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The Effect of Music Therapy Interventions with Premature Infants on Their Parents' Stress Levels

Elaine Vuong
THE EFFECT OF MUSIC THERAPY INTERVENTIONS WITH PREMATURE INFANTS
ON THEIR PARENTS’ STRESS LEVELS

By

ELAINE VUONG

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The members of the supervisory committee were:

Jayne M. Standley
Professor Directing Thesis

Clifford K. Madsen
Committee Member

John Geringer
Committee Member

The Graduate School has verified and approved the above-named committee members, and certifies that the thesis has been approved in accordance with university requirements.
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ABSTRACT

The aim of this series of case studies is to determine whether music therapy interventions are effective in decreasing perceived stress levels in parents of premature infants in the Neonatal Intensive Care Unit. The principal investigator administered the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU) and a Music Therapy Questionnaire prior to and following the three-week intervention period or upon discharge, whichever came first to all participants (N=6). During the intervention period, the music therapists provided the participants with at least one Parent Training session, and provided at least two Multimodal Stimulation sessions to their respective premature infants. Results determined that music therapy was effective in decreasing perceived parental stress levels in the Parental Role Alterations section of the PSS: NICU. However, results were inconclusive for the other two sections: Environment and Infant Appearance of the PSS: NICU. Participants indicated that music therapy helped their stress levels in all three sections. In addition, Music Therapy Questionnaire posttests showed that all participants remained, increased or started using music activities with their infants during their visits.
INTRODUCTION

Medical facilities can be difficult environments for both patients and their family members. Parents of pediatric patients may experience considerable stress, and may display symptoms of depression, posttraumatic stress disorder, or acute stress disorder (Bronner, Peek, Knoester, Bos, Last & Grootenhuis, 2010; Landlot, Vollrath, Ribi, Gnehm & Sennhauser, 2003; Miles, Holditch-Davis, & Schwartz, 2007; Shaw et al., 2006; 2009). Neonatal Intensive Care Units have both medical and environmental stress, which can cause uncertainty and anxiety in parents of premature infants (Doering, Moser, & Dracup, 2000; Miles, Funk & Kasper, 1992). Parental stress can result from prolonged hospitalization, unusual appearance of the infant, the infant’s diagnosis and treatment process, and the alternation in the parental role (Dudek-Shriber, 2004; Miles, Funk & Kasper, 1992; Seideman et al., 1997). Parenting-related stress occurs both during and post-treatment (Kazak & Barakat, 1996). Research has shown that fathers and mothers respond differently to the situation. Fathers appear to be more stressed by the physical environment, while mothers appear to be more involved with the infant and stressed by the parent-infant relationship (Bakewell-Sachs & Gennaro, 2004; Miles, Funk & Kasper, 1992; Steedman, 2007). Mothers often report greater stress over time, and they appear to show greater anxiety during Neonatal Intensive Care Unit stays (Miles, Funk & Kasper 1992). The research suggests that it is important for NICU staff to address parents’ needs during their infant’s medical treatment (Kazak & Barakat, 1996; Seideman et al., 1997), while also providing applicable information to help parents understand the situation (Loo, Espinosa, Tyler & Howard, 2003; Seideman, et al., 1997).

The American Music Therapy Association (2013) defines music therapy as “the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program”. For each individual patient, a music therapist assesses, creates a treatment plan, and evaluates outcomes. Each patient’s music therapy goals and objectives are specific and related to the “medical diagnosis, course of treatment, and discharge timeline” (American Music Therapy Association, 2013). In a medical setting, research has shown that the uses of music provide positive benefits, such as reducing anxiety, stress and pain, reducing nausea in
chemotherapy or hemodialysis, reducing fear related to serious illness or injury, elevating mood and emotional states, increasing patient participation in treatment, shortening length of hospital stay and providing emotional intimacy with families and caregivers (American Music Therapy Association, 2013; Standley et al., 2005). In addition, evidence shows that music therapy is effective in various hospital units, such as pre- and post-operative care, surgery, chronic pain management, oncology, orthopedic, neurology, heart and vascular care, obstetrics, emergency, physical rehabilitation, outpatient programs, pediatrics, and intensive care units, including the Neonatal Intensive Care Unit (American Music Therapy Association, 2013; Standley et al., 2005).

Music therapy has been used in the NICU for nearly 30 years, and research has shown its effectiveness with premature infants (Standley & Walworth, 2010). With music, infants benefit physiologically and behaviorally (Standley & Walworth, 2010), have higher oxygen saturation levels, and have a shorter length of stay (Standley, 2002). Multimodal Stimulation, an intervention to facilitate neurological growth and development (Standley & Walworth, 2010), has been shown to enhance developmental gains and mother-infant bonding (Whipple, 2000). Research indicates that premature infants who have used the Pacifier Activated Lullaby device increase nonnutritive sucking and improve feeding ability and show improved weight gain (Standley, 2002; Standley & Walworth, 2010).

Stress and anxiety occur in many parents of premature infants, and therefore, counseling is often helpful. Music therapy can be a “highly effective, nonthreatening methodology for expression of feelings, clarification of values, identification of choices and decisions, and inspiration to act” (Standley & Walworth, 2010). Additionally, music therapy has been shown to increase appropriate parent actions and responses to their infants, which may lead to decreased stress levels in parents (Whipple, 2000). The purpose of this research study is to investigate the effect of parental participation in music therapy interventions on the stress levels of parents of premature infants in the Neonatal Intensive Care Unit.
REVIEW OF LITERATURE

Parental Stress

It is an exciting time when a couple finds out they are about to have a child. However, this excitement does come with concerns. These may include childbearing events, such as pregnancy, birth, and early childrearing (Younger, 1991). Unexpected events, such as unplanned and unwanted pregnancy, may cause the experience to become more concerning (Younger, 1991).

“Parenting is a round-the-clock job with many concerns and demands that can be very stressful” (Pace, 1999). Sources of parental stress include employment, social support, marital relationship, and confidence (Bakewell-Sachs & Gennaro, 2004; Belsky, 1984; Loo, Espinosa, Tyler & Howard, 2003; Rodgers, 1998; Willinger, Diendorfer-Radner, Willnauer, Jorgl & Hager, 2005). Employment, which allows a couple to have personal and physical resources, can be a huge stress in a relationship (Abidin, 1990; Bakewell-Sachs & Gennaro, 2004). When a couple discovers that they need to care for another individual, income becomes a larger stress as increased costs are involved. These costs account for unexpected expenses for a premature infant, including healthcare and education (Bakewell-Sachs & Gennaro, 2004). Research links unemployment to child maltreatment (Belsky, 1984), and employment influences the quality of the parent-child interaction (Rodgers, 1998). Social support is also crucial as it provides emotional support, as well as information and guidance to parenting (Belsky, 1984).

A child can put strain on a marital relationship as the couple learns how the child will influence their relationship and what their parental role will be when the child comes (Belsky, 1984; Rodgers, 1998; Willinger, Diendorfer-Radner, Willnauer, Jorgl & Hager, 2005). When it comes to parenting, the parental role is different between the mother and the father. A mother and father can take on different roles, including the caregiver, the provider, the discipliner, the teacher, the helper, and the friend. Taking on any or multiple roles can cause distress, and “mothers have [been] found to be more distressed than fathers and to use different styles of coping” (Doering, Moser & Dracup, 2000). Mothers tend to use more social support and escapist coping strategies, while fathers tend to avoid anxiety (Doering, Moser & Dracup, 2000).
One specific stressor parents tend to have is their lack of confidence in parenting. Loo, Espinosa, Tyler & Howard (2003) found that "lack of parenting confidence has been associated with lower levels of child competence, less developed maternal caregiving skills, poor quality of the home environment, as well as diminished parent-child interaction skills.” The relationship between a parent and their own child is important as early attachment relationships seem to increase the relationship later on (Willinger, Diendorfer-Radner, Wallnauer, Jorgl & Hager, 2005).

