MUSICAL CONTOUR REGULATION FACILITATION (MCRF) TO SUPPORT EMOTION REGULATION DEVELOPMENT IN PRESCHOOLERS: A MIXED METHODS FEASIBILITY STUDY

A DISSERTATION IN
Music Education
and
Curriculum and Instruction

Presented to the Faculty of the University
of Missouri-Kansas City in partial fulfillment of
the requirements for the degree

DOCTOR OF PHILOSOPHY

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Kansas City, Missouri
2015

MUSICAL CONTOUR REGULATION FACILITATION (MCRF) TO SUPPORT EMOTION REGULATION DEVELOPMENT IN PRESCHOOLERS: A MIXED METHODS FEASIBILITY STUDY

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ABSTRACT

Emotion regulation (ER) is the ability for a person to maintain a comfortable state of arousal by controlling and shifting his or her emotional experiences and expressions. The emergence of maladaptive ER occurs in childhood and is one characteristic often shared by several disorders. Maladaptive ER can significantly affect multiple areas in child development, such as the ability to learn in school, form and maintain healthy relationships with peers and adults, and manage and inhibit behavioral responses.

Interventions for children at-risk for developing maladaptive ER skills are limited and need further exploration. Based on limitations noted in existing treatment options, this study provided a preliminary examination of the utility of using a music-based approach. An embedded convergent mixed methods research design was used to explore the feasibility of a Musical Contour Regulation Facilitation (MCRF) intervention. The MCRF intervention was developed to improve ER abilities in children by providing opportunities to practice real-time management of high and low arousal experiences. Typically developing preschool-aged children (n = 8) participated in 11 MCRF sessions over four weeks. Data to assess ER skills and related behaviors was collected pre- and post-MCRF treatment; current regulatory levels

were assessed and self-reported at the beginning and end of each MCRF session. In addition, parent and teacher interviews and questionnaires were conducted post-treatment.

Grounded theory-based qualitative analysis results suggest that most parents and both teachers noted emotional changes in the children following MCRF treatment. Perhaps more importantly, all interviewees believed in the importance and helpfulness of music on developmental outcomes even if they did not note changes in the children or they recognized that other factors may have contributed to perceived changes. Quantitative data analysis results indicated clinically significant improvements in ER skills in the children following MCRF treatment. Convergent mixed methods analyses results further support the efficacy and acceptability of the MCRF intervention. Together, these findings endorse future normative and clinical study of the MCRF intervention as way to facilitate ER development, especially as this medium is highly desired by parents and teachers and can be easily integrated in a preschool setting.

APPROVAL PAGE

The faculty listed below, appointed by the Dean of the School of Graduate Studies have examined a dissertation title "Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study," presented by Kimberly Sena Moore, Candidate for the Doctor of Philosophy degree, and certify that in their opinion it is worthy of acceptance.

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PREFACE

My particular interest in the topic of emotion regulation is founded on my experiences as a music therapy clinician in northern Colorado, where I worked with children ages 3-12 who had a history of complex trauma. Complex trauma is a concept that describes a child's exposure to multiple, wide-ranging traumatic events (e.g. physical abuse, sexual abuse, neglect, multiple moves, separation from parents) that are often invasive, interpersonal, and have a profound effect on development (The National Child Traumatic Stress Network [NCTSN], 2013). The children I worked with frequently exhibited behaviors consistent with maladaptive emotion regulation, such as physical aggression, verbal aggression, running behaviors, hypervigilance, poor interpersonal skills, poor attention span, and poor impulse control. What was especially notable to me was the impact music had on these children, in particular how quickly a single song could move a child from a dysregulated state of running, hitting, and yelling to a regulated state of sitting, engaging, and verbally processing. It was as if music provided direct access into the brains of these children and helped their brains and bodies calm down enough to allow them to function in a more adaptive and appropriate way.

Thus, my Ph.D. research has focused on exploring this phenomenon. In designing this approach, one of my models has been John Creswell (2013, 2014), who encourages investigators to explicitly outline the philosophical worldview assumptions they bring to a study. My approach aligns with a pragmatic worldview characterized by freedom of choice in research design, techniques, and analysis. It is a perspective that allows for more than one reality or truth that can change based on time and context and it does not commit me to one particular system of philosophy or reality (Creswell, 2013, 2014). This pragmatic worldview underlies the decisions that went into this dissertation research, such as the incorporation of a

mixed methods design, the use of multiple measures, and the decision to conduct a feasibility study. This dissertation is not the end of a research journey, but rather a watershed point. As I focus on whether my clinical observation of the connection between music and childhood emotion regulation has merit, it is with the intention to explore the potential of a music therapy treatment approach that addresses a need which transcends diagnoses, ages, and clinical populations.

CHAPTER 1

INTRODUCTION

Research indicates that in the United States, 6.69% of children are diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD) (Boyle et al., 2011), 2.00% are reportedly diagnosed with Autism Spectrum Disorder (Blumberg et al., 2013), and 9.1 out of 1,000 children, or 0.91% of children, are victims of at least one instance of maltreatment (U.S. Department of Health and Human Services [U.S. DHHS], 2012). The number of preschool children receiving psychopharmacological treatment for a mental health disorder is continuing to grow (Egger & Angold, 2006). Although the etiologies may differ, one aspect often shared by individuals with these disorders is maladaptive emotional regulation (Kim & Cicchetti, 2010; Masao, 2004; Mullin & Hinshaw, 2007; Perry & Pollard, 1998; Röll, Koglin, & Petermann, 2012; Stegge & Terwogt, 2007; Thompson & Meyer, 2007; Zeman, Cassano, Perry-Parrish, & Stegall, 2006).

Emotion regulation (ER) is an umbrella term to describe interactive, goal-dependent explicit and implicit processes that are intended to help an individual manage and shift an emotional experience. The unfolding of one's ability to regulate his or her emotions can be a lifelong process (Ochsner & Gross, 2007), but the primary window of development occurs during the infancy, toddlerhood, and preschool years. In fact, these years provide the critical opportunity for adaptive ER development to occur (Bargh & Williams, 2007; Calkins & Hill, 2007; Cole, Dennis, Smith-Simon, & Cohen, 2008; Eisenberg, Hofer, & Vaughn, 2007; Röll et al., 2012; Stegge & Terwogt, 2007). Atypical ER development is considered a risk factor for mental health problems in childhood (Hunter, Minnis, & Wilson, 2011; Röll et al., 2012) and adulthood (Perry & Pollard, 1998), and it has been implicated as a primary mechanism

underlying childhood pathologies (Mullin & Hinshaw, 2007; Perry & Pollard, 1998; Röll et al., 2012; Thompson & Meyer, 2007; Zeman et al., 2006), as well as childhood social competence and school adjustment (Calkins & Hill, 2007; Eisenberg et al., 2007; Jahromi, Meek, & Ober-Reynolds, 2012). Furthermore, due to the use-dependent nature of neurodevelopment, structural and functional neural changes associated with atypical ER development affect the functionality of an individual's brain through adulthood (Perry, Pollard, Blakley, Baker, & Vigilante, 1995).

Given the significance of healthy and adaptive ER development for an individual's mental health, it is important to explore strategies for facilitating its development should an individual be at-risk for developing maladaptive ER skills. Although options exist (Betty, 2013; Izard et al., 2008; Johnson, 2012; Webster-Stratton & Reid, 2003), limitations are present in these approaches that are primarily associated with a mismatch between the intervention method and developmental needs. For example, most of the current options primarily target verbal ER strategies, even though strategies can occur on a continuum from conscious, verbal strategies ("top-down") to unconscious, automatic ones ("bottom-up") (Gross & Thompson, 2007). Due to limitations with current options, there is a need to explore approaches that incorporate a wider range of bottom-up as well as top-down ER strategies, provide in-the-moment opportunities to manage emotionally arousing situations, and afford opportunities for this practice to be realized in the context of an interactive adult-child relationship.

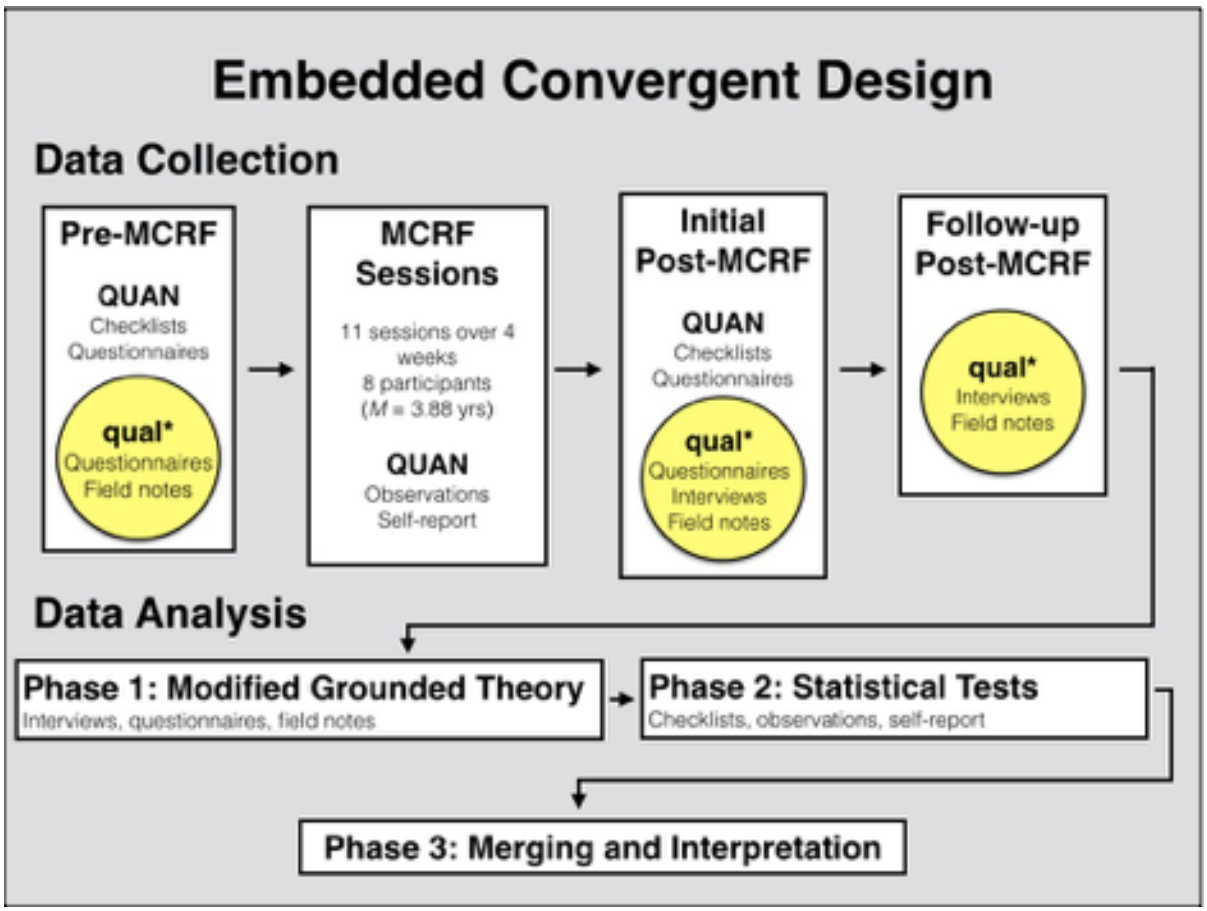
A potential approach that has not yet been explored involves the use of music and therapeutic music-based experiences. Though a long-standing connection between music and emotions exists, music may be particularly suitable to promoting ER development for three

reasons:

1. It is developmentally appropriate (Lamont, 2008; Marsh & Young, 2006; McDonald & Simons, 1989; Trehub, 2006);
2. There is a well-documented connection between music, emotions, and physiologic arousal (Berlyne, 1971; Blood & Zatorre, 2001; James, 1884; Menon & Levitin, 2005; Meyer, 1956), even in infants (Parncutt, 2006; Trainor & Schmidt, 2003; Trehub, 2003), whose emotion regulation strategies are primarily centered on controlling arousal levels (Calkins & Hill, 2007); and
3. Music is typically used as a way to facilitate ER development through caregiver-child musical interactions (Cross, 2003; Marsh & Young, 2006; Trainor & Schmidt, 2003; Trehub, 2003).

As an initial exploration into the phenomenon of the relationship between music and emotion regulation, this study provides a preliminary examination of the utility of using music as a way to facilitate ER development in preschool-aged children. More specifically, the present study explored the feasibility of a Musical Contour Regulation Facilitation (MCRF) intervention as a way to improve ER abilities in typically developing preschoolers.

As feasibility research, the primary aim here was to determine whether the MCRF intervention is practical, relevant, and sustainable (Bowen et al., 2009; Shoemark, 2013; Tickle-Degnen, 2013). The study followed an embedded convergent mixed methods research design, in which qualitative data were collected within a more traditional pretest-posttest quantitative design ("embedded") and the qualitative and quantitative data were collected in parallel, analyzed separately, and then merged ("convergent") (Creswell & Plano Clark, 2010) (Figure 1).



NOTE: Quan = quantitative data collection, QUAL = qualitative data collection. Uppercase letters indicate primary priority for RQ1. Asterisks (*) indicate primary priority for RQ2 and RQ3.

Figure 1. Representation of the embedded convergent mixed methods research design.

Multiple quantitative measures, such as standardized behavioral checklists and Likert-type rating scales, were incorporated to provide a preliminary exploration of the efficacy of the MCRF intervention on ER processes in typically developing preschoolers. The qualitative measures, which included interviews, questionnaires, and field notes, explored the acceptability and ease of integration of the MCRF intervention in a daycare setting as perceived by parents and teachers. The reason for collecting both quantitative and qualitative

data was two-fold: 1) it helped shape an understanding of participant experience and the context and variables that influenced the efficacy of the MCRF intervention plan (Shoemark, 2013), and 2) it allowed for the exploration and integration of multiple ways of knowing from several types of evidence (Bradt, Burns, & Creswell, 2013). Incorporating a mixed methods design supports the aim of feasibility research, which is intended to help shape an understanding of participant experience and the context and variables that influence intervention efficacy (Shoemark, 2013). Furthermore, it aligns with the pragmatic worldview that provides the philosophical foundation for this research in that it allows for the exploration and integration of multiple ways of knowing from multiple and diverse types of evidence (Bradt et al., 2013).

The purpose of the present study was to explore the feasibility of a Musical Contour Regulation Facilitation (MCRF) intervention as a way to improve ER abilities in typically developing preschoolers by providing opportunities to practice real-time management of high and low arousal experiences. More specifically, the study examined the following research questions (RQ):

- RQ1: Does the MCRF intervention show promise of being successful as a way to improve emotion regulation abilities in typically developing preschoolers?
- RQ2: To what extent is the MCRF intervention judged as meaningful and helpful by participants and their caregivers?
- RQ3: To what extent can the MCRF intervention be integrated into an existing early childhood daycare setting?

CHAPTER 2

EMOTION REGULATION AND MUSICAL CONTOUR REGULATION FACILITATION IN THEORY AND PRACTICE: AN INTEGRATED LITERATURE REVIEW

Emotion regulation (ER) includes several facets that collectively describe interactive, goal-dependent explicit and implicit processes intended to facilitate the management and shifting of an emotional experience. While developing one's ability to regulate emotions can be a lifelong process (Ochsner & Gross, 2007), the primary window of development occurs during the infancy, toddlerhood, and preschool years. Atypical ER development is considered a risk factor for mental health problems (Hunter et al., 2011; Röll et al., 2012) and has been implicated as a mechanism underlying childhood pathologies (Mullin & Hinshaw, 2007; Perry & Pollard, 1998; Röll et al., 2012; Thompson & Meyer, 2007; Zeman et al., 2006) as well as childhood social competence and school adjustment (Calkins & Hill, 2007; Eisenberg et al., 2007; Jahromi et al., 2012).

