TO ME AND OTHERS?

Taking part in this study may offer certain benefits. Those benefits may be:
- Increased time spent with your baby
- A new way to play and interact with your baby

There are no guarantees that you will benefit from taking part in this study.

H. WHAT OTHER ALTERNATIVES OR OPTIONS ARE AVAILABLE TO ME?

Before you decide whether to take part in this research study, the researcher will discuss the other options that are available to you. Instead of being in this study, you will still be offered the opportunity to receive music and learn to use music with your baby by setting up a separate meeting with the researcher.

I. HOW CONFIDENTIAL ARE MY RECORDS?

Unless required by law, we will not tell anyone that you are taking part in this research study. Federal government regulatory agencies and the Dignity Health Institutional Review Board (a committee that reviews and approves research studies) may look at and copy research records. Some of these records could have information that identifies you. If we write a report or article about this research study, we will describe the research study results in a way that you cannot be identified. However, it is possible that other people may become aware that you are taking part in this research study. All consent forms will be filed in a securely locked filing cabinet in a locked office in which only the researcher has access. Surveys and other materials collected will be coded using a computer-generated number. A code-book kept with the securely stored consent forms will be used to keep names, addresses, phone numbers, and basic demographic information (age, no. of children, gender).

J. IS BEING IN THIS STUDY VOLUNTARY?

Taking part in this research study is completely voluntary. You may choose not to take part at all. If you decide to be in this research study, you may stop participating at any time. If you decide not to be in this study, or if you stop participating at any time, you will not lose any benefits for which you are otherwise eligible.
K. WHAT IF I DECIDE TO DROP OUT OF THE STUDY?

If you decide to leave the study early, we will ask you to return CD players, speakers, and clipboards given to you at the start of the study. When possible, a final meeting will occur and you will be asked to complete surveys to close out your participation. You should contact the researcher if you wish to withdraw from the study. When the study is completed, you will also be asked to return CD players, speakers, and clipboards given to you at the start of the study.

L. CAN SOMEONE ELSE END MY PARTICIPATION IN THIS STUDY?

Under certain circumstances, the researchers might decide to end your participation in this research study earlier than planned. This might happen because you experience physical discomfort, increased stress while singing or completing surveys, or severe embarrassment, or if you are unable to attend predetermined meetings or reschedule meetings where surveys are completed. You may also be withdrawn from the study due to unanticipated circumstances.

M. WILL I BE PAID FOR PARTICIPATING?

You will not be paid for being in this research study.

N. WHO IS FUNDING THIS STUDY?

There is no funding for this research study. St. Joseph’s Medical Center and the research team are receiving no payments from other agencies, organizations, or companies to conduct this research study.

O. ARE THERE ANY CONFLICTS OF INTEREST?

There are no current conflicts of interest with the researcher and research team.

P. WILL IT COST ME ANYTHING TO BE IN THIS STUDY?

You will not have any additional costs for being in this research study.

You and/or your medical/hospital insurance carrier will remain responsible for your regular medical care expenses.

Q. WILL I RECEIVE NEW INFORMATION ABOUT THE STUDY WHILE PARTICIPATING?

During the course of the research study, you will be informed of any significant new findings (either good or bad), such as changes in the risks or benefits resulting from taking part in the research or new alternatives to participation that might cause you to change your mind about continuing in the study.
R. WHAT IF I HAVE QUESTIONS?

We encourage you to ask questions. If you have any questions about the research study itself, please contact: Casie Esposito, MT-BC, (916) 664-7425.

Should you have any questions about your rights as a research participant, you may call the Institutional Review Board which is concerned with protection of volunteers in research projects at (916) 851-2193 or by writing: Dignity Health Sacramento Institutional Review Board, 3400 Data Drive, Rancho Cordova, CA 95670.
SIGNATURE OF RESEARCH PARTICIPANT OR LEGAL REPRESENTATIVE

I am volunteering to take part in the research study described in this consent form. All my questions about this research study have been answered. My signature below indicates that I have read this consent form, the information in this consent has been explained to me, and that I have decided to take part in this research study.

__________________________  __/__/____
Signature of Adult Participant (over 18 years of age)  Date

Printed Name

I discussed this study with the above named participant or legal representative. This person had enough time to consider this information, had an opportunity to ask questions, and voluntarily agreed to participate in this study.

__________________________  __/__/____  Time
Signature of Person Obtaining Consent  Date

Printed Name

__________________________  __/__/____
Signature of Investigator  Date

Printed Name
AUTHORIZATION FOR USE OR DISCLOSURE
OF PROTECTED HEALTH INFORMATION
FOR RESEARCH (California)

PURPOSE: The investigators of this study need to ask your written permission to use the information we learn about you in this study. This authorization is to obtain your permission to collect, use, release and/or disclose protected health information about you in connection with your participation in this study.

You do not have to sign this form but must do so if you wish to be part of this study. If you do not sign, you can still receive health care that is not related to this study.