**Parental Stress in the Pediatric Unit**

Medical facilities are stressful environments for both patients and their family members since caring for and worrying about the health of a child or newborn with medical problems increases stress (Pace, 1999). Due to the stressful situation, parents may have anxiety, depression, loneliness, and physical and psychologic distress (Daniels, 2004), and they often display symptoms of post-traumatic stress disorder (PTSD), or acute stress disorder (Bronner et al., 2010; Landlot, Vollrath, Ribi, Gnehm & Sennhauser, 2003; Miles, Holditch-Davis, & Schwartz, 2007; Shaw et al., 2006; 2009). Parents of pediatric patients experience considerable stress related to the child’s diagnosis (Daniels, 2004), medical treatment and procedures, or the duration of hospitalization (Bronner et al., 2010; Kazak & Barakat, 1997). Research suggests that parental PTSD is related to parents’ perceptions of the treatment and procedures to their child’s life, and it is also related to the acute stress reactions during PICU treatment (Bronner et al., 2010). Stress of parenting is increased during and after medical procedures and treatments as they put strains on parent-child interactions (Kazak & Barakat, 1997). Research indicates that both mothers and fathers have higher state of anxiety after their child’s medical treatment is completed (Kazak & Barakat, 1997). However, females are more likely to develop post-traumatic stress symptoms and PTSD (Bronner et al., 2010). In addition, Landolt, Vollrath, Ribi, Gnehm & Sennhauser (2003) found that there are several variables associated with mothers’ severity of stress, including higher socioeconomic status, an incomplete family situation, and a longer duration of hospitalization of the child.
Parental Stress with Term Infants

The birth of a healthy term infant is a wondrous occasion for both the mother and the father. However, it can still lead to many parental stressors, including the adjustment to caregiving, coping with physical demands, and living with the new and ongoing financial obligations of having a child (Bakewell-Sachs & Gennaro, 2004). Despite the stressors, most soon-to-be mothers are not as worried compared to mothers of preterm infants. Soon-to-be mothers do not foresee and are not stressed about an early delivery, do not have increased worry related to the health of the baby, and are not anxious about being separated from their baby after delivery or at the time of discharge (Kaplan & Mason, 1965). While parenting stress always remains, mothers of term infants do not experience the initial stress that mothers of preterm infants encounter (Singer et al., 1999).

Parental Stress in the Neonatal Intensive Care Unit

The birth of a premature infant and the admission into the Neonatal Intensive Care Unit (NICU) are events that cause stress to most families. After labor and delivery, parents are separated from the infant, and are filled with feelings of uncertainty and anxiety and loss of control (Loo, Espinosa, Tyler & Howard, 2003). Parents need to learn to cope with adapting to the NICU environment, understanding medical terminology and medical needs of their child, infant’s uncertain survival and outcome, focusing on how to care for the infant post-discharge and long-term outcomes, the loss of parental role, and the emotional distress (Bachman & Lind, 1997; Bakewell-Sachs & Gennaro, 2004; Bell, 1997; Carter, Mulder, Bartram & Darlow, 2005; Frank, Cox, Allen & Winter, 2005; Holditch-Davis, Bartlett, Blickman & Miles, 2003; Miles, Funk & Kasper, 1992; Seideman et al., 1997; Simons, Ritchie, Mullett, 1998; Zimmerman & Bauersachs, 2012).

Parents often feel stress over the environment in the NICU. They need to adjust to the unfamiliar surroundings (Bakewell-Sachs & Gennaro, 2004; Carter, Mulder, Bartram & Darlow, 2005). This may include the sights and sounds of monitors and equipment, bright lights, other fragile babies, and the large number of medical staff and chemical orders (Bachman & Lind, 1997; Franck, Cox, Allen & Winter, 2005; Miles, Funk & Carlson, 1993). Parents must also
learn to understand the terminology and vocabulary of NICU medical staff (Bakewell-Sachs & Gennaro, 2004; Zimmerman & Bakersachs, 2012). This allows them to understand the realistic medical needs and status of their child while they are undergoing care in the NICU (Bachman & Lind, 1997). Another stressor for parents in the NICU is the unstable health status of their infant that may lead to the potential loss of their child (Bachman & Lind, 1997; Bakewell-Sachs & Gennaro, 2004; Bell, 1997; Zimmerman & Bauersachs, 2012). Once the infant is stabilized and recovering, parents need to focus on post-discharge care for their infant as well as the long-term outcomes, such as possible disabilities (Bachman & Lind, 1997; Bakewell-Sachs & Gennaro, 2004). The financial and caregiving burdens also lead to increased stress (Bachman & Lind, 1997).

Due to the uniqueness of the NICU environment, there is a loss of parental role. Unlike term infant deliveries, parents are separated from their baby (Kaplan & Mason, 1965). There is a change in parental role, or the loss of their desired parental role, as medical staff care for the infant due to the baby’s fragile condition (Bachman & Lind, 1997; Frank, Cox, Allen & Winter, 2005). In a study with 46 adolescent mothers, data was collected using the Parental Stressor Scale: NICU and a demographic data form. Bell (1997) found that mothers felt parental role alterations and the infant’s appearance and behavior were the most stressful aspects of the NICU.

Parents also have increased emotional stress and experience disappointment, frustration, guilt, fear, anxiety, helplessness, grief and anger (Bachman & Lind, 1997; Frank, Cox, Allen & Winter, 2005; Wyly, 1995). Parents may feel responsible for their child’s medical problems, and fear the uncertainty of their child’s survival and outcome as well as the financial burden of having a child in the NICU. Parents may be anxious about the child’s development and their ability to care for him or her after discharge. They may also feel helpless since they are unable to make the decisions for the treatment of their child. Lastly, they may feel grief or anger over the loss of their anticipated perfect child (Bachman & Lind, 1997).

Carter, Mulder, Bartram & Darlow (2005) compared depression and anxiety symptoms and psychosocial functioning of 447 parents of premature infants and 189 parents of term infants not admitted to the NICU. Results found that parents of premature infants displayed more anxiety symptoms compared to parents of term infants. A longitudinal study with mothers of both high- and low-risk very low-birth-weight (VLBW) infants, as well as term infants, compared the maternal psychological distress and parenting stress over all three participant
groups (Singer et al., 1999). Results were significant when compared at one month, two years and three years. At one month, mothers of high- and low-risk VLBW infants had more psychological distress compared to mothers of term infants. At two years, mothers of high-risk VLBW infants continued to indicate psychological distress, while mothers of low-risk VLBW and term infants did not differ. Parenting stress remained greater for mothers of high-risk VLBW infants, but their distress symptoms did not differ from mothers of term infants. Both studies showed that parents of preterm infants display more distress symptoms, which can lead to increased parental stress compared to parents of term infants (Carter, Mulder, Bartram & Darlow, 2005; Singer et al., 1999). In another study, also looking at parental responses, the participants were 469 parents of premature infants (Doering, Moser & Dracup, 2000). Results found that the participants had high levels of anxiety, hostility, depression and poor adjustment.

Parents need to cope with all of these stressors, as well as normal stresses of parenthood (Carter, Mulder, Bartram & Darlow, 2005). Factors, such as the adjustment to the new family situation, the health status of the baby, the relationship to the infant and control of care, may influence the perceived parental stress levels (Franck, Cox, Allen & Winter, 2005; Schappin, Wijnroks, Uniken Venema & Jongmans, 2013). Shields-Poe & Pinelli (1997) conducted a descriptive study to identify sources of parental stress in NICUs. They used four different instruments to detect sources of stress. Pregnancy expectations, family income, social support, and the severity of illness of their premature infant were the factors that were found to be associated to parental stress.

In addition, Shields-Poe & Pinelli (1997) found that mothers and fathers responded differently to the NICU experience. Miles, Funk & Kasper (1992) interviewed 23 couples of premature infants twice; the first time was within a week of their infant’s admission, and the second time was approximately one week later. Findings suggest that both mothers and fathers perceived the change in parental role as the greatest source of stress. It was found that mothers had 40% higher stress scores related to parental role alteration compared to fathers at Time 1, and by Time 2, mothers had decreased stress, but the scores still remained higher than fathers.

Overall, research has found that mothers appear to be more stressed and anxious, and adjust poorly compared to fathers (Doering, Moser & Dracup, 2000; Franck, Cox, Allen & Winter, 2005; Jackson, Ternestedt & Schollin, 2003; Miles, Funk & Kasper, 1992; Shields-Poe & Pinelli, 1997). Mothers are stressed by the parent-infant relationship, which may be impacted
by their involvement with their child, the longer time spent in the NICU, and the biological or social role differences between mothers and fathers. Jackson, Ternestedt & Schollin (2003) found that mothers felt they had a need for control in the care of the baby, and therefore, participated more with baby care, yet they felt insecure providing care of their baby in the environment. However, fathers had difficulty leaving work, which resulted in fewer visits (Jackson, Ternestedt & Schollin, 2003). Fathers appeared to be more stressed trying to find a balance between work and family life and by the physical NICU environment (Bakewell-Sachs & Gennaro, 2004; Franck, Cox, Allen & Winter, 2005; Jackson, Ternestedt & Schollin, 2003; Miles, Funk & Kasper, 1992; Steedman, 2007).