Many children in therapy have difficulty regulating their emotions due to atypical ER development. Maladaptive ER skills are seen in children with aggression-related behavioral problems (Mullin & Hinshaw, 2007; Stegge & Terwogt, 2007), childhood depression (Stegge & Terwogt, 2007), and is implicated in disorders such as Attention-Deficit/Hyperactivity disorder (Masao, 2004; Mullin & Hinshaw, 2007) and Autism Spectrum Disorders (Masao, 2004). Maladaptive ER significantly affects multiple areas in a child's development, including but not limited to the ability to learn in school, to form and maintain healthy relationships with peers and adults, and to manage and inhibit behavioral responses.

Understanding how ER develops is key to effective treatment of maladaptive ER skills. In addition, given the significance of healthy and adaptive ER development, it is also

important to explore strategies for facilitating its development should an individual be at-risk for developing maladaptive ER skills. Although there are therapeutic techniques and training programs that may improve ER in young children (Betty, 2013; Izard et al., 2008; Johnson, 2012; Webster-Stratton & Reid, 2003), a need remains for approaches that incorporate a wider range of adaptive ER strategies, provide real-time opportunities to manage "stress" (e.g. emotionally arousing experiences), and provide this practice in the developmentally appropriate context of an interactive adult-child relationship. A therapeutic music-based approach may be one way to promote ER development. Music is developmentally appropriate (Lamont, 2008; Marsh & Young, 2006; Trehub, 2006), it stimulates physiologic arousal and induces emotions (Juslin & Sloboda, 2010), and has a natural role in bonding and social interactions (Trehub, 2009; Welch, 2006b).

This study explored the feasibility of a Musical Contour Regulation Facilitation (MCRF) method, which aims to use music stimuli to manipulate the arousal levels of typically developing preschoolers, exposing them to an alternation of arousing and calming musical experiences. The intention of the music stimulus in this method is not to induce or elicit specific emotions; rather, it is to use the contour and temporal structure of a music therapy session to alternate between high-arousal and low-arousal states in a way that theoretically mirrors the changing flow of the caregiver-infant interaction.

The focus on typically developing preschool children is intentional. Although the preschool years (3-5 years) fall within the primary developmental window for ER, the more dramatic developments occur during the infancy and toddlerhood years (Calkins & Hill, 2007). However, for some children the challenges of emotion regulation are not identified until they enter some type of formalized schooling. In addition, it has been hypothesized that

early intervention can influence child development, guiding development towards a more typical pathway (Dawson, 2008). Therefore, the MCRF intervention targets a developmental period that is within the critical window of opportunity and, though provided in the later years of significant ER development, can theoretically guide future development. Furthermore, the focus on typically developing children is congruent with the third step in Thaut's (2000) Rational-Scientific Mediating Model. This step, the mediating model, is intended to systematically explore the influence of music on typical behavior function, thus providing a foundation and rationale for future inquiry with clinical populations. Thus, by focusing on typically developing children, this study provides a foundation and rationale for future study of the MCRF intervention with children who have clinical needs.

About Emotion Regulation

The construct of emotion regulation (ER) emerged in developmental research in the latter two decades of the 20th century (Gross & Thompson, 2007). Since then, it has been considered a risk factor for mental health problems (Hunter et al., 2011; Röll et al., 2012), has been implicated as a primary mechanism underlying childhood mental health pathologies (Mullin & Hinshaw, 2007; Perry & Pollard, 1998; Röll et al., 2012; Thompson & Meyer, 2007; Zeman et al., 2006), and has been linked to childhood social competence and school adjustment (Calkins & Hill, 2007; Eisenberg et al., 2007; Jahromi et al., 2012). Emotion regulation is worthy of study even beyond its connection to mental health problems. It is a core characteristic of the emotion process as emotional states typically involve an emotion regulation component (Juslin & Sloboda, 2010; Lewis, Todd, & Xu, 2010) and regulation in general is the mechanism through which the brain attempts to maximize an individual's functioning by minimizing distractions (Lewis et al., 2010).

A single agreed-upon definition does not yet exist in the literature, but authors tend to agree on several key features. “Emotion regulation” is an umbrella term for a diverse set of processes and strategies (Beer & Lombardo, 2007; Calkins & Hill, 2007; Eisenberg et al., 2007; Gross & Thompson, 2007; Gyurak, Gross, & Etkin, 2011; Lewis et al., 2010; Mullin & Hinshaw, 2007; Thompson & Meyer, 2007). These processes and strategies can be explicit, voluntary, controlled, and conscious (i.e., “top-down” strategies) or implicit, reactive, automatic, and subconscious (i.e., “bottom-up” strategies) (Beer & Lombardo, 2007; Calkins & Hill, 2007; Gross & Thompson, 2007; Gyurak et al., 2011; Lewis et al., 2010; Mullin & Hinshaw, 2007; Thompson & Meyer, 2007). In reality, this is not an either-or situation as strategies can occur on a continuum from top-down to bottom-up (Gross & Thompson, 2007). The purpose of ER is to manage and shift emotions through dampening, intensifying, or maintaining the intensity and temporal qualities of the emotion experience (Beer & Lombardo, 2007; Calkins & Hill, 2007; Eisenberg et al., 2007; Gross & Thompson, 2007; Thompson & Meyer, 2007). Thus, ER will alter the dynamics of the emotion, but not the quality of the emotion itself (Thompson & Meyer, 2007). As a goal-dependent process, how emotions are regulated will depend on an individual’s goal in the given context (Beer & Lombardo, 2007; Cummings & Davies, 1996; Eisenberg et al., 2007; Gross & Thompson, 2007; Thompson & Meyer, 2007). The end result of appropriate ER, therefore, cannot be considered optimal or maladaptive (Thompson & Meyer, 2007) as it should be congruent with what an individual needs in that particular moment or situation. Finally, ER is a dynamic and interactive process (Calkins & Hill, 2007; Cummings & Davies, 1996; Gross & Thompson, 2007; Gyurak et al., 2011) that does not rely solely on modifying emotions, but also on continually monitoring and appraising them (Thompson & Meyer, 2007).

Considering these key characteristics, for the purposes of this paper "emotion regulation" will be defined as a concept that describes interactive, goal-dependent explicit and implicit processes intended to help an individual manage and shift an emotional experience.

About ER Development

The unfolding of one's ability to regulate his or her emotions can be a lifelong process (Ochsner & Gross, 2007), but the primary window of development occurs during the infancy, toddlerhood, and preschool years. Although there are multiple possible pathways to ER development, the general trajectory follows a three-stage arc: 1) simple physiologic and reflexive responses (Calkins & Hill, 2007), 2) caregiver-directed coregulatory strategies or the use of simple attentional and motor strategies (Eisenberg et al., 2007; Thompson & Meyer, 2007), and 3) active and intentional self-regulation of emotions (Bargh & Williams, 2007; Calkins & Hill, 2007; Cole et al., 2008; Eisenberg et al., 2007; Stegge & Terwogt, 2007; Thompson & Meyer, 2007; Zeman et al., 2006).

Although an innate template for ER development exists, ER skills are also socially constructed (Thompson & Meyer, 2007). These socially constructed skills are influenced by one's cultural experiences, family environments, caregiver interactions, and gender expectations. Furthermore, a close relationship exists between ER development and other child development domains, such as attention (Calkins & Hill, 2007; Eisenberg et al., 2007; Feldman, 2009), motor (Calkins & Hill, 2007; Eisenberg et al., 2007), cognition (Calkins & Hill, 2007; Cole et al., 2008; Eisenberg et al., 2007; Feldman, 2009; Röll et al., 2012; Stegge & Terwogt, 2007), language (Blair et al., 2008; Cole et al., 2008; Gross & Thompson, 2007; Thompson & Meyer, 2007; Zeman et al., 2006), and brain development (Blair et al., 2008; Calkins & Hill, 2007; Feldman, 2009; Geva & Feldman, 2008; Schore, 2001; Zelazo &

Cunningham, 2007; Zuddas, 2012).

ER Development in Infancy (0-12 months)

In the first year of life, ER strategies are primarily centered on controlling arousal levels (Calkins & Hill, 2007), managing emotional cues, and handling external and internal stress (Feldman, 2009). They tend to involve innate physiological mechanisms (Calkins & Hill, 2007) or passive, caregiver-directed, mutual regulation (Feldman, 2009; Thompson & Meyer, 2007). The innate physiological mechanisms, predominant in the first three months, are reflexive behaviors that provide a generalized approach or withdrawal response to an arousal-inducing stimulus (Calkins & Hill, 2007). Caregivers provide a source of external regulation when they are responsive to infant distress, incorporating strategies such as rocking, singing, and feeding to facilitate the infant's return to a calm, homeostatic state. Young infants rely on their caregivers for this arousal regulation (Eisenberg et al., 2007).

Primitive yet intentional self-soothing strategies begin to emerge at around three months. These may include thumb sucking, simple motor movements that help infant move away from the stress-inducing stimulus (Calkins & Hill, 2007), and reflexive signaling (e.g. crying) designed to bring caregivers closer (Calkins & Hill, 2007; Perry et al., 1995). The next three to six months are characterized by the emerging use of attention-based strategies (Bargh & Williams, 2007; Gross & Thompson, 2007) and simple voluntary motor actions (Calkins & Hill, 2007). These attention-based strategies, sometimes referred to as attentional deployment, are intended to help an individual control and direct his or her attention in ways that influence the emotional experience (Bargh & Williams, 2007; Gross & Thompson, 2007; Gyurak et al., 2011; Ochsner & Gross, 2005, 2007). The emergence of their use is an important developmental milestone as attentional deployment is one of the earliest types of

ER strategies to develop (Gross & Thompson, 2007) and it continues to function as an important strategy through the preschool years (Bargh & Williams, 2007).

At six months of age, the infant begins to actively elicit social assistance from caregivers (Eisenberg et al., 2007) and more consistently uses gaze aversion, another attentional deployment strategy (Eisenberg et al., 2007; Gross & Thompson, 2007). At 12 months of age, infants demonstrate attempts to respond to environmental cues in active, flexible, and purposeful ways, through the use of self-soothing strategies (Calkins & Hill, 2007; Eisenberg et al., 2007), social signaling (e.g. crying), redirecting attempts (e.g. gaze aversion), and organized motor behaviors that allow the infant to reach, retreat, and redirect (Calkins & Hill, 2007). This first year of life provides multiple opportunities for practicing how to regulate our arousal and emotional states (Bargh & Williams, 2007), thus making it critical for healthy and adaptive ER development.

Caregiving needs and infant ER development. ER development is closely tied to an infant's caregiving needs. This is an important consideration since children generally cope more adaptively and develop more appropriate ER strategies when caregivers respond supportively and sympathetically to their emotional expressions (Gross & Thompson, 2007; Koole, 2009; Perry & Pollard, 1998; Thompson & Meyer, 2007). In early infancy, a child has undeveloped and restricted coping capacities and is completely dependent on the responsiveness of his or her caregivers. During these months, other than the infant's innate, generalized, and reflexive responses (Calkins & Hill, 2007), the caregiver's supportiveness and flexible responsiveness mediates successful emotion and stress regulation (Calkins & Hill, 2007; Eisenberg et al., 2007; Schore, 2001; Thompson & Meyer, 2007). In addition, a caregiver's attempts to soothe an infant's distress contribute to the emergence of basic

expectations, namely that by six months of age, an infant who has experienced this caregiver responsiveness will quiet in anticipation of the caregiver's arrival (Thompson & Meyer, 2007). Over time, sensitive, flexible, and responsive caregiving behaviors become integrated into the infant's repertoire of ER strategies (Calkins & Hill, 2007). Such behaviors influence the infant's ER development by demonstrating that stress can be managed (Cole et al., 2008; Thompson & Meyer, 2007) and that an adult can help with the management (Thompson & Meyer, 2007).

Beyond caregiver responsiveness, the type of attachment relationship between a caregiver and child also influences ER development. This is thought to be the primary mechanism through which the caregiver-infant relationship influences ER development (Calkins & Hill, 2007; Schore & Schore, 2008). The type of caregiver-infant attachment relationship mediates the type of ER strategy utilized, influences the development of physiological response systems (Calkins & Hill, 2007; Schore, 2001), and influences negative reactivity (Sherman, Stupica, Dykas, Ramos-Marcuse, & Cassidy, 2013). In general, the type of caregiver-child attachment relationship helps influence whether the child develops ER skills that are adaptive and appropriate or maladaptive and inappropriate. Infants with secure attachment relationships express an appropriate need for social support to assist in regulating their emotions and employ ER strategies such as social referencing (e.g. when meeting a new person, the infant will look to the caregiver to notice the caregiver's reaction, then will respond to the new person based on this observation). Those with non-secure attachment relationships develop more maladaptive strategies along the lines of self-soothing and solitary play (Calkins & Hill, 2007) that help them adapt to their own needs in their specific attachment environments. This relationship is also mirrored in the infant's

neurobiological responses as the type of attachment relationship (Schore, 2001) and overall maternal engagement with the infant (Blair et al., 2008) are both associated with cortisol reactivity, a measure of distress.

The caregiver and family environments are also implicated in providing the infant with a sense of emotional security or lack thereof (Thompson & Meyer, 2007). This sense of security influences emotion and arousal regulation (Cummings & Davies, 1996) and promotes an infant's openness to affective cues (Mikulincer, Shaver, & Pereg, 2003). Furthermore, it is not just through calming a distressed infant that caregivers support ER development but also through stimulating the infant by engaging in face-to-face play, an activity that emerges around two to three months of age (Thompson & Meyer, 2007). Finally, the caregiver-infant regulatory experience—which has been described as coregulatory or mutually regulating—is believed to facilitate the later development not just of ER but also of self-regulation overall (Feldman, 2009). These experiences and interactions help teach the child which ER strategies are more effective than others (Calkins & Hill, 2007; Cole et al., 2008). They also provide culturally relevant models and beliefs about emotions and their expression (Thompson & Meyer, 2007), as well as offer multiple and frequent opportunities to practice emotion and arousal regulation (Zeman et al., 2006). The latter strongly influences developing ER capacities in the infant and supports continued ER development during the toddler and preschool years.

ER Development in Toddlerhood (1-3 years)

ER development in toddlerhood is primarily characterized by a transition from passive, caregiver-directed, mutual regulation (Feldman, 2009; Thompson & Meyer, 2007) to more intentional self-regulation of emotions (Calkins & Hill, 2007; Eisenberg et al., 2007; Röll et

al., 2012) and an increasing emphasis on top-down cognitive strategies (Stegge & Terwogt, 2007). These top-down strategies are those that are explicit, voluntary, controlled, and conscious (Beer & Lombardo, 2007; Calkins & Hill, 2007; Gross & Thompson, 2007; Gyurak et al., 2011; Lewis et al., 2010; Mullin & Hinshaw, 2007; Thompson & Meyer, 2007). For example, attentional deployment (e.g. intentionally playing with a toy and ignoring the stress-inducing stimulus) (Ochsner & Gross, 2007) and response modulation (e.g. using words to say how you feel instead of yelling or hitting) (Bargh & Williams, 2007) are considered top-down ER strategies. This developmental period is also characterized by an emerging responsiveness to caregiver directives (Calkins & Hill, 2007).

Caregiver directives are important as they facilitate and externally "coach" the transition from the passive co-regulation of emotions to more active, internal self-regulation of emotions. Caregivers incorporate a variety of strategies in these directives, which may include distracting the toddler, helping the toddler problem-solve, providing alternate interpretations of situations, providing social referencing cues, suggesting adaptive responses, offering alternatives for maladaptive behavior, or structuring experiences to help make emotional demands more manageable (Thompson & Meyer, 2007). It is through practicing these ER strategies that they transition from being explicit top-down processes to implicit, automatic, bottom-up processes (Bargh & Williams, 2007).

