2007

The Effect of Developmental Music Groups for Parents and Premature or Typical Infants under Two Years on Parental Responsiveness and Infant Social Development

Darcy Walworth

THE FLORIDA STATE UNIVERSITY

COLLEGE OF MUSIC

THE EFFECT OF DEVELOPMENTAL MUSIC GROUPS FOR PARENTS AND PREMATURE OR TYPICAL INFANTS UNDER TWO YEARS ON PARENTAL RESPONSIVENESS AND INFANT SOCIAL DEVELOPMENT

By

DARCY DELOACH WALWORTH

A Dissertation submitted to the
College of Music
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

Degree Awarded:
Spring Semester, 2007

The members of the Committee approve the Dissertation of Darcy DeLoach Walworth defended on March 22, 2007.

_____
Jayne Standley
Professor Directing Dissertation

_____
Ron Mullis
Outside Committee Member

_____
Clifford Madsen
Committee Member

_____
Dianne Gregory
Committee Member

Approved:

Don Gibson, Dean, College of Music

The Office of Graduate Studies has verified and approved the above named committee members.

ACKNOWLEDGEMENTS

First, glory to God who provides strength to the weary…

To Dr. Standley, thank you for your inspiration and vision for advancing the field of music therapy. Thank you for encouraging and guiding me through the process of career development. Your belief in me and interest in my research are invaluable. Thank you for the time and energy you have invested in me.

To Dr. Madsen, thank you for challenging me to think, transfer, and have my biases. Your passion and love for teaching motivate me to not lose a student. I feel so fortunate to be mentored and taught by you.

To Dr. Mullis, Dianne Gregory, and Dr. Geringer, thank you for your feedback and support.

To Sheryl Sutton and Kate Weaver, thank you for your editorial assistance.

To Judy, thank you for being my colleague and friend through this process. Your willingness to collaborate, plan, and implement interventions is invaluable to me.

To Mike and Melita, thank you for coding the hours of videos and learning a new program.

To Angie, thank you for helping me keep perspective in reach.

To Dena, your guidance, friendship and mentoring are sustaining.

To my dad and brother, thank you for your prayers.

To Jimmy and Sue, thank you for the laptop that enabled me to make the best use of my mobile time and for the love and support you have showered on me.

To Carey and Sandra, thank you for mothering my children while I pursued this degree. I am forever grateful for the love you have shown my daughters and me.

To my sisters, Audrey and Deborah, thank you for listening to me, making me laugh, and making me believe I can do anything.

To my mom, your strength, stamina, and determination have fueled me when I need encouragement to go on. Thank you for telling me I am smart, beautiful, and can do anything I want to do.

Finally, to Jeremy, thank you for supporting me, helping me in ways only explained by love, and taking on multiple stressors to make my dream of completing this degree a reality. Thank you for being my biggest fan.

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ABSTRACT

The purpose of this study was to examine the effect of music therapy intervention on premature infants' and full term infants' developmental responses and parents' responsiveness. Subjects (n=56) were parent-infant dyads who attended developmental music groups or a control condition assessing responsiveness during toy play. Infants were between the ages of 6 and 24 months and included males and females. All subjects were matched according to developmental age using the Ages & Stages Questionnaire (Bricker, et al., 1999). Subjects were also matched by group for socioeconomic status using the Barratt Simplified Measure of Social Status (Barratt, 2006), and for maternal depression using the Beck Depression Inventory-II (Beck, Steer, &Brown, 1996).

Types of infant play and parent responsiveness were measured using observation of a standardized toy play for parent-infant dyads. Observations were coded with the number of seconds spent in each behavior using the SCRIBE observation program. Parents completed a questionnaire on the perception of their infant's general development, interpretations of their child's needs, the purpose of using music with their child, and their child's response to music.

The infants attending the developmental music groups with their parents demonstrated significantly more social toy play ($p < .05$) during the standardized parent-infant toy play than infants who did not attend the music groups. While not significant, graphic analysis of parent responsiveness showed parents who attended the developmental music groups engaged in more positive and less negative play behaviors with their infants than parents who did not attend the music groups. No group differences were found on any questionnaire areas of parent perception of their child's development, needs, or responses to music. Additionally, no significant differences were found between groups for the amount of time spent by children in toy play.

This study demonstrates the first findings of positive effects of developmental music groups on social behaviors for both premature and full term infants under two years old. These findings support the need for further investigation with both premature and full term infants from various socioeconomic backgrounds into the positive effects of social music therapy early interventions utilizing peer modeling and parent training for developmental milestone achievement.

INTRODUCTION

Interest is continually growing in the variables affecting developmental milestone achievement during infancy and early childhood. As existing child development theories are modified and new theories are created, many teachers and clinicians are using aspects of multiple theories to form their foundation for teaching and interventions. Developmental assessments now address skills across domains and provide information about how skills relate to each other between the various milestone areas (Prizant, Wetherby, Rubin, and Laurent, 2003). When assessing the developmental ability of a child, domains typically evaluated include cognition, communication, motor, social, emotional, vision, hearing, and self-regulation. A great deal of literature in this area focuses on the question of how maternal and paternal interaction impact developmental milestones across all these domains.

Research on how music affects developmental domains of the infant is commonly domain specific. To date, most research focuses on an infant's cognitive awareness of musical features. Yet, research on maternal and paternal interaction and music is very limited and is an area necessitating further investigation. Programs designed for making music with infants and caregivers exist, but are not currently being researched to investigate the developmental benefits associated with group participation. Kindermusik alone reports having 1 million families internationally enrolled in classes for parents and children aged birth through 7 years old (http://www.kindermusik.com, 2006).

The impact of music on the development of premature infants in the first two years of life is an area which requires special attention. The preterm delivery rate has increased 16 percent since 1990 and by more than 30 percent since 1981 (Martin, Hamilton, Sutton, Ventura, Menacker, & Munson, 2005). In 2003 there were 499,008 preterm births, about 12% of the total live births. Of the preterm births, 7.9% were low birthweight and 1.4% were very low birthweight (U.S. Department of Health and Human Services, 2005). The developmental impact of surviving premature birth has been investigated, as well as the impact for caregivers providing increased levels of care for these infants. Overall, when compared to full term controls, children born prematurely have higher rates of impairments in language, visual-perceptual areas, learning disabilities, some minor neuromotor dysfunctions, hyperactivity, and behavioral problems (Allen, 2002). There is currently little ongoing focused research for effective prevention of premature birth and little hope for premature rates to decline in the coming years (Alexander & Slay, 2002). Therefore, early detection and treatment of developmental disabilities for preterm survivors is important. Research on the impact of music on developmental milestones or mother-infant interaction in the first two years of life for babies born prematurely is exiguous. Discovering how music can impact childhood development as early as infancy may benefit children born full term as well as premature infants.

CHAPTER 1

DEVELOPMENTAL RESEARCH AND IMPACT OF MUSIC

Communication, motor, cognitive, and social skills are interrelated and develop as complex systems with each domain serving to influence many underlying systems (Cook, Klein, Tessier, & Daley, 2004). When nurturing the development of different domains for children with disabilities, it is important to individualize information presented to each child's perceptual and cognitive level. Professionals providing services for children with special needs are encouraged to actively involve parents and siblings in the process to create a partnership of responsibility for the child's development (Cook, Klein, Tessier, & Daley, 2004). The mother-infant relationship affects development across domains largely due to the continuing reciprocity present in the relationship (Bronfenbrenner & Morris, 1998).

Music and Developmental Domains

It has been demonstrated that through music and other aesthetic activities children develop social, language and communication skills (Broström, 2001). Early childhood teachers in Denmark support the theory that practical-aesthetic activities including music are the most important activities in which children can engage. After reviewing research on music and infant development, Fox (2000) recommended young children be active participants in making music through movement, singing, and playing instruments. Other recommendations for music groups for very young children stress the importance of empowering parents by giving them the ability and knowledge to make music with their children in the home environment (Fox, 2000; Ilari, 2003).

De Kruif & McWilliam (1999) observed infants and young children in a classroom setting to determine relationships between developmental age and engagement as reported by teachers and coded through videotapes. As the developmental age for children increased, observed high engagement levels increased as well. However, children who engaged in persistent behaviors, for example, looking for pieces of a puzzle, were more likely to display high levels of engagement regardless of developmental age. These findings indicate that children who possess the ability to attend to a task may have the capacity for higher levels of engagement typically shown by developmentally older children. Therefore, activities designed to increase attention to task could impact a child's ability to engage in their environment and nurture their development. Music maintains high attention levels significantly more during music based instruction groups when compared to play-based instruction groups for preschool age children (Robb, 2003).

Communication

Six to 9-month-old infants were observed during toy and rattle play with a parent to investigate age differences in the ability to coordinate vocal and motor movements (Iverson and Fagan, 2004). As infants increased in age, they engaged in a higher number of coordinated vocal and motor movements and moved their right arms more frequently than left arms, legs or torsos. This supports similar findings that adults coordinate speech and gestures with right arms. Also, consonant-vowel repetitions produced by infants were most likely to occur with rhythmic manual

movement. These results support a strong link between vocalization and manual activity existing before the time of first words and gestures used by infants for communication. Music offers many opportunities for rhythmic, manual activity at a very early age.

Encouraging early literacy skills for toddlers is one aim when incorporating music into the learning environment. Involving children in finger plays, chants and singing of songs exposes young children to literacy components in their culture. The importance of viewing the role of music from a literacy perspective lies in the innate ability of music to decontextualize language for children through symbolic and imaginary actions in the text of the song (Rosenquest, 2002). Music making through rhymes, singing, and chanting has been recognized as an important pre-verbal mode of communication due to the opportunities given to infants and young children to practice listening skills, to utilize taking turns with members of the class or a parent, to maintain eye contact and to respond to whoever is leading the music (Anning & Edwards, 1999). Pre-literacy skills have also been linked to music making for young children when they engage in clapping rhythms, singing nursery rhymes, and playing marching or action games. To participate, children must recognize the rhythm within the speech structure, and this is theorized to contribute to building a foundation for later phonetic and syllabic knowledge of words (Bryant & Bradley, 1985; Goswami & Bryant, 1990). When a music excerpt was paired with causal actions, 14-month-old infants were able to discriminate between and respond in terms of the causal actions of pushing and pulling (Casasola, M. & Cohen, L. B., 2000). In previous experiments, the infants were not able to distinguish when the causal actions were paired with nonsense verbal labels. Therefore, 14-month old infants were able to associate music with actions, but not verbal labels.

Motor

Research in the area of infant motor skills is varied and encompasses investigations on the effect of positioning on interaction with toys, free exploration versus directions, and long term music sessions designed to enhance infants' movements. Lefèvre (2002) researched the effects of body position and position of toys on exploratory behaviors for 5-month-old infants. Infants were placed in a semi-reclining (30°) and sitting (60°) position and presented with different toy stimuli. Results showed infants explored objects longer visually, for longer fixation periods, and with greater number of repetitions when objects were within reach. Also, infants explored the objects less when in the more upright sitting position, but did make more repetitions. These findings show the importance of seating position when testing infants or attempting to engage infants in toy play during intervention. As a result of similar research on the effect of prone positioning for premature infants showing positive increases in head control, upper body anti-gravity control, trunk and shoulder stability, fine motor function and bringing hands to midline (Mildred, Beard, Dallwitz, & Unwin 1995, Ratliff-Schaub, et al., 2001), parents are encouraged to play with their preterm infants in prone position on a firm surface.

Another example of infant motor skill research involved 8 to 12-week-old infants participating in movement experiences to determine the effect of task-related exercises versus general movements on hand and foot interactions with objects (Lobo, Galloway & Savelsbergh, 2004). Differential effects were found depending on which limbs infants used, with greater use and direction resulting in greater success for object interactions. Results of this study indicate emergence of new behaviors for infants can be advanced with exposure to new experiences.

Phillips-Silver and Trainor (2005) investigated the concept of movement influencing how rhythm is encoded by 7-month-old infants. Infants were bounced in duple or triple form and then tested with both rhythmic patterns to see which pattern was familiar. Infants preferred the rhythmic pattern that matched the beats on which they were bounced. When tested without the infants moving, but watching someone else move on either beat pattern, the infants showed no preference for either rhythmic pattern. This supports the theory that personal movement is a critical component of the multisensory way infants encode rhythm in music experiences.

Infants aged 1 to 2 years old were followed for 15 months to investigate developmental differences between infants who participated in weekly music sessions and infants participating in routine music experiences within a daycare setting (Gruhn, 2002). Infants receiving music sessions displayed significantly more body movements and vocalizations compared to the control group. All music activities were designed to enhance the natural movement and vocalizations infants make without words. Music provides a multisensory experience for infants to enhance and encode body movement awareness.

Cognition

Differences between how information is processed across phases of an infant's attention to an object or event has been researched and documented in relation to changes in heart rate (Lansink & Richards, 1997). Infants between 6 and 12 months were presented with a distractor while engaged with a toy during various attention phases shown by the infant's heart rate. Results indicate that the greatest amount of information processing occurs when the infant's heart rate decelerates during an episode of focused attention. Therefore, creating optimal sequences of activities to allow infants' attention to focus while participating during intervention activities will result in the most successful treatments. Infants focus while listening to soothing and sedative music (Kaminski & Hall, 1994; Standley & Madsen, 1990; Tims, 1978).

The development of children's cognitive skills through music making experiences is supported by the theory of Piaget's assimilation learning technique. When young children are making music with instruments before they can read notated music, they are learning the culturally accepted meaning of making music through their assimilated play and broadening their cognitive concepts of objects and rituals in the world around them (Anning & Edwards, 1999). Infants are no longer viewed as passive listeners when presented with a music stimulus. Rather, they have been documented extensively as active participants and sophisticated listeners who are able to discriminate music qualities, indicate preference, and use music as a contextual cue for learning, (Trehub & Trainor, 1993).

Beyond this, music maintains its overall character when heard in the womb making it possible for babies to learn music as early as the third trimester, which has been supported by babies' heartbeats changing in response to music pieces of varying tempi (Ilari, 2003, Olds, 1986, Woodward, 1992). As late as 12 months after birth, babies listened longer to a song their mother listened to every day throughout pregnancy than an unfamiliar song (Lamont, 2001). This supports the theory that babies do hear and retain musical information in their memory (Ilari, 2003).

To illustrate when a familiarized piece of music was played in the same timbre and tempo, six-month-old infants indicated recognition of the piece after one day, two weeks, and three weeks, but not when the timbre and tempo were altered (Trainor, Wu, & Tsang, 2001). Similarly, music retention for familiarized music was positively demonstrated by 8.5-month-olds

for as long as two weeks (Ilari, Polka, & Costa-Giomo, 2002). Affective music samples (*Adagio* by Barber, *Peter and the Wolf* by Prokofiev, & *Spring* by Vivaldi) significantly increased brain activity as measured by electroencephalogram (EEG) at 3 months and 12 months of age, suggesting significant developmental changes occurring on central and autonomic levels that could affect emotional regulatory processes up to 12 months of age (Schmidt, Trainor, & Santesso, 2003).

Additional research on rhythmic patterns indicated that 12-month-old infants were not able to differentiate between rhythmic patterns that were changed in a foreign cultural rhythmic pattern, but were able to differentiate rhythms patterns changed in familiar Western rhythm patterns (Hannon & Trehub, 2005). Following this, twelve-month-old infants were given Balkan folk music for listening at home to increase exposure to foreign rhythmic patterns. After listening for 2 weeks, infants were able to differentiate between altered rhythmic patterns, unlike the infants who did not receive exposure to foreign music. A further analysis of differences between adults and infants showed adults exposed to foreign music were not able to differentiate changes in rhythmic patterns as well as twelve-month old infants. This supports the theory that culturally specific responses to music are formed early in life and can be modified with repeated exposure to music with different cultural rhythmic patterns.

The importance of intersensory redundancy, or information presented across two senses, was investigated in relation to discrimination of rhythms with 5-month olds (Bahrick & Lickliter, 2000). When infants were habituated to a rhythm both audibly and visually, they were able to discriminate when a novel rhythm was presented, but were not able to when habituated unimodally (either auditory or visual). Therefore, when learning new rhythms, presenting the information across two modes enhances the early perceptual learning process. Seven-month-old infants demonstrated the ability to infer meter from duple and triple classes of rhythmic patterns when measured by orienting head turns (Hannon & Johnson, 2005). Also, infants were able to categorize melodies based on the relationship between meter and pitch showing the use of metrical knowledge when learning new music.

In another case, Fagan, et al. (1997) investigated the effect of music as a contextual learning cue by training 3-month-old infants to move an overhead mobile while listening to classical and jazz selections. When testing the retention of learning how to move the mobile, infants were able to successfully move the mobile 1-day after the training even when different music was played. However, when tested at day 7, infants were only able to move the mobile when the same music was played during the testing that was played during the training. This suggests that 3-month-old infants are able to use music as a contextual learning cue to recall information at longer retention intervals.

Emotion

Parents, teachers and other adults teach children information about emotional expression through modeling, including when and how to express emotion, how to understand, interpret and label emotions, and how to manage and regulate emotions (Denham, 1998; Eisenberg et al., 2001). Children are more prone to develop qualities of generosity, empathy, and frustration tolerance when they see these emotions frequently modeled by adults in their environments (Eisenberg & Fabes, 1998). Infants' emotional responses to specific circumstances created by an experimenter were analyzed to determine differences between joy, fear, anger, and discomfort (Kochanska, Coy, Tjebkes, & Husarek, 1998). Emotions elicited by infants were relatively stable

across episodes designed to target the same emotion. Also, infants who were able to modulate their negative emotions more effectively demonstrated a higher capacity for focused or effortful attention.

Mother-infant dyads were observed once a month for four months beginning at 2 months old to investigate attention and emotion during object play (Brighi, Genta & Fogel, 2000). Results showed that when infants were 2 and 3 months old, higher levels of mutual communication yielded more complex forms of infant affect and attention. However, at 4 and 5 months old, the same complex infant behaviors were associated with joint attention episodes. Therefore, as infants age the parental interactions that yield complex behaviors change.

Studies regarding the differences between behaviors shown by mothers when playing versus teaching their 12-month-old infants, showed that mothers who had higher sensitivity in free play were more likely to orient the infant's attention to the task instead of demonstrating the solution during the teaching task (Ney, T—th, Lakatos, & Gervai, 2000). When the infant's attention was off task during the teaching segment, less sensitive and more intrusive mothers were more likely to demonstrate the solution. No differences between infant genders were found in maternal teaching style.

When investigating music and emotion with infants, parental impact has also been documented. The emotional content in infant directed songs was perceived as significantly higher than when parents simulated singing to infants (Trehub et al., 1997). Mothers and fathers sang songs at a slower tempo and with higher pitch when actually singing to their infant. This intuitive adjustment of singing quality in the presence of infants is similar to intuitive infant directed speech differences. Listeners were able to distinguish the simulated from infant directed songs regardless of their musical training background, child-care experience, or cultural origin. The increased emotionality in infant directed songs may contribute to the reciprocal emotional ties infants and parents create while bonding. Research performed by Trainor, Clark, Huntley, and Adams (1997) found similar results when comparing the effect of an infant's presence for the emotional content in infant directed versus non-infant-directed songs.

Nawrot (2003) paired "happy" or "sad" music as determined by children in a previous study, with a videotape of a female telling a happy or sad story to capture a naturalistic expression of each emotion. The infants, aged 5–9 months old, were then shown four 2-minute trials with either concordant or discordant affective/music pairs. Responses indicated infants preferred the affectively concordant happy display suggesting a possible innate predisposition to emotional perception in music.

Social

Researchers have looked at infant's social responses during toy play, how infants' attention affects their social competence, and the social behaviors that are elicited in various settings. Information obtained from eye gaze was found to be a crucial social cue used by infants when socializing with an adult. Symons, Haines, and Muir (1998) studied 5-month-old infants and their response to very small horizontal and vertical deviations in eye gaze. Infants were found to smile more for adults who maintained eye contact and less when adults averted their eye gaze horizontally. The authors hypothesized that the sensitivity shown by infants in response to the small changes in eye gaze indicates infants use eye gaze as an important cue in developing socialization skills.

Six and 12-month-old infants' responsiveness and imitation of social competence skills were investigated for medically low risk and high risk preterm infants as well as full term infants (Landry, Smith, Miller-Lancar, & Swank, 1996). Infants were observed during toy playtime with their mothers who gave their infants specific requests for objects while attending and not attending to a toy. No group differences were found for social responsiveness indicating even high risk preterm infants are less likely to have difficulty when mothers provide infants with specific requests. Low risk infants did show greater difficulty forming a social goal when required to orient attention to their mother and toy simultaneously.

In the absence of toys, infants under 2-years-old demonstrated a high frequency of watching, pointing, touching and vocalizing to socialize with other infants (Geismar, 1984). These social bids are attempts for infants to become acquainted with peers and the absence of toys allows focusing on each other without the competition of objects present. Toys are appropriate for use in more sophisticated social situations and should be chosen carefully to parallel the infant's socialization level.