Outcomes of Parental Stress in the Neonatal Intensive Care Unit

Research has shown that parental stress in the NICU has negative outcomes for the family (Doering, Moser & Dracup, 2000). The birth of a premature infant may create increased stress in a family, such as personal strain, financial burden, and family and social disruption (Doering, Moser & Dracup, 2000). Stress attributed by NICU experience is related to parenting behavior (Rodgers, 1998). Research has shown that stress from the premature birth can affect parenting confidence, quality of the parent-child relationship and possibly the child’s outcomes (Loo, Espinosa, Tyler & Howard, 2003; Muller-Nix et al., 2004) in the forms of coercive parent-child interactions, inconsistent disciplining, inappropriate and unrealistic child expectations (Belsky, 1984; Rodgers, 1998). Additionally, mothers seem to be more distant in regards to mother-child interaction, which may be attributed to the child’s immaturity, prolonged hospitalization, early separation maternal emotional experience and alternations in parenting (Muller-Nix et al., 2004; Nair, Gupta & Jatana, 2003). Parental stress in the NICU may lead to depression, and Webster-Stratton & Hammond (1998) found that depressed mothers have significantly more problems in relation to attachment to their child. Mothers, who are depressed, also experience social isolation, low sense of competence and decreased health (Webster-Stratton & Hammond, 1998).
Interventions Used to Decrease Parental Stress

Researchers and clinicians are conscious about the need for helping parents decrease stress while in the NICU since stress may lead to negative effects on the parents as well as their relationship with their child. A useful intervention that NICU medical staff may use is to provide parents with accurate information that will allow them to participate in their child’s care and decision making (Cleveland, 2008; Franck, Cox, Allen & Winter, 2005; Holditch-Davis, Bartlett, Blickman & Miles, 2003; Nair, Gupta & Jatana, 2003; Shields-Poe & Pinelli, 1997; Zimmerman & Bauersachs, 2012). Providing parents with this opportunity of decision making and baby care has been shown to alleviate parental anxiety and confusion (Nair, Gupta & Jatana, 2003). When NICU medical staff teach parents how to read and respond to their premature infant’s behavioral cues, parents are able to understand the behavioral cues, and therefore become more competent caregivers; it also has been found to decrease stress and anxiety, and improve maternal confidence in caregiving (Bakewell-Sachs & Gennaro, 2004; Browne & Talmi, 2005; Franck, Cox, Allen & Winter, 2005; Loo, Espinosa, Tyler & Howard, 2003; Meyer et al, 1994). In a Portuguese study, an early intervention assisting mothers to interact and elicit responses from their infants resulted in better and more affectionate interactions and behaviors compared to the control group (Gomes-Pedro et al., 1995). A similar intervention of parents using an observation method of recognizing infant signs of stress and infant massage was found to reduce stress levels in the parents (Matricardi, Agostino, Fedeli & Montriosso, 2013). Melynk et al. (2006) designed an intervention, Creating Opportunities for Parent Empowerment, to educate parents about the appearance and behaviors of preterm infants. Results showed that parents in the intervention group demonstrated more positive parent-infant interaction and stronger beliefs about their parental role, and mothers in the intervention group reported significantly less stress, depression and anxiety in the NICU compared to the control group. An intervention, the Mother-Infant Transaction Program, “consisted of seven daily sessions conducted during the week prior to the infant’s discharge from the hospital and four [subsequent] sessions conducted in the home 3, 14, 30 and 90 days after discharge,” enabled the mother to appreciate her infant, be sensitized and respond appropriately to the infant’s behavioral cues, and enhanced the mother’s enjoyment of her baby. The use of kangaroo care has also been shown to
create more positive interactions between mother and infant, as well as lessen maternal anxiety (Lai et al., 2006; Loo, Espinosa, Tyler & Howard, 2003).

NICU medical staff encourage parents to participate in support groups (Doering, Moser & Dracup, 2000; Holditch-Davis, Bartlett, Blickman & Miles, 2003; Preyde & Ardal, 2003; Wyly, 1995). These support groups can be formal or informal support systems, such as social services and NICU parent support groups (Wyly, 1995). The groups can focus on coping strategies as some parents may need to talk about their feelings with other parents of NICU infants in order to cope with their infants’ illnesses (Doering, Moser & Dracup, 2000; Holditch-Davis, Bartlett, Blickman & Miles, 2003; Wyly, 1995). Mothers reported having less stress, anxiety and depression after participating in a parent buddy program with mothers who already had a premature infant (Preyde & Ardal, 2003). Rodgers’ (1998) study suggested that interventions to help parents deal with multiple sources of stress should incorporate techniques, including problem-solving skills, guided imagery, self-talk, and progressive relaxation. Interventions used to enhance the “parenting role adaptation may improve the quality of the mother-infant interaction, decrease stress, and perhaps improve the outcomes for these infants and families” (Raines, 2013).

**Music Therapy**

Music therapy is a “research based profession with specific a priori objectives to facilitate medical, psychological or educational goals” within a therapeutic relationship (American Music Therapy Association, 2013; Standley, 2003). Research has shown that the use of music can assist in reducing stress, anxiety and the perception of pain, reducing stimulus deprivation, reducing nausea in chemotherapy or hemodialysis, reducing fear related to serious illness or injury, promoting psychological adjustment to trauma anxiety, elevating mood and emotional states, increasing patient participation in treatment, shortening length of hospital stay, and providing emotional intimacy with families and caregivers (American Music Therapy Association, 2013; Gooding, 2010; Standley et al., 2005). Music therapy has been effective with a wide range of diagnoses and ages in medical settings (Standley, 2000). These include pre- and post-operative care, surgery, chronic pain management, oncology, orthopedic, neurology, heart and vascular care, obstetrics, emergency, physical rehabilitation, outpatient programs, pediatrics,
and intensive care units, including the Neonatal Intensive Care Unit (American Music Therapy Association, 2013; Standley et al., 2005).

**Music Therapy in the Neonatal Intensive Care Unit**

Music therapy has been used in the NICU for nearly 30 years, and research has shown its effectiveness with premature infants (Standley & Walworth, 2010). With music, infants benefit physiologically and behaviorally (Standley & Walworth, 2010). Music protocols have been shown to produce the following outcomes with premature infants: a) increased and stabilized oxygen saturation levels, b) increased sleep time, c) improved behavior states, d) decreased hospital stay, e) reinforced non-nutritive sucking, and f) decreased initial weight loss and improved weight gain (Abromeit, 2003; Caine, 1991; Cevasco & Grant, 2005; Keith, Russell & Weaver, 2009; Standley, 2002; Standley, 2012). When developmentally appropriate music listening interventions were used with premature infants, results showed that it decreased the frequency and duration of episodes of inconsolable crying and improved physiological measures, including heart rate, respiration rate, oxygen saturation and mean arterial pressure (Keith, Russell & Weaver, 2009). In Caine’s (1991) study, 30 minutes of recorded music set at 70-80 decibel levels was used with the experimental group. The results of the study showed that music had positive effects in improving feeding, shortening the length of hospital stay, and lowering stress levels of premature and low-birth-weight infants.

Research has demonstrated that using music contingently to reinforce non-nutritive sucking (NNS) assists with nipple acceptance and healthy sucking patterns (Gooding, 2010). NNS has found to provide benefits, including promoting neurological development, assisting oral feeding and pacification, fewer behavioral distress cues, fewer tube feedings, and earlier readiness for nipple feeding (Cevasco & Grant, 2005; Standley & Whipple, 2003). Standley (2000) assessed music as reinforcement for NNS. A device that was activated dependent on the frequency of sucks using a pacifier fitted to a pressure transducer was used. Once a sufficient suck of a premature infant activated the device, the infant would be rewarded by ten seconds of recorded lullaby music. The study found that the sucking rates were greater during contingent music periods compared to silence (Standley, 2000). This machine was the Pacifier Activated
Lullaby device (PAL). The PAL provides infants with developmentally appropriate contingent music that is activated by sucking on a pacifier connected to a pressure transducer and timer. Further research suggests that the use of the PAL effectively teaches infants NNS, improves feeding ability within one or two days, and improves weight gain (Standley, 2002; Standley, 2003; Standley & Walworth, 2010).

Music has been shown to be effective in facilitating neurological growth and development by enhancing developmental gains and mother-infant bonding with an intervention called Multimodal Stimulation (Standley & Walworth, 2010; Whipple, 2000). Standley (1998) assessed the benefits of this intervention paired with music. The intervention is a sequence of stroking, rocking and eye-to-eye contact that is used to soothe and increase the infant’s tolerance to stimulation. The results of this study showed that both genders increased tolerance for the stimulation, and it found that females were discharged 11.9 days sooner compared to the no contact control group, while males in the experimental group were discharged 1.5 days sooner (Standley, 1998). In Whipple’s (2000) study, parents were given training of Multimodal Stimulation. Parents were taught proper technique, interaction time limits, infant’s signs of overstimulation and the importance of a calming environment. Results indicated that parents increased their time in the NICU and displayed more appropriate parent-infant interactions, such as significantly fewer infant stress behaviors and significantly more appropriate parent behaviors. These appropriate parent actions and responses to their infants may lead to decreased stress levels in parents (Whipple, 2000). Loewy et al. (2013) found that live singing of parent-preferred lullabies enhanced parent-infant bonding while also significantly decreased the perception of parental stress.