Other developmental shifts occur during the toddler period. Between 12 and 18 months of age, toddlers exhibit an increasing use of behavioral avoidance and self-distracting strategies (e.g. purposefully playing with a toy to ignore a stress-inducing stimulus), the latter of which is the most common ER strategy at two years of age (Eisenberg et al., 2007). ER development towards the end of toddlerhood is characterized by a general decline in the use

of external self-soothing behaviors (e.g. thumb sucking) and an emerging use of objects (e.g. toys), social interactions (Eisenberg et al., 2007), and cognitive strategies (Stegge & Terwogt, 2007) to facilitate ER.

Caregiving needs and toddler ER development. The caregiver-child relationship continues to be of great importance in ER development during the toddler years. During this developmental period, caregivers still provide important, culturally relevant models and beliefs about emotions and their expression as well as a sense of emotional security or lack thereof (Thompson & Meyer, 2007). However, unlike when a caregiver responds to an infant's distress and seeks to soothe the infant, during the toddler years, caregivers incorporate a variety of pro-active and reactive strategies and directives designed to facilitate, prompt, model, and help structure the emotional experience (Calkins & Hill, 2007; Thompson & Meyer, 2007; Zeman et al., 2006). These may include preemptively structuring the environment to help control for emotional demands, providing social referencing cues, prompting the use of specific ER strategies, and providing contingencies for behaviors (Thompson & Meyer, 2007; Zeman et al., 2006). In this way caregivers facilitate the shift from passive coregulation to the active self-regulation of emotions.

Preschool ER Development (3-5 years)

ER development during the preschool years is generally characterized by a decline in caregiver interventions and directives (Thompson & Meyer, 2007) and a greater emphasis in the use of top-down cognitive strategies (Stegge & Terwogt, 2007). This includes an emerging awareness and intentionality in using ER strategies (Cole et al., 2008) and an increase in the knowledge and use of culturally defined behavioral display rules (i.e., cultural and commonly gender-based expectations for how an individual shows emotions in a given

situation) (Zeman et al., 2006). Preschool children also begin to identify appropriate and inappropriate ER strategies (Cole et al., 2008); in fact, a primary goal during this developmental period is to assess the effectiveness and appropriateness of the strategies they use (Röll et al., 2012).

Other types of ER strategies also begin to emerge. For example, during infancy and toddlerhood, children are unable to select or modify their environments and situations (Gross & Thompson, 2007). However, the preschool years mark the emergence of situation selection and situation modification strategies (Cole et al., 2008). Situation selection is defined as intentionally creating or selecting a situation that one feels will work to maximize positive, desirable feelings and minimize negative, undesirable feelings (Bargh & Williams, 2007; Beer & Lombardo, 2007; Gross & Thompson, 2007). Situation modification describes how one alters an ongoing situation in order to change its emotional impact (Gross & Thompson, 2007). In other words, preschoolers are developmentally advanced enough to be able to influence the situation phase of the emotion process by either selecting an emotionally pleasing situation or changing an ongoing situation to make it more so.

Caregiving needs and preschool ER development. The caregiver-child relationship continues to be of great importance during the preschool years though there is a shift in how that relationship informs ER development. The coaching-type of ER development that began during the toddlerhood years persists during the preschool years as caregivers continue to facilitate the transition to active self-regulation of emotions. This occurs through caregiver use of a variety of strategies and directives designed to facilitate, prompt, model, and help structure the emotional experience (Calkins & Hill, 2007; Thompson & Meyer, 2007; Zeman et al., 2006). However, the employment of these strategies and directives decline during this

developmental period as preschoolers take a more active role in the regulation of their emotions (Thompson & Meyer, 2007). Caregivers also continue to provide important, culturally relevant models and beliefs about emotions and their expression, as well as a sense of emotional security or lack thereof (Thompson & Meyer, 2007). In addition, caregiver-preschooler conversations about emotions facilitate ER development as they convey cultural values, gender expectations (Thompson & Meyer, 2007; Zeman et al., 2006), and assist the child in identifying emotions and regulating negative affect (Zeman et al., 2006). Thus, during the preschool years caregivers continue to facilitate the shift to intentional self-regulation of emotions and the emergence of more top-down cognitive ER strategies while imparting knowledge about cultural expectations related to ER.

Childhood Stress and ER Development

Emotions can be viewed as homeostasis-disrupting events in that they are indicators that an organism is not in the steady and calm state of equilibrium (Bargh & Williams, 2007). Furthermore, early ER development centers on controlling arousal levels (Calkins & Hill, 2007) and handling internal and external stress (Feldman, 2009). Given these connections, it seems valuable to connect ER development with the childhood stress response. In a mature individual, the classic "fight, flight, or freeze" stress response is the body's adaptive response to a stressful event, such as what occurs during an emotion-inducing event (Perry & Pollard, 1998). In this instance, although the emotion offers an important clue about one's environment, it can also be considered a homeostasis-disrupting event (Bargh & Williams, 2007). Thus, one primary function of ER is to return the organism to a state of homeostasis through managing and shifting the physiological response associated with the emotion experience. When these efforts are not successful, an individual remains in a stressed,

disequilibrium state and is said to be dysregulated (Linehan, Bohus, & Lynch, 2007).

Stress responses exhibit differently in children than in adults. Instead of the classic stress response, a child's stress response generally takes one of two patterns, 1) hyperarousal (also referred to as hyperactivating or overregulation) or 2) dissociative (also referred to as deactivating or underregulation) (Cummings & Davies, 1996; Mikulincer et al., 2003; Mullin & Hinshaw, 2007; Perry & Pollard, 1998; Perry et al., 1995). The type of response pattern a child utilizes is formed in infancy and influenced by caregiver-infant interactions. When an infant experiences stress, its initial reaction is hyperarousal (e.g. crying) as it seeks proximity to the caregiver (Perry & Pollard, 1998; Perry et al., 1995). If this strategy works, the infant will continue to use it when he or she seeks proximity, love, and support (Mikulincer et al., 2003). If the initial hyperarousal response attempt does not work, the infant will disengage from its proximity-seeking behavior and will instead attempt to manage the stress without caregiver support. These self-soothing and "managing" behaviors are on the dissociative end of the continuum and can manifest in behaviors such as distraction, avoidance, numbing, daydreaming, and fainting (Mikulincer et al., 2003; Perry & Pollard, 1998; Perry et al., 1995). The type of stress response a child utilizes is also mediated by age and gender as younger children and females are more likely to use dissociative strategies (Perry et al., 1995). Thus, a primary function of ER in childhood is to return the child to a state of homeostasis following a hyperarousal or dissociative stress response.

Developmental Implications

ER development occurs in infancy and early childhood and is heavily influenced by the caregiver-infant relationship (Calkins & Hill, 2007; Eisenberg et al., 2007; Schore, 2001; Thompson & Meyer, 2007). Due to the use-dependent nature of neurodevelopment (Perry &

Pollard, 1998), early stress-inducing emotional experiences shape the structure and function of the developing brain. Thus, without being exposed to developmentally appropriate ER experiences, a child is at-risk for developing poor ER skills and maladaptive ER strategies. This has implications for an individual's behavioral response patterns (Calkins & Hill, 2007; Eisenberg et al., 2007; Feldman, 2009; Jahromi et al., 2012; Lewis et al., 2010; Mullin & Hinshaw, 2007; Perry & Pollard, 1998; Perry et al., 1995), emotional and social health (Blair et al., 2008; Calkins & Hill, 2007; Eisenberg et al., 2007; Feldman, 2009; Jahromi et al., 2012; Lewis et al., 2010; Perry et al., 1995; Zeman et al., 2006), cognitive skills and learning (Blair et al., 2008; Calkins & Hill, 2007; Jahromi et al., 2012; Perry et al., 1995; Schore, 2001), and the potential development of psychopathology (Hunter et al., 2011; Mullin & Hinshaw, 2007; Perry & Pollard, 1998; Röll et al., 2012; Thompson & Meyer, 2007; Zeman et al., 2006). In short, the development of adaptive ER skills affects a child's mental health, behavioral and emotional responses to stress, his or her ability to develop healthy and appropriate adult-child and peer relationships, and the child's ability to learn in school.

A link exists between hyperarousal response patterns and uncontrolled "acting out" or aggressive behaviors. Increased amounts of stress in infancy and childhood may alter the developing HPA axis, which could result in a dysregulated stress response system (Calkins & Hill, 2007; Perry & Pollard, 1998). The effect of increased stress that occurs prenatally and during infancy can have even more damaging and lasting effects, since one of the first systems to mature are the basic physiological systems which are implicated in the stress response. These physiological systems are integrated into and impact the development of later-developing emotional, cognitive, and behavioral systems (Calkins & Hill, 2007). A dysregulated stress response system may lead to heightened states of arousal, which is

commonly found in aggressively reactive children (Mullin & Hinshaw, 2007). This type of aggressive reactivity can be accompanied by difficulty in controlling such reactivity, as these children may exhibit low levels of top-down, cognitive-based ER strategies (Eisenberg et al., 2007). In addition to increased reactivity, children who have a hyperarousal response pattern may exhibit other types of externalizing behaviors, such as inattention, impulsivity, anxiety, hyperactivity, hypervigilance, and antisocial behaviors (Mullin & Hinshaw, 2007; Perry & Pollard, 1998). In addition, this puts them at-risk for externalizing disorders (Zeman et al., 2006) and childhood pathologies such as Attention-Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD) (Mullin & Hinshaw, 2007).

A child is also at-risk when dysregulation occurs at the dissociated end of the childhood stress response continuum. In these instances, maladaptive ER skills are characterized by an inhibition or overcontrol of an emotion (Calkins & Hill, 2007). Children who exhibit this response pattern are thought to be as highly reactive as their hyperaroused counterparts, while their behavioral responses are characterized by poor attention regulation, poor behavior initiation (Eisenberg et al., 2007), and maladaptive self-soothing behaviors such as rocking or "cutting" (Perry & Pollard, 1998). In addition, they are prone to internalizing problems and disorders (Eisenberg et al., 2007; Röll et al., 2012; Zeman et al., 2006). That said, the link between maladaptive ER skills and internalizing problems is not as clear as the link between maladaptive ER skills and externalizing problems (Eisenberg et al., 2007).

Overall, ER significantly influences an individual's ability to function, which makes the development of ER an important area to understand. Poor ER skills put children at an increased risk for poor interpersonal skills, difficulties with social competence, and academic

challenges (Calkins & Hill, 2007; Eisenberg et al., 2007; Jahromi et al., 2012). These maladaptive ER strategies are thought to be a primary risk factor in childhood pathology (Röll et al., 2012; Zeman et al., 2006) and effects have also been noted beyond childhood. For example, many investigators consider adaptive ER to be a marker of mental health (Cole et al., 2008; Gyurak et al., 2011; McRae, Misra, Prasad, Pereira, & Gross, 2012). They assert that how stress and adversity is experienced and handled early in life programs an adult's stress response (Hunter et al., 2011). This does not mean that every child who experiences stress is susceptible to such challenges and problems; ER development outcomes also depend on the child's natural temperament and resilience (Ochsner & Gross, 2007) and the environmental context (Mullin & Hinshaw, 2007).

Maladaptive ER-related behaviors serve an important communicative function for parents, caregivers, and clinicians as they indicate that a child is in a dysregulated state. Chronically maladaptive behaviors may indicate a pervasive problem that needs to be addressed. The hyperarousal or dissociative behaviors themselves, although observable, are not the primary issues of concern when facilitating ER development. The underlying problem concerns the development of maladaptive ER skills. Therefore, understanding how ER develops is key to effective intervention methods and supports the call for a more theory-based approach to clinical work, including in fields such as music therapy (Robb, 2012). A theory-based approach should focus less on the hyperarousal and dissociative behaviors and more on the mechanisms underlying ER development—the developing stress response system, the supportive, caring environments, the predictable, safe, flexible, and loving caregiver responses, and the interactions between them. These are the mechanisms that influence brain development and should theoretically be the primary targets of interventions

intended to facilitate ER development.

Current Intervention Methods for Preschool ER Development

One of the primary goals of ER development during the preschool years is to practice different ER strategies in various situations and contexts. It is through practicing these strategies that ER development transitions from being explicit, top-down, caregiver-facilitated processes to implicit, automatic, self-initiated ones (Bargh & Williams, 2007). Furthermore, typical ER development is mediated in large part through the child's interactive experiences with a caregiver (Calkins & Hill, 2007; Eisenberg et al., 2007; Thompson & Meyer, 2007). A child may be at-risk for developing maladaptive ER strategies if he or she does not have a secure attachment relationship with a primary caregiver and is not exposed to experiences that help him or her practice ER strategies in an adaptive and safe way (Calkins & Hill, 2007). To date, other than one notable exception (Betty, 2013), literature that explores therapeutic strategies for preschoolers expressly designed to facilitate the necessary practice of ER strategies within the context of a trusted relationship remains extremely limited.

Many of the published therapeutic strategies are either verbal- or behavioral-based. Johnson (2012) outlines a narrative therapy technique called externalization, where the primary task of the psychotherapist is to help a child label an emotional experience and foster the child's ability to manage that emotion through verbal talk therapy strategies. Webster-Stratton and Reid (2003) cite short- and long-term benefits to their Dina Dinosaur Treatment Program, a social skills training program for parents and children intended to develop emotion- and social-based skills in preschoolers with early onset conduct problems. This program starts with a focus on following group rules, then teaches emotional literacy,

problem solving strategies, and friendly behaviors. The researchers note that the most significant improvements occurred with a combination of child training and parent training (Webster-Stratton & Reid, 2003). A similar program incorporates an emotion-based prevention program in rural and inner city Head Start programs. This program incorporates lesson-based strategies designed to improve emotional and social competence while decreasing maladaptive behaviors. One key finding is verifiable evidence that their program led to greater increases in emotion knowledge and ER for the children enrolled in them (Izard et al., 2008).

All three studies incorporate evidence to support the efficacy of the particular intervention technique or training program. However, several limitations exist with these approaches. One is that they only target verbal, top-down ER strategies, even though ER strategies can occur on a continuum from top-down to bottom-up (Gross & Thompson, 2007). Furthermore, although there is a greater emphasis during the preschool years on the use of top-down cognitive strategies (Stegge & Terwogt, 2007) and a growing repertoire of behavioral strategies (Zeman et al., 2006), these approaches are built on the assumption that the child has had a typical ER developmental trajectory in the years leading up to the therapeutic intervention. Therefore, theoretically, a preschool child at-risk for developing maladaptive ER strategies may benefit from an approach that models early ER development facilitation, namely the use of less cognitive teaching strategies and more intentional practice of ER management through the facilitation, prompting, modeling, and structuring of the emotion experience (Calkins & Hill, 2007; Thompson & Meyer, 2007; Zeman et al., 2006).

Another potential limitation in the previous studies is the disconnect between the timing of the intervention strategies and the occurrence of an emotionally stressful situation.

Again, ER development is strongly mediated by the caregiver-child attachment relationship and the nature of the caregiver-child interactions. Children cope more adaptively and acquire more positive ER strategies when caregivers respond supportively and sympathetically to their emotional expressions (Gross & Thompson, 2007; Koole, 2009; Perry & Pollard, 1998; Thompson & Meyer, 2007). The key word is "respond" in that the caregiver is responsive to the child's emotional needs in the moment. It is through this responsiveness and the subsequent caregiver-facilitated regulatory experience that the child learns that emotions can be managed. Over time and with multiple real-time practice opportunities, the child internalizes these regulatory experiences and ER strategies. The previously published behavioral- and verbal-based teaching strategies do not seem to provide such real-time opportunities in that the child is not brought to an emotionally aroused state that may allow for practicing how to manage the feelings and sensations. Current approaches are a priori therapeutic methods that may help the child learn ER strategies, but do not necessarily provide the child with an opportunity for real-time practice of handling emotionally arousing experiences necessary to internalize the strategies. Although this is partially addressed through the parent training components included in some programs (i.e., parents are trained to provide necessary in-the-moment responsiveness to an emotionally stressed child) (Izard et al., 2008; Webster-Stratton & Reid, 2003), perhaps what is needed is a therapeutic approach that incorporates real-time, in-the-moment opportunities to practice experiencing and managing stress-inducing experiences.