<table>
<thead>
<tr>
<th>Name of Subject:</th>
<th>Date of Birth:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Names (a.k.a)</td>
<td>M.R. or Account Number</td>
</tr>
</tbody>
</table>

NAME OF STUDY: Infant-Directed Lullaby To Facilitate Bonding Between Parents and Neonates

GOAL OF STUDY: The goal of this study is to provide information on a music intervention, infant-directed lullaby (IDL). With this research, we hope to determine different levels of bonding from your perspective as a parent, different levels of stress you might experience, and your experience with using lullaby with your baby.

PRINCIPAL INVESTIGATOR’S NAME: Casie Esposito, MT-BC

WHO CAN DISCLOSE YOUR HEALTH INFORMATION?
- DIGNITY HEALTH and its facilities and clinics
- The Principal Investigator and the research team
- People providing care to you during this research
WHAT TYPES OF HEALTH INFORMATION ABOUT YOU WILL BE USED OR DISCLOSED IN THE STUDY?

- Personal Information (such as, name, address, age, contact info)

WHO MAY RECEIVE AND USE YOUR HEALTH INFORMATION?

- Principal Investigator (listed above) and all research team members currently approved by the DIGNITY HEALTH IRB.
- The DIGNITY HEALTH Research Oversight Committee and research administration personnel.
- The DIGNITY HEALTH Institutional Review Board(s).
- Medical Staff Departments which provide oversight of this study.
- The U.S. Food and Drug Administration (FDA) and Department of Health and Human Services (DHHS) agencies.

CAN YOU CHANGE YOUR MIND OR REVOKE YOUR AUTHORIZATION?

You may withdraw (cancel) your permission for the use and/or disclosure of information about you for this study, but you must do so by notifying the Principal Investigator (listed above) in writing. All information collected before receiving your written withdrawal, including your reasons for stopping your participation in this research study, may still be used by the Principal Investigator and other parties subject to this authorization as permitted by law. If medically indicated, the Principal Investigator or study staff may ask to follow-up with you for safety reasons. If you withdraw your authorization for the use and disclosure of your health information for this study, the follow-up information cannot be used or disclosed for this Study, except if required or permitted by law.

WILL YOU HAVE ACCESS TO YOUR HEALTH INFORMATION (Medical Records) DURING THE RESEARCH?

Yes, there are no restrictions on your access to your medical records.

HOW LONG IS THIS AUTHORIZATION EFFECTIVE?

This authorization to use or disclose protected health information about you will automatically expire one year from the date you sign this form, unless a different end date is specified here (month/day/year):
AUTHORIZATION AND ACCEPTANCE

By signing below, you are saying that you have read this form and agree to permit the use and disclosure of health information about you as described in this form. You will be given a signed copy of this authorization form for your records.

<table>
<thead>
<tr>
<th>Name of Subject (Please Print)</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Signature:</td>
<td></td>
</tr>
</tbody>
</table>

If you have any questions about permitting the use and disclosure of your health information or about being part of this study in general please contact the principal investigator or DIGNITY HEALTH Institutional Review Board (IRB) that has approved this project.

<table>
<thead>
<tr>
<th>Principal Investigator:</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casie Esposito, MT-BC</td>
<td>(916) 664-7425</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIGNITY HEALTH Institutional Review Board:</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dignity Health Sacramento Institutional Review Board</td>
<td>(916) 851-2193</td>
</tr>
</tbody>
</table>
APPENDIX C: INTERVENTION USE CALENDAR

Infant-Directed Lullaby Intervention Use Calendar
*Music should occur no more than 3 times a day for no more than 30 minutes at a time.

<table>
<thead>
<tr>
<th>Date</th>
<th>Start time</th>
<th>End time</th>
<th>Comments (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX D: FAMILY D CALENDAR

<table>
<thead>
<tr>
<th>Date</th>
<th>Start/End Times</th>
<th>Number of Minutes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/7/18</td>
<td>18:15/18:35</td>
<td>20</td>
<td>It scared him once but he didn’t seem to mind otherwise</td>
</tr>
<tr>
<td>4/8/18</td>
<td>18:30/19:00</td>
<td>30</td>
<td>Listened without any problem</td>
</tr>
<tr>
<td>4/9/28</td>
<td>18:30/19:00</td>
<td>30</td>
<td>He didn’t get scared kinda smiled</td>
</tr>
<tr>
<td>4/12/18</td>
<td>18:00/18:30</td>
<td>30</td>
<td>He moved some but slept through most</td>
</tr>
<tr>
<td>4/18/18</td>
<td>18:30/19:00</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>4/23/18</td>
<td>18:30/19:00</td>
<td>30</td>
<td>He fell asleep during</td>
</tr>
<tr>
<td>4/29/18</td>
<td>17:30/18:30</td>
<td>60</td>
<td>Listened and looked around</td>
</tr>
</tbody>
</table>