Kangaroo care has presented positive outcomes for mothers and their premature infants. In a Taiwanese study, the experimental group had benefits when they received kangaroo care paired with recorded music for three consecutive days compared to the control group’s routine incubator care (Lai et al., 2006). Infants in the experimental group benefited with more quiet sleep states and less crying, and mothers in this group had significantly lower scores for maternal anxiety compared to both infant and mother control groups.

Research has also demonstrated some possible benefits of the use of music with premature infants and their mothers after discharge. Cevasco (2008) focused on music recorded
by each mother in the experimental group to be used at home throughout two weeks. Results showed that the experimental preterm infants who listened to the CD recording of their mothers’ singing were discharged an average of two days sooner than the control group, and the mothers in the experimental group perceived that the music recordings helped them cope with their infants’ hospitalization (Cevasco, 2008).

Stress and anxiety occur in many parents of premature infants, and therefore, counseling is often helpful. Parental counseling in music therapy with premature infants may increase bonding and goal-oriented interactions. It can teach developmental skills, provide awareness of developmental delays and offer emotional support for parents when dealing with stressful issues related to their infant (Gooding, 2010). Music therapy can be a “highly effective, nonthreatening methodology for expression of feelings, clarification of values, identification of choices and decisions, and inspiration to act” (Standley & Walworth, 2010).

**Purpose of This Study**

The purpose of this research study was to investigate the effect of parental participation in music therapy interventions on the stress levels of parents of premature infants in the Neonatal Intensive Care Unit (NICU). The participants in this series of case studies were mothers of premature infants receiving medical treatment in a NICU. As research has indicated, parents have high levels of stress when they have a premature infant receiving medical care. Music therapy has demonstrated various positive impacts on premature infants and parent-infant bonding in past research studies. However, there is no research specifically addressing the parents of premature infants’ stress levels. Since research has shown that music therapy has the ability to decrease stress in other populations, it is appropriate to consider its potential benefits with parents of premature infants in the NICU. The variables examined in this study were participants’ stress levels in the following areas: 1) sights and sounds in the NICU and infant’s appearance, and 2) parental role alterations.
METHOD

Case Study Approach

Design

This study used a prospective case study approach to evaluate the effects of music therapy on parental stress levels in a Neonatal Intensive Care Unit (NICU). Data were taken pre and post intervention period or upon discharge. The dependent variables were participants’ stress levels in the following areas: 1) sights and sounds in the NICU and infant’s appearance, and 2) parental role alterations.

Case Study Participants

Six mothers (N=6) of premature infants receiving medical care in a NICU voluntarily participated in this study at a NICU of a regional medical center in the Southeastern region of the United States. Table 1 identifies the demographic information regarding the study participants: mothers and Table 2 identifies information of the premature infants.

Table 1. Participant (Mothers) Demographics

<table>
<thead>
<tr>
<th>Age</th>
<th>Race/Ethnicity</th>
<th>First Child</th>
<th>Had a Child in the NICU Before</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>African American</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>24</td>
<td>African American</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>34</td>
<td>Caucasian</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>22</td>
<td>African American</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>29</td>
<td>African American</td>
<td>Yes</td>
<td>N/A</td>
</tr>
<tr>
<td>25</td>
<td>African American</td>
<td>Yes</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 2. Premature Infant Demographics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Gestational Age at Birth</th>
<th>Gestational Age at Consent</th>
<th>Length of Stay at Consent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32 weeks + 6 days</td>
<td>34 weeks + 6 days</td>
<td>14 days</td>
</tr>
<tr>
<td>Male*</td>
<td>28 weeks</td>
<td>33 weeks + 2 days</td>
<td>39 days</td>
</tr>
<tr>
<td>Male</td>
<td>33 weeks + 4 days</td>
<td>34 weeks + 2 days</td>
<td>8 days</td>
</tr>
<tr>
<td>Male*</td>
<td>29 weeks + 2 days</td>
<td>35 weeks</td>
<td>41 days</td>
</tr>
<tr>
<td>Female</td>
<td>31 weeks + 1 day</td>
<td>33 weeks + 6 days</td>
<td>20 days</td>
</tr>
<tr>
<td>Male</td>
<td>33 weeks + 3 days</td>
<td>35 weeks + 4 days</td>
<td>15 days</td>
</tr>
</tbody>
</table>

* = Infants in greater danger due to very early premature birth.

All participants were mothers with the mean age of 26.8. Five out of six participants were African American, and the sixth participant was Caucasian. Four out of six participants were new mothers. Out of the two mothers that have had children previously of which one had a child in the NICU.

Participants’ premature infants consisted of five males and one female. The mean gestational age at birth was 31 weeks and 2.5 days. At the time of consent, the mean gestational age was 34 weeks and 3.83 days. Average length of stay in the hospital at the time of consent for all participants’ premature infants was 22.8 days. Participants and their infants were in the research study for a mean of 15.2 days.

**Case Study Procedure**

The principal investigator obtained Florida State University Institutional Review Board (Appendix A) and Tallahassee Memorial HealthCare Institutional Review Board approvals (Appendix B). Participants were recruited after medical staff determined their infants met inclusion criteria. The criteria for inclusion were: 1) Participants had infants appropriate for music therapy services receiving medical care in the NICU, and 2) Infants received music therapy at least two times and parents interacted with the music therapist at least one time. The participants of this study were excluded if their infant received music therapy less than two times and/or the participant did not interact with the investigator. Due to the counseling nature of the
participant interactions, non-English speaking parents were not a part of this study. Also, participants that did not complete the posttests were not included in the data analysis.

Once potential subjects were identified, a NICU nurse approached potential subjects to inform them about the research study. If interested, the potential participants were contacted by the principal investigator, who gained written consent for participation (Appendix C). After gaining consent, participants were asked to complete the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU) (Appendix D) and the Music Therapy (MT) Questionnaire (Appendix E). This occurred prior to any data collection.

Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU) was adapted from the Parental Stress Scale: Pediatric Intensive Care Unit (PSS: PICU) (Carter & Miles, 1989; Miles, Funk & Carlson, 1993). It was “designed to measure parental perception of stressors arising from the physical and psychosocial environment of the Neonatal Intensive Care Unit” (Miles, Funk & Carlson, 1993). PSS: NICU’s content validity was established by professionals who work with parents of infants in the NICU and by parents of infants recently discharged from a NICU (Miles, Funk & Kasper, 1992). “The PSS: NICU consisted of 26 items grouped into three dimensions that assess parental perception of stress related to aspects of the NICU environment” (Miles, Funk & Kasper, 1992). The three dimensions were: 1) Sights and Sounds (5 items), 2) Infant’s Appearance (14 items), and 3) Parental Role Alterations (7 items) (Miles, Funk & Carlson, 1993; Miles, Funk & Kasper, 1992). Sights and Sounds measured stress caused by the appearance and sounds of the physical environment of the NICU. Infant’s Appearance measured the stress as a result of the appearance and behavior of the infant as well as some of its related treatments. Parental Role Alterations measured stress related to changes in the expected parental role with the infant as well as stress brought upon the parenting role by the infant’s illness and treatments (Miles, Funk & Kasper, 1992; Miles, Holditch-Davis, Schwartz, & Scher, 2007).

Internal consistency reliability coefficients for the dimensions were: Sights and Sounds (.66); Infant’s Appearance (.79); and Parental Role Alteration (.81) (Miles, Funk & Kasper, 1992).

On the PSS: NICU, the participants were asked whether or not they had experienced the situation, and if they did, they rated the 26 items on a 5-point rating scale ranging from 1 ("not at all stressful") to 5 ("extremely stressful"). If they did not experience the situation on an item, that item received a score of 1, which indicated that no stress was experienced since the event or item did not occur (Miles, Funk & Carlson, 1993; Miles, Funk & Kasper, 1992). The first two dimensions, Sights
and Sounds of the environment (5 items) and Infant’s Appearance (14 items), were scored as one section and Parental Role Alteration scored as the second section (7 items). The mean scores of both sections were collected, and the PSS: NICU pretests and posttests scores of each participant were compared.

In the Music Therapy (MT) Questionnaire, the participants rated how music therapy helped in the three dimensions (questions 9-11) on a 5-point rating scale ranging from “did not help” to “helped a lot.” MT Questionnaire pretest and posttest scores were compared.