The third potential limitation to the previously published literature is closely aligned with the timing disconnect. The key word in this instance is "interactive." ER is taught in large part through caregiver-child interactions. As mentioned previously, an a priori

therapeutic approach may help the child learn ER strategies, but it does not guarantee that the child will get the caregiver-mediated interactions needed to practice and internalize the strategies. A parent training component may provide caregivers the education they need to alter and strengthen the attachment relationship they have with the child, but perhaps what is also needed is a therapeutic approach that incorporates more opportunities for interactive experiences.

A notable exception to these latter two limitations is a Dance/Movement Therapy approach outlined by Betty (2013). The purpose of Betty's approach is to support ER development in maltreated children by teaching non-parental caregivers movement patterns and interactive approaches to help children develop successful ER skills. Central to Betty's framework are in-the-moment interactions between the "caregiver" (i.e., the direct care professional) and the child during a stressful situation. However, even with this exception, a lack of therapeutic options exist that provide real-time, adult-child interactive opportunities to manage emotionally arousing experiences and simultaneously practice and internalize ER strategies.

Music as an ER-facilitating Mechanism

Although therapeutic techniques and training programs that may help improve ER in preschoolers are plentiful, a need still seems to exist for approaches that incorporate a wider range of bottom-up as well as top-down strategies, that provide in-the-moment opportunities to manage "stress" (e.g. emotionally arousing experiences), and that afford opportunities for this practice to be realized in a developmentally appropriate context of an interactive adult-child relationship. One such therapeutic approach that may fit these needs is the incorporation of therapeutic, music-based experiences. The idea that music can induce

emotions began to emerge in the scientific literature in the late 1800s (James, 1884) and continued to be mentioned in subsequent literature from the psychological and anthropological fields (Berlyne, 1971; Frijda, 2007; James, 1884; Lazarus, 1991; Merriam, 1964; Meyer, 1956; Sears, 1968; Zajonc, 1994). Although the connection between music and emotions was largely ignored in the latter half of the 20th century, there has been renewed interest over the past 20 years in understanding this phenomenon (Juslin & Sloboda, 2010). In addition, more recent neuroscience research indicates there are shared neural networks implicated in both emotion and music processing (Baumgartner, Lutz, Schmidt, & Jäncke, 2006; Bengtsson, Csíkszentmihályi, & Ullén, 2007; Berkowitz & Ansari, 2008; Blood & Zatorre, 2001; Brown & Martinez, 2007; Brown, Martinez, & Parsons, 2004; Foss, Altschuler, & James, 2007; Kleber, Birbaumer, Veit, Trevorrow, & Lotze, 2007; Koelsch, Fritz, Cramon, Müller, & Friederici, 2006; Koelsch, Fritz, & Schlaug, 2008; Lerner, Papo, Zhdanov, Belozersky, & Hendler, 2009; Limb & Braun, 2008; Menon & Levitin, 2005; Mitterschiffthaler, Fu, Dalton, Andrew, & Williams, 2007; Mizuno & Sugishita, 2007; Satoh, Takeda, Nagata, Hatazawa, & Kuzuhara, 2001). Although the literature supports that music can influence emotions, there is also evidence to support using music-based experiences to target ER development in preschoolers. Music is developmentally appropriate for preschoolers, it stimulates physiologic arousal and induces emotions, and it assumes a natural role in bonding and social interactions.

Developmental Appropriateness

Parents and professionals who work with preschool-aged children know that children are inherently musical. This connection is also well documented in the literature. Preschoolers have an unbridled enthusiasm for music (Trehub, 2006) and music has a

prevalent role in their lives (Lamont, 2008). The developmental foundations for music are laid in infancy. Infants are born with a curiosity and attentiveness to musical sounds (McDonald & Simons, 1989) and they are born with finer frequency, timing, and timbre perception than what is needed at this point in their musical development (Trehub, 2003). As preschoolers, a child's first social experiences likely involve musical games (Marsh & Young, 2006; McDonald & Simons, 1989). Furthermore, music holds an important role in childcare rituals and routines, both in the home and at preschool or daycare settings (Lamont, 2008). Thus, it seems commonsensical to utilize as a therapeutic mechanism a medium with which preschool children are familiar and to which they are inherently drawn.

The Music - Physiologic Arousal - Emotions Connection

The connection between music, physiologic arousal, and emotions has been recorded as early as the late nineteenth century (James, 1884). Listening to music produces physiologic changes associated with emotion processing. What is particularly notable is that an overt reaction is not typically required for musically induced emotions (Trainor & Schmidt, 2003). Another notable observation is how early this connection begins. Infants have been shown to be sensitive to sound and movement patterns and their emotional connotations (Parncutt, 2006). Caregivers use the connection between music and physiologic arousal as a means of modulating an infant's arousal level. This can be seen through caregiver-infant interactions, which often incorporate stimulating music (i.e., play songs) and calming music (i.e., lullabies) (Trainor & Schmidt, 2003; Trehub, 2003). In addition, music has the ability to convey emotional information (Schubert & McPherson, 2006), even for young children (Trainor & Schmidt, 2003). Thus, the connection between music, physiologic arousal, and emotion induction that is apparent early in the development process provides additional

support for the use of music as a mechanism to facilitate ER development in preschool children.

Music-mediated Bonding and Interactions

Perhaps the strongest argument supporting the use of music to facilitate ER development is its role in facilitating bonding and caregiver-child interactions. From an early age children are exposed to musical interactions, first with their caregivers (Cross, 2003; Marsh & Young, 2006; Trainor & Schmidt, 2003; Trehub, 2003), then through social experiences (Marsh & Young, 2006; McDonald & Simons, 1989) and interactions in a daycare or preschool setting (Lamont, 2008). These early music interactions help to stimulate the child, soothe the child, or allow the child to share emotional information (Trehub, 2009). Furthermore, caregiver-infant interactions seem to incorporate music-like characteristics in that they have a rhythmic and dynamic back-and-forth quality. These music-like interactions are critically important in helping a child acquire capacities to self regulate and to bond emotionally with another person (Cross, 2003). In addition, they serve an essential role in nonverbal caregiver-infant communications (Marsh & Young, 2006) and caregivers commonly use music as part of their familiar and structured parenting rituals (Lamont, 2008).

Even beyond infancy and the caregiver-infant relationship, a key characteristic of musical play is its importance as a form of social interaction (Marsh & Young, 2006). Interactive musical play between parents and young children can have a positive effect on the quality of parent-child communications and understanding (Welch, 2006b). Outside the home, music infuses the interactions between young children and their peers. They share musical play ideas, synchronize rhythmic movements with each other, and imitate each other's melodic ideas (Marsh & Young, 2006). As a natural component of early interactions,

bonding, and social experiences, music can be an effective mechanism to facilitate therapeutic change in preschool children.

Neural Support

There is emerging, although inconclusive, neurological support for using music as an intervention mechanism that centers on the role of the right hemisphere in music processing, attachment, and stress. Infants show a right hemisphere advantage for music processing (Trehub, 2003) and it is the right hemisphere that seems specialized for processing musically induced emotions (Peretz, 2010). In addition, the prosodic elements of speech processing—the patterns of stress and intonation that are sometimes referred to as the "music" of speech—may be processed more in the right hemisphere than in the left (Welch, 2006b). Outside of music and speech processing, some researchers hypothesize that the right hemisphere is implicated in an organism's ability to cope with stress (Schore & Schore, 2008). Furthermore, caregiver-infant interactions are implicated in the appropriate development of the prefrontal cortex, particularly in the right hemisphere (Calkins & Hill, 2007). Finally, although this does not address ER from a developmental perspective, music activates neural networks implicated in ER processing (Sena Moore, 2013). This means that, although a specific brain-based connection has not yet been made, evidence exists for a connection between music processing, attachment, stress management, ER, and child development. Such correlations provide support for pursuing a line of inquiry that explores how music can be used to facilitate ER development.

Theoretical Strategy: Musical Contour Regulation Facilitation (MCRF)

Music can perhaps be used as a mechanism to provide in-the-moment interactive opportunities for the management and regulation of "stress" (e.g. emotionally arousing

experiences) in the context of a healthy adult-child relationship. Behavioral and neural evidence supports using music as a mechanism due to music's natural role in infant and early childhood interactions (Cross, 2003; Lamont, 2008; Marsh & Young, 2006; McDonald & Simons, 2989; Trainor & Schmidt, 2003; Trehub, 2003; Welch, 2006b), caregiver-infant bonding (Cross, 2003; Marsh & Young, 2006), and developmental appropriateness (Lamont, 2008; Marsh & Young, 2006; McDonald & Simons, 1989; Trehub, 2003, 2006). Building on this support, the Musical Contour Regulation Facilitation (MCRF) intervention was designed with the intention that the contour and temporal structure of a music therapy session alternate between high-arousal and low-arousal states in a way that theoretically mirrors the changing flow of the caregiver-infant interaction. In essence, this method does not seek to induce or elicit specific emotions, but to use the music stimulus to manipulate the arousal levels in preschool-aged children, exposing them to an alternation of stimulating and calming experiences. This strategy builds on the works of Berlyne (1971), Meyer (1956), and others (Juslin & Sloboda, 2010) as it is intended to manipulate one property of the emotion process, the physiologic aspect (Juslin & Sloboda, 2010; Koole, 2009; Zelazo & Cunningham, 2007), through high and low arousal music-based experiences.

Although the MCRF intervention is novel, there are mechanisms underlying more well-studied approaches, such as exposure therapy and Eye Movement Desensitization and Reprocessing (EMDR), that theoretically transfer to understanding how a session contour approach that allows for opportunities to practice managing arousal levels might work. Exposure therapy is a behavior therapy technique that utilizes a set of procedures designed to block avoidance and diminish anxiety associated with a feared stimulus (De Raedt, 2006). Exposure therapy is used in the treatment of Post-Traumatic Stress Disorder (PTSD) (Jaycox,

Foa, & Morral, 1998), anxiety disorders such as phobias (De Raedt, 2006), and emotional disorders (Lang, Craske, and Bjork, 1999). One of the mechanisms thought to underlie the effectiveness of exposure therapy is habituation, the concept that repeated exposure to a feared, high arousal-inducing stimulus or experience may help an individual get used to the emotions and feelings associated with that stimulus or experience (De Raedt, 2006; Jaycox et al., 1998). In essence, the individual is habituating to, or learning, that those feelings and sensations can be managed. If the MCRF intervention shows promise of being successful, then perhaps its effectiveness is at least partially due to exposing participants to high and low arousal experiences, thus allowing them opportunities to habituate to and learn that high arousal feelings associated with dysregulatory states can be managed.

A similar transfer can be made with Eye Movement Desensitization Reprocessing (EMDR), an extension of exposure therapy that involves a client focusing on a target memory while engaging in simultaneous bilateral stimulation (e.g. alternating back-and-forth eye movements), then moving through a series of therapeutic prompts designed to elicit other aspects of the target memory, thus changing the memory to be more adaptive (Propper & Christman, 2008). EMDR is commonly used to treat symptoms of stress and, in more severe cases, Post-Traumatic Stress Disorder (PTSD) in both adults (Nowill, 2010; Propper & Christman, 2008) and children (Beer & Bronner, 2010; Tufnell, 2005). What is unique about EMDR is that it incorporates dual stimulation, which is thought to increase the amount and quality of interactions between the right and left hemisphere (Propper & Christman, 2008) and facilitate integration of information at the neural level (Nowill, 2009). Some researchers suggest that an increase in interhemispheric interaction via the corpus callosum may enhance memory processing and neutralize mood states (i.e., decreasing the intensity of the emotional

experience) (Propper & Christman, 2008), although this has yet to be corroborated.

Again, transfers can be made that might explain why the MCRF intervention could theoretically be effective as a method for addressing in-the-moment practice of managing high arousal experiences. For example, music training has been shown to enlarge the corpus callosum (Schlaug, 2009), even in children (Hodges, 2006). In theory, then, engaging in therapeutic music experiences may increase interhemispheric interactions in the same way as eye movements do as utilized in EMDR (Propper & Christman, 2008), thus allowing for the neutralization of mood states and at least partially explaining the mechanisms underlying the potential effectiveness of the MCRF intervention plan.

Conceptual Framework

A therapeutic mechanism like MCRF does not facilitate change in isolation. There are a myriad of potential variables and complex interactions between variables that may influence therapeutic change. Creating a conceptual framework for a particular research problem allows the investigator to illustrate, organize, and make sense of the phenomenon being explored. A conceptual framework can be broadly defined as a set of theory-based assumptions and broad ideas taken from the literature that help structure research through identifying potential variables and the relationships between variables (Camp, 2001; Smyth, 2004). It allows the investigator to not only understand the research situation, but also to reflect on the research and make meaning of the findings (Smyth, 2004). In music therapy research, a clinical framework allows the investigator to identify and measure these potential variables, thus allowing a more comprehensive understanding of the therapeutic treatment and facilitating the translation of music therapy research to clinical practice (Robb, 2012). The conceptual framework for this study is outlined in Figure 2. It identifies potential

covariates, mediators, moderators, and expected outcomes that relate to the research problem of increasing emotion regulation abilities in typically developing preschoolers by providing opportunities to practice managing high and low arousal experiences.

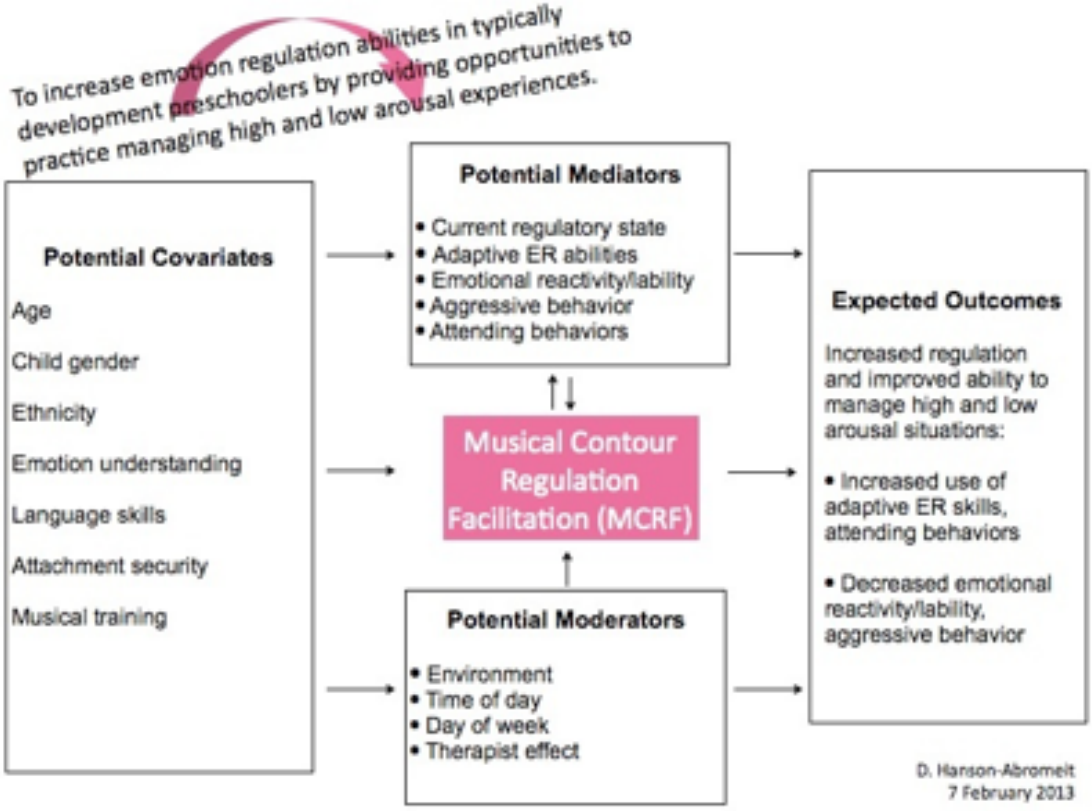


Figure 2. Conceptual framework for exploring the feasibility of utilizing the Musical Contour Regulation Facilitation (MCRF) intervention to improve emotion regulation abilities in typically developing preschoolers.