When exploring the evolution of music, researchers have focused on music's ability to reinforce social bonds (Balter, 2004). Music can teach social skills by encouraging interaction through directions in the lyrics, by taking turns playing instruments, and by telling stories in the music (Gourgey, 1998). To investigate the ecological impact on music play behaviors, Littleton (1991) observed preschool children in a music specific play area and non-music house play setting. When the children played in the music setting, more functional and constructive play was observed while children engaged in more dramatic play when playing in the house setting. Also, the music setting elicited almost twice as much solitary play as the house setting even though both settings encouraged group play.

Music Preference

Infant preferences for various music elements such as tempo, consonance, pitch, and style has been investigated extensively. Infants are able to indicate music preferences very early in life. Therefore, when investigating the impact of music on infant responses it is important to consider the various elements of music used during an experiment. A common form of music used with babies around the world is a lullaby. Trehub, Unyk, and Trainor (1993) note that lullabies may soothe the singer as well as the infant contributing to why lullabies have survived as long as they have. The most frequently cited reason for lullaby recognition is the repetition of the melody.

As infants grow and become young children, tempo preferences for music may change. Differences in tempo preferences were found between children and adults with children preferring fast tempos versus adults preferring moderate tempos (Baruch, Panissal-Vieu, & Drake, 2004). Although infants may be able to discriminate tempo preferences, they may not always show their preferences because both stimuli being tested are equally interesting (Trainor & Heinmiller, 1998). However, preferences between consonant and dissonant music have been discovered. Six-month-old infants preferred listening to consonance versus dissonance as measured by looking time (Trainor & Heinmiller, 1998). Four-month-old infants also preferred consonant to dissonant melodies as measured by looking time and turned away and fretted less often when hearing a consonant melody (Zentner & Kagan, 1998).

In other research, when presented with high-pitch and low-pitch versions of the same song, infants repeatedly listened longer to the high-pitch version (Trainor & Zacharias, 1998).

Implicit learning of tonality may exist for infants as early as 8 months old who demonstrated the ability to induce the beginnings of tonal structure (Saffran, 2003). In addition to tonality, infants also noticed differences in musical form as indicated by listening longer to naturally segmented musical excerpts compared to excerpts with pauses inserted into the middle of phrases (Jusczyk & Krumhansl, 1993). Ten-month-old infants oriented longer to a familiarized excerpt of music than to a novel music stimulus when measured by head turn (Palmer, Jungers, & Jusczyk, 2001). Based on infant preference research, songs used with infants should be consonant, high-pitched, in the tonal structure of their exposed culture, intact in form, and repetitious to build familiarization. As infants age and become young children, the tempo should increase to captivate and engage the child for participation in the musical activity.

Children With Special Needs

Developmental Disabilities

Music therapy interventions for children with developmental disabilities can improve the functioning of children with cognitive disabilities, communication impairments, social skill deficits, behavior disorders, visual impairments, hearing loss, and physical disabilities (Adamek & Darrow, 2005; Humpal, 1990). A music therapist can address Individualized Education Program (IEP) goals as a part of the multidisciplinary team contributing to the child's IEP in the public school setting. Music therapists can also serve children with developmental disabilities in a clinic setting, through hospital rehabilitation outpatient services or as a private therapist in the home environment (American Music Therapy Association, 2005). Skills learned through music therapy interventions can be transferred to other areas of the child's life, such as a song giving directions for the sequence of getting dressed or facilitating eye contact and taking turns during a music therapy session (Patterson, 2003).

Preschoolers with visual impairments attended significantly more during music based instruction sessions than play-based instruction sessions (Roob, 2003). Similarly, preschool children with varying disabilities in an inclusive classroom setting demonstrated on-task attentive behavior for 97% of the music therapy sessions' duration and responded with 90% accuracy to teacher directed tasks (Standley & Hughes, 1996). Preschool children with developmental disabilities responded with a higher percentage of appropriate communication responses during musical antecedents than social antecedents (Braithwaite & Sigafoos, 1998). Musical and nonmusical communication scores increased for children with autism ages 6 through 9-years-old after completing 10 weeks of improvisational music therapy sessions (Edgerton, 1994). Nine to 12-year-old hearing impaired students significantly increased the frequency range and decreased the fundamental frequency of their speech after completing singing paired with vocal exercises for eight weeks (Darrow & Starmer, 1986). Children aged 5 to 19-years-old with cerebral palsy, spina bifida, and brain trauma resulting in spastic movements improved their gait rhythm, speed, and even walking after rhythmic auditory stimuli were paired with walking (Staum, 1983). Music has improved the functioning of children with developmental disabilities across domains and ages.

For children with disabilities receiving music interventions, family involvement can impact intervention success. Family predictors of how actively involved parents are in intervention programs for children with disabilities was investigated for children under 5 years old (Gavidia-Payne & Stoneman, 1997). How mothers and fathers perceive family processes,

relationships and well-being influenced the amount of parental involvement in intervention services. Mothers and fathers who were more educated and had financial security were more involved in their disabled child's intervention. Mothers who were less stressed and used a variety of coping strategies were also more involved, while fathers who used coping strategies like social services and turning to religion were more involved. Similarly, how mothers perceive their children's behavior and the positive perception of the relationship with their child varied based on marital status (Mullis & Mullis, 1987). Single mothers reported less favorable behaviors for their children than married mothers. Additionally, fewer single mothers reported having positive relationships with their children than married mothers, with the lowest positive relationships reported for single mothers of 6- to 7- year old children. These findings are relevant in designing research studies aimed at investigating effects attributed to program interventions.

Premature Developmental Outcomes

Differences in developmental outcomes between premature and full term infants have been identified and investigated from infancy through teenage years. With no evidence pointing towards premature births declining in the future, identifying effective interventions to decrease the impact of these developmental delays is critical. Hence, knowing the developmental areas most commonly affected by premature birth will help formulate successful intervention strategies.

Korner (1996) analyzed differences in excitability for preterm infants beginning at 32 weeks old to determine if preterm infants displayed similar behaviors as full term infants. Infants were measured weekly and completed at least three examinations to be included in the study. Results showed that like full term infants, preterm infants had high self-consistency over time in excitability, activation, irritability, and availability to sensory stimulation. Also like full term infants, preterm babies showed highly reliable individual differences in these temperament areas. These self-consistencies and individual differences were displayed independent of prior medical complications implying possible future temperament predispositions for preterm infants.

For infants still in the intensive care unit, decreased behavioral and autonomic pain reactivity to an invasive procedure performed at 32 weeks was found as infants' gestational age decreased and number of previous painful procedures increased (Johnston & Stevens, 1996, Grunau, Oberlander, & Whitfield, Fitzgerald, & Lee, 2001). For preterm infants without complications, no impairment was present for visual attention, mental, or motor development during the first 6 months of life when compared to full-term infants. When compared at conceptional age (corrected age) preterm infants performed as well as full-term infants (Bonin, Pomerleau, Malcuit, 1998). However, Tommiska and others (2003) found that for children born prior to 27 weeks who were evaluated at 24 months, 36% had mild developmental delays. For studies of extremely low birthweight infants (ELBW, <1000 grams) in the first 3 years of life survivors ranged from 9-26% for cerebral palsy, 1-15% for blindness, 0-9% for deafness, and 6-42% for evolving cognitive disability. Rates for preschool limitations were 5-27% motor, 5-30% self-care, and 5-22% communicative. Rates of school-age functional educational disabilities exceeded 50% (Msall & Tremont, 2002). Eighty percent of ELBW children free of neurosensory abnormalities who tested at the subnormal level on the Bailey Scales of Infant Development at 20 months old scored higher than subnormal at 8 years old, even though scores were still lower than ELBW children scoring in the normal range at 20 months (Hack et al., 2005)

At school age, children born prematurely between 1982 and 1986 and under 750 grams were less developmentally advanced than children born between 750 and 1499 grams as well as children born full term. The ELBW children showed poorer social skills and adaptive behaviors and more attention and behavior problems. The rates of mental retardation for the three groups, respectively, were 21% (<750 g), 8% (<1500 g), and 2% (full term), cerebral palsy rates were 9%, 6% and 0% for the three groups, respectively, and for severe visual disability were 25%, 5%, and 2% (Hack, Taylor, Klein, Eiben, Schatschneider, Mercuri-Minich, 1994).

As ELBW children age, other developmental differences become apparent. The perceived intensity of pain related to pictures of medical procedures (stitches in the arm) was rated as higher than the perceived pain related to pictures of psychosocial embarrassing situations (reprimanded by teacher) for ELBW children when evaluated at 8-10 years of age. However, their full-term peers rated the pain intensity in the two situations exactly the opposite (Grunau, Whitfield, & Petrie, 1998). When measured at ages 8-9 years old, significantly more ELBW premature children had at least one learning disability than did control children and were more likely to display multiple academic area learning disabilities (LD's) than controls. The most frequently affected area was written output, then arithmetic, then reading explained by visual spatial and visual motor abilities. However, control children's LD's were explained by verbal functioning ability (Grunau, Eckstein, Whitfield, & Davis, 2002).

Further, very low birthweight infants were measured by Ment et al., (2003) with the Peabody Picture Vocabulary Test (PPVT) at 3 years and 8 years old and showed an 11-point median test score increase over time. Increasing age, two parent household, and higher levels of maternal education were all significantly associated with higher PPVT scores. Children with early-onset Intra Ventricular Hemorrhage resulting in significant Central Nervous System injury had the lowest scores declining over time. Early intervention resulted in increased scores over time for infants whose mothers had less than a high school education compared to mothers with high school or greater education (Ment, et al., 2003). When measured at 17 years old, ELBW preterm infants showed decreased cognitive scores and academic skills and self reported decreases in scholastic achievement, athletics, job competence and romantic confidence. Increased percentage of clinical behavioral problems was also found (Grunau, Whitfield, & Fay, 2004).

When preterm infants are discharged home, many parents are faced with increased levels of care for their infant. Donohue (2002) found that most parents of preterm infants adjust well to their change in lifestyle, but some did report having psychological distress for years after their preterm child's birth due to the the child's health problems. Health related quality of life (HRQL) was measured at preschool age for infants admitted to the Newborn Intensive Care Unit and also for their parents (Klassen, Lee, Raina, Chan, Matthew, & Brabyn, 2004). Parents reported more worry and stress as well as less time to meet their own needs. One interesting finding concerned the reported HRQL rated as lower for parents of preterm infants born 33-37 weeks gestation compared with parents of infants born less than 33 weeks with the inverse being true for the actual infants. Parents of infants admitted to a NICU reported more maladaptation from fathers and need for support during the first year after delivery as well as more child behavior problems at 3 years of age and less time for themselves due to intensity of child care than did parents of low risk and no hospitalization control infants (Rautava, Lehtonen, Helenius, Sillanpää, 2003).

Music Therapy with Premature Infants

A meta-analysis of the efficacy of 10 studies with varying music therapy interventions in the newborn intensive care unit (NICU) setting showed highly significant effects of almost a standard deviation due to music treatment. Results were homogeneous indicating consistent, highly positive benefits across studies (Standley, 2002). Music paired with multimodal stimulation helps infants to maintain homeostasis, enhances neurological development by promoting tolerance for increasing levels of stimulation, and results in greater average weight gain per day and significantly shorter hospitalization for females (Standley, 1998). Infants using the Pacifier Activated Lullaby (PAL) device learned to control the music duration within about 2.5 minutes and resulted in increasing non-nutritive sucking rates by more than double during their first learning opportunity (Standley, 2000). Also, infants using the PAL have shown improved feeding rates possibly due to the sucking and pausing to listen to music when using the PAL. It is theorized that this teaches pacing skills needed for efficient feeding (Standley, 2003). Also, music and the voice of the infant's mother resulted in increased oxygen saturation and stable respiration rates (Standley & Moore, 1995).

It has also been found that early physical, cognitive, and emotional development can be positively influenced by touch or tactile stimulation (Caulfield, 2000). After one year, preterm infants who received massage three times a day for 10 days scored 12 points higher on the motor scale portion and 15 points higher on the mental portion of the Neonatal Behavior Assessment Scale (NBAS) than infants not massaged (Field, Scafidi, & Schanberg, 1987). Similarly, the previously discussed research supporting the use of music paired with tactile stimulation enhances neurological development for premature infants (Standley, 1998).

Mother-Infant Interaction

A large body of research has focused on the impact of maternal interaction on infants' development. Maternal responsiveness, play behaviors, affect, depression, joint attention, and synchrony with their infants have all been investigated and have led to the development of various theories. Odom and Wolery (2003) tie together multiple theories of child development to form a unified theory of practice currently supported by the field of early intervention/early childhood special education. The EI/ECSE programs in every state primarily provide services for infants and preschool children with disabilities and their families. The purpose of the paper by Odom and Wolery was to identify the tenets of the unified theory and provide evidence-based practices supporting each tenet. The tenets of the unified theory are: families and homes are primary nurturing contexts, strengthening relationships is an essential feature of EI/ECSE, children learn through acting on and observing their environment, adults mediate children's experiences to promote learning, participation in more developmentally advanced settings is essential, program transitions are enhanced by adults or experiences, and broader ecological contexts influence families and EI/ECSE programs.

Communication

While the developmental impact of maternal and paternal interaction is across domains, much attention has focused on infants' development of communication skills. Schafer (2005) compared two groups of children receiving training on different word sets to children in a control

group receiving no word training. Children were tested at 9 and 12 months. Results of the comparison showed children trained with new words oriented to images named, suggesting that infants under one year of age can be taught specific words without needing contextual support to recognize the words. Schafer noted that one possibility for word learning could have been the mother's training influencing joint attention behaviors elicited when pointing out new objects to their infants. Shared attention has been noted as an important component of language learning.

When investigating the development of symbol-infused joint engagement between infants and caregivers, Adamson and Bakeman (2004) hypothesized that as joint engagement developed, symbols would gradually appear within that context. They also investigated how caregiver communication context affects infants' organization of symbol-infused shared attention. They also examined how differences seen in infants language ability are affected by variations shown in symbol-infused joint engagement in the middle of the third year of life. Dyads were longitudinally observed in a forty-minute play sequence where mothers were given cue cards to direct eight different interaction scenes designed to heighten interaction, requesting, commenting and narrating between mothers and infants. Results of the study supported the authors' hypothesis of symbol-infused joint engagement developing over time. Also, results showed that variations in the onset of language for infants are linked to variations in the amount of symbol-infused joint engagement seen between mothers and infants.

Additional research regarding joint engagement has produced similar findings. When parents placed a target item within their six month-old infant's visual field, a significant number of infants were able to match the parent's direction of gaze toward the object, but were not able to when the target object was placed out of the infant's visual field (Morales, Mundy & Rojas, 1998). The infants who were able to match gaze at six months scored consistently higher on tests of receptive vocabulary at 12 months old and expressive vocabulary at 18, 21, and 24 months-old than infants who did not have the capacity to follow their parent's direction of gaze. These findings show some infants are developing important socialization joint attention skills as early as six months old when interacting with a parent.

A subsequent study by Morales et al. (2000) with six-month-old infants examined associations between temperament, response to joint attention bids from a parent, and language. Parental reports of their infant's language were predicted by parental report of attention regulation as well as direct observation of infants responding to joint attention. The amount of time infants oriented, engaged in smiling and laughing responses, and how easily infants were soothed were all correlated with infant receptive vocabulary. An infant's capacity for responding to joint attention bids was correlated with mother-reported duration of orienting. These results suggest that the variability shown in infants' ability to regulate attention may be linked with responsiveness to joint attention.

A large sample of 111 mother-infant pairs were investigated by Laasko, Poikkeus, Eklund, and Lyytinen (1999) to assess 14 month-old children's symbolic play competence and early social interactional behaviors. Mothers and their infants were observed in a laboratory setting interacting during free play with toys provided by the researchers. During the follow-up, each child's language development was assessed at 14, 18, and 30 months. Results indicated that an infant's social attention coordination serves as a prerequisite for expressive language, and maternal interactional strategies have a positive influence on symbolic play behaviors. Both aid in later language development for the infant.

Interactions between security of mother-infant attachment, mother-infant vocal rhythms, and language outcomes revealed that high degrees of coordinated turn-taking during

conversations is linguistically beneficial for insecurely attached mother-infant dyads (Feldstein, 2002). However, securely attached infants showed a linguistic benefit when vocal turn-taking had a low level of predictability. Kitamura, Thanavishuth, Burnham, and Luksaneeyanawin (2002) researched mother-infant directed speech in two different cultures and found mothers speaking both Australian English and Thai exaggerated the pitch characteristics in their respective languages when speaking to infants. Authors of this study suggest the social responsivity of the infant and the mothers' expectations across cultures could impact the exaggerations displayed in infant directed speech.

Reissland, Shepherd, and Cowie (2002) investigated whether a mother's surprise vocalization pitch was a reaction to or was a predictor of their infant's surprise facial expression when interacting with a jack in the box. Infants were compared by age with one group of infants aged 3 to 4 months old and the other group five to six months old. Results showed that when infants did not show a surprise facial expression, mothers exclaimed in a higher pitch but did not change their own surprise expression. Therefore, infant's expressions were a stronger predictor of maternal vocal pitch than the infant's age. These results suggest that infants learn by listening to their mother's voice instead of looking at their facial expressions, since mothers did not change their expressions but rather modulated the pitch of their vocalization.

In other research, the impact of maternal verbal sensitivity and intrusiveness on infant language comprehension was observed while mothers interacted during a free playtime with their 9 and 13-month-old infants (Baumwell, Tamis-LeMonda, & Bornstein, 1997). Maternal sensitivity but not intrusiveness was found to uniquely predict infant language comprehension. Mothers who had higher scores in verbal sensitivity maintained joint topic focus with their child, were more responsive to their infant's behaviors, were able to focus their child when he/she was unfocused, and did not miss their child's signals. These results indicate mothers' responses and interactions are strongly affecting their child's future language development.

A link between infants' attentional skills and language development was found when investigating the effects of maternal interactional behavior including responsivity, sensitivity, synchrony, and reciprocity during mother-infant interaction (Crawford, 2004). Children who were able to attend to a low intensity stimulus vocalized more frequently and had mothers who were highly responsive and sensitive to their needs. Results of this study indicate language and attention skills are closely related and a responsive parenting style supports these developmental skills.

Another factor found to affect an infant's attentional performance is the congruency between maternal and infant characteristics (Miceli, Whitman, Borkowski, Braungart-Rieker, & Mitchell, 1998). When four-month old infants were assessed for responsiveness by averaging each infant's task engagement and activity scores, infant's who were highly responsive demonstrated better attentional performance during interactive toy play with their mothers when mothers were less actively involved. These findings give support to the idea that mothers who behave in ways that fit with their child's temperament may enhance their child's ability to attend to an object or event.

Again, infant expressivity and coinciding maternal responsiveness was studied in relation to early language development for infants from 9 until 21 months of age (Nicely, Tamis-LeMonda, Bornstein, 1999). Infants and mothers were observed at nine months and twelve months playing together in the home environment with toys provided by the experimenter to assess infant affect expressivity and corresponding maternal responsiveness. Mothers were called by telephone every two weeks from when infants were nine months until they were 21 months to

assess language development. Results of the data analysis indicate mother-infant shared affect at nine months is the specific time period optimal for predicting language outcomes at two years old.

Additionally, Bornstein, Tamis-LeMonda, and Haynes (1999) observed mother-child verbal interactions at 13 months and 20 months during playtime and mealtime to see if variations in language exposure influence a child's language acquisition. Stability across age and context were found for children's vocabulary, and similarly, mothers were stable across context for verbal responses and vocabulary. Children verbalized a 14-fold increase in word roots during playtime and a 7-fold increase in word roots at meal time when observed at 20 months, and similarly mothers used more vocabulary words at playtime than mealtime as their children aged. Also, children who displayed a larger vocabulary at 20 months had mothers who were more verbally responsive. While maternal vocabulary did not predict child vocabulary, maternal responsiveness was predictive. Results indicate that dynamically sensitive modifications in a parent's speech, both semantic and syntactic are important factors for a child's vocabulary growth. Parents are encouraged to match their child's developing language ability, and, therefore, create a responsive environment promoting language growth.

Responsiveness

The developmental outcomes and impact of parent-child interactions were analyzed across four early intervention studies consisting of 625 total parent-child dyads (Mahoney, Boyce, Fewell, Spiker, Wheeden, 1998). Results indicated intervention effects were contingent on mothers changing their interaction style with their infants. Also, the only interaction style positively associated with a child's developmental outcome was maternal responsiveness. Resulting recommendations include parents having highly responsive interactions with their children. While programs that focus on family support activities and parent-professional collaboration are important, the results of this analysis show they may be ineffective at promoting a child's development unless the parent is encouraged to engage in more responsive interactions with their child.

In a previous study, a three year intervention program for low-birthweight premature infants was examined to determine the effects of home visits, center based services and parent groups on developmental outcome and parent-child interaction. Higher scores were obtained by mothers in the intervention group for three of the four maternal interactive style factors on the Maternal Behavior Rating Scale. A stepwise multiple regression looking at children's developmental outcomes showed a mother's interaction style with her child accounted for six times more of the variance than membership in the intervention group (Wheedon, 1995).