A three-week intervention period began after completing the pretests. During the intervention period, the parents and their infants received music therapy interventions, including Multimodal Stimulation and Parent Training (Standley, 1998; Whipple, 2000). Multimodal Stimulation (MMS) is a protocol that involves gradually layering auditory, tactile, vestibular, and visual stimulation in a way that the infant tolerates the input without startling and facilitates neurological growth and development (Standley, 2012; Standley, 2002; Standley & Walworth, 2010). Parent Training consisted of the parent being taught the music therapy intervention with their premature infant with the supervision of the music therapist, and the music therapist educated the parent on the goals and benefits of the intervention. Music therapists at the hospital provided the parent and infant interactions, while also tracking the number of times each interaction occurred during the three-week period or until the infant’s discharge. These interventions were part of the standard protocol in the NICU music therapy program. To be consistent, a script was provided to all music therapists working with parents to ensure that parents received the same standard interactions (Appendix F). At the end of the three-week intervention period or upon discharge, the participants completed the PSS: NICU and the MT Questionnaire again.
RESULTS AND DISCUSSION

Case Study Results

Out of the nine potential candidates that met criteria and were approached for the study, all individuals participated in the study. However, three participants were not included in the data analysis as two participants did not receive all the required number of music therapy interventions prior to discharge, and the principal investigator was unable to reach one participant to obtain posttest scores and answers. Data was analyzed for six (N=6) participants, and the results were determined through pretests and posttests scores and answers from the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU) and the Music Therapy (MT) Questionnaire.

Participant Case Studies

Case Study #1

Participant was a 27-year-old African American woman, and a first time mother. She had a male infant born at 32 weeks and 6 days. At the time of consent, the infant’s gestational age was 34 weeks and 6 days.

Before the intervention period, she took the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU). In the Environment and Infant Appearance section of the PSS: NICU, the participant scored 2.16 out of 5, and she scored 5 out of 5 in the Parental Role Alterations section. On the Music Therapy (MT) Questionnaire, the participant indicated she visited her son zero to three times a week, and she did not use any music activities with her baby. She indicated that she interacted with her baby by talking to, rocking and holding her son. Participant did not use music to help herself cope with her son’s hospitalization.

During the 12 days the participant and her infant were in the study before discharge, the
participant had one Parent Training session, and her infant had three Multimodal Stimulation (MMS) sessions. Participant took the two posttests three days after her infant’s discharge.

Participant’s PSS: NICU posttest indicated that the participant’s stress increased 1.89 to 4.05 out of 5 in the Environment and Infant Appearance section, and remained the same in the Parental Role Alterations section since the start of the intervention period. Additionally, the participant indicated on the MT Questionnaire that she increased the number of visitation days from zero to three days up to four to seven days per week. Participant began to use music, specifically singing, with her son in the mornings zero to three days per week. She also began to interact with her child more from three activities to four activities. Lastly, on the MT Questionnaire, the participant indicated that working with a music therapist helped her a lot (5 on the Likert scale) when dealing with all the stressors of the NICU.

Case Study #2

Participant was a 24-year-old first time mother of African American descent. Her son was born at 28 weeks gestational age, and at the time of consent, the infant was 33 weeks and 2 days gestational age.

Participant scored 1.16 (Environment and Infant Appearance section) and 2.14 (Parental Alternations Role section) on the PSS: NICU pretest. On the MT Questionnaire, the mother indicated that she visited her son four to seven days per week, and stated that she did not use music. She interacted with her son by talking to him, rocking, holding, and feeding him, and doing kangaroo care. She used music to cope with her son’s hospitalization by listening to music and doing music-based relaxation.

Participant and her son were in the study for the full three-week intervention period, and posttests were taken 23 days after consent was obtained. She had two Parent Training sessions, and her infant had five MMS sessions.

The posttests of the PSS: NICU Environment and Infant Appearance section indicated that the
participant’s stress increased 0.52 from 1.16 to 1.68. In PSS: NICU Parental Role Alterations section, participant’s stress levels decreased on the Likert scale from 2.14 to 1.71. Participant indicated on the MT Questionnaire that she continued to visit her son four to seven days per week, and started using music, specifically singing, zero to three times per week during her visits only in the mornings. Her other interactions with her son remained the same. She no longer used music to help her cope with her child’s hospitalization. Lastly, the participant stated that music therapy helped a lot (5) while dealing with the sights and sounds in the NICU. Music therapy helped her stress levels (4) with the way her baby looked and behaved in the NICU as well as some of the treatments, and it helped some (3) in her relationship with her baby and her parental role.

Case Study #3

Participant was a 34-year-old Caucasian female. She had a son, whose gestational age at birth was 33 weeks and 4 days. His gestational age at the time of consent was 34 weeks and 5 days. While this was not the participant’s first child, this was the first time one of her children received medical services in the NICU.

In the pretests of PSS: NICU Environment and Infant Appearance section and Parental Role Alterations section, she scored 1.53 and 1.86, respectively. Participant indicated on the MT Questionnaire that she visited her son eight or more days per week. She held and rocked her child to music in the afternoons or during feedings eight or more times per week. The other ways the participant interacted with her son was by talking to, rocking, holding and feeding him as well as doing kangaroo care. The mom listened and played or sang music to herself to help her cope with her child’s hospitalization.

The participant and her son were in the study for 11 days. During the study, the participant had three Parent Training sessions, and her infant had three MMS sessions. The mom took the two posttests five days after discharge.

Participant’s stress levels increased from 1.53 to 4.11, a difference of 2.58 in PSS: NICU
Environment and Infant Appearance section. Her stress levels also increased in Parental Role Alterations from 1.86 to 4.71, a difference of 2.85. Before taking the posttests, the participant told the principal investigator that her son had been having complications after discharge. Therefore, the scores on both sections of the PSS: NICU may reflect her stress levels related to the complications. In the MT Questionnaire, there was no change in the number of days the participant visited or used music with her son. However, besides holding and rocking her son to music, she started to listen to music with him only in the afternoons. The amount of other interactions with her son decreased from five to four activities; she no longer did kangaroo care with him. The participant continued to use music to help her cope with her infant’s hospitalization, but only by listening to music, and no longer playing or singing music herself. She indicated that music therapy helped (4) her deal with the sights and sounds in the NICU and her relationship with her baby and her parental role. Music therapy helped some (3) with the way she dealt with how her baby looked and behaved in the NICU as well as some of the treatments her baby received.

Case Study #4

Participant was a 22-year-old African American female, who had other children receive care in the NICU. Her son was born at 29 weeks and 2 days, and his gestational age at the time of consent was 35 weeks.

Participant’s PSS: NICU pretests scores indicated that her stress levels were 2.79 and 3.86 out of 5 in the Environment and Infant Appearance section and the Parental Role Alteration section, respectively. In the MT Questionnaire, the mom stated that she visited her son four to seven days per week, and she did not use any music with her son during her visits. Even though she did not use music with her son, she talked to, rocked and held her baby. Participant did not use music to help her cope with her infant’s hospitalization.

While being in the study for 14 days, the participant had one Parent Training session. Her son received four MMS sessions. The principal investigator obtained posttests from the participant one day after discharge.
From the time of consent to the time of discharge, participant’s stress levels decreased in both sections of the PSS: NICU. In the Environment and Infant Appearance section, participant decreased 0.63 to the score of 2.16, and stress levels decreased from 3.86 to 1.14 in the Parental Role Alterations section. There was no change in the number of days the participant visited her son in the NICU. However, participant began to use music zero to three times per week with her infant. She listened to, held and rocked her baby to music, and she read and sang musical books to him during the afternoons or when he was crying. The number of her interactions with her son increased from three to four activities; she started reading to him. In addition, the participant started to use music to help her cope with her child’s hospitalization. She began to listen to music, play and sing music herself and do music-based relaxation. Participant indicated that music therapy helped a lot (5) with her experiences with the sights and sounds in the NICU and her relationship with her baby and her parental role. Music therapy helped (4) with the way she dealt with how her baby looked and behaved in the NICU as well as some of the treatments her baby received.

Case Study #5

Participant was a 29-year-old African American female, and she was a first time mother. Her daughter was born at 31 weeks and 1 day gestational age. At the time of consent, the infant was 33 weeks and 6 days gestational age.

Out of the maximum score of 5, participant’s PSS: NICU Environment and Infant Appearance section and Parental Role Alterations section scores were 3.21 and 3.86, respectively. In addition, the participant stated that visitation was stressful because the hospital did not allow visitors during certain hours of each day. On the MT Questionnaire, the mother indicated that she visited her daughter eight or more times per week, and during her visits, she would use music four to seven times per week, usually at night. The music activities included listening to recorded music, holding or rocking her infant to music, and singing to her infant. The participant also talked, rocked, held and did kangaroo care with her infant; she also added that she prayed with her. The mother listened to recorded music to help her cope with her daughter’s hospitalization.
The participant and her daughter were in the study for the full three-week intervention period, and the posttests were taken 22 days after consent was obtained. During the study, the participant participated in one Parent Training session, and her daughter had four MMS sessions.