Potential covariates. Covariates are pre-existing factors (Robb, 2012) that participants bring to the study that may influence or help study outcomes and provide context to a research finding. The potential covariates identified in this study are based on factors identified in the literature that inform ER development in preschoolers. They include age and gender, which influence the type of stress response a child utilizes (Perry et al., 1995), language skills, which facilitates a preschool-aged child's ability to understand, convey, manage, and reflect on emotions (Gross & Thompson, 2007; Thompson & Meyer, 2007), and emotion understanding, which influences a child's ability to analyze emotional situations (Cole et al., 2008; Stegge & Terwogt, 2007). A child's ethnicity influences his or her understanding and use of culturally defined emotion display rules (Zeman et al., 2006) and supports the social construction of ER skills (Thompson & Meyer, 2007). A preschooler's sense of attachment security influences the type of ER strategy utilized, the development of physiological response systems (Calkins & Hill, 2007; Schore, 2001), and negative reactivity (Sherman et al., 2013). Due to the effect music training has on child neurodevelopment (Rauschecker, 2003; Schlaug, 2009), it is theoretically possible that any musical training a preschool-aged child has had may influence the effect of a music-based intervention approach. Therefore, music training and experiences are also considered covariates. These seven potential covariates (age, gender, ethnicity, emotion understanding, language skills, attachment security, and musical training) were measured and results used to help explain or provide context for the research findings.

Potential mediators. A mediator is a third variable that helps explain how and why an intervention produces an effect. It is a change that occurs during the intervention process and helps explain part or all of the effect the intervention had on the outcomes (4researchers.org,

2013; Baron & Kenny, 1986). The intervention method itself is designed to target potential mediators (Robb, 2012). The potential mediators identified in this study were the behaviors measured and targeted by the MCRF intervention. Two of the potential mediators, participant current regulatory state and adaptive ER abilities, were included as they directly relate to two elements identified in the research problem: the ability to manage high and low arousal experiences and increasing ER abilities, respectively. The other three mediators (emotional reactivity, aggressive behaviors, and attending behaviors) are indicative of a child's hyperarousal or dissociative stress response system. Children who have a hyperarousal response pattern may exhibit externalizing behaviors such as inattention, impulsivity, anxiety (Mullin & Hinshaw, 2007; Perry & Pollard, 1998), aggression, and emotional reactivity (Mullin & Hinshaw, 2007). Children who have a dissociative stress response patterns may exhibit behavioral responses characterized by poor attention regulation (Eisenberg et al., 2007) and maladaptive self-soothing behaviors such as rocking or "cutting" (Perry & Pollard, 1998). These five potential mediators (current regulatory state, adaptive ER skills, emotional reactivity/lability, aggressive behaviors, and attending behaviors) were measured as indicators of the effectiveness of the MCRF intervention and to help explain or provide context for the research findings.

Potential moderators. A moderator is also a third variable that influences the effect of the intervention and helps explain under what conditions an intervention produces change (4researchers.org, 2013). Stated another way, a moderator works by influencing or changing the strength of the relationship between two variables, such as between a study intervention and the outcome (Baron & Kenny, 1986). Most potential moderators identified in this study were not tied specifically to the research problem, but are variables that commonly influence

clinical interventions and outcomes. They include the environment or setting, therapist effect, and day and time of day. These three potential moderators were monitored and assessed to help explain or provide context for the research findings.

Expected outcomes. The expected outcomes serve as the hypothesis for the study. They identify the change expected in the research problem as a result of the intervention and as measured by the change in potential mediators. In this study, it was expected that participants would demonstrate increased regulation and improved abilities to manage high and low arousal situations as indicated by increased use of adaptive ER skills, increases in attending behaviors, as well as decreases in emotional reactivity and aggressive behaviors.

Therapeutic Function of Music for MCRF

The therapeutic mechanism under investigation is the Musical Contour Regulation Facilitation (MCRF) intervention, which is designed to use the contour and temporal structure of a music therapy session to manipulate the arousal levels of participants. In essence, the intent is to mirror the changing flow of the caregiver-infant interaction through the alternation of high arousal and low arousal music therapy experiences. An important aspect of an effective music-based intervention is to determine how to structure the music stimulus intentionally for this task. One method to develop effective music-based intervention strategies is to outline the Therapeutic Function of Music (TFM) for the MCRF intervention. Hanson-Abromeit (2013) defines the TFM as "the direct relationship between the treatment goal and the explicit characteristics of the musical elements, informed by a theoretical framework and/or philosophical paradigm in the context of a client" (p. 130). In other words, it allows the clinician to have an explicit understanding of why and how music affects a desired change, thus informing the intentional, therapeutic use of music in clinical

practice. For the purposes of this paper, the goal in outlining the TFM is to help determine how to structure the music stimulus so that it is developmentally appropriate for typically developing preschoolers living in a Western culture and has either an arousing ("high arousal") or a calming ("low arousal") effect. This analysis was based on a review of literature pertaining to Western music. The results and synthesis are detailed in Table 1.

Developmentally appropriate music. A developmentally appropriate music stimulus should be predictable and structured, incorporating rhythmic and melodic repetition and simple consonant harmonies. Melodies should have an easy-to-follow contour characterized by descending intervals and step-wise movements. Pitches and pitch intervals should help create "singable melodies" by falling within an octave pitch range and include skips with small-integer ratio intervals (e.g. octaves, perfect fifths, perfect fourths). The music should mostly incorporate binary rhythms, should have a simple form, and should be primarily diatonic. Stylistically appropriate music should sound like popular music, be chant-like and repetitive, or be solitary and free flowing. Preschool children can be expected to synchronize to a beat, control and alter basic rhythmic patterns, and produce and discriminate loud and soft sounds. Most will have an imprecise sense of pitch, but will posses a developing ability to sing in tune. Preschool children should be able to synchronize their motor movements to a musical beat, detect tempo changes, and synchronize to those tempo changes. Furthermore, they should be able to discriminate various musical styles, timbres, and textural changes. If incorporating valence into the music-based experience (e.g. a musically induced positive or negative emotions), major modes can be used to reflect positive emotions and minor modes negative ones. Preschoolers can be expected to focus on words, thus lyrics can provide a verbal prompt to use an explicit ER strategy or explore the effectiveness of an ER strategy.

Table 1

Therapeutic Functions of Music Worksheet

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
Melody	Music Theory • Melodic contour/direction has little effect on emotional expression (Gabrielsson & Lindström, 2010). • Melodic structure can be used to create expectation (Stevens & Byron, 2009). Music Development • Children possess concepts and control of melodic contour (Costa-Giomi, 2003; McDonald & Simons, 1989; Morrongiello & Roes, 1990; Schwarzer, 1997; Welch, 2006a). • Songs should contain melodic repetition (McDonald & Simons, 1989) • Children able to imitate simple melodic ideas (Marsh & Young, 2006). • Songs containing descending intervals and few wide skips are easier to sing (McDonald & Simons, 1989). • Attention is focused on melody (Costa-Giomi, 2003). • Children can detect mis-tunings in tonal melodies but fail to notice contour-preserving changes as different (Lamont, 2009). • Spontaneous singing often includes altered melodic transformations of snatches of known songs (Marsh & Young, 2006). • It is challenging to verbally discriminate melodic direction (Costa-Giomi & Descombes, 1996). • The best "next note" in a melody is one close in pitch (Lamont, 2009). • Musically trained children perform better that untrained at discriminating features of unfamiliar melody (Morrongiello, Roes, & Donnelly, 1989).	• To provide developmentally appropriate structure to the music experience. • To create expectation through the use of the melodic structure as to initiate a prompt for a lyric-based instruction (e.g. identify an explicit ER strategy) or behavioral expectation (e.g. waiting for a response). • To create expectation through the use of melodic structure that allows an opportunity to practice inhibitory control.	General Description • Developmentally appropriate melodies should incorporate melodic repetition and an easy-to-follow contour characterized by descending intervals and step-wise movement. High Arousal • Use unexpected melodic elements to elicit attention, such as ascending intervals, wide skips, an intentional mis-tuning, or a pause before a cadential moment. • Use a pause in the melody to create a sense of expectation. Low Arousal • Maintain familiar developmentally appropriate characteristics.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
Pitch	Music Theory • Lower-than-normal pitches are associated with sadness and aggression (Huron, 2013). • High arousal is associated with rising and/or sharp micro-intonations and harmonic "noise"; low arousal with flat micro-intonations (Juslin & Timmers, 2010). Music Development • Younger children focus on concrete melodic elements such as pitch (Costa-Giomi, 2003). • There are variations in reported preschooler pitch ranges, but easiest range may be one octave between a and a' (McDonald & Simons, 1989). • The ability to pitch accurately develops between ages 4 and 6 (Leighton & Lamont, 2006). • Young children are able to maintain scale steps within melodic phrases (Krumhansl & Keil, 1982; Morrongiello & Roes, 1990). • Children are able to discriminate semitone increments (Trehub, Cohen, Thorpe, & Morrongiello, 1986) though it is a challenge to verbally discriminate pitch. However, 3-year-olds are able to nonverbally express an understanding of pitch-related elements (Costa-Giomi & Descombes, 1996). • Preschoolers detect interval changes more easily in the context of small-integer ratios (e.g. octave 2:1, perfect fifth 3:2, perfect fourth 4:3) (Trehub, 2003).	• To use pitch changes to reflect desired arousal level and/or modulation between arousal levels.	General Description • Incorporate pitches and pitch intervals that help to create singable melodies: an octave pitch range from a to a'; skips with small-integer ratio intervals such as the octave, perfect fifth, perfect fourth. • Expect a developing ability to sing in tune accurately. High Arousal • Incorporate rising pitches, instruments that produce extraneous harmonic "noise," and sharp changes in pitch tunings • Incorporate sudden and unexpected changes in pitch characteristics. Low Arousal • Use lower-than-normal pitches and no changes in pitch tuning.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
(Pitch continued)	• The perception of melodic interval is facilitated by musical training (Morrongiello & Roes, 1990; Morrongiello et al., 1989; Tsang, Friendly, & Trainor, 2011). • Pitch is strongly correlated with happiness (Yrtti, 2011). Consonant intervals are associated with positive emotions, dissonant with negative emotions (Trainor & Schmidt, 2003). • Children as young as 4 manipulate the pitch of familiar songs when asked to present them in happy or sad way (Schubert & McPherson, 2006).		
Rhythm	<u>Music Theory</u> • High arousal is associated with no ritardando, sharp duration contrasts, accents on unstable notes and low arousal with inclusion of a final ritardano, accents on stable notes, and soft duration contrasts (Juslin & Timmers, 2010). • Rhythmic structure can be used to create expectation (Stevens & Byron, 2009). <u>Music Development</u> • Songs should contain rhythmic repetition (McDonald & Simons, 1989). <u>High Arousal</u> • Rhythmic characteristics can include no ritardando, accents on unstable notes, or sudden and sharp rhythmic changes. • Use more complex ternary rhythmic patterns. • Use a pause in rhythmic pattern to create a sense of expectation.	• To provide developmentally appropriate structure to the musical experience. • To create an expectation through use of rhythmic structure as to facilitate a prompt for a lyric-based instruction (e.g. identify an explicit ER strategy) or behavioral expectation (e.g. waiting for a response). • To create an expectation through use of rhythmic structure that provides an opportunity to practice inhibitory control. • To facilitate motor-based ER strategies.	<u>General Description</u> • Developmentally appropriate rhythmic structure should incorporate rhythmic repetition and utilize mostly binary rhythms. • Expect the ability to synchronize to a beat and to control and alter basic rhythmic patterns <u>High Arousal</u> • Rhythmic characteristics can include no ritardando, accents on unstable notes, or sudden and sharp rhythmic changes. • Use more complex ternary rhythmic patterns. • Use a pause in rhythmic pattern to create a sense of expectation.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
(Rhythm continued)	Music and Motor Processing • Auditory-motor coactivation is present in infants (Trainor & Zatorre, 2009). • Rhythm perception may involve interactions between auditory and cortical motor areas (e.g. motor cortex, supplemental motor area, and premotor cortex) (Trainor & Zatorre, 2009) and activation of bilateral, widely-distributed temporo-parietal areas (Stewart, von Kriegstein, Dalla Bella, Warren, & Griffiths, 2009). Metric rhythms may engage the frontal lobe and cerebellum (Peretz & Zatorre, 2005). • Cortical motor areas are implicated in rhythm perception and production. The cerebellum and basal ganglia are implicated in controlling motor and perceptual timing (Peretz & Zatorre, 2005).		Low Arousal • Rhythmic characteristics can include ritardando at end of song, accents on stable notes, and little rhythmic change • Maintain familiar developmentally appropriate musical characteristics.
Dynamics	Music Theory • Loud music is associated with high arousal and soft music with low arousal (Gabrielsson & Lindström, 2010). • Dynamics influence valence, e.g. sadness is soft and aggression is loud (Huron, 2013). Depending on valence, high arousal can be associated with loud (happiness/ anger) or soft (fear) volumes and little (happiness) or large (fear) loudness variability. Low arousal is associated with softness and small sound level variability (Juslin & Timmers, 2010). Music Development • Young children are able to discriminate loud and soft sounds (McDonald & Simons, 1989). • Young children focus on melody unspecific features such as loudness (Lamont, 2009). • Young children manipulate dynamics when asked to sing familiar song in happy or sad way (Schubert & McPherson, 2006).	• To use loudness level changes to reflect the desired arousal level and/or modulate between arousal levels. • To use loudness level changes to create an expectation that provides an opportunity to practice inhibitory control. • To use loudness level to reflect desired valence or emotional tone.	General Description • Expect an ability to produce and discriminate loud and soft sounds. High Arousal • Depending on the intended emotion, incorporate loud sounds (happiness/anger), soft sounds (fear), little loudness variability (happiness) or large loudness variability (fear). Low Arousal • Incorporate soft loudness levels and small loudness variability.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
Harmony	Music Theory • Modes are commonly associated with valence differences, major modes with a positive valence and minor modes with a negative valence (Gabrielsson & Lindström, 2010). • Tonal and harmonic structures can be used to create expectation (Stevens & Byron, 2009). Music Development • Children have a limited understanding of harmony and tonal hierarchy (Trehub, 2006) and an imprecise sense of tonality (McDonald & Simons, 1989). • The gradual development of sensitivity to key membership and harmony begins to develop around age 5 (Costa-Giomi, 2003; Dalla Bella, Peretz, Rousseau, & Gosselin, 2001; Trehub, 2009; Tsang et al., 2011) without conscious awareness (Krumhansl & Keil, 1982). • Sensitivity to mode is established by age 6 and remains unchanged across the lifespan (Dalla Bella et al., 2001). • The acquisition of tonal hierarchy develops in an orderly fashion, starting with the discrimination of scale and nonscale tones (Krumhansl & Keil, 1982). • Young children might shift keys between phrases (Krumhansl & Keil, 1982; Morrongiello & Roes, 1990) but they begin a developmental shift towards being able to maintain key across phrases (Krumhansl & Keil, 1982; Morrongiello & Roes, 1990; Tsang et al., 2011). • Young children have a predisposition to consonance, but more sensory consonance rather than culture-based harmonic consonance (Costa-Giomi, 2003). • Children show a preference for diatonic versus nondiatonic tones (Morrongiello & Roes, 1990; Trehub et al., 1986). • Sensitivity to harmony is enhanced by music training (Morrongiello & Roes, 1990).	• To provide developmentally appropriate structure to the musical experience. • Incorporate major and minor modes to reflect simple positive/ negative valence associations. • To use simple dissonant and consonant harmonic progressions as to create an expectation that provides an opportunity to practice inhibitory control. • To create an expectation through use of simple harmonic structure that facilitates a prompt for a lyric-based instruction (e.g. identify an explicit ER strategy) or a behavioral expectation (e.g. waiting for a response).	General Description • Developmentally appropriate music will be primarily diatonic and characterized by a simple harmonic structures and use of consonance. • Expect an imprecise sense of tonality. • If incorporating valence, use major modes to reflect positive emotions and minor modes to reflect negative emotions. High Arousal • Use harmonic dissonance to create a sense of expectation. Low Arousal • Maintain familiar developmentally appropriate musical characteristics.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
(Harmony continued)	• Younger children are unable to distinguish happy and sad music that contrasts by mode (Dalla Bella et al., 2001; Lamont, 2009; Schubert & McPherson, 2006).		
Form	Music Theory • Not referenced in literature Music Development • Children exhibit a developmental shift from incorporating some repetition and ostinato to commonly using rhythmic and melodic repetition (McDonald & Simons, 1989). • Children able to group music into segments by pitch, intensity, tone duration, and pause duration (Drake & Bertrand, 2003).	• To create expectation through the use of phrasings to support a prompt for a lyric-based instruction (e.g. identify an explicit ER strategy) or a behavioral expectation (e.g. waiting for a response). • To provide developmentally appropriate structure to the musical experience. • To create an expectation through use of phrasings that provides an opportunity to practice inhibitory control.	General Description • Developmentally appropriate music characterized by simple structure that includes rhythmic and melodic repetition. High Arousal • Use pauses in phrasing to create a sense of expectation. Low Arousal • Maintain familiar developmentally appropriate musical characteristics.
Tempo	Music Theory • Slow tempos are consistently association with low activation and fast tempos with high activation (Gabrielsson & Lindström, 2010; Juslin & Timmers, 2010) • Depending on valence, small tempo variations are associated with happiness or anger and large variations with fear (Juslin & Timmers, 2010). • Tempo is implicated in the recognition of emotional tone (Peretz & Zatorre, 2005).	• To use tempo changes to reflect the desired arousal level and/or modulate between arousal levels. • To incorporate fast and slow tempos to reflect simple positive and negative valence associations. • To provide a temporal structure that facilitates motor-based ER strategies.	General Description • Expect the ability to synchronize motor movements to tempo. • Expect the ability to detect tempo changes and synchronize to them.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
(Tempo continued)	Music Development • Children able to detect small tempo changes (Drake & Bertrand, 2003) and are responsive to tempo (Marsh & Young, 2006). • Young children focus on melody unspecific features such as tempo (Lamont, 2009). • Accuracy of synchronized tapping with tempo changes increases with age (Drake et al., 2000). • Exhibit a developmental shift from being unable to distinguish happy and sad music that contrasts by tempo to being able to do so (Dalla Bella et al., 2001; Lamont, 2009). • Children show evidence of an ability to manipulate the tempo of familiar songs when asked to present them in a happy or sad way (Schubert & McPherson, 2006). • Children use faster tempos when singing in an angry (Yrtti, 2011) or happy way (Mote, 2011; Yrtti, 2011) and they use tempo as a cue in identifying musical emotions (Mote, 2011).		High Arousal • Use fast tempos. • Depending on valence, use small tempo variations (happiness/anger) or large tempo variations (fear). Low Arousal • Use slow tempos.
Timbre	Music Theory • Tones with higher harmonics are associated with high activation and tones with lower harmonies are associated with low activation (Gabrielsson & Lindström, 2010). • High activity is associated with bright or sharp timbres, rising/sharp micro-intonations, and fast/shallow/regular vibrato. Low activity is associated with soft or dull timbres, flat micro-intonations, and slow vibrato (Juslin & Timmers, 2010).	• To use timbral qualities to reflect the desired arousal level and/or modulate between arousal levels. • To incorporate timbral changes to facilitate attention-based ER strategies.	General Description • Expect a developing ability to discriminate timbres. High Arousal • Use bright/sharp timbres, rising/sharp microintonations, and fast/ shallow/regular vibrato. • Incorporate novel timbres or unexpected timbral changes to elicit attention.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
(Timbre continued)	Music Development • Children are able to discriminate and identify timbres (Lamont, 2009; McDonald & Simons, 1989), though less successfully on difficult comparisons (Lamont, 2009). • Children exhibit a rapid development of timbral sensitivity (Lamont, 2009). • Young children focus on melody unspecific features such as timbre (Lamont, 2009).	• To use timbral qualities to reflect the desired arousal level and/or modulate between arousal levels. • To incorporate timbral changes to facilitate attention-based ER strategies.	Low Arousal • Use familiar timbres, soft/ dull timbres, and slow vibrato.
Style	Music Theory • High activity is associated with staccato articulations (Gabrielsson & Lindström, 2010; Juslin & Timmers, 2010), sharp amplitude envelopes (Gabrielsson & Lindström, 2010), large articulation variability, and fast or abrupt tone attacks (Juslin & Timmers, 2010). Low activity is associated with legato articulations (Gabrielsson & Lindström, 2010; Juslin & Timmers, 2010), round amplitude envelopes, which are also associated with sadness or softness (Gabrielsson & Lindström, 2010), small articulation variability, and slow tone attacks (Juslin & Timmers, 2010). Music Development • Children incorporate two broad singing styles, a communicative, chant-like, repetitive style often produced in group activity and a solitary, free-flowing style used primarily in solo and introspective singing (Marsh & Young, 2006). • Children are highly accurate at discriminating musical style, especially for popular music (Marshall & Hargreaves, 2007). • Children tend to prefer popular music (Miyamoto, 2007).	• To use articulation style to reflect the desired arousal level and/or modulate between arousal levels. • To use developmentally appropriate musical style to reflect the desired arousal level and/or modulate between arousal levels.	General Description • Developmentally appropriate music can sound like popular music, can be chant-like and repetitive, or can be solitary and free-flowing. • Expect an ability to discriminate styles. High Arousal • Use staccato articulations, fast/abrupt attacks, and articulation variability. • Incorporate sudden and unexpected changes to the musical style. Low Arousal • Use legato articulations, slow attacks, small articulation variability. • Use familiar-sounding, developmentally appropriate musical styles.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
Lyrics	Music Theory • Not applicable Music Development • Children pay more attention to the words rather than the melody when the cognitive load of a task is high (Tsang et al., 2011). Music and Speech Processing • There are shared processing areas between those that underlie speech and language function and music perception and production, namely Broca's area, Wernicke's area, and primary auditory cortex (Devous et al., 2006; Patel, 2009; Peretz & Zatorre, 2005; Stewart et al., 2009; Trainor & Zatorre, 2009).	• To use lyrics to verbally reflect the intended arousal level. • To use lyrics to verbally prompt the use of explicit ER strategies (attention-based, motor-based, or social assistance-based). • To use lyrics to verbally prompt a exploration of the effectiveness of an ER strategy.	General Description • Expect preschoolers to attend to the words. • Use lyrics to verbally prompt the use of explicit ER strategy and/or an exploration of the effectiveness of an ER strategy. High Arousal • The choice of words in lyrics should reflect high arousal level. Low Arousal • The choice of words in lyrics should reflect low arousal level.
Texture	Music Theory • Not referenced in literature Music Development • Children are able to recognize texture associated with accompanied versus unaccompanied melodies (McDonald & Simons, 1989).	• To incorporate textural changes to facilitate attention-based ER strategies.	General Description • Expect a developing ability to discriminate textural changes. High Arousal • Incorporate novel textures or unexpected textural changes to elicit attention. • Use more complex textures, such as an accompanied melody or multiple instruments.