The assessment of mother-infant interactional synchrony, or nonverbal coordination, was observed longitudinally at 7-, 13-, and 20-months-old in two contexts instead of the traditional format of free play only to determine if context is a factor in synchrony (Yamokoski, Jaquay, Smith, Bernieri, & Dixonŕ, 2000). Results indicated context does affect synchrony between mothers and infants. As the infants' age increases, synchrony decreases in play settings and increases in book reading settings, regardless of the infants' book reading experience. Authors of this study recommend obtaining synchrony ratings from at least two contexts to increase the validity and ability to generalize findings.

By contrast, children with developmental disabilities functioning at the 18 month to 30 month-old age level were compared with typically developing infants to investigate their

interactive engagements with their mothers (Kim & Mahoney, 2004). Mothers were observed during a ten minute play session with toys provided by the researchers and were instructed to play as they normally do with their children. The child's engagement was assessed on the items of attention, persistence, interest, cooperation, initiation, joint attention, and affect. Maternal responses were evaluated with the Maternal Behavior Rating Scale and scored on items of responsiveness, affect, achievement orientation, and directiveness. Results indicated that children's engagement was correlated only with maternal responsiveness and children's disabilities. Further analysis showed maternal responsiveness and affect to be positively associated with the child's engagement level.

In another case, when mother-infant dyads were observed at 5 months and 13 months, maternal responsiveness to infant nondistress vocalizations was found to predict later infant attention span and symbolic play competence but not language comprehension (Bornstein & Tamis-LeMonda, 1997). Interestingly, higher levels of maternal responsiveness in general did not result in greater abilities for children in all areas. Maternal responsiveness appeared to be varied and related to specific variations in different areas of a child's ability.

Additional research by Krahn (2004) observed mother-infant dyads for six consecutive weeks to compare infants' looking behaviors in response to maternal touching, looking, and vocalizing. Infants demonstrated decreased looking at 5-weeks-old and 10-weeks-old compared with 6-9 weeks old. Also, infants displayed more looking when mothers engaged in less looking, touching, and vocalizing. These findings have research implications when assessing very young infants.

A meta-analysis on parental antecedents of infant attachment looked specifically at the role of maternal sensitivity in attachment theory (De Wolff & van IJzendoorn, 1997). Maternal sensitivity was defined as "the ability to respond appropriately and promptly to the signals of the infant" (pg 584). A moderately strong association was found suggesting that in normal settings maternal sensitivity plays an important but not exclusive role in the infant's development of attachment security. Other domains showing effect sizes similar to attachment include mutuality, synchrony, stimulation, positive attitude, and emotional support. These findings do not replicate the large affect size found between maternal sensitivity and infant attachment in the landmark Baltimore study (Ainsworth, Blehar, Waters, & Wall, 1978), but they do suggest investigating new multidimensional parenting antecedents associated with maternal sensitivity.

Play

In a longitudinal study following 8,400 children in the UK, children who attended small playgroups located either in the home or in the community showed higher academic results overall when measured at ages five and ten compared with children who attended day care or stayed home with their parents (Osborn & Milbank, 1987).

Six-month-old infants' exploratory behaviors during a free play session with their mothers was influenced by individual infant characteristics including fussy/difficult and unpredictable temperaments as well as relational features of mother-infant communication including co-regulation states (Porter & Porter, 2000). When infants and mothers displayed symmetrical patterns of co-regulation, infants displayed more active forms of exploration during play.

Newland, Roggman, and Boyce (2001) completed a longitudinal study investigating how infant's language development is affected by the development of mother-infant social toy play. Two groups of infants were compared by age, 11 to 14 months and 14 to 17 months. The

developmental trends resulting from this study were related to acquisition of language by infants and showed immediate and later effects on language development as a result of mother-infant toy play. Specific trends in maternal and infant social toy play development were evident after analysis of the data. Infants increased the number of initiations they used in play and mothers coordinated their infants' interactions resulting in increased turn taking during play.

Mothers and their two year-old children were observed at home and in the laboratory setting to investigate differences in symbolic play behaviors between settings as well as between a stranger/investigator and mother interactions (Bornstein, Haynes, Legler, O'Reilly, and Painter, 1997). Symbolic play demonstrated by the children did not differ between settings or interactions with a stranger versus their mothers. This finding supports the use of a more controlled laboratory setting versus the naturalistic home environment when observing play behaviors for research purposes. Also, when interacting with an investigator with a mother present in the room, children may show similar play behaviors as when interacting with their own mothers.

Infants were observed at 3 and 9 months old during two play situations to investigate the impact of changes in maternal, paternal, and infant traits (Feldman, Greenbaum, Mayes, & Erlich, 1997). Changes in mother and infant behaviors were centrally predicted by changes in maternal anxiety scores. Increased involvement from fathers in home and childcare duties was associated with more infant exploratory play behaviors and less maternal intrusive play behaviors. Additionally, increases in maternal sensitivity during the play situations was predicted by decreases in maternal trait anxiety scores as well as infant difficult temperament scores.

Dixon and Smith (2003) investigated predictors of maternal play due to the impact maternal play may have on children's social, cognitive, and linguistic development. Infants were followed longitudinally from 5 to 20 months old and measured when engaged in maternal play for habituation rates and temperamental scores. Maternal play quality at the 20-month observation was predicted by the infant habituation scores at the five-month observation and by the infant temperamental difficulty at the 13 and 20-month observations. These findings support other literature about mothers changing play behaviors in response to the cognitive and temperamental abilities of their child.

Cognition

Mothers' interactions with their 20-month-old infants were observed during a free play situation to investigate maternal distancing strategies and the resulting memory performance of their infants (Prudhomme, 2003). Results of the study showed a positive and significant correlation during enabling sequences for infant memory recall of events, as well as a strong effect for sequence type when looking at the correlation between maternal distancing and memory performance. In other words, the first two levels of low and medium distancing demands had a higher correlation with memory recall for infants during enabling sequences of showing a child how to make an object be active than for arbitrary sequences. A longitudinal study followed extremely premature babies and found that in the home environment increased amounts of verbal stimulation and involvement from the mother positively correlated to infant cognitive scores at 18 and 24 months old (van Baar, 1996).

Depression

A review of literature on intrusive and withdrawn depressive mothers and their infants addressed the impact of depression on electroencephalogram (EEG) levels and neurotransmitters (Field, Hernandez-Reif, & Diego, 2005). Differences in physiological and biochemical profiles are evident between intrusive and withdrawn styles of depressive mothers. Lower levels of dopamine as well as an EEG pattern that is associated with negative affect are present in withdrawn mothers and their infants as early as 3-months-old. Newborns who mirror their depressed mother's style of interacting generalize these behaviors to interactions with nondepressed adults (Cohn, Campbell, Matias, & Hopkins, 1990; Field, 1984; Field et al., 1988). Intrusive style depressed mothers show greater left frontal EEG activation, which is associated with approach behaviors. Withdrawn mothers show greater right frontal EEG activation, which is associated with withdrawal behaviors (Jones, et al., 1997).

Another set of studies compared differences in touch between depressed mothers coded as intrusive or withdrawn and their 3-month-old infants (Malphurs, et al., 1996; Malphurs, Raag, Field, Picken, Pickens, & Pelaez-Nogueras, 1996). Intrusive mothers touched their infants almost twice as much as withdrawn mothers, but used more negative touching and less positive touching than the mothers with withdrawn styles of depression. The differences in types of touch could have implications on the distress levels of infants, since positive touching is associated with pacification for many infants.

A sample of 122 mothers with and without postnatal depression was investigated to determine the effects of maternal depression on mother-infant interaction, maternal responsiveness, and infant learning ability (Stanley, Murray, & Stein, 2004). Results indicated maternal depression was associated with lower levels of mother-infant interaction and lower maternal responsiveness associated with depression predicted poorer operant learning for infants. Mothers with depressive symptoms showed less contingent positive responsiveness and more contingent negative responsiveness when interacting with their infants. However, the organization of mother-infant attachment was not affected by maternal depressed mood when assessed by the Center for Epidemiological Studies- Depression scale (Hinshaw-Fuselier, 2004).

In a subsequent study, infants of mothers with chronic depression lasting throughout the first 12 postpartum months and brief depression episodes lasting no more than 4 months were tested to determine differences in motor, cognition, and language performance between infants with mothers having no depressive symptoms (Cornish et al., 2005). When the 112 infants were assessed at 15 months, infants with chronically depressed mothers performed significantly lower on motor and cognitive tests compared to infants with never depressed mothers. However, early language scores were not affected by maternal depression.

Differences in infant development between 260 infants whose mothers showed depressive symptoms versus infants born to mothers without depressive symptoms were measured with mental and motor scores at a twelve-month follow up after mothers were randomly assigned to the control or intervention group (Field, et al., 2000). Intervention groups consisted of maternal relaxation therapy, music mood induction, massage therapy, and mother-infant coaching. Mothers in the intervention group showed significantly improved interactions, biochemical values, and normalized vagal tone. Infants whose mothers were in the intervention group also demonstrated more positive maternal interaction, better growth, normalized biochemical values and at the twelve-month follow up had higher mental and motor scores than infants in the control group.

When comparing depressed and nondepressed mothers' self-perception and perception of their infants' behaviors, surprising differences emerged (Field, Morrow, & Adlestein, 1993). Depressed mothers perceived their own behaviors more positively than nondepressed mothers' perception of self, and perceived their infants' behaviors as more negative than nondepressed mothers' perceptions of their infants. Although self-perception is differentiated between depressed and nondepressed mothers postnatally, the self-report Behavioral Inhibition and Activation Scales (BIS/BAS) have correctly identified depressed mothers beginning with pregnancy (Field et al., 1999). Women who scored highly on the BIS during pregnancy had infants with lower Brazelton scores at birth and greater relative right frontal activation. Having the ability to identify depressed mothers during the prenatal period with a cost effective self-report tool could reduce the time a fetus is exposed to the mother's negative biochemistry by implementing intervention early.

Intervention techniques designed to specifically address the withdrawn versus intrusive style of interaction resulted in positive gains made by depressed mothers interacting with their infants (Malphurs et al., 1996). Intrusive mothers received imitation coaching to facilitate contingent responsivity and infantilized behavior, while withdrawn mothers received attention-getting instruction to facilitate vocalizations, game playing, and facial expressions. Mothers received better interaction scores, spent less time in negative behavior states, and more time in positive behavior states.

Adolescent withdrawn depressed mothers received music as a mood induction to determine changes in frontal brain activity measured by electroencephalogram (EEG) (Field et al., 1998). After mothers listened to 20 minutes of recorded stimulating rock music, all but two mothers showed a significant shift from greater relative right frontal EEG activation to symmetry indicating a positive mood state. The two mothers who did not show a shift indicated they did not enjoy listening to rock music and preferred classical music for listening during a second session. After listening to classical music for 20 minutes, the two depressed mothers also showed an EEG response of shifting to symmetry. These results indicate that music can have an immediate positive influence on depressed mood state, and that music preference can impact the success of music interventions.

A subsequent study measured the impact of music mood induction for both intrusive and withdrawn mothers (Torneck, Field, Hernandez-Reif, Diego, & Jones, 2003). Mothers listened to recorded rock and classical music and were measured pre and post music listening for changes in depression, anxiety, and EEG activity. Both intrusive and withdrawn mothers showed positive changes with decreased anxiety and cortisol levels for intrusive mothers and positive EEG changes for withdrawn mothers. Intrusive mothers did not show differences on EEG responses as a function of type of music, but withdrawn mothers showed greater positive EEG shifts after listening to rock versus classical music. Therefore, music genre can impact changes in EEG activity for intrusive depressed mothers.

Lastly, a small sample of depressed mothers participated in an 8-week long music listening protocol that paired individual preferred recordings with muscle tension relieving exercises, relaxation exercises, and vigorous movement exercises (Shiraishi, 1997). A majority of the mothers receiving the music protocol did display decreased depression and increased levels of self-esteem. Progress was monitored with either home visits or phone calls. Mothers who received home visits made slightly better gains in depression and self-esteem measurements than mothers monitored by phone. Results imply having personal interaction over the course of a treatment may impact gains made by depressed mothers.

Based on the above findings associated with depressed mothers and their infants, it is important that research conducted with mother/infant dyads assess maternal depression. A mother suffering from a depressed mood state impacts not only interaction with her infant, but also how the infant interacts with other individuals in his/her environment.

Music and Mother/Infant Interaction

Researchers have described music interactions between mothers, fathers, and infants in relation to the evolution of music, beliefs about music, infant responses, affective communication, and parental bonding. Some researchers hypothesize music originally evolved to give parents the ability to soothe infants while foraging for food (Blater, 2004). Ilari (2005) surveyed 100 mothers of infants 7-9 months old to investigate how mothers use music with their infants and their beliefs about music. Results suggested that mothers do use music with their infants primarily through singing. And although mothers believe there is such a thing as appropriate music to use with infants, there was not a consensus found for what music is appropriate. Littleton (1999) researched mother and infant interactions during an unstructured home observation and found a pattern of up to 20-minute musical interactions occurring which involved vocalizations and physical movement. Infants also responded by gazing, smiling, vocalizing, cooing, kicking, tapping, waving, and reaching out to touch the mother's face or musical toy when the mothers initiated music-play actions.

When looking at affective communication with infants, Rock, Trainor, & Addison (1999) found music to possibly be more powerful than speech. Infants were observed while listening to songs recorded by their mothers in a playful style and lullaby style. Infants demonstrated more attention to self during the lullaby style songs and attended more toward the external world during play style songs. Also, mothers and fathers were found to sing more playfully, expressively, and soothingly when singing to infants that were the same sex as the parent (Trehub, Hill, & Kamenetsky, 1997). Researchers contribute this difference to a greater attachment between parents with same-sex infants than opposite-sex infants. No research was found on the effects of music versus play on parent interactions and infant responsiveness.

A parent group within the Early Intervention program for infants ages zero to three was researched to find the elements contributing to effective practice in the social work group setting (Lyons, 2000). Music was primarily incorporated into the sessions due to its ability to create a means for bonding between parent and child. Other reasons listed for incorporating music activities within the group sessions were the benefits of group cohesion and leadership roles assumed by parents leading a new song for the group. Lyons also noted as a result of his research that infants as young as 4 months old were fully engaged during the music portions of the group.

Music has the ability to pacify and stimulate infants in ways advantageous to parents and infants (Standley, 1991). Parents of premature infants were trained to use music and multimodal stimulation as well as to look for signs of overstimulation when visiting their infants in the neonatal intensive care unit (NICU) (Whipple, 2000). When compared to parents who did not receive training, parents trained in the music and multimodal group reported spending significantly more time in the NICU and displayed more appropriate actions and responses to their infant's signs of overstimulation. Also, infants of trained parents displayed significantly fewer stress behaviors. These results indicate music is a helpful tool in creating a desirable

environment for parent interaction with premature infants. Equipping parents with knowledge of appropriate music interaction techniques had positive influences on parents as well as infants.

CHAPTER 2

INFANT CURRICULUM DESIGN

A review of existing curricula used with young children yields several different approaches. While some curricula focus on the format of what is being taught to children, others focus heavily on the theories of child development that contributed to the formation of the curricula. Williams (1992) associates the term curriculum with the whole child's way of learning through the child's inner connections of cognitive, emotional, social, and physical capabilities. Greenman and Stonehouse (1996) define curriculum not as a list of activities done with children but as the framework and rationale for the intervention or work being done. Albrecht and Miller (2000) view curriculum as a comprehensive focus by involving all aspects of growing and learning for a child, both in the school or day care setting and home setting. This view includes training issues for teachers, parents participating as primary educators, environmental issues such as health, safety and room arrangement, knowledge of child development theories, and sensitivity and understanding of infant issues such as temperament.

An example of a theoretically based curricula is the NEAT curriculum (Coleman, Horodynski, Contreras, & Hoerr, 2005) based on Social Cognitive Theory that suggests personal factors, environmental influences and behavior all interact when learning a new skill or concept. The curriculum focuses heavily on positive reinforcement of desired behaviors for parents incorporating new eating habits and routines in the home with their toddlers. It surmises that an infant's development cannot be separated into different developmental domains since each system affects what is learned by other systems. Therefore, an infant curriculum needs to be inclusive by emphasizing social and relationship goals, creating a safe and emotionally supportive environment through a set of routines to provide security, focusing on learning through play, and helping infants meet all areas of developmental milestones (Swim & Muza, 1999).

Other curricula philosophies emphasize assessment of how the curricula impact the child. For instance, Driscoll and Nagel (2002) view assessment of curriculum as critical due to the importance of the relationship between matching the child to the curriculum being implemented. Authentic assessment of curriculum including play-based, child-centered, hands-on learning activities yields important information about how to improve the curriculum that fosters the child's learning and development.

Yet, another view of infant and toddler curriculum focuses on the dynamic relationship between the teacher, environmental motivators, and the child's responses as well as the families' concerns and goals for their child (Bergen, Reid, & Torelli, 2001). Physical, social-emotional, and cognitive needs are all addressed in this view as well as the integration of infants and toddlers with special needs. Assessment of this curriculum is conducted individually by monitoring development over time through individual portfolios for each child comprised of daily observations of a child's play time. Similarly, the Gladsaxe Curriculum (Broström, 2001) used in Denmark contains three sections: aims, basic competencies, and content. Evaluation of the curriculum occurs within a cycle of pre-understanding and perceived infant purpose leading to curriculum development. After the curriculum is implemented the cycle continues with the child's pre-understanding and perceived infant purpose of the curricula goals assessed leading to future curricula development.

Dombro, Colker, Dodge (1997) describe a high quality curriculum for infants and toddlers as one that addresses seven specific areas. These areas include being grounding in accepted theories of child development, being individualized to meet the needs of each child, including family members in programming while respecting each family's culture, offering a variety of toys that are familiar and stimulating, allowing children to select activities, emphasizing that adults show children respect, and having trained and qualified implementers. Involving parents as active participants within curricula created for use with infants is a critical component of the design (DeJong, Cottrell, & Hansen, 1999).

The Hawaii Early Learning Profile (HELP) is a curriculum-based assessment for children aged birth to 3 years old (Parks, 1997). It is designed for use by professionals working together with families to facilitate a family directed assessment of their child's development. This comprehensive assessment covers the domains of cognitive, receptive and expressive language, gross and fine motor, social-emotional, self-help, and regulatory/sensory organization. Within the domains, 685 skills and behaviors are identified and grouped into 58 developmentally-sequenced conceptual strands in a hierarchical order. The purpose of the HELP assessment is to identify individual developmental strengths and needs for children under 3-years-old.

A differing approach emphasizes infant learning style. Infants are theorized to engage in intermodal mapping as a matching-to-target process when demonstrating imitation skills (Meltzoff, 1999). This theory proposes infant perception and production are bound together at birth, enabling infants to compare the visual target they see with self-produced movements while trying to achieve the imitation. Meltzoff also claims deferred imitation resulting from memory is present in infants 9 months old. This theory challenges the limited abilities of infants described in classic child development theories such as Piaget.

Various other child development theorists such as Montessori, Dewey, Froebel, Piaget, and Isaacs view play as the primary method by which children learn. The National Association for the Education of Young Children (NAEYC) also supports this theory. Music curricula for young children often adhere to this philosophy. The early childhood music practitioner is encouraged by Turner (1999) to incorporate play into the learning activities presented to children, more specifically child initiated and selected "free time" music play. Turner presents a music curriculum developed from the child's perspective that includes (1) self-selected activities, (2) opportunities for individual and small-group interaction, and (3) developmentally and educationally sound musical activities. Tarnowski (1999) expands on the topic of musical play by encouraging music educators of young children to expand their roles from conductor and entertainer to observer and conversationalist involving the teacher as an equal partner with the child in the learning process. Providing a variety of interaction styles for young children making music such as individual and group music activities as well as self-selected music activities is an important component of music curricula used with young children (Oberg, 1997).

When investigating the effects of music on very young children, parents have been thought to be the most important factor in determining the child's level of exposure and development that is impacted by music interactions or music exploration. Because most very young children's time is spent with a parent, the parent has been viewed as playing the primary role in creating an environment in which music is prevalent and the child can create, explore, and manipulate sounds (Scott-Kassner, 1999). However, Levinowitz (1999) discusses how current society has moved away from active music making experiences that were formerly common within households, such as playing piano, guitar, and singing. The impact of this cultural shift has resulted in parents viewing themselves as passive consumers of music and not capable of

being their child's first music teacher to provide active music guidance in the home (Levinowitz, 1999).

Saffran, Loman, and Robertson (2000) researched familiar music and preference of repeated music exposure for seven-month-old infants. They found that infants remember music they hear with at least a two-week delay following repeated exposure. Results also support the theory that infants are able to learn the structured cues within their environments and are able to distinguish and form a preference for music that is repeatedly played in their environment. This relates to the home life infants are experiencing every day and the music that surrounds them in this environment (Ilari, 2002). Because even very young infants can form music preferences based on exposure, it is recommended that parents be asked what music they use in the home when making song choices to use within an infant curriculum (Warner, 1999).