The posttests of the PSS: NICU Environment and Infant Appearance section indicated that the participant’s stress decreased 1.68 to the score of 1.53. In PSS: NICU Parental Role Alterations section, participant’s stress levels decreased from 3.86 to 1.71. The participant recorded on the MT Questionnaire that the number of days she visited her daughter at the hospital did not change. She continued to use the same music activities with her infant at night during her visits, but the number of times she used music decreased from four to seven days per week to zero to three times per week. She still interacted with her daughter during the visits, except she stopped praying with her. The participant may have stopped praying with her daughter as she told the principal investigator that her infant was to be discharged the following week. She proceeded to use music to help her cope with her baby’s hospitalization. Not only did she listen to recorded music, she began singing or playing music and doing music-based relaxation. Lastly, after the three-week intervention period, the participant indicated on the MT Questionnaire that working with a music therapist helped her a lot (5 on the Likert scale) when dealing with all the stressors of the NICU.

Case Study #6

Participant was a 25-year-old first time mother of African American descent. Her son was born at 33 weeks and 3 days gestational age. The infant was 35 weeks and 4 days gestational age by the time of consent.

In the pretests of PSS: NICU Environment and Infant Appearance section and Parental Role Alterations section, the participant scored 3.95 and 4.57, respectively. When asked if there were any other stressful situations not addressed on the PSS: NICU, she stated it was extremely stressful to know her child was in the NICU. On the MT Questionnaire, she indicated that she visited her son eight or more times per week, and did not use music during the visits. Instead,
the participant talked to, rocked, held and fed her baby. The mother used music to cope with her infant’s hospitalization by listening and exercising to music and doing music-based relaxation.

The participant and her son were in the research study for nine days. She had one Parent Training session, and her son received two MMS sessions. The principal investigator obtained posttests from the participant two days after discharge.

Participant’s PSS: NICU posttest indicated that the participant’s stress decreased slightly in both sections. In the Environment and Infant Appearance section, the score decreased from 3.95 to 3.89, and in the Parental Role Alterations section, it decreased 0.14. Participant continued to visit her son eight or more times per week until discharge. She began to use music, such as singing, holding or rocking and reading or singing musical books to her infant, in the afternoons zero to three times per week. She also began to interact with her child more, from four activities to six activities; she started to read books and do kangaroo care with him. Participant continued to use various music activities to help her cope with her infant’s hospitalization, and she added that she started to play or sing music herself. Lastly, on the MT Questionnaire, the participant indicated that working with a music therapist helped her a lot (5 on the Likert scale) when dealing with all the stressors of the NICU.

Table 3. Summary of Case Studies

<table>
<thead>
<tr>
<th>Participant’s Infant’s Birth Age</th>
<th>PSS: NICU Environment and Infant Appearance</th>
<th>PSS: NICU Parental Role Alterations</th>
<th>No. of PT</th>
<th>Perceived Music Therapy Help</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>32 wks + 6</td>
<td>2.16</td>
<td>4.05</td>
<td>5.00</td>
<td>5.00</td>
</tr>
<tr>
<td>28 wks</td>
<td>1.16</td>
<td>1.68</td>
<td>2.14</td>
<td>1.71</td>
</tr>
<tr>
<td>33 wks + 4*</td>
<td>1.53</td>
<td>4.11</td>
<td>1.86</td>
<td>4.71</td>
</tr>
<tr>
<td>29 wks + 2</td>
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<td>2.16</td>
<td>3.86</td>
<td>1.14</td>
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<td>1.53</td>
<td>3.86</td>
<td>1.71</td>
</tr>
<tr>
<td>33 wks + 3</td>
<td>3.95</td>
<td>3.89</td>
<td>4.57</td>
<td>4.43</td>
</tr>
</tbody>
</table>

*Participant’s infant had complications post-discharge
Summary Results

Data were analyzed for six participants (N=6). Table 3 shows a summary of the results. On the PSS: NICU Environment and Infant Appearance section, half of the participants increased stress with an average increase of 1.66 out of 5, while half of the participants decreased stress on this section with an average decrease of 0.79. On the Parental Role Alterations section of the PSS: NICU, all participants, except for Participant 3, showed an average decrease or no change of 1.09 out of 5. Participants 4 and 5 decreased stress substantially with a mean difference between pre- and posttest scores of 2.44, while the other participants showed none to moderate decreases in stress, an average of 0.19. Participant 3 increased stress substantially in both sections of the PSS: NICU; her infant’s complications after discharge may have been the source of increased stress. Figure 1 shows that as the number of Parent Trainings increased, the difference in the participants’ PSS: NICU Environment and Infant Appearance pre- and posttest scores increased, while when the number of MMS sessions increased, the difference in participants’ pre- and posttest scores decreased. Figure 2 shows similar trends for the two different interventions for the PSS: NICU Parental Role Alterations’ pre- and posttest scores.

On the Music Therapy Questionnaire at posttest, all participants indicated that they used music. Half of the participants started using music activities during the visits with their babies, and one participant increased her use of music. There were no other significant changes shown on the questionnaire, including days of visitation, number of interactions and the use of music mothers used to help cope. All moms specified that music therapy helped (score of 3) to helped a lot (score of 5) with the three categories of stressors in the NICU: Environment, Infant Appearance and Parental Role Alterations. Overall, the participants gave a score of 5 (helped a lot) on 12 out of 18 questions (67%) addressing the perceived music therapy help for the three PSS: NICU sections. The greatest perceived music therapy help was in the NICU Environment section, a mean of 4.83. The participants scored the Infant Appearance section on an average of 4.3, and the Parental Role Alterations section was scored a mean of 4.5. Figure 3 shows that as the days of which posttests were obtained increased, the differences in stress scores also increased in the PSS: NICU sections. New stressors after the infants’ discharge may have influenced participants’ perceived levels of stress on the posttests.
Figure 1. PSS: NICU Environment and Infant Appearance Number of Sessions versus Difference in Pre- and Posttest Stress Scores

Figure 2. PSS: NICU Parental Role Alterations Number of Sessions versus Difference in Pre- and Posttest Stress Scores
Figure 3. Days PSS: NICU Posttests were Obtained after Discharge versus Difference in Pre- and Posttest Stress Scores

Case Study Discussion

The effectiveness of music therapy with perceived parental stress levels in the PSS: NICU Environment and Infant Appearance sections were inconclusive given the small number of participants. Music therapists are unable to change the NICU environment as it is part of the facility. Also, they are unable to change the infant’s appearance with the equipment and tubes connected to the infant as those are needed for the infant’s health and development. Therefore, it makes sense that music therapy interventions were not as helpful in decreasing stress in that combined section, Environment and Infant Appearance.

However, the music therapy interventions seemed to have a positive impact on the Parental Role Alterations section, as long as no complications occurred. When the music therapists did a Parenting Training with participants, this allowed music therapists to teach them their infants’ positive and negative behavioral cues and promote parent-infant bonding, which may have influenced the decrease in parental stress levels. Regardless, of the effectiveness
shown by the obtained data, participants indicated that they perceived music therapy to help with their stress levels in all three sections.

**Implications for Future Research**

Researchers that wish to follow up with similar research focusing on parental stress in the Neonatal Intensive Care Unit should seek a large number of participants. Allowing more time for research or spreading the research over multiple locations may be helpful in obtaining more participants. Researchers should address not only mothers of premature infants, but also the fathers as parental stress influences the development of the infant and parent-infant relationship. Another factor to note is the infant’s parental unit, such as single parent, parents that are dating or a married couple, as this may influence parental stress. Also, premature infants’ number of medical treatments and severity of illness should be acknowledged as this may impact their parents perceived level of stress.

In this study, PSS: NICU pretest scores did not influence the interventions. However, future researchers should look into having multiple interventions dependent on participants’ pretest scores. Participants with higher stress scores may benefit from having a counseling intervention for coping skills, along with the Parent Training intervention described in this study.

This study involved premature infants of a certain gestational age that met the medical center’s criteria to receive the music therapy intervention, Multimodal Stimulation. A study involving parents with premature infants that are younger may be more effective in decreasing parental stress as parents may have higher stress and anxiety levels at the beginning of the hospital stay. Music therapy interventions that address coping skills and relaxation techniques may be effective with this population.

Lastly, researchers attempting to do a similar follow-up study should obtain posttests as close to discharge as possible as new stressors post-discharge may influence participants’ perceived levels of stress. Events during mothers’ pregnancy may also be a factor in stress levels and should be taken into account.