table continued

Musical Element	Theoretical Framework	Purpose of Musical Element	Description of Musical Element
(Texture continued)			Low Arousal • Use simpler textures, such as an unaccompanied melody.

Objective synthesis of the music:

General Description
A developmentally appropriate music stimulus should be predictable and structured, incorporating rhythmic and melodic repetition and simple consonant harmonies. Melodies should have an easy-to-follow contour characterized by descending intervals and step-wise movements. Pitches and pitch intervals should help create "singable melodies" by falling within an octave pitch range and include skips with small-integer ratio intervals (e.g. octaves, perfect fifths, perfect fourths). The music should mostly incorporate binary rhythms, should have a simple form, and should be primarily diatonic. Stylistically appropriate music should sound like popular music, be chant-like and repetitive, or be solitary and free-flowing.

Preschool children can be expected to synchronize to a beat, control and alter basic rhythmic patterns, and produce and discriminate loud and soft sounds. Most will have an imprecise sense of pitch, but will posses a developing ability to sing in tune. Preschool children should be able to synchronize their motor movements to a musical beat, detect tempo changes, and synchronize to those tempo changes. Furthermore, they should be able to discriminate various musical styles, timbres, and textural changes.

If incorporating valence into the music-based experience (e.g. a musically induced positive or negative emotion), major modes can be used to reflect positive emotions and minor modes negative ones. Preschoolers can be expected to focus on words, thus lyrics provide a verbal prompt to use an explicit ER strategy or explore the effectiveness of an ER strategy.

High Arousal
Highly arousing music avoids ritardandos and accents on unstable notes. For preschool children, it may include complex ternary rhythmic patterns. High arousal music can also have rising pitches and use instruments that produce extraneous harmonic "noise." It typically will be in a fast tempo with bright or sharp timbres, rising or sharp micro-intonations, fast or shallow vibrato, staccato articulations, quick and abrupt attacks, complex musical textures, or with variable articulation styles. Lyrics can be created to reflect the intended arousal level.

To manipulate a music stimulus to make it more arousing, sudden and unexpected musical events or novel musical elements can be incorporated. These can be melodic (e.g. ascending intervals, wide skips, and intentional mis-tunings), pitch-related (e.g. sharp change in pitch tuning), timbral (e.g. novel timbres or unexpected timbral changes), stylistic (e.g. sudden change in musical style), rhythmic (e.g. sudden or sharp rhythmic changes), or textural (e.g. novel texture or unexpected textural changes).

table continued

If incorporating valence into the music experience, happy-sounding music can be loud, have small tempo variations, and variability in loudness levels. Angry music can be loud and have small tempo variations. Fearful-sounding music can be soft and have substantial variability in terms of volume or tempo.

Low Arousal

Structuring music to create a calming, low arousal effect may be as simple as incorporating the familiar developmentally appropriate musical characteristics previously outlined. Other music characteristics that may be considered low arousal for preschoolers includes music in a lower-than-normal range, no changes in pitch tuning, soft loudness levels, narrow loudness variability, familiar, soft, or dull timbres, slow tempos, legato articulations, slow attacks, simpler textures, slow vibrato, and limited articulation variability. Rhythmic characteristics of low arousal music include incorporating a ritardando at the end of a song, placing accents on stable notes, and avoiding rhythmic change. Additionally, lyrics can be created to reflect the intended arousal level.

This synthesis outlining characteristics of developmentally appropriate music is based on the following literature: Costa-Giomi, 2003; Costa-Gioi & Descombes, 1996; Dalla Bella, Peretz, Rousseau, & Gosselin, 2001; Devous et al., 2006; Drake & Bertrand, 2003; Drake & Gérard, 1989; Drake, Riess Jones & Baruch, 2000; Gabrielsson & Lindström, 2010; Krumhansl & Keil, 1982; Lamont, 2009; Leighton & Lamont, 2006; Marsh & Young, 2006; Marshall & Hargreaves, 2007; McDonald & Simons, 1989; Miyamoto, 2007; Morrongiello & Roes, 1990; Morrongiello, Roes, & Donnelly, 1989; Patel, 2009; Peretz & Zatorre, 2005; Schubert & McPherson, 2006; Schwarzer, 1997; Stewart, von Kriegstein, Dalla Bella, Warren, & Griffiths, 2009; Trainor & Schmidt, 2003; Trainor & Zatorre, 2009; Trehub, 2003; Trehub, 2006; Trehub, 2009; Trehub, Cohen, Thorpe, & Morrongiello, 1986; Tsang, Friendly & Trainor, 2011; Welch, 2006a.

High arousal music. A variety of characteristics surround highly arousing music and a music stimulus can be manipulated in various ways to make it more arousing. Highly arousing music avoids ritardandos and accents on unstable notes. For preschool children, it may include complex ternary rhythmic patterns. High arousal music can also have rising pitches and will typically be in a fast tempo with bright or sharp timbres, rising or sharp micro-intonations, fast or shallow vibrato, staccato articulations, quick and abrupt attacks, complex musical textures, or have variable articulation styles. Lyrics can be created to reflect the intended arousal level.

To manipulate a music stimulus to make it more arousing, sudden and unexpected musical events or novel musical elements can be incorporated. These can be melodic (e.g. ascending intervals, wide skips, intentional mis-tunings), pitch-related (e.g. sharp change in pitch tuning), timbral (e.g. novel timbres or unexpected timbral changes), stylistic (e.g.

sudden change in musical style), rhythmic (e.g. sudden or sharp rhythmic changes), or textural (e.g. novel texture or unexpected textural changes). If incorporating valence into the music experience, it may be helpful to reference a two-dimensional circumplex model that features the dimensions of valence and activity, or arousal. Within this model, happiness, anger, and fear are considered emotions of high arousal (Juslin & Timmers, 2010). Happy-sounding music can be loud, have small tempo variations, and variability in loudness levels. Angry music can be loud and have small tempo variations. Fearful-sounding music can be soft and have substantial variability in terms of volume or tempo. Finally, creating a sense of expectation is an important element of a music-induced emotional response (Stevens & Byron, 2009) and another mechanism through which arousal can be elicited. Musically, expectation can occur by creating a pause in the melodic or rhythmic pattern or through the use of harmonic dissonance. This synthesis outlining high arousal music is based on the following literature: Costa-Giomi, 2003; Dalla Bella et al., 2001; Devous et al., 2006; Drake & Bertrand, 2003; Gabrielsson & Lindström, 2010; Huron, 2013; Juslin & Timmers, 2010; Lamont, 2009; Morrongiello & Roes, 1990; Mote, 2011; Patel, 2009; Peretz & Zatorre, 2005; Schubert & McPherson, 2006; Stevens & Byron, 2009; Stewart et al., 2009; Trainor & Schmidt, 2003; Trainor & Zatorre, 2009; Trehub et al., 1986; Yrtti, 2011.

Low arousal music. Structuring music to create a calming, low arousal effect may be as simple as incorporating the familiar developmentally appropriate musical characteristics previously outlined. Other music characteristics that may be considered low arousal for preschoolers include incorporating a lower-than-normal pitch range, no changes in pitch tuning, soft loudness levels, narrow loudness variability, familiar, soft, or dull timbres, slow tempos, legato articulations, slow attacks, simpler textures, slow vibrato, and limited

articulation variability. Rhythmic characteristics of low arousal music include incorporating a ritardando at the end of a song, placing accents on stable notes, and avoiding rhythmic change. Additionally, lyrics can be created to reflect the intended arousal level. This synthesis outlining low arousal music is based on the following literature: Devous et al., 2006; Gabrielsson & Lindström, 2010; Huron, 2013; Juslin & Timmers, 2010; Mote, 2011; Patel, 2009; Peretz & Zatorre, 2005; Schubert & McPherson, 2006; Stewart et al., 2009; Trainor & Schmidt, 2003; Trainor & Zatorre, 2009; Yrtti, 2011.