Purpose

While there are many music studies relating to perception of music for typical infants, and the effect of music for neonates and children in medical settings, no studies were found relating to effects of music activities on parent/infant interactions and infant responses in the first 2 years of life. Therefore, the purpose of the dissertation will be to ascertain the effect of music therapy intervention on premature infants' and full term infants' developmental responses and parent responsiveness. Music therapy will be used to teach parents enhancement of child development skills with emphasis on language skills (including baby sign language), social skills, and motor development skills. Maternal interaction and responsiveness will be evaluated to determine changes between mother-infant dyads attending music groups and those attending control organized play groups.

CHAPTER 3

EXPERIMENT

Method

Study Design

The investigator used a quasi-experimental matched subjects design with post test only. Due to the difficulty associated with infants leaving the home environment, this design served as a viable alternative to randomly assigned groups. Infants and young children, whose parents provided informed consent for themselves as well as their child, chose to participate in at least three 30-minute developmental music groups followed by a developmental assessment or chose to complete a one time developmental assessment. Developmental music groups occurred once a week on a recurring basis for five months.

Subjects

This study solicited the participation of 70 parents/infants and young children dyads. All children admitted to the regional hospital Newborn Intensive Care Unit for a one-year period were mailed a flyer advertising the beginning of a developmental music group for children 6 months- 24 months old corrected ages and their caregivers. An email advertising the study was sent to several preschools, daycares, community mom and baby groups, churches, and home school email lists. Children enrolled in the study were between the ages of 7 and 24 months and their caregivers included mothers, father, grandparents, and nannies (see Table 1). Due to the differing types of caregivers enrolled in the study, when describing caregivers the words parent and caregiver will be used interchangeably. Of those 70 caregiver/infant dyads, 56 dyads were matched by infant developmental age.

Parents were asked to complete the Ages and Stages Questionnaire (ASQ) to determine the developmental age of each child (Bricker, et al., 1999). The ASQ measures a child's functional ability for communication, gross motor, fine motor, problem solving, and personal social domain areas. For the ASQ, validity data indicate overall agreement across questionnaires at 83% accuracy and test-retest and interrater reliability exceeds 90%. The ASQ is designed as a parent report and asks specific questions about the child's behavior for each domain. It is designed for one-time screenings, as was used in this study, or for ongoing developmental assessment. The ASQ contains 19 developmental questionnaires designed for administration at 2-month intervals beginning with the age of 4 months. Each questionnaire is valid for 1 month before the indicated age and 1 month after, creating a 2-month window for use. The cutoff scores for each domain were derived by the authors of the ASQ and indicate 2 standard deviations below the mean of 7,900 completed questionnaires. If a child fell below the cutoff score for more than one domain, they were determined to not be functioning at that developmental age. Therefore, one subject in the experimental group and one subject in the control group were not included in the analysis. Subjects born prematurely were given the ASQ age form closest to their corrected age. One subject diagnosed with developmental delays was given the ASQ age forms matching his previously diagnosed developmental age. In order to determine if there were pre-study developmental differences between groups, separate *t*- tests were conducted on each

developmental domain of the ASQ. No significant differences were found for communication, t (54) = .33, p = >.05, gross motor, t (54) = -.14, p = >.05, fine motor, t (54) = -.32, p = >.05, problem solving, t (54) = .36, p = >.05, or personal-social domains, t (54) = .06, p = >.05 (see Table 2).

Table 1

Subject Demographics by Group

	Experimental Music	Control
Adult		
Mothers	23	27
Fathers	4	1
Grandparents	1	0
Nannies	1	0
Child		
Premature	7	2
Sets of twins	2	1
Male	14	17
Female	14	11
Mean Developmental Age (months)	15.85	15.71

Table 2

Means and Standard Deviations of Demographic Data by Group

Test	Group			
	Experimental		Control	
	M	SD	M	SD
Ages and Stages Questionnaire				
Communication	45	11.39	43.96	12.47
Gross Motor	50	15.25	50.53	13.56
Fine Motor	47.32	11.42	48.21	9.05
Problem Solving	45.54	8.64	44.64	9.9
Personal Social	47.5	11.9	47.32	8.87
Barratt Simplified Measure of Social Status	49.44	9.22	47.15	12.43
Beck Depression Inventory	5.18	5.77	3.79	4.46

The Barratt Simplified Measure of Social Status (BSMSS) was completed by each parent to determine similarity between groups on the measure of social status (Barratt, 2006). The BSMSS is built on the work of the Hollingshead Four Factor Measure (1975) and provides an updated list of occupations to better address current occupations as they relate to social status.

However, as the occupations listed are not comprehensive, some study participants were unable to find occupations within the given choices. In those situations, the participants wrote in the occupation on the form and the researcher placed them in the most closely related category. For example, business owner was placed in the senior manager/CEO category, pastor was placed in the educational administrator category, information technology programmer (also known as software engineer) was placed in the engineer category, antique dealer was placed in the buyer category, and interior decorator was placed in the artist category. No significant differences were found between groups on the BSMSS, t (54) = .78, p = >.05 (see Table 2).

The Beck Depression Inventory (BDI) was also completed by parents due to the vast amount of literature findings related to the impact of maternal depression on maternal infant interaction (Beck, Steer, & Brown, 1996). The BDI is designed to screen for depression in male and female adults. The adult attending the music groups with the child (mother, father, grandparent, or nanny) was asked to complete the BDI to determine if depression was a factor in the interaction style between the caregiver and child. No significant differences were found between groups on the BDI, t (54) = 1.01, p = >.05 (see Table 2).

Typically developing infants and young children were included in the study in addition to infants and children with varying diagnoses. Diagnoses included premature birth, visual impairment, and developmental delay. Parents were informed of the general purpose of the study prior to participation and informed of the specific purposes after completing the developmental assessment with their child to avoid compromising internal validity. While most participants self-selected into either the experimental music group or control group, 7 parent/infant dyads were wait-listed and completed the control assessment before attending the music group. These 7 dyads were not included in the experimental music group analysis, but were allowed to attend the music group after completing the requirements for control subjects. The parents in this situation wanted to attend the music groups and were asked to first participate in the study as a control subject to lessen the internal threat of validity that occurs when subjects self select into groups (Campbell & Stanley,1963).

Parent/infant dyads that attended 3 music groups were given a $40.00 Target gift card as an incentive for study enrollment. Parent/infant dyads that completed the one time control assessment were given a $10.00 Target gift card as an incentive for study participation.

Post Observation

The researcher videotaped 10 minutes of parent and child toy play with a standard set of toys used in a previous mother responsiveness experiment (Baumwell, Tamis-LeMonda, & Bornstein, 1997) to facilitate the collection of behavioral data. Toys included a baby doll, blanket, bottle, 4 cups, plates, and spoons, teapot, bus with people, wooden blocks, soft blocks, phone, stacking cups and sponges. Toys were spread out on the floor in a semicircle in front of the camera. Parents and children were positioned in front of the toy and facing the camera with the parent beside the child or holding the child in their lap. Parents and children were observed individually or in groups of two parents and children.

The SCRIBE 4.0.4 (Duke & Stammen, 2006) software program for behavioral observation was used to code all video data in a continuous time format. Therefore, the amount of time spent in each behavior was recorded for each parent and child. Coded videotape times ranged from 8.43 minutes to 11.66 minutes.

Based on a review of related literature, the investigator identified seven parent behaviors and eight child behaviors that indicate parent responsiveness and child engagement. The seven parent behaviors included responsive to toy play, responsive to distress, focus, prohibition, interrupting, miss, and no parent involvement. The eight child behaviors included parent/child toy play, alone toy play, parent/child vocal/gesture toy play, alone vocal/gesture toy play, parent/child vocal/gesture, alone vocal/gesture, parent/child no toy or vocalizations, and alone no toy or vocalizations. The researcher created coding definitions prior to videos being evaluated (Baumwell, Tamis-LeMonda, & Bornstein, 1997). Parent coding definitions included:

- Responsive to toy play- A positive and meaningful change in the parent's verbal or physical behavior subsequent to, and dependent on, a child's exhibiting a vocal or exploratory act. This change had to occur within 5 seconds of the child's initiation of play with a toy.
- Responsive to distress- A positive and meaningful change in the parent's verbal or physical behavior subsequent to, and dependent on, a child's exhibiting signs of distress, such as crying or screaming. This change had to occur within 5 seconds of the child's signs of distress.
- Focus- A parent attempting to verbally or physically focus an unfocused child on a toy.
- Prohibition- A parent negating or discouraging a child's behavior.
- Interrupting- A parent attempting to verbally or physically direct child's attention to a different toy when a child was focused on a toy or group of toys for at least 2 seconds.
- Miss- A parent failed to respond verbally or physically to a new child activity within a 5 second period or before the child shifted focus to a different toy.
- No parent involvement- A parent did not engage with the child or interact in any way.

The eight child behaviors included:

- Parent/child toy play- Child is engaged socially with a parent while engaged with a toy.
- Alone toy play-Child is engaged with a toy and no socialization.
- Parent/child vocal/gesture toy play- Child is engaged with a parent socially while engaged with a toy and vocalizing or gesturing.
- Alone vocal/gesture toy play- Child is engaged with a toy and vocalizing or gesturing while alone with no socialization. The vocal/gesture act is not directed to a parent.
- Parent/child vocal/gesture- Child's vocalizations or gestures are directed to a parent. Child is not engaged in toy play.
- Alone vocal/gesture- Child's vocalizations or gestures are not directed to a parent. Child is not engaged in toy play.
- Parent/child no toy or vocalizations- Child is socializing with a parent while not engaged in toy play and no vocalizations or gestures occur. For example, child is sitting in parent's lap.
- Alone no toy or vocalizations- Child is sitting alone.

Social infant behaviors consisted of an infant engaged with the caregiver/parent through vocalizations/gestures, vocalizations/gestures with a toy, toy play, or no toy or vocalizations/gestures. Definitions for social behaviors included:

- Social behaviors occurred when a child attempted to convey a message to a partner.
- Social behaviors could last as long as a single behavior such as an initiation to play, or as long as an episode/exchange of social behaviors involving several turns (an initiation that is responded to by a parent, that is responded to by the child).

- Social responding was considered ended after 3 seconds of no responding. Nonsocial infant behaviors consisted of the same categories without any caregiver/parent interaction.

Definitions for toy engagement included:

- Toy engagement was signaled when the child visually oriented to a target toy or group of toys for a minimum of 2 seconds.
- Disengagement with a toy was signaled when the child turned away from the toy or group of toys for more than 2 seconds.
- Toy engagement included picking up, reaching for, mouthing toy, etc.

Definitions for gestures included:

- Giving or showing object, pushing away or rejecting an object, reaching toward a parent or object the parent is holding, pointing toward an object or person, nodding or shaking head to indicate "yes" or "no", shrugging shoulders, and gestures made in conjunction with vocalizations, single- or multiple-words.

Definitions for vocalizations included:

- Laughing out loud, animal sounds, transportation/motor sounds, sounds such as "ah," "da," "eee," vocalizations that serve as fillers, such as “mm,” or “huh”, standard sign language, and any complete word.
- Vocalizations excluded crying and involuntary noises such as hiccups.

Two observers blind to the purpose of the study were trained in the use of SCRIBE on sample videos by the researcher. Training continued until intraobserver reliability with the researcher reached a minimum Pearson correlation coefficient of .80 for each of the eight child and seven parent behavior category times recorded in SCRIBE. See Appendix G for raw data. Reliability means were collapsed into the two social or alone child categories and two parent positive or negative categories used for data analysis and reported in Table 3. Establishing reliability between observers is a necessary attempt to minimize the inevitable measurement error that occurs during the observation process (Geringer, Madsen, & Gregory, 2004). To ensure consistency for both observers, interobserver reliability checks were conducted on 20% of both experimental and control group developmental assessment videos. Pearson correlation coefficients for the coded videos remained above .85. To ensure observers did not drift over time as observations were completed, every 8th coded video was checked for reliability. Pearson correlation coefficients remained above .86 for the drift videos (see Table 3).

Table 3

Pearson Correlations for Interobserver Reliability

Subject Behavior	Initial Correlation	Drift Correlation
Infants		
Social	.91	.87
Nonsocial	.88	.86
Parents		
Positive	.85	.96
Negative	.92	.89

Parent Perception Questionnaire

A Parent Perception/Music Use Questionnaire (PPQ) developed by the researcher was completed by parents to determine their child's reactions to music and the use of music in the home environment (see Appendix D). The questionnaire contained four sections. The first section addressed the parent's perception of their child's general development. The second section identified parent's ability to perceive what their child wanted. The third section addressed the parent's purpose of using music in the home. And the last section identified the behavioral responses of the child when music is played.

Music Curriculum

The investigator designed a 36-session developmental music curriculum based on the Hawaii Early Learning Profile (HELP) (Parks, 1997) for parents and infants ages 6 through 24 months old. The HELP strand goals for each age that are naturally addressed through music are incorporated into the curriculum. The curriculum is designed in three sections according to developmental age: 6 -11 months, 12 -17 months, and 18- 24 months. During music sessions, caregivers are given instructions and suggestions for each activity with the intention of training the caregivers in developmentally appropriate interactions with their children. For example, to address HELP strand skill 3.102 which addresses a child's ability to pick an item up off the floor

from a standing position, parents are told: “Have your child stand up, reach over, and pick up an instrument off the floor.”

Each music session follows similar format with 11 developmental domain areas addressed in the same order. For example, each session begins with a hello song, followed by sign language songs (through 18 months old), followed by instrument songs, and then movement songs. Various manipulatives are included in each session to increase the stimulation and of each child and include scarves, puppets, bubbles, books, various music instruments, trains, picture cards, and mirrors. Songs within the curriculum are age appropriate and collectively amount to 156 songs. Each session has both enough repetition to establish familiarity for the caregiver and infant, and variability in presenting new songs to maintain interest and high participation levels. For an example of each age groups’ session plans see Appendix E.

Music Group Setting

Participation in the weekly music group was completely voluntary and caregivers were allowed to continue coming after completing the attendance requirement and post tests for the current study. Therefore, groups varied in size from week to week. Groups ranged from 4 –12 infants seated on the floor in a semi-circle facing the music therapist. Parent/infant dyads sat on padded mats on a carpeted floor. The group met in a large room with enough space for children to crawl, walk, and run, depending on the level of their mobility. Caregivers usually began and ended the group with their child seated in their lap, but the mobile children usually moved around the room while participating in the various activities during the sessions. For the current study, music therapists leading the sessions used all live music and usually accompanied songs with classical guitar. To help facilitate passing out and collecting instruments and manipulatives, large canvas bags were positioned on either side of the music therapist with the contents divided by type of manipulative. Also, after the items were used, they were stored for the remainder of the session behind a table laid on its side to act as a visual and physical barrier to prevent children from being distracted during the session. This also aided the music therapists in determining the necessary instruments to sanitize before the next age groups’ music session.

Procedures

Music parents responded to mail sent to all infants admitted into the regional hospital Newborn Intensive Care Unit the previous calendar year, advertisements in various community baby and mom groups, church nurseries, preschools, and daycares, and home school email lists. Parents called to register for the music group or arrived at the group and registered at the door. Upon arrival to the first music group, parents completed a consent form to participate in the study and filled out the registration information including their child’s corrected age if born prematurely. After attending a minimum of 3 developmental music groups within an 8-week period, parent/infant dyads in the experimental group (n=28) completed a videotaped developmental assessment. The location of the assessment was the hallway immediately preceding the music group room in the regional hospital. A thick blanket was spread on the floor for the toy play because the floor was hard vinyl. Parents were given the option of completing the assessment either immediately following the third music group or before a future music group if the parent elected to continue attending the music groups. The developmental assessment consisted of 10 minutes of structured toy play between the child and parent. The

researcher provided the standard set of toys previously discussed. At the completion of the toy play, parents filled out the ASQ, the BDI, and the PPQ while the researcher supervised the child. Some parents chose to take the forms home and return them completed after coming to another music group. Parents received a $40.00 Target gift card after returning all completed forms to the researcher.

Control parents responded to advertisements in various community baby and mom groups, church nurseries, preschools, and daycares, and home school email lists. Parents called to sign up for a one-time video taped developmental assessment. Control dyads (n=28) completed only the developmental assessment without attending the developmental music groups. The location of the assessments for the control subjects was a carpeted room with a door in a student life center in the community. Due to security issues and concerns, control parents were not able to come to the hospital where the music group was meeting to complete the assessment. Apart from the difference in location, the developmental assessment was the same assessment the music parents completed and consisted of 10 minutes of structured toy play between the child and parent. The researcher provided the same set of standard toys previously discussed. At the completion of the toy play, parents filled out the ASQ, the BDI, and the PPQ while the researcher supervised the child. Parents received a $10.00 Target gift card after returning all completed forms to the researcher.

Results

Parent Responsiveness

Due to the high number of zero scores in the parent individual behavior categories, responsive to toy play, responsive to distress and focus behaviors were grouped together to form a positive behavior category. Similarly, the four behaviors of prohibition, interrupting, miss and no parental involvement were grouped together to form a negative behavior category. Therefore, a two-way analysis of variance was used to determine differences between groups for positive and negative parent behaviors. Results indicated a significant difference for the factor of behavior for both groups, $p < .01$ (see Table 4). However, no significant difference was found between groups in the amount of positive versus negative interaction behaviors, $p > .05$ (see Table 4). Additionally, no interaction for group by behavior was found $p > .05$ (see Table 4).

Figures 1 and 2 show both groups of parents interacting with higher rates of positive than negative behaviors with their infants. The rate of each behavior in seconds for the experimental group shows the highest amount of time spent in responsive to toy play for experimental (see Figure 1) and control groups (see Figure 2) followed by no interaction for both groups. Parents in the experimental group engaged in more responsive to toy play time than the control parents while the control group parents disengaged and exhibited no interaction more than parents in the experimental group. Also, while not significant, the trend is clearly present (see Figure 3) of parents in the experimental group engaging in more positive interactions than the control group parents.