In this series of case studies, results suggest that the use of music therapy interventions may be effective in decreasing stress related to parental role alterations created when having a child in the NICU. Music therapy has been shown to be beneficial in decreasing stress in other
populations. Further studies should be conducted in order to document the true benefits of music therapy interventions with perceived parental stress levels in Neonatal Intensive Care Units.
APPENDIX A

FLORIDA STATE UNIVERSITY
HUMAN SUBJECTS APPROVAL FORM

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 • FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 05/02/2013
To: [Redacted]
Address: [Redacted]
Dept.: MUSIC SCHOOL
From: Thomas L. Jacobson, Chair
Re: Use of Human Subjects in Research
    The Effect of Music Therapy Interventions with Premature Infants on their Parents’ Stress Levels

The application that you submitted to this office in regard to the use of human subjects in the research proposal referenced above has been reviewed by the Human Subjects Committee at its meeting on 04/10/2013. Your project was approved by the Committee.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 04/09/2014, you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing, any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to ensure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: [Redacted] Advisor
HSC No. 2013.10323
APPENDIX B

TALLAHASSEE MEMORIAL HEALTHCARE
INSTITUTIONAL REVIEW BOARD APPROVAL FORM

Tallahassee Memorial Hospital
Tallahassee Memorial HealthCare
Institutional Review Board at TMH
1300 Miccosukee Road, Tallahassee, FL 32308
Phone: 850/431-5676   Fax: 850/431-4949

July 18, 2013

Elaine Vuong
Florida State University
College of Music
122 N. Copeland Ave.
Tallahassee, FL 32360

Dear Ms. Vuong:

Your Study # 2013-10, Titled “The Effect of the Use of Music Therapy Interventions with Premature Infants on their Parents’ Stress Levels (FSU)” met the criteria for review using the expedited review guidelines. Larry C. Deeb, MD, Chairperson, Institutional Review Board (IRB) at Tallahassee Memorial HealthCare, Inc. (TMH) reviewed the study and the supporting documents. The study has been approved for a period of 12 months. The IRB approval for this study expires on July 7, 2014.

Intramural Investigator: Elaine Vuong
Extramural Investigator: Lori Gooding, Jessica Rushing, Miriam Hillmer, Brianna Negrete

*Key Personnel:

Materials Reviewed
1- Study Protocol
2- Informed Consent Form
3- NICU Parent Script
4- Parental Stress Scale and Survey

*Due to the strict regulatory requirements, all study personnel who will be at any Tallahassee Memorial HealthCare facility or have access to patient records must be cleared by Human Resources prior to the start of the study. To initiate this process, please contact Amanda Kent at Amanda.Kent@tmh.org.

Reporting Requirements:
• Report to the IRB any planned change in the study or informed consent and do not implement any change without receiving prior approval, except to eliminate immediate hazard;
• Report to the IRB any unanticipated problems involving risks to subjects;
IRB # 2013-10  Page 2 of 2

- Report to the IRB any new information on the project that adversely influences the risk/benefit ratio;
- Report to the IRB any serious or unexpected adverse events;
- Report to the IRB any major protocol violations within ten days. Minor protocol deviations may be reported at the time of the Study Progress Report (Application for Renewal). Maintain a log throughout the year and establish a plan of correction to minimize the deviations.
- Report to the IRB when the study is terminated or completed and submit a summary of the study findings.

Please request approval for advertising copy, recruitment flyers, publications, that appear in any media prior to use.

**Continuation Review Requirements:** To ensure timely review of the study, the investigator must submit a complete study progress report and supporting documents to the IRB Office two months prior to the approval expiration date. Information on IRB application requirements and IRB current forms can be obtained by visiting the IRB intranet site (http://www.tmh.org/IRB). For questions, please contact the IRB Office at (850) 431-5676.

As the principal investigator you are responsible for ensuring compliance with the study protocol, the applicable IRB at TMH Guidelines, and the Code of Federal Regulations set forth by the Department of Health and Human Services. The IRB Guidelines and forms required to comply with reporting requirements are available on the TMH Intranet.

Enclosed are copies of the Study Informed Consent form and study materials which were reviewed and approved by the IRB and has the IRB approval stamp for this year.

Sincerely,

[Signature]

Cynthia Blair
Administrative Liaison/IRB

[Redacted]
APPENDIX C

CONSENT TO PARTICIPATION FORM

INSTITUTIONAL REVIEW BOARD

Consent Form

The Effect of the Use of Music Therapy Interventions with Premature Infants on their Parents' Stress Levels

You are invited to be in a research study to investigate the effect of parental participation in music therapy interventions on the stress levels of parents of premature infants in Neonatal Intensive Care Units (NICU). You were selected as a possible participant because your infant meets the criteria to have music therapy interventions, according to the NICU medical staff's recommendation and gestational age. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by Elaine Vuong, music therapy graduate student of Florida State University, and Dr. Lori Gooding, music therapy professor, and Jessica Rushing, music therapist, of University of Kentucky.

Background Information:

The purpose of this study is to investigate the effect of parental participation in music therapy interventions on the stress levels of parents of premature infants in Neonatal Intensive Care Units.

Procedures:

If you agree to be in this study, we would ask you to do the following things: You will be asked to fill out two forms: 1) Parental Stressor Scale: Neonatal Intensive Care Unit and 2) Music Therapy Questionnaire. Both forms will take approximately twenty minutes to complete. You will fill out these forms twice, three weeks apart. If you wish for your infant to have music therapy services, you will be placed into the experimental music therapy group, and if you do not wish your infant to have music therapy, you will be placed into the control no music therapy group. Infants of parents in the music therapy group will receive a music therapy intervention at least two times. The music therapist will also interact with you, the parent, at least once during the study intervention period. Participants and their infants in the non-music therapy group will fill out the two forms three weeks apart, and will not receive music therapy interventions. Once the study is completed, participants and their infants will receive music therapy intervention when appropriate. The total time of participation in this study will be approximately four weeks. All parts of the study will be done at the hospital.

Risks and benefits of being in the Study:

The study has one possible risk. There may be a breach of confidentiality. However, the investigators will make all efforts to secure all data, which will be password protected and locked in a cabinet.

FSU Human Subjects Committee Approved on 9/19/2013. Void after 8/09/2014. HSC # 2013.10990
The possible benefits to participation for the parents of the infants may be decreased stress levels, and increased parent-infant bonding and interaction. However, there is no guarantee that the infant or parent will benefit from being in this study. In addition, the results of this research may guide the future use of music therapy to help decrease stress levels of parents with premature infants.

Compensation:
You will receive no compensation for participating in this study.

Confidentiality:
The records of this study will be kept private and confidential to the extent permitted by law. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely, and information will not be shared outside the research personnel. Once the research is complete, your personal information will be destroyed.

Voluntary Nature of the Study:
Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Florida State University, Tallahassee Memorial HealthCare or University of Kentucky. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships. If you would like to withdraw at any time, please contact Elaine Vuong at [Contact Information].

Contacts and Questions:
The researchers conducting this study are Elaine Vuong, Lori Gooding, and Jessica Rushing. You may ask any question you have now. If you have a question later, you are encouraged to contact the investigator at [Contact Information], or [Contact Information] or Dr. Lori Gooding at [Contact Information] or [Contact Information].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the FSU IRB at 2010 Levy Street, Research Building B, Suite 276, Tallahassee, FL 32306-2742, or [Contact Information] or by email at [Contact Information].

If you have any questions about your rights, you may contact Cynthia Blair of the Institutional Review Board at Tallahassee Memorial HealthCare at [Contact Information].

You will be given a copy of this information to keep for your records.

FSU Human Subjects Committee Approved on 9/19/2013. Void after 8/09/2014. HSC # 2013.10990
Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature of Participant  Print Name of Participant  Date

Signature of Investigator  Print Name of Investigator  Date

FSU Human Subjects Committee Approved on 9/19/2013. Void after 8/09/2014. HSC # 2013.10990
APPENDIX D

PARENTAL STRESSOR SCALE:
NEONATAL INTENSIVE CARE UNIT

PARENTAL STRESS SCALE: NEONATAL INTENSIVE CARE UNIT

We are interested in knowing more about the stresses experienced by parents when a premature is sick and hospitalized in an neonatal intensive care unit (NICU). We would like to know about your experience as a parent whose child is presently in the NICU.