CHAPTER 3

THE EFFECTIVENESS OF MCRF IN FACILITATING EMOTION REGULATION: METHODOLOGY FOR A FEASIBILITY STUDY

Several disorders and mental health problems that emerge in childhood (e.g. Attention-Deficit/Hyperactivity Disorder, Autism Spectrum Disorder, aggression-related behavioral problems, childhood depression) often share a common characteristic: maladaptive emotion regulation (ER) skills due to atypical ER development (Kim & Cicchetti, 2010; Masao, 2004; Mullin & Hinshaw, 2007; Perry & Pollard, 1998; Röll et al, 2012; Stegge & Terwogt, 2007; Thompson & Meyer, 2007; Zeman et al., 2006). Maladaptive ER significantly affects multiple areas in child development, including but not limited to the ability to learn in school, the ability to form and maintain healthy relationships with peers and adults, and the ability to manage and inhibit behavioral responses.

Given the importance of healthy and adaptive ER development, it is important to explore strategies for facilitating its development should an individual be at-risk for the development of maladaptive ER skills. Although options exist (Betty, 2013; Izard et al., 2008; Johnson, 2012; Webster-Stratton & Reid, 2003), there are limitations to them, leading to a need to explore approaches that incorporate a wider range of bottom-up as well as top-down ER strategies, provide in-the-moment opportunities to manage emotionally arousing situations, and afford opportunities for this practice to be realized in the context of an interactive adult-child relationship. A potential approach yet to be explored involves the use of music and therapeutic music-based experiences. As an initial exploration, the present study provides a preliminary examination of the utility of using music as a way to facilitate ER development in typically developing preschool-aged children. More specifically, the

purpose of this study was to explore the feasibility of a Musical Contour Regulation Facilitation (MCRF) method as a way to improve ER abilities in typically developing preschoolers by providing opportunities to practice real-time management of high and low arousal experiences. It examined the following research questions (RQ):

- RQ1: Does the MCRF intervention show promise of being successful as a way to improve emotion regulation abilities in typically developing preschoolers?
- RQ2: To what extent is the MCRF intervention judged as meaningful and helpful by participants and their caregivers?
- RQ3: To what extent can the MCRF intervention be integrated into an existing early childhood daycare setting?

Rationale for Mixed Methods Feasibility Study

A feasibility study is a methodically rigorous process that addresses the general question of whether or not an intervention and measures can work within a particular context. Commonly confused with a pilot study (Shoemark, 2013), a feasibility study is intended to determine whether an intervention or measure is practical, relevant, and sustainable (Bowen et al., 2009; Shoemark, 2013; Tickle-Degnen, 2013). A pilot study, on the other hand, is a smaller version of a main study that is run to see whether components of the methodology work prior to execution on a larger scale (Tickle-Degnen, 2013). The feasibility study is an important first step in a phased research agenda and its findings may help shape an understanding of participant experience and the context and variables that influence the efficacy of an intervention (Shoemark, 2013). This investigation is a feasibility study to conduct limited efficacy testing and explore the acceptability and integration (Bowen et al., 2009) of the MCRF intervention, thus determining whether it warrants further exploration.

This study was conducted using an embedded convergent mixed methods research design, a type of design in which qualitative data are collected within a more traditional pretest-posttest quantitative design ("embedded") and in which qualitative and quantitative data are collected in parallel, analyzed separately, then merged ("convergent") (Creswell & Plano Clark, 2010) (Figure 1). A mixed methods design aligns with the intent of feasibility research in that it allows for the exploration and integration of multiple ways of knowing from several types of evidence (Bradt et al., 2013). In this study, multiple quantitative measures, such as standardized behavioral checklists and Likert-type rating scales, were incorporated to provide a preliminary exploration of the efficacy of the MCRF intervention on ER processes in typically developing preschoolers (RQ1). The qualitative measures, which included interviews, questionnaires, and investigator field notes, explored the acceptability (RQ2) and ease of integration (RQ3) of the MCRF intervention as perceived by parents and teachers, as well as to enhance the understanding of the quantitative limited efficacy results as perceived by the study participants (RQ1). The reason for collecting both quantitative and qualitative data was two-fold: (a) it helped shape an understanding of participant experience and the context and variables that influenced the efficacy of the MCRF intervention plan (Shoemark, 2013), and (b) it allowed for the exploration and integration of multiple ways of knowing from several types of evidence (Bradt et al., 2013).

The qualitative data collection and analyses used in this study incorporated a modified grounded theory approach, which is common in music therapy research (O'Callaghan & Hiscock, 2007). Grounded theory is intended to generate or discover a theory (Amir, 2005; Creswell, 2013); an investigator conceptualizes data, thinks about it, and draws theories from it (O'Callaghan, 2012). Grounded theory involves the systematic application of methods that

allow the investigator to inductively discover themes and theory from collected data (Amir, 2005). Its methods help an investigator understand a phenomenon that might not be well understood (O'Callaghan, 2012), as is the case when conducting feasibility research to explore a new intervention approach (Bowen et al., 2009). Modified grounded theory incorporates the rigorous and systematic data collection and analysis process involved in a grounded theory study, but the aim is not the development of a new theory (Amir, 2005; O'Callaghan & Hiscock, 2007). Although a new theory is not discovered, a modified grounded theory approach still allows the investigator to uncover and generate more information about a phenomenon (Amir, 2005), which is appropriate given the intent of a feasibility study (Bowen et al., 2009). The modified grounded theory portion of this study was primarily used to explore and understand the acceptability (RQ2) and integration (RQ3) (Bowen et al., 2009) of the MCRF intervention, and to provide participant views on its efficacy (RQ1).

The quantitative data collection methods and analyses used in this study were utilized to address the limited efficacy (RQ1) (Bowen et al., 2009) focus of the study. The methods and analyses were appropriate to the measurement instruments used to assess the covariates and mediators identified in the conceptual framework (Figure 2). As is appropriate to a convergent-based mixed methods design, findings from the quantitative and qualitative data were first analyzed separately, then merged during a combined analysis to address the limited efficacy research question (Creswell & Plano Clark, 2010), thus allowing for a more comprehensive understanding of the feasibility of the MCRF intervention.

Participants

Inclusion Criteria

Children eligible for inclusion were those who were typically developing preschoolers. "Typically developing" referred to children who did not have a diagnosed disorder or disability (e.g., mental health disorder, developmental disorder). In order to be included in this study, a child had to regularly attend the daycare at which the study was conducted and the parent must have provided a signed informed consent. Child participants ("children") were between the ages of 3 and 5 years at the time of informed consent, were able to speak English fluently, did not have a diagnosis or disorder, and had not have received any type of music therapy prior to study participation. In addition, parents and teachers participating in the proposed study were able to speak and read in English fluently. Children were excluded if they did not meet all the inclusion criteria or if their parent or teacher did not meet the English fluency criteria.

Recruitment Process

Once IRB approval was obtained from the University of Missouri-Kansas City, the investigator contacted several daycare directors located in the suburbs of a large, metropolitan area in the southeastern United States to request an opportunity to visit the daycare and discuss the possibility of participating in the study. Two directors agreed to meet, following which the investigator sent an email to confirm the meeting. Included in the email was a brief synopsis of the study and attachments of the parent recruitment flyer (Appendix C) and informed consent for review (Appendix D). One daycare director agreed to allow the study to be conducted at her site, following which the teachers from two eligible classrooms serving children aged 3-5 years were informed of the study protocol and teacher involvement. The daycare director, participating classroom teachers, and researchers signed a willingness-to-participate letter and participating teachers signed an informed consent

(Appendix D).

The flow of the recruitment and study participation process is outlined in Figure 3. A recruitment flyer and brief informational letter was sent home to parents or legal guardians ("parents") of children in the two participating classrooms briefly introducing the study, notifying the parents of eligibility for the study, and inviting families to participate (Appendix C). In addition, the investigator scheduled two times to recruit parents in person during the afternoon pick-up. During these in-person recruitment periods, the investigator introduced herself, briefly stated her purpose, and asked if the parent would be interested in more information. If the parent stated "no" then the investigator thanked the parents for their time and consideration (Appendix C). If the parents expressed interest in participating, the investigator recorded their name, child's name, and telephone contact information and gave them a copy of the informed consent (Appendix D). A total of 22 eligible families were recruited through these in-person interactions. Two additional families approached the investigator about study participation following the onsite recruitment process and prior to the start of sessions. Of those, 17 agreed to consider participation in the study and 7 parents declined participation, stating scheduling conflicts (e.g., summer vacations, an out-of-state move).

The investigator confirmed interest in study participation by calling parents (n = 17) to explain the study in more detail (Appendix C). Six parents did not return phone messages left by the investigator. When phone conversations transpired, parents were given an opportunity to state whether they were interested in participating. If the parent stated "no," they would not like their child to participate, then the investigator thanked the parents for their time and consideration. Two parents declined participation due to scheduling conflicts. The

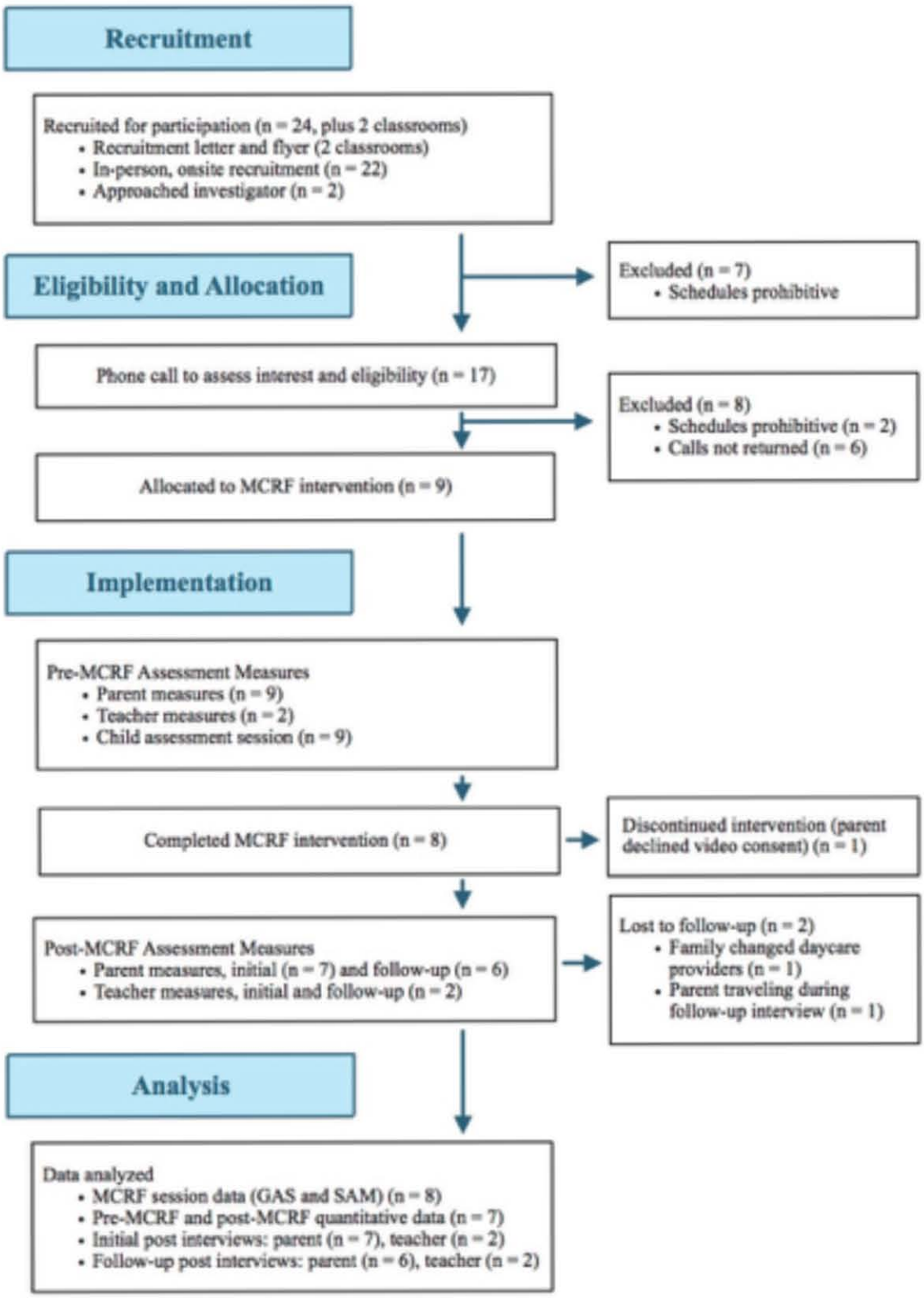


Figure 3. Participant flow chart diagram following Consolidated Standards of Reporting Trials (2015) guidelines.

investigator prepared a packet with another copy of the informed consent document and the parent pre-MCRF assessment measures (Appendix E) for parents who confirmed interest in participating (n = 9); packets were sent home with the child. In addition, the investigator provided the potential child participant's teacher with the teacher pre-MCRF assessment measures (Appendix E). If needed, the investigator followed up with the parent by phone with a reminder to submit the signed informed consent and completed pre-MCRF assessment measures. Upon obtaining informed consent from the parents, child participants (n = 9) were assigned a unique identifying code for data collection and analysis purposes. These codes were used for all rating scales, interviews, questionnaires, checklists, and audio recordings. The investigator was the only individual with access to the participant's identification. One parent declined consent to allow her child to be videotaped following completion of the pre-MCRF measures, MCRF assessment session, and the first MCRF session; this child participant was removed from the study. A total of eight child participants completed the MCRF intervention.

Informed Consent and Child Assent

Due to the age of the participants, child assent to participate was obtained at regular intervals verbally, through the child's participation in MCRF sessions, and through the investigator's continual monitoring of child behaviors throughout study implementation (e.g., assessment session, MCRF implementation, post-MCRF measures) (Appendix D). Child assent was obtained verbally at the beginning of the assessment session to determine assent to participate in the assessment session, then again at the end of the assessment session to determine child assent to continue participating in the study. If a child did not agree to participate in, or did not complete the assessment session, the investigator asked the child if

he or she would like to try again another day. If the child said or indicated "yes," the assessment session was rescheduled. If the child said or indicated "no," then it was determined that the child indicated a desire not to participate and he or she was removed from the study. All child participants initially enrolled in the study (n = 9) indicated assent to participate in the assessment session. Child assent to continue study participation was obtained on a session-by-session basis prior to each MCRF session and through the investigator's continual monitoring of child behaviors that indicated assent. Participating children indicated assent to participate verbally (e.g. stated "yes") or nonverbally (e.g. smiling, nodding "yes") and by following the investigator's directions to transition out of the classroom (e.g. lining up at the door, standing next to the investigator). All child participants who completed the study (n = 8) indicated assent to participate in every MCRF session in which they were available (i.e., they were not absent).

Participant Characteristics

Eight preschool children (seven males and one female) participated in the study. Table 2 provides an overview of participant characteristics. The average age of the children was 3.88 years (*SD* = 0.64) and they were from diverse ethnic backgrounds. All child participants lived in households from a moderate to high socioeconomic level with two married parents. Child participants all had one sibling. One of the children was adopted and the remaining were biological offspring. Participating children had an average of 0.19 years of group music experience (*SD* = 0.35) and 0.13 years of music lessons (*SD* = 0.35). Assessed language skills resulted in an average phrase length of 8.28 words (*SD* = 5.16) and a high percentage of age-appropriate vocabulary words (*M* = 96.03, *SD* = 3.97). Child participants had an average emotion understanding accuracy score of 15.13 out of 16 (*SD* = 1.25).