Table 4

2-way Analysis of Variance: Groups by Positive/Negative Behaviors of Parents

Factor	SS	*df*	ms	*F*	*p*	η^2
Groups	231.15	1	231.15	.18	ns	
Error between	69134.78	54	1280.27			
Behaviors	591734.4	1	591734.4	16.82	<.01	.237
Groups x Behaviors	85742.69	1	85742.69	2.44	ns	
Error x Subjects within	1900187.12	54	35188.65			

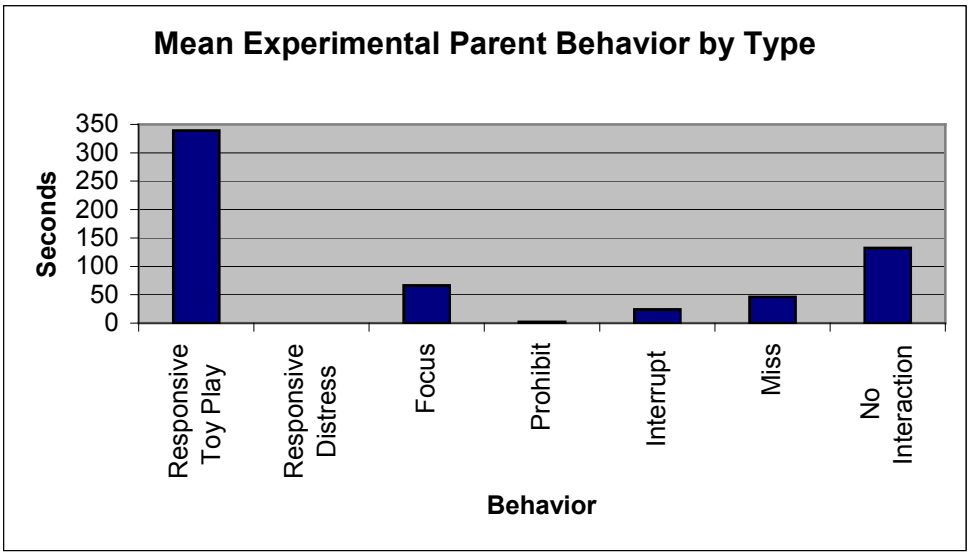

Figure 1Mean Experimental Parent Behavior by Type

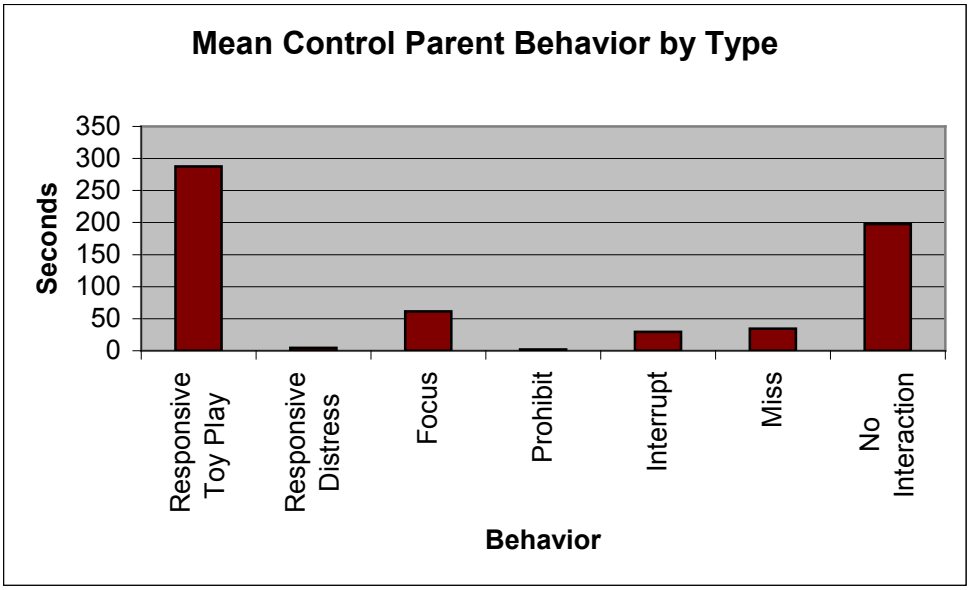

Figure 2 Mean Control Parent Behavior by Type

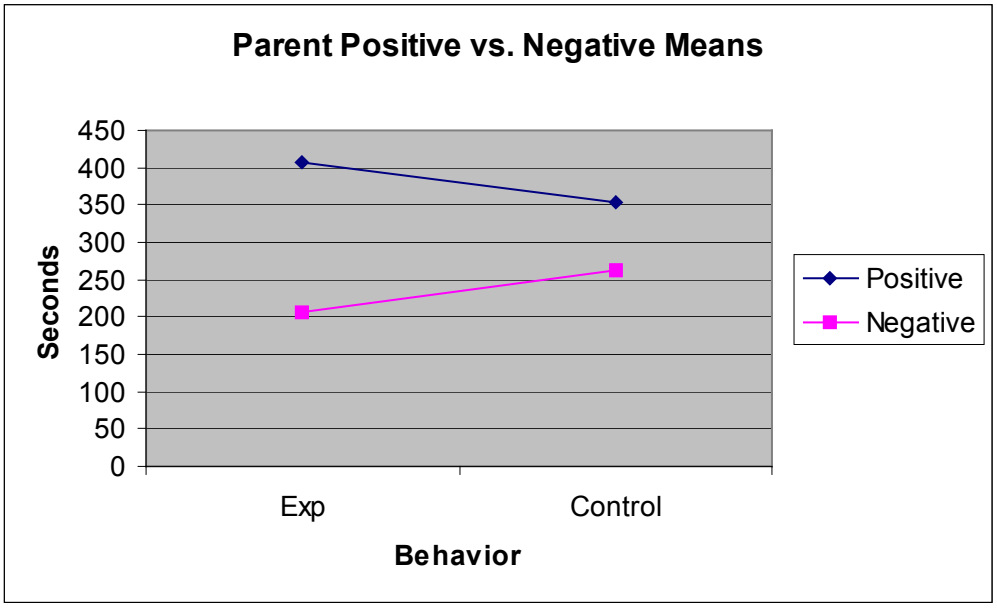

Figure 3 Parent Positive vs. Negative Means

Infant Responses

Due to the high number of zero scores in the infant individual behavior categories, the parent/child toy play, parent/child vocal/gesture toy play, parent/child vocal/gesture, and parent/child no toy or vocalizations behaviors were combined to form a social behavior category. Similarly, the alone toy play, alone vocal/gesture toy play, alone vocal/gesture, and alone no toy

or vocalizations were combined to form a nonsocial behavior category. A two-way analysis of variance was then used to determine differences between groups for social and nonsocial infant behaviors. Results indicated significant differences for the factor of behavior ($p < .05$) as well as an interaction for groups by behaviors ($p < .05$) (see Table 5 and Figure 4). However, no significant differences were found for the factor of groups (see Table 5). Figure 5 shows experimental infants spending the most time engaged in toy play with the parent. Figure 6 shows control infants spending slightly more time engaged in alone toy play followed closely by toy play with the parent.

Table 5

2-way Analysis of Variance: Groups by Positive/Negative Behaviors of Children

Factor	SS	*df*	MS	*F*	*p*	η^2
Groups	12.893	1	12.893	.042	ns	
Error between	16551.21	54	306.504			
Behaviors	521430.04	1	521430.04	7.63	<.01	.124
Groups x Behaviors	316518.89	1	316518.89	4.63	<.05	.079
Error x Subjects within	3689614.07	54	68326.19			

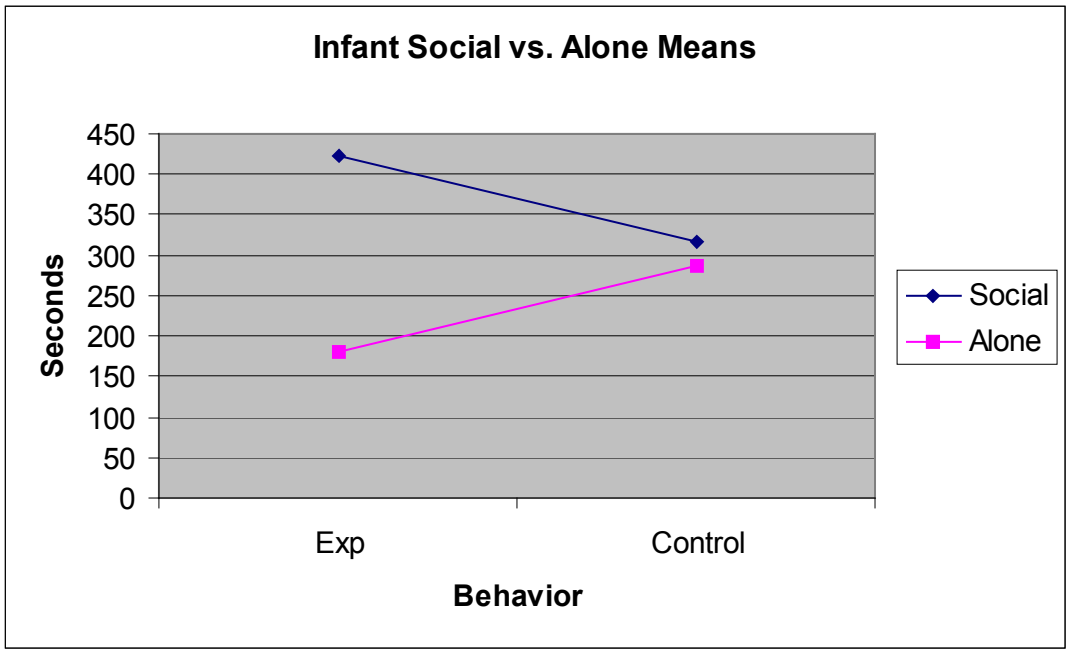

Figure 4 Infant Social vs. Alone Means

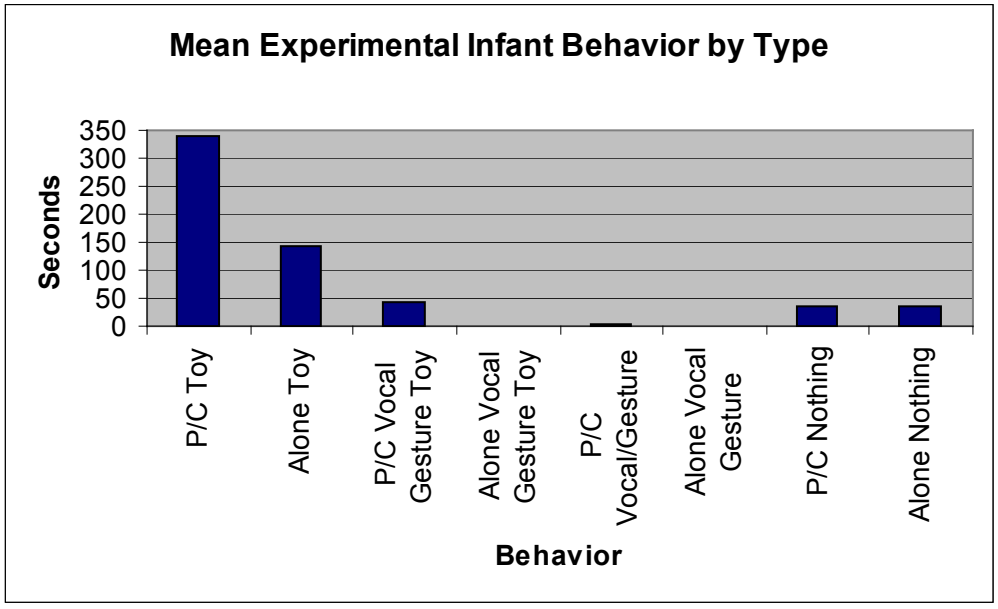

Figure 5 Mean Experimental Infant Behavior by Type

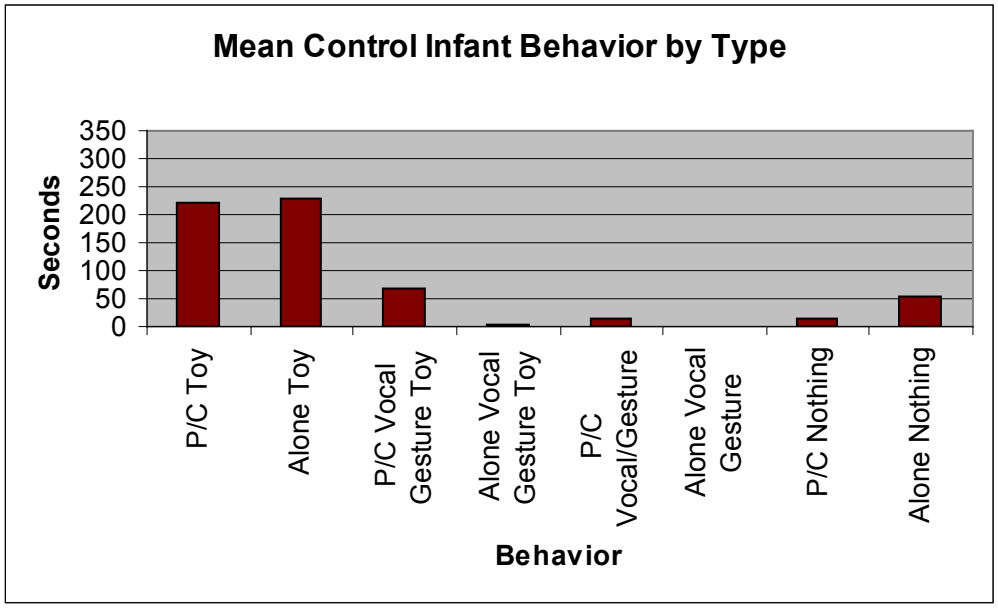

Figure 6 Mean Control Infant Behavior by Type

Parent Perception Questionnaire

Parents were given a Parent Perception/Music Use Questionnaire to determine group differences for the parent's perception of their child's general development, their interpretations of their child's needs, the purpose of using music with their child, and their child's response to music (see Appendix D). All parents in the control group completed the questionnaire (n=28) while one parent in the experimental group did not fill out the questionnaire (n=27). Questions were grouped by content area to allow for group analysis. All questions were scored in a positive direction. For example, "my child cries always" is a 7 score on the questionnaire and was inverted to a 1 score for the purpose of grouping answers in a positive direction. A Mann-Whitney *U* was used for analysis of the four groups of questionnaire answers. No significant differences were found between groups for parent's perception of their infant's general development ($n1 = 27$; $n2 = 28$; obtained $U = 383.5$; $p > .05$), for their interpretations of their child's needs ($n1 = 27$; $n2 = 28$; obtained $U = 289$; $p > .05$), the purpose of using music with their child ($n1 = 27$; $n2 = 28$; obtained $U = 306$; $p > .05$), or for their child's response to music ($n1 = 27$; $n2 = 28$; obtained $U = 297$; $p > .05$).

Child Toy Attention

The amount of time spent in toy play was summed across the categories of parent/child toy, alone toy, parent/child vocal/gesture toy, and alone vocal/gesture toy. A *t*-test revealed no significant differences between music and non-music groups for time spent in seconds of toy play, $t\ (54) = .33$, $p = >.05$.

Premature Subjects Comparison

No statistical analysis was conducted to determine group differences for premature versus full term children due to the low number of premature subjects. However, interesting trends are apparent when looking at descriptive findings. No difference was found between premature infants attending the music group (n=7) and matched age full term infants attending the music group (n=7) for time engaged in either social or alone behaviors (see Table 6). Additionally, the premature infants attending the music groups engaged in more social and less alone behaviors than full term control infants (n=7) matched for developmental age (see Table 6).

Table 6

Means of Social and Alone Behaviors for Experimental Premature and Matched Age Experimental and Control Full Term Children

	Experimental Music Full Term	Experimental Music Premature	Control Full Term
Social Behaviors (seconds)	513.6	470.6	354.4
Alone Behaviors (seconds)	94	138	264.6

Discussion

Limitations

One limitation of the study is that parents self-selected to participate in either the experimental music group or control group. Although random assignment is preferred in controlled studies, the ability to find a substantial subject base of participants willing to come on a recurring basis to the music group with their infants was challenging and warranted the quasi-experimental matched subjects design used for this study. The threat of internal validity posed by

this factor is acknowledged by the investigator and should be considered for future study designs.

The self-selection design may have also caused a bias in the parental motivation for music group participation. It could be argued that parents who make the effort to attend a music group interact at a more attentive level than parents who do not. Similarly, parents who are interested in learning new techniques for interacting with their children, such as those taught in the curriculum, might be more responsive to their child than parents who do not choose to attend the music groups. However, such motivation was represented in both groups. One-fourth of the control dyads were wait-listed for the music group and completed the control assessment before eventually attending the music session.

The discrepancy in prices for gift card incentives was intended to reflect the amount of time spent in participation for the study. Although not measured, the researcher recalls only one parent commenting that the larger gift card made it appealing to attend the music group. Incidentally, that parent enrolled as a control subject after realizing the music group time conflicted with her schedule. There was no evidence that this differential affected results.

An additional limitation of this study lies in the data collection procedure. When parent/infant dyads attended the music sessions, the 10-minute toy play was video taped at the location of the group either immediately after the 3rd session or before the 4th session. The location of the taping was in the path of the traffic going into and coming out of the group. This could have affected the parents negatively by causing distraction from the infant interaction. The resulting noise level of the high traffic area made coding parent and child verbalizations/intentions more difficult than a quieter location. Additionally, the location of the 10-minute toy play for the control subjects was in a different facility and was quiet and secluded. Parent/infant dyads did not encounter any environmental distracters during the toy play. This may have negatively influenced the data for the music group.

The frequency of so many zero scores in the child alone and distress behavior categories and parent behaviors of "miss" and "focus" are supported by previous research (Baumwell, Tamis-LeMonda, & Bornstein, 1997). While data was collapsed for group analysis due to the high number of zero scores, it is still interesting for descriptive analysis purposes to collect information on rates of these behaviors. Behaviors were grouped for coding due to the limitations present in the SCRIBE software. Only one button can be activated at any time while capturing data information, making it impossible to know when multiple behaviors are being exhibited unless behaviors are grouped. For example, if a child was playing with a toy with a parent and vocalizing about the toy, three corresponding button for those behaviors could not be activated. Only one button labeled parent/child vocal/gesture toy play could be activated. While this is not the most straightforward way to collect data, it was necessary due to the software design.

In data analysis, the child behaviors were first grouped by toy play or not so the researcher could identify the length of time spent in toy play between groups. They were then grouped by social interaction or not to identify parent/child interaction. To measure infant development and parent responsiveness and to capture a holistic picture of possible behaviors (therefore lessening the occurrence of zero scores), multiple observations across environments and situations would have been necessary. This is the preferred method of behavior observation for young children at risk for Autism Spectrum Disorder (Prizant, Wetherby, Rubin, and Laurent, 2003) because observation of low occurrence behaviors is deemed necessary to get a complete picture of areas needing intervention. Bronfenbrenner's Ecological Systems Theory supports

naturalistic setting observations as well (Thomas, 2004). According to this theory the relationships that form between each of the child's environments influence that child's development. Unfortunately, the amount of time and resources necessary to complete naturalistic setting observations limits the amount of research conducted in this fashion.

Implications

Infants who attended the experimental music group engaged in more social behaviors during toy play with their parents, a result that is not surprising. Research in infant social learning has shown that as infants progress in age from 12 to 24 months, the context of social interaction positively impacts the amount of attention and imitation infants display when copying a model's actions and outcomes (Nielsen, 2006). Similarly, reenacting an object movement or the steps required to move an object impacted the social learning of actions on objects for 17 month-old infants (Huang & Charman, 2005). The music activities in the curriculum promoted social learning by providing a social context for the acquisition of new skills. As each developmental area was addressed throughout the music groups, children were given the opportunity to see new actions and object movements modeled by parents, music therapists, and other children. Children were given the opportunity within the structure of the curriculum to practice new skills as activities and songs repeated from week to week. Children were also reinforced for new skill development. For example, parents, music therapists and other children cheered for a child when he/she played the drum, ran during movement time, or played with his/her puppet.

The impact of other children present during the music group could have increased the ability of children to play socially. Similar research found infants between 14 and 18 months old with a peer model outperformed children with an adult model putting a teddy bear to bed a week after the imitation task (Ryalls, Gul, & Ryalls, 2000). This leads to the added benefits of a community based music group. Parents with premature infants are advised to keep the infant home for the first 6 months during respiratory syncytial virus (RSV) season to reduce the risk of RSV infection for the premature infant. This isolation prevents the mother and infant from participating in social situations. Additionally, many mothers who stay at home by choice are not provided the opportunity of peer modeling during toy play for their infants. Even if older siblings are present, the peer model research previously mentioned paired similar aged peers to model a task. One explanation could be that when young children have the opportunity to see how a task is performed at a level similar to their current ability, the task is assimilated with more ease. This is supported by Vygotsky's theory of scaffolding to learn new tasks (Thomas, 2004). If the new task is too far above the child's current cognitive functioning, it is frustrating and unattainable. If the task is not challenging at all, the child is not stimulated to grow. The current curriculum is designed to provide multiple levels of task performance within each age group to help each child successfully participate in the music activities. For example, during movement activities, some children are just learning to walk while others are running around and each is encouraged. Also, during the emotion and mirror play some infants are able to turn the mirror over to the right side, while other infants do not recognize the mirror is face down. In addition to children seeing other children turning the mirror over, in this situation parents are instructed to repeatedly show the infant the mirror turning from face down to face up.

While the differences found in social play between infant groups could have resulted from the group setting interaction, another focus of the group was parent instruction through

music. Activities within the curriculum targeting developmental areas through music were modeled each week, and parents were able to see peer modeling as other parents interacted with their infants. Additionally, parents were given handouts to take home each week with ideas of developmentally appropriate interactions to do at home. Research has shown mothers who increased responsiveness to their infants resulted in increased infant social, emotional, communication, and cognitive competence (Landry, Smith, & Swank, 2006). The parent training could, therefore, have had a great influence on the increased social toy play exhibited by infants in the experimental group.

While the parents in the experimental group did not show significant differences from parents in the control group, the evident trend towards parents in the music group engaging in more positive interactions during toy play warrants further investigation. Parents were only required to attend three music sessions to be enrolled in the study, however many parents continued coming to the music groups after completion of the current study. Of the 28 parents attending the music groups, 20 continued coming after they completed the 3 required sessions as a study participant. Of the 7 parents who completed the control subject requirements before attending the music group, 3 continued coming to the groups more than once. Investigating longer-term impact of the music sessions to see if the trend continues should be considered in future studies.

Parents often commented on how enjoyable the music group was and much their children looked forward to attending. One mother said her twin boys asked every morning, "Is it music day?" Another mother said she noticed an increase in how much her child sings while playing since attending the group. Many parents apologized for missing groups, even after completing the 3 sessions required for the study when conflicts arose like trips out of town or children being sick. One mother stated, "We hate missing music class! I am so glad none of us are sick anymore!" Many mothers commented on how much they liked the various manipulatives used throughout the curriculum, especially the mirrors during the emotion songs. Every time new instruments were introduced in the curriculum many mothers would make positive comments. When one mother was handed a children's ocean drum she said, "Ooh, look at the new instrument, it's so pretty! What is it and where can I buy one?"

The lack of differences between groups for parental perceptions of their infants, themselves, use of music, and their infants response to music could be due to the design of the questionnaire or lack of specificity in infant responses available on the questionnaire. Another cause could be simply that parents perceive their infants in a positive manner as a whole. Additionally, much marketing attention has been placed on using music at home with infants with products such as Baby Einstein, Leapfrog, and children's music groups like "The Wiggles" and "The Doodlebops". Popular concepts such as "Mozart makes you smarter" and "children who listen to classical music have higher math scores" are ubiquitous. Many parents feel the need to incorporate music into their child's life without having a full knowledge of the researched benefits or, in the case of the "Mozart effect," the lack of benefits. One control parent stated she placed her baby in front of the television every day to watch the Baby Einstein classical music DVD because she knew that was good for her baby's cognitive development. A Google™ search for infant music resulted in 5.13 million hits and a search for baby music had 231 million results. One could infer from the vast information and music marketing materials available to parents today that many parents believe it is important to incorporate music into their child's life. Therefore, it is not surprising that control parents reported using music with the same frequency.