This questionnaire lists various experiences other parents have reported as stressful when their baby was in the NICU. We would like you to indicate how stressful each item listed below has been for you. By stressful, we mean that the experience has caused you to feel anxious, upset, or tense. On the questionnaire, circle the single number that best expresses how stressful each experience has been for you. The numbers indicate the following levels of stress:

1 = Not at all stressful the experience did not cause you to feel upset, tense, or anxious
2 = A little stressful
3 = Moderately stressful
4 = Very stressful
5 = Extremely stressful

If you have not experienced an item, please circle NA "not applicable"

Now let's take an item for an example: The bright lights in the NICU.

If for example you feel that the bright lights in the neonatal intensive care unit were extremely stressful to you, you would circle the number 5 below:
NA 1 2 3 4 5

If you feel that the lights were not stressful at all, you would circle the number 1 below:
NA 1 2 3 4 5

Below is a list of the various SIGHTS AND SOUNDS commonly experienced in an NICU. We are interested in knowing about your view of how stressful these SIGHTS AND SOUNDS are for you. Circle the number that best represents your level of stress. If you did not see or hear the item, circle the NA meaning "Not applicable."

1. The presence of monitors and equipment NA 1 2 3 4 5
2. The constant noises of monitors and equipment NA 1 2 3 4 5
3. The sudden noises of monitor alarms NA 1 2 3 4 5
4. The other sick babies in the room NA 1 2 3 4 5
5. The large number of people working in the unit NA 1 2 3 4 5

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Below is a list of items that might describe the way your **BABY LOOKS AND BEHAVES** while you are visiting in the NICU as well as some of the **TREATMENTS** that you have seen done to the baby. Not all babies have these experiences or look this way, so circle the NA, if you have not experienced or seen the listed item. If the item reflects something that you have experienced, then indicate how much the experience was stressful or upsetting to you by circling the appropriate number.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tubes and equipment on or near my baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2.</td>
<td>Bruises, cuts or incisions on my baby</td>
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<tr>
<td>3.</td>
<td>The unusual color of my baby (for example looking pale or yellow jaundiced)</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>4.</td>
<td>My baby's unusual or abnormal breathing patterns</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5.</td>
<td>The small size of my baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>The wrinkled appearance of my baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7.</td>
<td>Having a machine (respirator) breathe for my baby</td>
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<td></td>
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</tr>
<tr>
<td>8.</td>
<td>Seeing needles and tubes put in my baby</td>
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<td></td>
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<tr>
<td>9.</td>
<td>My baby being fed by an intravenous line or tube</td>
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<td></td>
<td></td>
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<tr>
<td>10.</td>
<td>When my baby seemed to be in pain</td>
<td></td>
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<td></td>
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<tr>
<td>11.</td>
<td>When my baby looked sad</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12.</td>
<td>The limp and weak appearance of my baby</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>13.</td>
<td>Jerky or restless movements of my baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>14.</td>
<td>My baby not being able to cry like other babies</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
The last area we want to ask you about is how you feel about your own RELATIONSHIP with the baby and your PARENTAL ROLE. If you have experienced the following situations or feelings, indicate how stressful you have been by them by circling the appropriate number. Again, circle NA if you did not experience the item.

1. Being separated from my baby                                           NA 1 2 3 4 5
2. Not feeding my baby myself                                             NA 1 2 3 4 5
3. Not being able to care for my baby myself (for example, diapering, bathing) NA 1 2 3 4 5
4. Not being able to hold my baby when I want                             NA 1 2 3 4 5
5. Feeling helpless and unable to protect my baby from pain and painful procedures NA 1 2 3 4 5
6. Feeling helpless about how to help my baby during this time             NA 1 2 3 4 5
7. Not having time alone with my baby                                     NA 1 2 3 4 5

Thank you for your help.

Feel free to write about other situations that you found stressful during the time that your baby was in the neonatal intensive care unit.

© Margaret S. Miles, RN, PhD 1987, 2004, 2011
APPENDIX E

MUSIC THERAPY QUESTIONNAIRE

Research Code ______________________

Date Completed: ________________ Pre Post (Circle one)

Please check or circle answers to the following questions:

1. How many times per week on average do you visit your baby in the NICU? (Check one.)
   - □ 0 – 3 times per week
   - □ 4 – 7 times per week
   - □ 8 or more times per week

2. When you spend time with your baby do you use music with your baby?
   - □ Yes
   - □ No

3. How many times per week on average do you use music with your baby? (Check one.)
   - □ 0 – 3 times per week
   - □ 4 – 7 times per week
   - □ 8 or more times per week

4. What kind of musical activities do you use with your baby? (Check all that apply.)
   - □ Listen to music recordings
   - □ Sing to my baby
   - □ Hold/rock my baby to music
   - □ Read/sing musical books
   - □ I do not use any kind of music with my baby
   - □ Other: ______________________

5. When do you use music with your baby?
   - □ Morning
   - □ Afternoon
   - □ Night
   - □ During feedings
   - □ When my baby is crying or upset
   - □ Other: ______________________
6. What other ways do you interact with your baby? (Check all that apply.)

☐ I talk to my baby  ☐ I read to my baby
☐ I rock my baby  ☐ I hold my baby
☐ I place objects/notes in my baby's crib/isolette  ☐ I do kangaroo care with my baby
☐ I feed my baby  ☐ Other: ____________________

7. Do you use music to help you cope with your baby's hospitalization? (Check one.)

☐ Yes  ☐ No

8. If you do use music to help you cope while your baby is in the hospital, how do you use it? (Check all that apply.)

☐ Listen to music recordings  ☐ Exercise to music
☐ Play/sing music myself  ☐ Do music-based relaxation
☐ I do not use music to help  ☐ Other: ____________________

9. If you worked with a music therapist, do you feel like the music therapist helped you deal with the sights and sounds in the NICU? (Circle one.)

Did not help  1  2  Helped Some  3  4  Helped A lot  5

10. If you worked with a music therapist, do you think it helped you deal with the way your baby looks and behaves in the NICU as well as some of the treatments? (Circle one.)

Did not help  1  2  Helped Some  3  4  Helped A lot  5

11. If you worked with a music therapist, do you feel like it helped you deal with your relationship with your baby and your parental role? (Circle one.)

Did not help  1  2  Helped Some  3  4  Helped A lot  5
APPENDIX F

NEONATAL INTENSIVE CARE UNIT
PARENT SCRIPT

Hello, My name is ________, I am with the music therapy department.

How are you doing today? How is your little one? What name does your little one go by?

__________ was referred for music therapy services by your clinical team because he fits the weight, age and medical stability to begin receiving cautious stimulation through live music, touch, rocking, or music based development play. We are pleased to provide this opportunity for you and your infant. We welcome any questions you may have at any time and encourage you to be a part of music therapy with your infant.

What we would like to do (if appropriate) is have you hold your infant, if comfortable, as we walk you through slowly introducing music, touch and rocking to your infant. We do this particular intervention slowly and with care so that we are able to monitor your infants responses such as vital signs, positive signs such as...and any signs of over stimulation such as...

Infants are very smart and are often able to tell us exactly what they are ok or not ok with. Let’s check out how he looks before we pick him up.

Direct parents attention towards monitors, equipment or any behavioral signs worth noting or describing prior to beginning. If the infant is already being held do the same prior to introducing music.

As we begin _____may start to show us some of the signs we talked about or they may remain calm and resting. We often find that infants may open their eyes or turn towards you when you sing as your voice is familiar, comforting and the one they prefer to hear the most. My voice is lovely but yours is what they really want to hear! I will walk you through it and sing with you as much as you need me to.

Are there any songs you already sing with _______? Are there any songs or types of songs you particularly like? We will start with some simple repetitive ones. Please feel free to join in as you are comfortable.

As we wait for ________ to settle in, tell me a bit more about how your NICU experience has been going? Is it what you expected? Is there anything that has been particularly challenging or surprisingly easy?

Other things you could ask:

• Do you have other children?
• Is there someone special helping you take care of ________?
• ________ looks like he has been getting a lot of rest have you been able to?
• Are there any special ways you have been able to interact with ______ while he has been in the NICU?
REFERENCES


BIOGRAPHICAL SKETCH

Name: Elaine Vuong
Date of Birth: April 7, 1988
Place: Rochester, New York

Education: Nazareth College of Rochester
Rochester, New York
Bachelor of Music in Music Therapy with Education Certification
Degree Awarded May 2011

Florida State University
Tallahassee, Florida
Master of Music in Music Therapy
Degree Awarded December 2013

Certifications: Neonatal Intensive Care Unit-Music Therapist (2013)
Music Therapist-Board Certified (2012)
New York State Initial Certification in Music (2012)

Experience: Research Assistant, Florida State University
Tallahassee, FL; September 2012-September 2013

Music Therapy Internship, Tallahassee Memorial HealthCare
Tallahassee, FL; January 2012-July 2012

Research Assistant, University of Rochester Medical Center
Rochester, NY; May 2011-December 2011