Total Number of Times Used: 7

Total Number of Minutes Used: 230
## APPENDIX E: FAMILY F CALENDAR

<table>
<thead>
<tr>
<th>Date</th>
<th>Start/End Times</th>
<th>Number of Minutes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/2/18</td>
<td>18:05/18:08</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5/2/18</td>
<td>18:59/19:02</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5/3/18</td>
<td>6:40/6:42</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5/3/18</td>
<td>15:00/15:03</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5/4/18</td>
<td>9:48/10:00</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>5/5/18</td>
<td>7:11/7:13</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5/6/18</td>
<td>10:07/10:10</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5/7/18</td>
<td>10:13/10:15</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5/7/18</td>
<td>15:47/15:48</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5/8/18</td>
<td>12:30/12:32</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5/8/18</td>
<td>17:02/17:05</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total Number of Times Used**: 11

**Total Number of Minutes Used**: 36
### APPENDIX F: FAMILY G CALENDAR

<table>
<thead>
<tr>
<th>Date</th>
<th>Start/End Times</th>
<th>Number of Minutes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/5/18</td>
<td>9:43/10:20</td>
<td>37</td>
<td>Somewhat woke him up in the beginning</td>
</tr>
<tr>
<td>4/12/18</td>
<td>8:30/8:45</td>
<td>15</td>
<td>Music in the car ride, not bothered, no change</td>
</tr>
<tr>
<td>4/13/18</td>
<td>4:00/5:00</td>
<td>60</td>
<td>Singing to him can calm him down sometimes</td>
</tr>
<tr>
<td>4/18/18</td>
<td>12:00/NA</td>
<td>NA</td>
<td>When he’s awake and calm he seems to like my singing</td>
</tr>
<tr>
<td>4/19/18</td>
<td>8:20/8:30</td>
<td>10</td>
<td>Played while he sleeps, no changes</td>
</tr>
<tr>
<td>4/23/18</td>
<td>3:30/4:02</td>
<td>32</td>
<td>Just listened</td>
</tr>
<tr>
<td>5/1/18</td>
<td>9:00/9:10</td>
<td>10</td>
<td>Slept through the music</td>
</tr>
<tr>
<td>5/1/18</td>
<td>15:00/15:07</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>5/3/18</td>
<td>18:00/18:10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5/7/18</td>
<td>8:19/8:27</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>5/8/18</td>
<td>11:30/11:37</td>
<td>7</td>
<td>Fell asleep</td>
</tr>
</tbody>
</table>

Total Number of Times Used: 11

Total Number of Minutes Used: 196
### APPENDIX G: FAMILY H CALENDAR

<table>
<thead>
<tr>
<th>Date</th>
<th>Start/End Times</th>
<th>Number of Minutes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/19/18</td>
<td>9:45/10:5</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>4/20/18</td>
<td>10:00/10:20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>4/21/18</td>
<td>12:50/1:05</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>4/23/18</td>
<td>10:00/10:15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>4/26/18</td>
<td>9:55/10:10</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>4/27/18</td>
<td>9:55/10:05</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>4/29/18</td>
<td>10:05/10:20</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>4/30/18</td>
<td>10:05/10:20</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>5/3/18</td>
<td>9:50/10:10</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>5/5/18</td>
<td>10:00/10:15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>5/6/18</td>
<td>10:00/10:10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5/9/18</td>
<td>10:10/10:30</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>5/10/18</td>
<td>10:00/10:15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>5/14/18</td>
<td>10:00/10:15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>5/16/18</td>
<td>9:45/10:15</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>5/20/18</td>
<td>8:30/9:00</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

**Total Number of Times Used**: 16

**Total Number of Minutes Used**: 295
## APPENDIX H: IRP RAW SCORES AND COMMENTS

<table>
<thead>
<tr>
<th>Family</th>
<th>Raw Score T1</th>
<th>Raw Score T2</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family C</td>
<td>84</td>
<td></td>
<td>You are amazing. He loves it.</td>
</tr>
<tr>
<td>Family D</td>
<td>72</td>
<td></td>
<td>I really enjoyed the lullaby study. When I couldn’t be here with him it was nice to know they could play that and he would still be able to hear my voice.</td>
</tr>
<tr>
<td>Family E</td>
<td>90</td>
<td></td>
<td>It was very beneficial. They raved in [the hospital] about how social she was. Music really helped that. I appreciate it.</td>
</tr>
<tr>
<td>Family F</td>
<td>83</td>
<td>88</td>
<td>Cool research. Totally agree with it. I sang to him at least four to six times a day. Great intervention.</td>
</tr>
<tr>
<td>Family G</td>
<td>81</td>
<td>88</td>
<td>If you play it enough it gives them a sense of comfort.</td>
</tr>
<tr>
<td>Family H</td>
<td>85</td>
<td>89</td>
<td>When we were playing lullaby for her when she seems fussy, it would stop her and you could see she was listening.</td>
</tr>
</tbody>
</table>
APPENDIX I: TIME BETWEEN MEASURES FOR FAMILIES WITH MULTIPLE MEASURES TAKEN

<table>
<thead>
<tr>
<th>Family</th>
<th>Days Between T1 and T2</th>
<th>Days Between T2 and T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family C</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Family D</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Family E</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Family F</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>Family G</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>Family H</td>
<td>31</td>
<td>19</td>
</tr>
</tbody>
</table>