A music group parent stated that she caught herself singing to her child while playing at home after attending the music group. This was something she had consciously avoided previously because she did not like her singing voice. Her husband typically sang to her children and she considered that his area of interaction and not hers. However, she noticed that her child enjoyed the singing so much that it made her want to sing more. Consequently, she stated that she now sings almost daily to her child during play. Previously discussed research stating children prefer their mothers' singing voices to other voices supports the concept of her child enjoying her singing. To better understand the benefits of attending a live music group future research could address if parents sing more to their infants after attending music groups or look at the number of times per day parents initiate music with their infants in the home environment.

Although the number of premature infants in this study did not warrant separate group analysis, it is interesting to note that there was no difference between premature infants attending the music group and matched age full term infants attending the music group in time spent for both social and alone behaviors. Additionally, the premature infants attending the music groups displayed more social behaviors and less alone behaviors than full term control infants matched for developmental age. These general findings warrant investigation with more preterm infants participating in developmental music curricula. The range of premature births for infants enrolled in this study ranged from 5 weeks to 12 weeks premature. Previous findings have differing results based on birth weight and complications with no differences found between premature infants without complications and full term infants (Bonin, Pomerleau, Malcuit, 1998) and many developmental delays present at school age for ELBW premature infants (Hack, Taylor, Klein, Eiben, Schatschneider, Mercuri Minich, 1994). If premature infants attending the 3 experimental music groups were able to engage in social behaviors at a higher rate than full term infants matched for developmental age, skill development across other domains might be increased with more extended music time.

Although this study did not measure if the enrolled premature infants received music therapy while hospitalized in the Newborn Intensive Care Unit (NICU), it should be noted as a possible confounding variable. Previously discussed research has found many positive short-term effects of receiving various music interventions while admitted in the NICU. While long term effects are not known, the ability for NICU infants to assimilate auditory, visual, tactile, and vestibular stimulation simultaneously early in life could impact their responses to music later in life. All NICU infants who meet referral criterion in the hospital where the current study's music group were located are able to receive music therapy intervention. Therefore, it is possible that the premature infants who participated in this study could have received music therapy interventions if they were admitted to that NICU.

Because premature births and resulting risks for developmental delays continue to increase, knowledge about effective interventions across developmental domains is needed. Parent training for infant developmental interventions is an area needing further investigation. The maternal impact on infant responses is clear and yet programs training parents on how to address developmental milestone achievement are not prevalent. Finding a location to reach the greatest number of parents with premature infants is challenging. Issues such as lack of transportation to a community group, the time of day the group is scheduled so as not to interfere with work, infants' individual napping schedules, and finding childcare for other siblings all interfere with group participation. The need for parent training is supported by research (Whipple, 2000), as is the ability for music to augment parent-training principles. Because music is such an engaging resource across developmental domains, further investigation is needed into

the logistics of successfully conducting a parent-training group targeted for parents with premature infants to teach developmentally appropriate interactions and interventions.

Curriculum Recommendations

Based on reviews of the curriculum implementation, several curriculum revisions are recommended. More parental instruction on the purpose of each music activity should be addressed in the future use of the curriculum. While it is intuitive for the music therapist leading the group, the parents were not in tune to the developmental importance of the music activities partly due to how focused parents were on the behaviors being exhibited by their child. More than one parent commented on how disappointed they were each week that their child was not singing and doing the movements for each song with the same frequency they did at home. One parent stated, "I promise, he sings the songs and signs at home all the time. I don't know why he won't sing when we get here. I hope he will do it right this time." It is not surprising that children would "perform" less in a stimulating environment, based on the research previously discussed on infant social learning. Taking in new information and formulating new skills requires time to integrate and assimilate. The inclusion in the curriculum of more cues for research-based parent involvement could improve the parent responsiveness of music parents as well. The positive impact of maternal involvement for infant eye gaze, infant affect, and interaction style could all be cued more often in the curriculum. Many times parents watched other parents to see how they were interacting with their child, but may not have transferred that interaction to their own infant. Encouraging the music therapist leading the group to give more feedback to the parent during the group could be beneficial in improving the parent-training portion of the curriculum.

Many types of educators could incorporate this curriculum to augment infant developmental interventions. Childcare settings could implement these activities to address infant development across domains. It would be interesting to see if childcare workers are able to use live or recorded music in the classroom environment to teach developmental skills. Research supports the need for collaboration and consultation between music therapists and early childhood educators for the inclusion of specific music interventions in the classroom setting (Register, 2002). Future research could address the ability of childcare workers to incorporate developmentally appropriate music in the classroom. Music educators in early childhood environments and music therapists in early intervention settings might consider the addition of parental involvement in music interactions. If infants are already receiving music instruction/intervention, then finding a way to include the parent could have a greater impact on the development of the child. For this to be successfully implemented, music educators might need further training and instruction about the management of groups of infants and toddlers.

Currently there is a prolific amount of recorded music and music videos available for parents to play for their children. Based on the research reviewed for this study, the importance for live music that involves the parent and is infant-directed cannot be overlooked. Finding ways to reach the parents who are not able to attend a mom and baby music group that charges money (for example, Kindermusik) seems warranted. One possibility would be to broadcast the type of curriculum used in this study with parent and infant models using live music. If parents were able to "participate" through a public television segment, more parents of premature and typical infants could be reached. Many of the ideas in the curriculum's parent handouts incorporate how to make homemade instruments which lends itself to the homebound population of parents who are not being reached for various reasons. The parent handout suggestions could also be shared

via public broadcast. Future research could investigate parents who actively participate in a broadcast of the developmental infant curriculum versus passive music programs that do not promote parent involvement.

This study confirms that infants between 6 and 24 months old attending only 3 group developmental music therapy sessions engaged in significantly more social toy play behaviors than infants matched for developmental age not attending music sessions. Music parents were more positively engaged with their children, but not significantly so. These findings support the need for further investigation with both premature and full term infants from various socioeconomic backgrounds into the positive effects of social music interventions utilizing peer modeling and parent training for developmental milestone achievement.

APPENDIX A

Human Subjects Committee Approval Letter

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8633 FAX (850) 644-4392

REAPPROVAL MEMORANDUM

Date 10/31/2006

To:
Jayne Standley
MC 1180

Dept.: **MUSIC THERAPY**

From **Thomas L. Jacobson, Chair**

Re. **Reapproval of Use of Human subjects in Research:**
The effect of music therapy and parent training in infant language, social, and motor skills on development of premature infant after NICU discharge vs. that of term infants after hospital dischargeThe Effect of a Short-Term

Your request to continue the research project listed above involving human subjects has been approved by the Human Subjects Committee. If your project has not been completed by 10/10/2007 please request renewed approval.

You are reminded that a change in protocol in this project must be approved by resubmission of the project to the Committee for approval. Also, the principal investigator must report to the Chair promptly, and in writing, any unanticipated problems involving risks to subjects or others.

By copy of this memorandum, the Chairman of your department and/or your major professor are reminded of their responsibility for being informed concerning research projects involving human subjects in their department. They are advised to review the protocols of such investigations as often as necessary to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

Cc:
HSC No. 2003.0857-R

APPENDIX B

Tallahassee Memorial HealthCare Institutional Review Board Approval Letter

Tallahassee Memorial

October 2, 2006

Jayne M. Standley, PhD, MT-BC
Florida State University
College of Music
Tallahassee, FL 32606-1180

Dear Dr. Standley:

The Tallahassee Memorial HealthCare (TMH) Institutional Review Board (IRB) unanimously approved the Renewal of study IRB # 53 "The Effect of Music Therapy and Parent Training in Infant Language, Social, and Motor Skills on Development of Premature Infants After Discharge With That of Term Infants After Discharge," on September 26, 2006 to expire on September 25, 2007.

IRB # 53	The Effect of Music Therapy and Parent Training in Infant Language, Social, and Motor Skills on Development of Premature Infants After Discharge With That of Term Infants After Discharge
Principal Investigator:	Jayne M. Standley, PhD, MT-BC
Informed Consent:	**Approved as is**
Reporting Requirements:	Report to the IRB any: 1) planned change in the study, and do not implement any change without receiving prior approval, except to eliminate immediate hazard; 2) any unanticipated problems involving risks to subjects; 3) any new information on the project that adversely influences the risk/benefit ratio. 4) any serious or unexpected adverse events.
Supplemental Reporting Requirements:	**None**
Expiration Date:	September 25, 2007
Continuation Review Date:	September 25, 2007

FWA #00006166
Tallahassee Memorial HealthCare Inc. Institutional Review Board is organized and operates [illegible] ICH-GCP standards and applicable laws and regulations.

Tallahassee Memorial HealthCare Institutional Review Board Approval Letter, Continued

Continuation Review Requirements: The investigator must apply for continuation review and approval one month prior to this expiration date.

The study Informed Consents and questionnaire with the IRB approval stamp for this year are enclosed. The approved IRB forms necessary to comply with the Reporting Requirements are:

- Serious Adverse Event Reports – Internal
- Study Closure Form
- Amendment Requests Prior to Scheduled Continuation Review

They are being sent to you electronically for your convenience. If you have any questions about the forms or submitting them, please feel free to contact Mary Sandell or me at (850) 431-5676.

Sincerely,

Cynthia Blair / Ron Smith

Cynthia Blair
Administrative Liaison/IRB

Enclosure

cc: Mary Sandell

APPENDIX C

Experimental Subject Consent Form

Consent form (experimental group)

* * * * * * *

I wish to attend the music sessions and give consent for me and my child _(insert child's name here)_____ to participate in the above study, for my child to be tested by the researchers, and for me to complete requested questionnaires.

I will sign a release of protected health information form allowing access of TMH hospital records on my child for the following information only: DOB, birthweight, gestational age, problems at birth, Apgar score at birth, Brazelton results at discharge. I understand that the individual identity of my child will be protected by coding of data with destruction of the coding key destroyed at the end of the study. During the study, access to my child's information will be restricted to the researchers only and to official agency audits of their work should these occur.

If my child has been a client of CHS, I also agree to the release of applicable developmental tests of my baby completed by the Children's Home Society to avoid additional testing by these researchers.

I also give additional consent for me and my child to be videotaped during music sessions for making parent training films of these procedures. I understand that these tapes will be kept by the researcher in a locked filing cabinet until edited for educational films. I understand that only the researcher will have access to unused tapes and that unused tapes will destroyed by August 1, 2012.

I understand that no monetary compensation for this study will be provided to participants or researchers.

Parent's Name:_____

Parent's Signature _____ (Date) _____

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Vice President for the Office of Research at (850) 644-8633.

APPENDIX D

Control Subject Consent Form

Consent Form (Control Group)

(same letter)

* * * * * * *

I do not wish to attend the music sessions but give consent for me and my child _(insert child's name here)_____ to participate in the control group of the above study, for my child to be tested by the researchers at 6 month intervals, and for me to complete requested questionnaires.

I will sign a release of protected health information form allowing access of UMH hospital records on my child for the following information only: DOB, birthweight, gestational age, problems at birth, Apgar score at birth, Brazelton results at discharge. I understand that the individual identity of my child will be protected by coding of data with destruction of the coding key destroyed at the end of the study. During the study, access to my child's information will be restricted to the researchers only and to official agency audits of their work should these occur.

If my child has been a client of CHS, I also agree to the release of applicable developmental tests of my baby completed by the Children's Home Society to avoid additional testing by these researchers.

I understand that no monetary compensation for this study will be provided to participants or researchers.

Parent's Name: _____

Parent's Signature _____ (Date) _____

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Committee, Institutional Review Board, through the Vice President for the Office of Research at (850) 644-8633.

APPENDIX E

Parent Perception/Music Use Questionnaire

Parent Name:_____

Child's Name:_____ _____premature _____term

Child's DOB:_____ Number of other siblings_____

General Development	**Never**	**Average Amount**					**Always**
My child cries	1	2	3	4	5	6	7
My child sleeps	1	2	3	4	5	6	7
My child is cheerful	1	2	3	4	5	6	7
My child is overstimulated	1	2	3	4	5	6	7
My child plays well	1	2	3	4	5	6	7
Child's Needs							
I feel I am able to meet my child's needs	1	2	3	4	5	6	7
I am confused about what my child wants	1	2	3	4	5	6	7
I feel I respond to my child appropriately	1	2	3	4	5	6	7

Music Use

I use music: (check all that apply)

_____ never (go to next question)

_____ to calm my child

_____ to interact with my child during child care such as diaper changes or feedings

_____ to play with the child alone or with other children

_____ to promote specific developmental milestones

_____ as background music

_____ in the car

Response to Music

In response to music, my child usually: (check all that apply)

_____Shows no response

_____Listens intently

_____Sleeps

_____ Appears uninterested/looks away

_____Ceases crying

_____Makes eye contact

_____ Cries

_____Sings/vocalizes

_____Smiles/laughs

_____Moves playfully, jumps or rocks

APPENDIX F

Sample Session Plans for Music Groups

Little Ones Music Play
6-11 months
Session Plan 1

Hello Song- ***My Right Hand Says Hello***

Sing and Sign Song- ***Clap Your Hands*** *(signs: more, music)*
Parent Instruction: Take your child's hands and form the signs for your child. Find a routine time to sign with your child so you don't forget to do it at home. Examples of routine times include: meal times, bath time, play time, and bedtime

Instruments**- Shakers**- Song: **Shake, Shake, Shake!**
Parent Instruction: Encourage reaching for your child by placing the shaker in front of your child on the carpet to see if she will reach for it…or hold the shaker slightly out of his reach in front of him to encourage reaching. Make sure he is not getting frustrated!

Movement**-** Songs: **Pat a Cake, Itsy Bitsy Spider, Little One Said Roll Over**
Parent Instruction: Depending on your child's movement ability encourage him by:

A) Back time- bringing feet to mouth,
B) Lifting head with chin tucked toward chest
C) Holds head in line with trunk when pulled from lying to sitting
D) rolling back to tummy
E) If already crawling or about to crawl encourage crawling by laying infant on tummy and putting your hands flat against your infants feet and slightly pushing
F) If already standing or about to stand, encourage supported or unsupported standing
G) If your child is about to walk, then help them walk by holding both of their hands

Book: **This is our Dance** (social circle time movement)

Visual**- Scarves- Rainbow Song** http://www.niehs.nih.gov/kids/lyrics/singarainbow.htm
Parent Instruction: Play Peek-a-boo with scarves with your child

Animals/Puppets**-** Songs: **Old Macdonald, Brown Bear, Brown Bear** (with book)
Parent Instruction: Let your child feel and explore puppets features, encourage interaction with the puppet by puppet pretending to kiss, nudge, and play with child

Body Parts**-** Song: **Head, Shoulders, Knees, and Toes**
Parent Instruction: Take your child's hands and touch each body feature in song

Mirror Time**-** Song: **If You're Happy and You Know It**- with different expressions
Parent Instruction: Hold the mirror in front of your child so you can see your child's face and make different faces for the different emotions in song

Affection/Bonding- Song: **Love and Kisses** (with book)
Parent Instruction: Show your child affection during this song by hugging, kissing, and rocking with your child…It is always good for your child to hear "I Love You"

Massage/Bedtime Routine- Song: **Hush Little Baby** (moms can use ocean drums)
Parent Instruction: Massage your infant if they will tolerate it right now, otherwise continue to show your child affection and rock together while playing the ocean drum.

***Goodbye Song*- It's Time To Go-** with sign language

Little Ones Music Play
12-17 months
Session Plan 1

*Throughout Session- Use verbal directions for activities for child to follow without gestural cues, also give directions while pointing to objects.

***Hello Song*- Let's Say Hello**

***Sing and Sign Song*- Skye Boat Song** (signs: stars, blanket, moon, I love you)
Review: **My World, Charlie Over the Water**
Parent Instruction: Take your child's hands and form the signs for your child. Find a routine time to sign with your child so you don't forget to do it at home. Examples of routine times include: meal times, bath time, play time, and bedtime.

***Instruments*-** Various **rhythm instruments**. Song: **Let's Get Ready To…**
Parent Instruction: Have your child stand up and pick up an instrument off the floor from standing. Ask your child to hand you an instrument to play together. Ask your child "what's this?" Play an instrument while moving around your child to follow and localize sound.

***Movement*-** Song: **Walk, Walk, Walk** (Raffi, pg 167)
Parent Instruction: "Walk" with your child while holding hands if needed- to the front, to the side, and backwards.

***Visual*-** Scarves- **The Color Song** (Rhymes songs poems, pg 82)
Parent Instruction: Encourage your child to imitate/copy your movements with the scarf.

***Animals/Puppets*-** Song: **Boarding the Train**
Parent Instruction: Let your child feel and explore puppets features, encourage interaction with the puppet by pretending to kiss, nudge, and play with your child.

***Book/Body Parts*- Hand, Hand, Fingers, Thumb**
Parent Instruction: Take your child's hands and touch each body part mentioned in the book.

***Mirror Time*-** Song: **Oh me, oh my** (Raffi, pg 52)- with different expressions
Parent Instruction: Have your child hold the mirror so you can see your face in the mirror too. Make the different emotional faces in the mirror for your child to see.

***Affection/Bonding*-** Song: **Teddy Bear Hug** (chorus, Raffi, pg 152)
Parent Instruction: Show your child affection during this song by hugging, kissing, and rocking with your child…It is always good for your child to hear "I Love You."

***Massage/Bedtime Routine*-** Song: **La, La, Lu** (Disney babies CD #11) (moms can use ocean drums)
Parent Instruction: Massage your infant if they will tolerate it right now, otherwise continue to show your child affection and rock together while playing the ocean drum.

***Goodbye Song*- It's Time To Go-** with sign language

Little Ones Music Play
18-23 months
Session Plan 1
*****Ask parents to bring a picture of their child from home or take a Polaroid picture.

Hello Song- **Elmo's Song** with each child's name inserted
Parent Instruction: Ask your child to say their name in the song and show them their picture during the hello song.

Instruments- Song: **Hagalina Magalina** with **boomwhakers** or **drums**
Parent Instruction: Encourage your children to pick up the instrument off the floor from a standing position.
Song: **Clean Up**
Parent Instruction: Show your child where the instruments go when the song is over.

Movement- Song: **Get Ready To Wiggle- put running and jumping in verses**
Parent Instruction: Encourage your child to follow the movement directions in the song like running and jumping.

Gestures- Song: **Go Down Emmanuel Road**
Parent Instruction: Encourage your child to pat their head on "one by one," "two by two", etc.

Animals- Song: **Barnyard Dance** (2.53) **with picture cards**
Parent Instruction: Encourage your child to show you or point to the picture card of each animal when the animal sound is heard in the song.
Song: **Clean Up**
Parent Instruction: Encourage your child to put the picture cards away when the song is over and show your child where the picture cards go if needed.

Book/Pictures- paired with animal song

Body Parts- Song: **Point Your Fingers** (Wiggles)
Parent Instruction: Encourage your child to point to each body part named in the song and follow the movement directions heard in the song.

Emotions/Dramatic Play- Chant: **Three Bears With a Beat**
Parent Instruction: Encourage your child to act out the emotions described in each verse.

Affection/Bonding- Song: **Shining Star** (DZ) (5.53)
Parent Instruction: Show your child affection during this song by hugging, kissing, and rocking with your child…It is always good for your child to hear "I Love You."

Goodbye Song- **It's Time To Go**- with sign language

APPENDIX G

Raw Data

Infant social (with others) data in seconds

E=1 C=2	WO V/G	WO Toy	WO VGToy	WO No	Others Sum
1	0	33	0	0	33
1	0	344	112	22	478
1	0	227	2	85	314
1	19	513	59	16	607
1	0	245	0	0	245
1	0	402	1	48	451
1	3	189	16	143	351
1	11	413	7	13	444
1	6	357	20	12	395
1	0	321	8	186	515
1	8	467	12	0	487
1	0	546	39	6	591
1	2	392	9	154	557
1	0	525	70	5	600
1	3	405	27	3	438
1	0	212	8	0	220
1	0	579	2	46	627
1	16	46	31	7	100
1	6	199	49	0	254
1	3	402	66	0	471
1	41	426	28	62	557
1	3	439	3	7	452
1	0	471	62	0	533
1	0	201	14	136	351
1	1	552	8	32	593
1	0	249	342	0	591
1	0	393	211	0	604
1	0	1	0	0	1
2	0	222	0	0	222
2	16	151	158	7	332
2	49	562	52	0	663
2	3	427	70	11	511
2	0	389	102	0	491
2	7	115	8	0	130
2	0	234	6	0	240
2	6	105	23	0	134
2	9	92	4	0	105
2	48	256	258	5	567
2	0	453	156	18	627
2	0	277	204	0	481
2	25	251	231	31	538

2	14	436	124	3	577
2	0	141	0	53	194
2	0	29	0	0	29
2	7	67	47	21	142
2	0	119	0	0	119
2	4	67	57	0	128
2	1	222	100	0	323
2	100	65	27	56	248
2	10	20	9	0	39
2	14	61	3	0	78
2	0	469	101	27	597
2	15	319	11	53	398
2	0	302	97	10	409
2	66	204	17	46	333
2	16	135	3	55	209

Infant alone data in seconds

E=1 C=2	V/G	Toy	V/G Toy	No	Alone Sum
1	0	429	0	105	534
1	0	71	0	3	74
1	0	50	0	238	288
1	0	0	0	0	0
1	0	313	0	56	369
1	0	112	0	9	121
1	8	136	1	143	288
1	3	100	0	71	174
1	0	179	0	13	192
1	0	70	0	30	100
1	0	106	0	6	112
1	0	19	0	0	19
1	0	0	0	32	32
1	0	26	0	0	26
1	0	171	0	0	171
1	0	381	0	0	381
1	7	6	0	13	26
1	4	433	0	87	524
1	1	371	1	15	388
1	0	139	0	0	139
1	0	13	0	18	31
1	0	135	0	2	137
1	0	59	0	29	88
1	0	158	0	106	264
1	0	0	0	0	0
1	0	9	0	0	9
1	0	0	0	0	0
1	1	535	0	39	575

2	0	337	0	1	338
2	5	237	37	0	279
2	0	2	0	0	2
2	1	63	0	14	78
2	0	109	0	44	153
2	0	256	3	227	486
2	0	374	1	0	375
2	0	376	0	106	482
2	0	445	5	51	501
2	0	48	0	0	48
2	0	0	0	0	0
2	0	128	8	0	136
2	0	85	0	0	85
2	0	17	0	0	17
2	2	236	0	98	336
2	0	567	0	0	567
2	0	308	0	135	443
2	0	461	0	27	488
2	0	348	0	119	467
2	0	225	0	57	282
2	0	284	0	13	297
2	0	405	0	154	559
2	0	224	4	292	520
2	0	22	0	0	22
2	0	111	0	98	209
2	0	169	6	9	184
2	16	258	0	3	277
2	0	334	0	55	389

Parent positive behavior data in seconds

E=1 C=2	Responsive Toy Play	Responsive Distress	Focus	Sum Positive
1	185	0	18	203
1	399	0	50	449
1	234	0	80	314
1	377	0	70	447
1	332	0	104	436
1	455	0	73	528
1	324	0	118	442
1	117	0	325	442
1	194	0	24	218
1	209	0	54	263
1	294	0	204	498
1	369	0	66	435
1	191	0	250	441
1	547	0	8	555

1	265	0	19	284
1	317	0	45	362
1	514	0	33	547
1	207	0	2	209
1	320	0	25	345
1	455	0	51	506
1	390	0	78	468
1	391	0	1	392
1	329	0	27	356
1	265	0	36	301
1	391	0	36	427
1	564	0	25	589
1	556	0	7	563
1	314	0	31	345
2	167	0	58	225
2	376	0	72	448
2	383	2	123	508
2	489	0	23	512
2	502	0	36	538
2	92	0	35	127
2	288	0	31	319
2	273	0	123	396
2	301	0	0	301
2	447	0	78	525
2	564	0	20	584
2	459	0	8	467
2	383	73	74	530
2	284	3	64	351
2	69	0	78	147
2	156	0	19	175
2	217	0	113	330
2	115	0	53	168
2	212	0	18	230
2	413	0	59	472
2	341	0	94	435
2	79	0	19	98
2	46	0	82	128
2	519	0	52	571
2	166	10	143	319
2	301	0	0	301
2	282	35	165	482
2	133	0	76	209

Parent negative behavior data in seconds

E=1 C=2	P	I	M	No	Sum Negative
1	0	55	106	230	391
1	0	6	46	26	78
1	0	38	2	230	270
1	0	61	16	82	159
1	0	0.1	163	0	163.1
1	9	26	6	68	109
1	0	22	83	236	341
1	21	26	144	21	212
1	0	45	28	297	370
1	6	0	31	303	340
1	0	23	0	78	101
1	0	18	56	99	173
1	0	0	0	154	154
1	4	29	0	49	82
1	0	28	19	90	137
1	0	139	30	71	240
1	0	39	3	47	89
1	0	0	192	305	497
1	0	0	182	171	353
1	0	3	0	102	105
1	5	4	0	101	110
1	7	50	44	13	114
1	6	50	47	154	257
1	0	0	86	313	399
1	2	0	3	154	159
1	8	7	0	3	18
1	0	0	0	36	36
1	0	16	3	269	288
2	0	5	64	327	396
2	0	10	14	124	148
2	0	40	36	114	190
2	0	76	0	6	82
2	10	16	8	85	119
2	0	5	51	436	492
2	0	76	65	154	295
2	31	77	101	50	259
2	0	34	40	249	323
2	0	8	12	70	90
2	0	12	2	33	47
2	0	67	51	35	153
2	8	0	18	113	139
2	0	142	4	122	268
2	0	37	44	330	411
2	0	2	10	407	419
2	0	17	95	147	259

2	0	15	153	293	461
2	0	6	7	330	343
2	0	34	10	83	127
2	7	37	10	108	162
2	4	4	20	476	504
2	0	0	29	459	488
2	0	25	15	7	47
2	1	14	31	243	289
2	0	34	40	249	323
2	0	23	9	100	132
2	1	7	20	381	409

Descriptive data for Ages & Stages Questionnaire, Barratt Simplified Measure of Social Status, and Beck Depression Inventory

E=1 C=2	ASQ Communication	ASQ Gross Motor	ASQ Fine Motor	ASQ Problem Solving	ASQ Personal Social	BSMSS	BECK
1	55	60	60	45	45	64.33	2
1	50	55	40	25	45	64.33	2
1	35	60	60	35	35	50.167	9
1	60	50	50	50	55	51.33	0
1	40	60	35	40	60	57.83	7
1	60	60	45	50	55	49.83	2
1	50	60	40	40	45	49.83	2
1	50	50	25	45	35	48.83	2
1	25	45	45	45	55	56.33	2
1	55	40	35	50	40	38.83	4
1	50	15	40	55	20	58.33	3
1	40	60	55	60	60	44	0
1	40	60	50	50	40	54.17	4
1	40	55	40	40	55	42	3
1	40	60	45	40	50	44.5	13
1	60	60	60	45	60	52.16	6
1	20	40	55	40	45	37	1
1	50	60	55	50	60	56	7
1	25	0	40	30	40	34.667	12
1	30	50	55	55	60	54.83	7
1	60	60	50	55	55	49.167	4
1	40	50	45	55	55	59.83	14
1	50	35	60	40	55	31.5	27
1	45	60	60	60	50	32.66	4
1	45	55	60	50	45	42.83	0
1	50	55	45	50	35	51.83	0
1	60	60	60	40	60	44.83	2
1	35	25	15	35	15	62.5	6
2	55	60	50	45	55	35.16	0

2	25	60	55	35	35	37	4
2	45	60	60	50	55	53.16	4
2	35	45	50	50	55	48	0
2	36	30	45	20	40	55.66	7
2	25	60	45	35	30	49.16	6
2	60	60	55	55	50	46.16	5
2	25	40	30	30	40	59.83	6
2	55	60	45	45	50	55.83	1
2	20	35	45	30	35	64.33	1
2	30	60	30	55	40	61.16	3
2	45	50	60	50	40	64.67	0
2	60	60	50	55	45	58	0
2	50	45	40	45	50	47.5	16
2	60	55	45	55	55	36.5	0
2	60	60	50	60	50	30.66	2
2	50	60	55	45	55	22.5	19
2	35	40	35	30	50	49.66	6
2	55	60	60	55	55	50.66	5
2	45	60	60	50	50	53	4
2	35	40	45	50	55	45	2
2	40	50	60	40	50	41.66	4
2	40	0	35	35	30	34.33	0
2	45	40	60	40	35	30.16	0
2	60	55	50	55	60	51.83	3
2	40	55	45	45	60	19.16	3
2	60	60	40	50	45	61.66	3
2	40	55	50	40	55	57.66	2

REFERENCES

American Music Therapy Association. (2005). *2005 AMTA Member Sourcebook.* Silver Spring, MD: Author.

Adamek, M. S. & Darrow, A. A. (2005). *Music in Special Education.* Silver Spring, MD: American Music Therapy Association.

Adamson, L. B. & Bakeman, R. (2004). The development of symbol-infused joint engagement. *Child Development, 75,* 1171-1187.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the Strange Situation.* Hillsdale, NJ: Erlbaum.

Albrecht, K. & Miller, L. G. (2000). *The Comprehensive Infant Curriculum: A Complete, Interactive Curriculum for Infants From Birth to 18 Months.* Beltsville, MD: Gryphon House.

Alexander, G. R. & Slay, M. (2002). Prematurity at birth: Trends, racial disparities, and epidemiology. *Mental Retardation and Developmental Disabilities, 8,* 215-220.

Allen, M. C. (2002). Preterm outcomes research: A critical component of neonatal intensive care. *Mental Retardation and Developmental Disabilities Research Reviews, 8,* 221-233.

Anning, A. & Edwards, A. (1999). *Promoting children's learning from birth to five*. Buckingham: Open University Press.

Bahrick, L. E. & Lickliter, R. (2000). Intersensory redundancy guides attentional selectivity and perceptual learning in infancy. *Developmental Psychology, 36,* 190-201.

Balter, M. (2004). Seeking keys to music. *Science, 306,* 1120-1122.

Barratt, W. (2006). *The Barratt simplified measure of social status (BSMSS) measuring SES.* Unpublished paper, Indiana State University, Terre Haute, Indiana.

Baruch, C., Panissal-Vieu, N., & Drake, C. (2004). Preferred perceptual tempo for sound sequences: Comparison of adults children and infants. *Perceptual and Motor Skills, 98,* 325-339.

Baumwell, L., Tamis-LeMonda, C. S. & Bornstein, M. H. (1997). Maternal sensitivity and child language comprehension. *Infant Behavior and Development, 20,* 247-258.

Beck, A.T., Steer, R. A. & Brown, G. K. (1996). *Beck Depression Inventory®- II*. San Antonio, TX: Harcourt.

Bergen, D., Reid, R. & Torelli, L. (2001). *Educating and Caring for Very Young Children: The Infant/Toddler Curriculum*. New York: Teachers College.

Bonin, M., Pomerleau, A., & Malcuit, G. (1998). A longitudinal study of visual attention and psychomotor development in preterm and full-term infants during the first six months of life. *Infant Behavior and Development, 21,* 103-118.

Bornstein, M. H., Haynes, O. M., Legler, J. M., O'Reilly, A. W., & Painter, K. M. (1997). Symbolic play in childhood: Interpersonal and environmental context and stability. *Infant Behavior and Development, 20,* 197-207.

Bornstein, M. H. & Tamis-LeMonda, C. S. (1997). Maternal responsiveness and infant mental abilities: Specific predictive relations. *Infant Behavior and Development, 20*, 283-296.

Bornstein, M. H., Tamis-LeMonda, C. S. & Haynes, O. M. (1999). First words in the second year: Continuity, stability, and models of concurrent and predictive correspondence in vocabulary and verbal responsiveness across age and context. *Infant Behavior and Development, 22*, 65-85.

Braithwaite, M. & Sigafoos, J. (1998). Effects of social versus musical antecedents on communication responsiveness in five children with developmental disabilities. *Journal of Music Therapy, 35,* 88-107.

Bricker, D., Squires, J., Mounts, L., Potter, L., Nickel, R., Twombly, E., et al. (1999). *Ages & Stages Questionnaire® (ASQ): A parent completed, child-monitoring system* (2nd ed.). Baltimore, MD: Brookes.

Brighi, A., Genta, M. L., & Fogel, A. (2000, July). *Attention and emotion during mother-infant-object play from 2 to 5 months.* Poster session presented at the annual meeting of the International Conference on Infant Studies, Brighton, UK.

Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon (Series Ed.), & Lerner, R. M. (Vol. Ed.), *Handbook of Child Psychology: Vol. 1. Theoretical Models of Human Development* (5th ed., pp. 993-1023). New York: Wiley.

Broström, S. (2001). Constructing the early childhood curriculum: The example of Denmark. In T. David (Ed.), *Advances in applied early childhood education, Vol. 1. Promoting evidence-based practice in early childhood education: Research and its implication* (pp. 151-170). Oxford: Elsevier Science.

Bryant, P. E. & Bradley, L. (1985). *Children's Reading Difficulties.* Oxford: Blackwell.

Campbell, D. T. & Stanley, J. C. (1963). *Experimental and Quasi-Experimental Designs for Research.* Boston: Houghton Mifflin.

Casasola, M. & Cohen, L. B. (2000). Infants' association of linguistic labels with causal actions. *Developmental Psychology, 36,* 155-168.

Caulfied, R. (2000). Beneficial effects of tactile stimulation on early development. *Early Childhood Education Journal, 27,* 255- 257.

Cohn, J. R., Campbell, S. B., Matias, R., & Hopkins, J. (1990). Face-to-face interactions of postpartum depressed and nondepressed mother-infants pairs at 2-months. *Developmental Psychology, 26,* 185-193.

Coleman, G., Horodynski, M. A., Contreras, D., & Hoerr, S. M. (2005). Nutrition education aimed at toddlers (NEAT) curriculum. *Journal of Nutrition Education and Behavior, 37*, 96-97.

Cook, R. E., Klein, M. D., Tessier, A., & Daley, S. E. (2004). *Adapting Early Childhood Curricula for Children in Inclusive Settings* (6th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Cornish, A. M., McMahon, C. A., Ungerer, J. A., Barnett, B., Kowalenko, N., & Tennant, C. (2005). Postnatal depression and infant cognitive and motor development in the second postnatal year: The impact of depression chronicity and infant gender. *Infant Behavior and Development, 28,* 407-417.

Crawford, J. S. (2004). Parental and temperamental influences on the early development of attention and language. *Dissertation Abstracts International, 64* (09), 4651B. (UMI No. 3106435).

Darrow, A. A. & Starmer, G. J. (1986). The effect of vocal training on the intonation and rate of hearing impaired children's speech. *Journal of Music Therapy, 23,* 194-201.

DeJong, L. & Cottrell, B. H. (1999). Designing infant child care programs to meet the needs of children born to teenage parents. *Young Children, 54,* 37-45.

De Kruif, R. E. L., & McWilliam, R. A. (1999). Multivariate relationships among developmental age, global engagement, and observed child engagement. *Early Childhood Research Quarterly, 14,* 515-536.

Denham, S. (1998). *Emotional development in young children.* New York: Guilford Press.

De Wolff, M. S. & van Ijzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68,* 571-591.

Dixon, W. E., Jr., & Smith, P. H. (2003). Who's controlling whom? Infant contributions to maternal play behaviour. *Infant and Child Development, 12,* 177-195.

Dombro, A. L., Colker, L. J., & Dodge, D. T. (1997). *The Creative Curriculum for Infants & Toddlers.* Washington: Teaching Strategies.

Donohue, P. K. (2002). Health related quality of life of preterm children and their caregivers. *Mental Retardation and Developmental Disabilities Research Reviews, 8,* 293-297.

Driscoll, A. & Nagel, N. G. (2002). *Early Childhood Education, Birth-8: The World of Children, Families, and Educators.* (2nd ed). Boston: Allyn & Bacon.

Duke, R. A. & Stammen, D. (2006). SCRIBE 4.0.4. [Computer software] Austin, TX: The Center for Music Learning, University of Texas.

Edgerton, C. (1994). The effect of improvisational music therapy on the communicative behaviors of autistic children. *Journal of Music Therapy, 31,* 31-62.

Eisenberg, N., & Fabes, R. A. (1998). Prosocial development. In N. Eisenberg (Ed.), *Handbook of child psychology, Vol. 3. Social, emotional, and personality* (5th ed., pp. 701-778). New York: Wiley.

Eisenberg, N., Losoya, S., Fabes, R.A., Gutherie, I. K., Reiser, M., Murphy, B., et al. (2001). Parental socialization of children's dysregulated expression of emotion and externalizing problems. *Journal of Family Psychology, 15,* 183-205.

Fagan, J. Prigot, J., Carroll, M., Pioli, L., Stein, A., & Franco, A. (1997). Auditory context and memory retrieval in young infants. *Child Development, 68,* 1057-1066.

Feldman, R., Greenbaum, C. W., Mayes, L. C., & Erlich, S. H. (1997). Change in mother-infant interactive behavior: Relations to change in the mother, infant, and the social context. *Infant Behavior and Development, 20,* 151-163.

Feldstein, S. (2002). A dyadic approach to the interactional context of language acquisition: The direct and indirect effects of early mother-infant vocal coordination in predicting language outcomes at 24 months. *Dissertation Abstracts International, 63* (08), 3598B. (UMI No. 3062584).

Field, T. (1984). Early interactions between infants and their postpartum depressed mothers. *Infant Behavior and Development,7,* 527-532.

Field, T., Healy, B., Goldstein, S., Perry, S., Bendell, D., Schanberg, S., et al. (1988). Infants of depressed mothers show "depressed" behavior even with non-depressed adults. *Child Development, 59,* 1569-1579.

Field, T., Hernandez-Reif, M, & Diego, M. (2005). Intrusive and withdrawn depressed mothers and their infants. *Developmental Review, 26,* 15-30.

Field, T., Hernandez-Reif, M, Hart, S., Theakston, H., Schanberg, S., & Kuhn, C. (1999). Pregnant women benefit from massage therapy. *Journal of Psychosomatic Obstetrics and Gynecology, 20,* 31-38.

Field, T., Martinez, A., Nawrocki, T., Pickens, J., Fox, N. A., & Schanberg, S. (1998). Music shifts frontal EEG in depressed adolescents. *Adolescence, 33,* 109-116.

Field, T., Morrow, C., & Adlestein, D. (1993). "Depressed" mothers' perceptions of infant behavior. *Infant Behavior and Development, 16,* 99-108.

Field, T., Pickens, J., Prodromidis, M., Malphurs, J., Fox, N., Bendell, et al. (2000). Targeting adolescent mothers with depressive symptoms for early intervention. *Adolescence, 35,* 381-414.

Field, T. M., Scafidi, F., & Schanberg, S. M. (1987). Massage of preterm newborns to improve growth and development. *Pediatric Nursing, 13,* 385-387.

Fox, D. B. (2000). Music and the baby's brain early experiences. *Music Educators Journal, 87* (2), 23-27.

Gavidia-Payne, S. & Stoneman, Z. (1997). Family predictions of maternal and paternal involvement in programs for young children with disabilities. *Child Development, 68,* 701-717.

Geismar-Ryan, L. (1986). Infant social activity. The discovery of peer play. *Childhood Education, 63,* 24-29.

Geringer, J. M., Madsen, C. K., & Gregory, D. (2004). A fifteen-year history of the *Continuous Response Digital Interface:* Issues related to validity and reliability. *Bulletin for the Council for Research in Music Education, 160,* 1-15.

Goswami, U. & Bryant, P. E. (1990). *Phonological skills and learning to read.* London: Lawrence Erlbaum Associates.

Gourgey, C. (1998). Music therapy in the treatment of social isolation in visually impaired children. *RE:view, 29*, 157-162.

Greenman, J. & Stonehouse, A. (1996). *Prime Times: A Handbook for Excellence in Infant and Toddler Programs.* St. Paul, MN: Redleaf.

Gruhn, W. (2002). Phases and stages in early music learning. A longitudinal study on the development of young children's musical potential. *Music Education Research, 4,* 51-71.

Grunau, R. E., Eckstein, R., Whitfield, M. F., & Davis, C. (2002). Pattern of learning disabilities in children with extremely low birth weight and broadly average intelligence. *Archives of Pediatrics and Adolescent Medicine, 156,* 615-620.

Grunau, R. E., Oberlander, T. F., Whitfield, M. F., Fitzgerald, C., & Lee, S. K. (2001). Demographic and therapeutic determinants of pain reactivity in very low birthweight neonates at 32 weeks postconceptional age. *Pediatrics, 107,* 105-112.

Grunau, R. E., Whitfield, M. F., & Fay, T. B. (2004). Psychosocial and academic characteristics of extremely low birth weight (≤ 800 g) adolescents who are free of major impairment compared with term-born control subjects. *Pediatrics, 114,* 725-932.

Grunau, R. E., Whitfield, M. F., & Petrie, J. (1998). Children's judgements about pain at age 8-10 years: Do extremely low birthweight (<1000 g) children differ from full birthweight peers? *Journal of Child Psychology and Psychiatry, 39,* 587-594.

Hack, M., Taylor, H. G., Drotar, D., Schluchter, M., Cartar, L., Wilson-Costello, D. et al. (2005). Poor predictive validity of the Bayley Scales of Infant Development for cognitive function of extremely low birth weight children at school age. *Pediatrics, 116,* 333-341.

Hack, M., Taylor, H. G., Klein, N., Eiben, R., Schatschneider, C., & Mercuri-Minich, N. (1994). School-age outcomes in children with birth weights under 750 g. *The New England Journal of Medicine, 331,* 753-759.

Hannon, E. E. & Trehub, S. E. (2005). Tuning in to musical rhythms: Infants learn more readily than adults. *Proceedings of the National Academy of Sciences of the United States of America, 102,* 12639-12643.

Hinshaw-Fuselier, S. S. (2004). Pathways to disorganized attachment in infancy: Are maternal depressed mood and disruptive like events meaningful contributors? *Dissertation Abstracts International, 65* (08), 4321B. (UMI No. 3144388).

Hollingshead, A. B. (1975). *A four-factor classification of social status.* Unpublished manuscript, Yale University, New Haven, CT.

Huang, C-T. & Charman, T.(2005). Gradations of emulation learning in infants' imitation of actions on objects. *Journal of Experimental Child Psychology, 92,* 276-302.

Humpal, M. E. (1990). Early intervention: The implications for music therapy. *Music Therapy Perspectives, 8,* 30-35.

Ilari, B. S. (2002). Music perception and cognition in the first year of life. *Early Child Development and Care, 172*, (3), 311-322.

Ilari, B. S. (2003). Music and babies: A review of research with implications for music educators. *Update: Applications of Research in Music Education (Online), 21* (2), 1.

Ilari, B. S. (2005). On musical parenting of young children: Musical beliefs and behaviors of mothers and infants. *Early Child Development and Care, 175,* 647-660.

Ilari, B. S., Polka, L., & Costa-Giomi, E. (2002, June). Infants' long-term memory for complex music. Paper presented at the 143 Meeting of the Acoustical Society of America, Pittsburgh, PA.

Iverson, J. M. & Fagan, M. K. (2004). Infant vocal-motor coordination: precursor to the gesture-speech system? *Child Development, 75,* 1053-1067.

Johnston, C. C., & Stevens, B. J. (1996). Experience in a neonatal intensive care unit affects pain response. *Pediatrics, 98,* 925-930.

Jones, N. A., Field, T., Fox, N. A., Davalos, M., Malphurs, J., Carraway, K., et al. (1997). Infants of intrusive and withdrawn mothers. *Infant Behavior and Development, 20,* 175-186.

Jusczyk, P. W., & Krumhansl, C. L. (1993). Pitch and rhythmic factors affecting infants' sensitivity to musical phrase structure. *Journal of Experimental Psychology: Human Perception and Performance, 19,* 627-640.

Kaminski, J. & Hall, W. (1994). The effect of soothing music on neonatal behavioral state in the hospital newborn nursery. *Neonatal Network, 15,* 45-54.

Kim, J-M & Mahoney, G. (2004). The effects of mother's style of interaction on children's engagement: implications for using responsive interventions with parents. *Topics in Early Childhood Special Education, 24,* 31-38.

Kitamura, C., Thanavishuth, C., Burnham, D. & Luksaneeyanawin, S. (2002). Universality and specificity in infant-directed speech: Pitch modifications as a function of infant age and sex in a tonal and non-tonal language. *Infant Behavior and Development, 24,* 372-392.

Klassen, A. F., Lee, S. K., Raina, P., Chan, H. W. P., Matthew, D., & Brabyn, D. (2004). Health status and health related quality of life in a population-based sample of neonatal intensive care unit graduates. *Pediatrics, 113,* 594-600.

Kochanska, G., Coy, K. C., Tjebkes, T. L., & Husarek, S. J. (1998). Individual differences in emotionality in infancy. *Child Development, 64,* 375-390.

Korner, A. F. (1996). Reliable individual differences in preterm infants' excitation management. *Child Development, 67,* 1793-1805.

Krahn, M. J. S. (2004). Young infants' looking behaviors in relation to mothers' behaviors during mother-infant interaction. *Dissertation Abstracts International, 65* (12), 6687B. (UMI No. 3158419).

Laakso, M.-L., Poikkeus, A-M., Eklund, K., & Lyytinen, P. (1999). Social interactional behaviors and symbolic play competence as predictors of language development and their associations with maternal attention-directing strategies. *Infant Behavior and Development, 22,* 541-556.

Lamont, A. (2001, August). Infants' preferences for familiar and unfamiliar music: A sociocultural study. Paper presented at the Meeting of the Society for Music Perception and Cognition, Queens University, Kingston, Ontario, Canada.

Landry, S. H., Smith, K. E., Miller-Lancar, C. L., & Swank, P. R. (1996). Responsiveness and initiative: Two aspects of social competence. *Infant Behavior and Development, 20,* 259-262.

Landry, S. H., Smith, K. E., & Swank, P. R. (2006). Responsive parenting: Establishing early foundations for social, communication, and independent problem-solving skills. *Developmental Psychology, 42,* 627-642.

Lansink, J. M. & Richards, J. E. (1997). Heart rate and behavioral measures of attention in six-, nine-, and twelve-month old infants during object exploration. *Child Development, 68,* 610-620.

Lefèvre, C. (2002). Posture, muscular tone and visual attention in 5-month-old infants. *Infant and Child Development, 11,* 335-346.

Levinowitz, L. M. (1999). The importance of music in early childhood. *Music Educators Journal*, *86*, 17-18.

Littleton, D. (1991). Influence of play settings on preschool children's music and play behaviors. *Dissertation Abstracts International, 52* (04), 1198A. (UMI No. 9128294).

Littleton, D. (1999). Mother-infant play: The cradle of musicality. *Bulletin of the Council for Research in Music Education,* pp 86.

Lobo, M. A., Galloway, J. C., & Savelsbergh, G. J. P. (2004). General and task-related experiences affect early object interaction. *Child Development, 75,* 1268-1282.

Lyons, S. N. (2000). "Make, make, make some music": Social work group with mothers and babies together. *Social Work With Groups, 23,* 37-54.

Mahoney, G., Boyce, G., Fewell, R. R., Spiker, D., & Wheeden, C. A. (1998). The relationship of parent-child interaction to the effectiveness of early intervention services for at-risk children and children with disabilities. *Topics in Early Childhood Special Education, 18,* 5-17.

Malphurs, J. E., Field, T., Larraine, C., Pickens, J., Pelaez-Nogueras, M., Yando, R. et al. (1996). Altering withdrawn and intrusive interaction behaviors of depressed mothers. *Infant Mental Health Journal, 17,* 152-160.

Malphurs, J. E., Raag, T., Field, T., Pickens, J., & Pelaez-Nogueras, M. (1996). Touch by intrusive and withdrawn mothers with depressive symptoms. *Early Development and Parenting, 5,* 111-115.

Martin, J. A., Hamilton, B. E., Sutton, P. D., Ventura, S. J., Menacker, F., & Munson, M. L. (2005). Births: Final data for 2003. *National Vital Statistics Report, 54(2),* retrieved November 9, 2005, from http://www.cdc.gov/nchs/data/nvsr/nvsr54/nvsr54_02.pdf.

Meltzoff, A. N. (1999). Origins of theory of mind, cognition and communication. *Journal of Communication Disorders, 32,* 251-269.

Ment, L., Vohr, B., Allan, W., Katz, K., Schneider, K., Westerveld, M., et al. (2003). Change in cognitive function over time in very low-birth-weight infants. *The Journal of the American Medical Association, 289,* 705-711.

Miceli, P. J., Whitman, T. L., Borkowski, J. G., Braungart-Rieker, J., & Mitchell, D.W. (1998). Individual differences in infant information processing: The role of temperamental and maternal factors. *Infant Behavior and Development, 21,* 119-136.

Mildred, J., Beard, K., Dallwitz, A., & Unwin, J. (1995). Play position is influenced by knowledge of SIDS sleep position recommendations. *Journal of Paediatrics and Child Health, 31,* 499-502.

Morales, M., Mundy, P., & Rojas, J. (1998). Following the direction of gaze and language development in 6-month-olds. *Infant Behavior and Development, 21,* 373-377.

Morales, M., Mundy, P., Delgado, C. E. F., Yale, M., Neal, R. & Schwartz, H. K. (2000). Gaze following, temperament, and language development in 6-month-olds: A replication and extension. *Infant Behavior and Development, 23,* 231-236.

Msall, M. E. & Tremont, M. R. (2002). Measuring functional outcomes after prematurity: Developmental impact of very low birth weight and extremely low birth weight status on childhood disability. *Mental Retardation and Developmental Disabilities Research Reviews, 8,* 258-272.

Mullis, R. L. & Mullis, A. K. (1987). Reports of child behavior by single mothers and married mothers. *Child Study Journal, 17,* 211-225.

Nawrot, E. S. (2003). The perception of emotional expression in music: evidence from infants, children, and adults. *Psychology of Music, (31)*, 75-92.

Newland, L. A., Roggman, L. A., & Boyce, L. K. (2001). The development of social toy play and language in infancy. *Infant Behavior and Development, 24,* 1-25.

Ney, K., T—th, I., Lakatos, K. & Gervai, J. (2000, July). *Mothers' and fathers' behaviour with one-year-olds during free-play and teaching.* Poster session presented at the annual meeting of the International Conference on Infant Studies, Brighton, UK.

Nicely, P. Tamis-LeMonda, C. S., & Bornstein, M. H. (1999). Mothers' attuned responses to infant affect expressivity promote earlier achievement of language milestones. *Infant Behavior and Development, 22,* 557-568.

Nielsen, M. (2006). Copying actions and copying outcomes: Social learning through the second year. *Developmental Psychology, 42,* 555-565.

Oberg, B. (1997). Movin' to the music: Simple- and essential- experiences for preschoolers. *Texas Child Care*, *20* (4), 14-19.

Odom, S. L. & Wolery, M. (2003). A unified theory of practice in early intervention/early childhood special education: evidence-based practices. *Journal of Special Education, 37,* 164-173.

Olds, C. (1986). A sound start in life. *Pre- and Peri-Natal Psychology, 1,* 82-85.

Osborne, A. F., & Milbank, J. E. (1987). *The effects of early education: A report from the child health and education study.* Oxford: Oxford University Press.

Palmer, C., Jungers, M. K., & Jusczyk, P. W. (2001). Episodic memory for musical prosody. *Journal of Memory and Language, 45,* 526-545.

Parks, S. (1997). *HELP Strands: Curriculum-Based Assessment Birth to Three Years.* Palo Alto, CA: VORT.

Patterson, A. (2003). Music teachers and music therapists: Helping children together. *Music Educators Journal, 89,* 35-8.

Phillips-Silver, J. & Trainor, L. J. (2005). Feeling the beat: Movement influences infant rhythm perception. *Science, 308,* 1430.

Porter, C. L. & Porter, A. E. (2000, July). *Co-regulation in mother-infant dyads: links to infant temperament and exploration.* Poster session presented at the annual meeting of the International Conference on Infant Studies, Brighton, UK.

Prizant, B. M., Wetherby, A. M., Rubin, E., & Laurent, A. C. (2003). The SCERTS Model: A Transactional, Family-Centered Approach to Enhancing Communication and Socioemotional Abilities of Children With Autism Spectrum Disorder, *Infants and young children, 16*(4), 296-316.

Prudhomme, N. (2003). Maternal distancing and event memory at 20 months. *Infant and Child Development, 12,* 369-385.

Ratliff-Schaub, K., Hunt, C. E., Crowell, D., Golub, H., Smok-Pearsall, S., Palmer, P., et al. (2001). Relationship between infant sleep position and motor development in preterm infants. *Journal of Developmental and Behavioral Pediatrics, 22,* 293-299.

Rautava, P., Lehtonen, L., Helenius, H., & Sillanpää, M. (2003). Effect of newborn hospitalization on family and child behavior: A 12-year follow-up study. *Pediatrics, 111,* 277-283.

Register, D. (2002). Collaboration and consultation: A survey of board certified music therapists. *Journal of Music Therapy, 39,* 305-21.

Reissland, N., Shepherd, J., & Cowie, L. (2002). The melody of surprise: Maternal surprise vocalizations during play with her infant. *Infant and Child Development, 11,* 271-278.

Robb, S. L. (2003). Music interventions and group participation skills of preschoolers with visual impairments: Raising questions about music, arousal, and attention. *Journal of Music Therapy, 40,* 266-282.

Rock, A. M. L., Trainor, L. J., & Addison, T. L. (1999). Distinctive messages in infant-directed lullabies and play songs. *Developmental Psychology, 35,* 527-534.

Rosenquest, B. B. (2002). Literacy-based planning and pedagogy that supports toddler language development. *Early Childhood Education Journal, 29,* 241-249.

Ryalls, B. O., Gul, R. E., & Ryalls, K. R. (2000). Infant imitation of peer and adult models: evidence for a peer model advantage. *Merrill-Palmer Quarterly, 46,* 188-202.

Saffran, J. (2003). Absolute pitch in infancy and adulthood: the role of tonal structure. *Developmental Science, 6,* 35-47.

Saffran, J. R., Loman, M. M., & Robertson, R. R. W. (2000). Infant memory for musical experiences. *Cognition*, *77*, B15-B23.

Schafer, G. (2005). Infants can learn decontextualized words before their first birthday. *Child Development, 76,* 87-96.

Schmidt, L. A., Trainor, L. J., & Santesso, D. L. (2003). Development of frontal electroencephalogram (EEG) and heart rate (ECG) responses to affective musical stimuli during the first 12 months of post-natal life. *Brain and Cognition, 52,* 27-32.

Scott-Kassner, C. (1999). Developing teachers for early childhood programs. *Music Educators Journal*, *86*, 19-25.

Shiraishi, I. M. (1997). A home-based music therapy program for multi-risk mothers. *Music Therapy Perspectives, 15,* 16-23.

Standley, J. M. (1991). The role of music in pacification/stimulation of premature infants with low birthweights. *Music Therapy Perspectives, 9,* 19-25.

Standley, J. M. (1998). The effect of music and multimodal stimulation on physiologic and developmental responses of premature infants in neonatal intensive care. *Pediatric Nursing, 24,* 532-538.

Standley, J. M. (2000). The effect of contingent music to increase nonnutritive sucking of premature infants. *Pediatric Nursing, 26,* 493-499.

Standley, J. M. (2002). A meta-analysis of the efficacy of music therapy for premature infants. *Journal of Pediatric Nursing, 17,* 107-113.

Standley, J. M. (2003). The effect of music-reinforced nonnutritive sucking on feeding rate of premature infants. *Journal of Pediatric Nursing, 18,* 169-173.

Standley, J. M. & Hughes, J. E. (1996). Documenting developmentally appropriate objectives and benefits of a music therapy program for early intervention: A behavioral analysis. *Music Therapy Perspectives, 14,* 87-94.

Standley, J. M., & Madsen, C. K. (1990). Comparison of infant preference and responses to auditory stimuli: Music, mother, and other female voice. *Journal of Music Therapy, 27,* 54-97.

Standley, J. M. & Moore, R. (1995). Therapeutic effects of music and mother's voice on premature infants. *Pediatric Nursing, 21,* 509-512, 574.

Stanley, C., Murray, L. & Stein, A. (2004). The effect of postnatal depression on mother-infant interaction, infant response to the Still-face perturbation, and performance on an Instrumental Learning task. *Development and Psychopathology, 16,* 1-18.

Staum, M. J. (1983). Music and rhythmic stimuli in the rehabilitation of gait disorders. *Journal of Music Therapy, 20,* 69-87.

Swim, T. J & Muza, R. (1999). Planning curriculum for infants. *Texas Child Care*, *22* (4), 2-7.

Symons, L. A., Hains, S. M. J., & Muir, D. W. (1998). Look at me: Five-month-old infants' sensitivity to very small deviations in eye-gaze during social interactions. *Infant Behavior and Development, 21,* 531-536.

Tarnowski, S. M. (1999). Musical play and young children. *Music Educators Journal*, *86*, 26-29.

Thomas, R. M. (2004). *Comparing Theories of Child Development* (6th ed.). Belmont, CA: Wadsworth.

Tims, F. C. (1978). *Contrasting music conditions, visual attending behavior, and state in eight-week-old infants*. Doctoral Dissertation, The University of Kansas. Critiqued by A. Gabrielsson (1981), in *Bulletin of the Council for Research in Music Education, 66,* 164-168.

Tommiska, V., Heinonen, K., Kero, P., Pokela, M-L., Tammela, O., Järvenpää, A-L., et al. (2003). A national two year follow up study of extremely low birthweight infants born 1996-1997. *Archives of Disease in Childhood- Fetal and Neonatal Edition, 88,* 29-35.

Torneck, A., Field, T., Hernandez-Reif, M., Diego, M., & Jones, N. (2003). Music effects on EEG in intrusive and withdrawn mothers with depressive symptoms. *Psychiatry, 66,* 234-243.

Trainor, L. J., Clark, E. D., Huntley, A., & Adams, B. A. (1997). The acoustic basis of preferences for infant directed singing. *Infant Behavior and Development, 21,* 383-396.

Trainor, L. J. & Heinmiller, B. M. (1998). The development of evaluative responses to music: Infants prefer to listen to consonance over dissonance. *Infant Behavior and Development, 21,* 77-88.

Trainor, L. J., Wu, L., & Tsang, C. D. (2001, August). Infants' long-term memory for music. Paper presented at the Meeting of the Society for Music Perception and Cognition, Queens University, Kingston, Ontario, Canada.

Trainor, L. J., & Zacharias, C. A. (1998). Infants' prefer higher-pitched singing. *Infant Behavior and Development, 21,* 799-806.

Trehub, S. E., Hill, D. S., & Kamenetsky, S. B. (1997). Parents' sung performances for infants. *Canadian Journal of Experimental Psychology, 51,* 385-396.

Trehub, S. E., & Trainor, L. J. (1993). Listening strategies in infancy: The roots of music and language development. In S. McAdams & E. Bigand (Eds.) Thinking in sound: The cognitive psychology of human audition (pp. 278-320). Oxford: Clarendon Press.

Trehub, S. E., Unyk, A. M., Kamenetsky, S. B., Hill, D. S., Trainor, L. J., Henderson, J. L. et al. (1997). Mothers' and fathers' singing to infants. *Developmental Psychology, 33,* 500-507.

Trehub, S. E., Unyk, A. M., & Trainor, L. J. (1993). Adults identify infant-directed music across cultures. *Infant Behavior and Development, 16,* 193-211.

Turner, M. E. (1999). Child-centered learning and music programs. *Music Educators Journal*, *86*, 30-33.

U.S. Department of Health and Human Services. (September 9, 2005) *Birthweight and gestation.* Retrieved November 5, 2005, from http://www.cdc.gov/nchs/fastats/birthwt.htm.

Van Baar, A. (1996). Cognitive development of extreme preterm infants and stimulation at home. *Infant Behavior and Development, 19, supplement 1,* 792.

Warner, L. (1999). Ten guidelines for preschool music programs. *Texas Child Care*, *22* (4) 30-35.

Wheedon, C. A. (1995). The effects of a comprehensive early intervention program on the quality of maternal interactive behavior with low birthweight, premature infants. *Dissertation Abstracts International, 56* (12), 7070. (UMI No. 9611601).

Whipple, J. (2000). The effect of parent training in music and multimodal stimulation on parent-neonate interactions in the neonatal intensive care unit. *Journal of Music Therapy, 37,* 250-268.

Williams, L. R. (1992). Determining the curriculum. In C. Seefeldt (Ed.), *The early childhood curriculum: A review of current research* (2nd ed., pp. 1-15). New York: Teachers College.

Woodward, S. C., Guidozzi, F., Hofmeyr, G. J., Jong, P., Anthony, J., & Woods, D. (1992). Discoveries in the fetal and neonatal worlds of music. *ISME Yearbook*, 58-66.

Yamokoski, C. A., Jaquay, C., Smith, P. H., Bernieri, F. J. & Dixonú Jr, W. E. (2000, July). *Measuring interactional synchrony: context plays a role.* Poster session presented at the annual meeting of the International Conference on Infant Studies, Brighton, UK.

Zentner, M. R. & Kagan, J. (1998). Infants' perception of consonance and dissonance in music. *Infant Behavior and Development, 21,* 483-492.

BIOGRAPHICAL SKETCH

Name:	Darcy DeLoach Walworth
Birthplace:	Winter Park, FL
Higher Education:	The Florida State University Tallahassee, FL Major: Music Therapy Degree: B.M. (2000) The Florida State University Tallahassee, FL Major: Music Therapy Degree: M.M. (2001) The Florida State University Tallahassee, FL Major: Music Therapy Degree: Ph. D. (2007)
Experience:	Florida State University and Tallahassee Memorial HealthCare Tallahassee, FL; 2001-2003 General medical clients; inpatient and outpatient; birth through end of life care Refuge House Tallahassee, FL; 2000-2002 Battered and abused women and children Big Bend Hospice Tallahassee, FL; 2003-2004 Hospice patients and families
Honors:	Florida State University Teaching Assistantship Lawton Research Award Assistant Pi Kappa Lambda Honor Society