Table 2

Participant Characteristics and Demographic Information

Test or Measure	Total *M* (*SD*)	Group 1 *M* (*SD*)	Group 2 *M* (*SD*)	Group 3 *M* (*SD*)	*F* or $\chi 2$	*df*	*p*
Number	8	2	3	3	-	-	-
Age	3.88 (0.64)	4.50 (0.71)	3.33 (0.58)	4.00 (0.00)	3.661	2,5	0.105
Gender	7 males 1 female	2 males 0 female	3 males 0 female	2 males 1 female	4.50	1	0.034*
Ethnicity	3 White 2 Asian 2 Black 1 not reported	1 White 0 Asian 1 Black 0 not reported	1 White 2 Asian 0 Black 0 not reported	1 White 0 Asian 1 Black 1 not reported	2.00	1	0.157
Relationship to family	7 biological 1 foster/adopt	2 biological 0 foster/adopt	3 biological 0 foster/adopt	2 biological 1 foster/adopt	4.50	1	0.034*
Birth status	8 full-term	2 full-term	3 full-term	2 full-term, 1 unknown	-	-	-
# of parents	8 dual parent	2 dual parent	3 dual parent	3 dual parent	-	-	-
Parent status	8 married	2 married	3 married	3 married	-	-	-
Number of children in the family	2.00 (0.00)	2.00 (0.00)	2.00 (0.00)	2.00 (0.00)	-	-	-
Family order	5 oldest child 3 youngest child	2 oldest child 0 youngest child	1 oldest child 2 youngest child	2 oldest child 1 youngest child	0.50	1	0.480
Reported income	3 $50,000-$100,000 2 $150,000-250,000 1 over $250,000 1 not reported	0 $50,000-$100,000 0 $150,000-250,000 2 over $250,000 0 not reported	2 $50,000-$100,000 1 $150,000-250,000 0 over $250,000 0 not reported	1 $50,000-$100,000 1 $150,000-250,000 0 over $250,000 1 not reported	0.29	2	0.867
Years of group music	0.19 (0.35)	0.00 (0.00)	0.33 (0.58)	0.17 (0.17)	0.469	2,5	0.651
Years of music lessons	0.13 (0.35)	0.50 (0.71)	0.00 (0.00)	0.00 (0.00)	1.875	2,5	0.247
Average phrase length	8.28 (5.16)	8.90 (4.10)	9.33 (7.57)	6.08 (3.78)	0.190	2,4	0.834
Percentage of vocabulary words	96.03 (3.97)	93.81 (8.30)	95.56 (0.96)	97.99 (2.95)	0.625	2,5	0.572

table continued

Test or Measure	Total *M* (*SD*)	Group 1 *M* (*SD*)	Group 2 *M* (*SD*)	Group 3 *M* (*SD*)	*F* or $\chi 2$	*df*	*p*
Emotion understanding accuracy	15.13 (1.25)	16.00 (0.00)	14.33 (1.53)	15.33 (1.16)	1.207	2,5	0.373
Attachment security type	8 authoritative 0 authoritarian 0 permissive	2 authoritative 0 authoritarian 0 permissive	3 authoritative 0 authoritarian 0 permissive	3 authoritative 0 authoritarian 0 permissive	-	-	-
# of absences	2.00 (1.93)	1.00 (1.41)	3.33 (2.52)	1.33 (1.16)	-	-	-

* $p < .05$

Child participants were randomly assigned to one of three groups prior to the start of the MCRF sessions. A series of tests (one-way ANOVAs with Sidak adjustment and Chi-Square tests, as appropriate) were conducted to test for equivalence between the groups on characteristics and covariate measures in which there were differences between groups. These results are reported in Table 2. The three groups were equivalent with respect to age ($F(2,5) = 3.661$, $p > .05$); years of group music ($F(2,5) = 0.469$, $p > .05$) and music lessons ($F(2,5) = 1.875$, $p > .05$); ethnicity ($\chi2(1) = 2.00$, $p > .05$); family characteristics, including reported household income ($\chi2(2) = 0.29$, $p > .05$) and family order (youngest or oldest) ($\chi2(1) = 0.50$, $p > .05$); as well as with respect to the covariate measures of language skills, including phrase length ($F(2,4) = 0.190$, $p > .05$) and percentage of known vocabulary words ($F(2,5) = 0.625$, $p > .05$); and emotion understanding accuracy ($F(2,5) = 1.207$, $p > .05$). The three groups were not equivalent with respect to gender ($\chi2(1) = 4.50$, $p < .05$) and relationship to family (biological or adopted) ($\chi2(1) = 4.50$, $p < .05$). In both these instances there was one participant who did not demographically match the others (i.e., one girl participant and one adopted participant).

Participant Compensation

To compensate for their time and effort, participating children received a pair of small shakers once all data collection measures were collected. In addition, families that completed all pre- and post-MCRF measures were placed in a lottery to win one of three $25 gift cards to Target. To compensate for their time and effort, the facility received a $25 gift card to Target for each classroom with children participating in the study. Families and schools did not incur charges or other financial obligations for participation in this study. Participant compensation was funded by a University of Missouri-Kansas City (UMKC) Women's

Council Graduate Assistance Fund award and a UMKC Chancellor's Doctoral Fellowship award.

Implementation

Pre-MCRF Assessments

All pre-MCRF assessment measures (parent assessments, teacher assessments, and an assessment session) were conducted and collected in the two weeks prior to the start of the MCRF sessions. Upon obtaining informed consent, parents were provided with and asked to complete the following pre-MCRF assessment measures: the Pre-MCRF Questionnaire—Parent, Child Behavior Checklist (CBCL/1.5-5) with the Language Development Survey (LDS), Emotion Regulation Checklist (ERC), and Parenting Authority Questionnaire—Revised (PAQ-R) (Appendix E). Parents were instructed to deposit the completed forms in a manila envelope provided to them by the investigator and leave the envelope in the preschool classroom in a folder designated for the study. If needed, follow-up phone calls were made to remind parents to complete and submit the assessment forms.

The following pre-MCRF assessment measures were given to the primary teacher ("teacher") of each child for which informed consent was given: the Caregiver-Teacher Report Form (C-TRF), the ERC, and the Pre-MCRF Questionnaire—Teacher (Appendix E). Teachers were instructed to deposit the completed measures in a manila envelope provided to them by the investigator and leave the envelope in the classroom in the folder designated for the study. If needed, the investigator followed-up with the teacher via phone or in person to request that the measures be completed and submitted prior to the start of MCRF sessions.

Finally, the investigator scheduled times for the parent-consented child participants to complete a 1:1 assessment session. These sessions were conducted during the child's

regularly scheduled weekday attendance at a time coordinated with the classroom teacher. They were held in an outdoor patio setting, the same as would be used for the MCRF session (Figure 4). As the investigator served as interventionist for this study, this assessment session provided an opportunity for the investigator to develop rapport with each child, introduce the child to the Self-Assessment Manikin (SAM) assessment tool and the music therapy interventions that incorporated the SAM measure, and administer the puppet play interview.

Assessment session. The assessment session lasted approximately 30 minutes and consisted of two components: (a) administering the puppet play interview to assess emotion understanding (Appendix E), followed by (b) introducing the SAM assessment tool (Appendix E) and associated MCRF applications (Appendix A). Child assent to participate was obtained verbally at the beginning of the assessment session (Appendix D). The child and investigator sat on the floor during the assessment session and, once settled, began the puppet play interview. The puppet play interview process was adapted from Denham, Zoller, and Couchoud (1994) and Martin, Boekamp, McConville, & Wheeler (2010), and the emotion vignettes from Bisson (2013) and Widen and Russell (n.d.).

The interview process was conducted as follows: First, children participated in an expressive identification task. They were presented with a series of prototypical emotion faces depicting happy, sad, angry, and scared facial emotional expressions and were asked to verbally identify each feeling. These faces were taken from the NIMH Child Emotional Faces Picture Set (NIMH-ChEPS) and have demonstrated validity (Egger et al., 2011) (Appendix E). Then children were asked to point to the appropriate facial expression in response to the prompt "Show me the _____ face," a receptive identification task. If an

Figure 4. Pictures of the outdoor patio MCRF session space.

emotion was labeled incorrectly in either the expressive or receptive identification portion of the test, that emotion-labeling task was repeated until the child correctly identified the appropriate emotion. The presentation order for the expressive and receptive identification tasks were randomized and the faces used gender-matched for each child.

Next, children were presented with a blank-faced puppet body and four faces depicting the same prototypical emotional expressions previously introduced; each face was affixed with a Velcro backing and the puppet with Velcro affixed to the blank face. The investigator demonstrated how the faces could be attached to the puppet. This was followed by the presentation of vignettes depicting happy, sad, angry, and scared emotions, with the name of the protagonist character changed to match the child's gender. When reading the vignettes, the investigator utilized specific facial and vocal cues to reflect the intended emotion, such as a downturned mouth and eyes and crying tones to express sadness and broad smiles and relaxed vocal tones to express happiness (Denham et al., 1994). At the end of each vignette, the child was prompted to identify how the puppet was feeling by placing one of the four faces on the puppet. Each emotion was depicted twice for a total of eight stories. Responses to the vignette task were scored based on the process described by Denham et al. (1994); 0 if incorrect, 1 if the correct valence (i.e., positive or negative) is given for an incorrect emotion (e.g. "angry" for "sad"), and 2 if correct.

The second component of the individual child assessment session involved introducing the child-based Self-Assessment Manikin (SAM) assessment tool (Appendix E) and the opening (MCRF 1) and closing songs (MCRF 2) from the Musical Contour Regulation Facilitation (MCRF) intervention (Appendix A). The SAM is a nonverbal, picture-based measure designed to assess a child's self-reported level of pleasure, arousal, and dominance

associated with that child's reaction to a pre-determined stimulus (Bradley & Lang, 1994). Given that only the self-reported judgments on the pleasure and arousal scales correlate highly with similar ratings from more extensive semantic differential scales (Bradley & Lang, 1994), only self-reported levels of pleasure and arousal were assessed in this study. Each scale consists of a set of five drawings of a schematized robot that represents a 5-point Likert-type scale (Greenbaum, Turner, Cook III, & Melamed, 1990).

The SAM arousal and pleasure scales utilized in this proposed study were presented on a single laminated paper. The investigator showed the laminated SAM scales to the child, who was instructed to "show me how you feel" by pointing to one robot on each scale that most closely matched how the child currently felt. The investigator described each scale and showed the child how the SAM moved from excited to calm in the arousal scale (top) and from smiling to frowning in the pleasure scale (bottom). The child was told that there are no wrong answers and that whatever he or she felt was the right answer.

Next, the investigator provided two colored dot stickers to the child and explained that she was going to sing a song. The child was instructed to listen to the song and, when hearing the words "show me how you feel," to place a colored dot on one robot in each scale that most closely matched how he or she currently felt. The investigator then sang the opening song, MCRF 1 (Appendix A), and, if needed, verbally prompted the child to place a dot on the SAM robot at the appropriate time. Finally, the investigator instructed the child to repeat the process with a different song, following which she sang the closing song, MCRF 2. If needed, one or both of these songs were repeated until the child had demonstrated an understanding of the task. Once the child seemed to understand the SAM measurement tool and process, the assessment session was finished. The investigator verbally obtained the

child's assent to continue study participation, the child was returned to his or her classroom, and the investigator completed a field note entry.

Intervention—Musical Contour Regulation Facilitation (MCRF)

Prior to implementing the MCRF sessions, child participants were randomly assigned to a small group with one to two other child participants. Each group was seen for a total of eleven times during which they received the same 20-minute group music therapy session. Sessions were held between 3:00 and 5:00 pm two to three times a week across four weeks. The sixth session was canceled due to inclement weather and following two unsuccessful rescheduling attempts. Participants were absent for an average of two MCRF sessions (*SD* = 1.93) (Table 2). Steps were taken to ensure that session conditions were as identical as possible across each group and over the course of the 11 sessions (e.g. same room, same setup, same equipment, same group order). All music therapy sessions adhered to the MCRF intervention protocol (Appendix A).

The theoretical basis for and implementation of the MCRF intervention is described in detail in the intervention manual found in Appendix A. The intention of the music stimulus in this approach is not to induce or elicit specific emotions; rather, it is to use the contour and temporal structure of a music therapy session to alternate between high arousal and low arousal states in a way that theoretically mirrors the changing flow of the caregiver-infant interaction. In this way, music is used as a mechanism to provide in-the-moment interactive opportunities for the management and regulation of "stress" (e.g. emotionally arousing experiences) in the context of a healthy adult-child relationship. In essence, the MCRF intervention aims to imitate interactions that occur during infancy and allow for the development and later internalization of appropriate ER skills. Music stimuli for the MCRF

intervention were composed to be developmentally appropriate for preschool children and to contain musical characteristics that are high arousal, low arousal, or neutral arousal. Neutral arousal music compositions were predictable and structured, incorporated rhythmic and melodic repetition and simple consonant harmonies, and were structurally similar to familiar children's songs. High arousal music compositions incorporated musical characteristics identified as highly arousing, such as fast tempos, bright or sharp timbres, staccato articulations, or sudden and unexpected melodic or rhythmic events. Low arousal music compositions incorporated musical characteristics that contribute to a sense of calm, such as slow tempos, soft volumes, legato articulations, and lower-than-normal pitches (Sena Moore & Hanson-Abromeit, in review). Table 1 provides an analysis of the theoretical framework underlying the development of neutral, high, and low arousal music.

Vetting. The MCRF applications utilized in this study were vetted by a panel of experts ($N = 5$); music therapists with experience working with preschoolers and/or experience working with children with emotional and behavioral challenges. The purpose of the vetting was to ensure the validity of the neutral, high, and low arousal intent of the music-based applications. Members of the panel listened to audio recordings of the investigator either singing the songs composed for the MCRF intervention or, with the instrumental improvisation application, facilitating the improvisation with two preschool-aged members from the interventionist's family. Panelists were asked to indicate the level of perceived arousal on a 7-point Likert-type scale of the each song as a whole, as well as by its musical characteristics (e.g. rhythm, melody, tempo). In addition, panelists were prompted to provide feedback on the perceived appropriateness and effectiveness of each application (Appendix B). Overall, averaged expert ratings were congruent with the intended arousal levels both by

musical element and for the song as a whole (Table 3), suggesting validity for the intended arousal levels indicated through the music. Any inconsistencies were due to the challenge of rating a music experience through audio recording alone, such as when an experience involved moving to music or included tactile stimulation from an instrument (e.g., an ocean drum).

MCRF procedures. The intervention began when the investigator went to the children's classroom(s) to invite children assigned to the scheduled group to join her for music. Participating children indicated assent to participate verbally (e.g. stated "yes") or nonverbally (e.g., smiling, nodding "yes") and by following the investigator's directions to transition out of the classroom (e.g., lining up at the door, standing next to the investigator). If a participating child did not indicate a willingness to participate in music, the investigator initially attempted techniques such as redirection or positive reinforcement to encourage the child to join music. If the participating child continued to exhibit an unwillingness to join the music group, the child was given the opportunity to stay in the classroom and resume with the next scheduled music session (Appendix D).

Participating group members followed the investigator to the outdoor patio space where the session was held. A research assistant was also present to videotape the sessions for future research and to provide inter-rater reliability for the pre-post session Goal Attainment Scaling (GAS) measure that was also completed by the investigator (Appendix E). The research assistant was an upper-level undergraduate music therapy student from a local university who had completed CITI training as required by the IRB. During the study recruitment process, the investigator trained the research assistant to use the GAS measure.

Table 3

Panel of Experts' (n = 5) Rating Results of Arousal Level of MCRF Applications

Music Element	Musical Contour Regulation Facilitation (MCRF) Application												
	Neutral (3-5)		High (5-7)					Low (1-3)					
	1	2	3	4	5	6	7	8	9	10	11	12	13
Melody	4.6	4.4	3.8	5.8	2.8	5.8	6	3.2	2.2	1.4	3	2	2
Pitch	4	3.8	3.4	5	4.2	5.2	5.4	3.4	2.6	1.5	2.8	2	2
Rhythm	4.6	3.8	4	5.6	6.4	5.8	6.2	3.4	1.8	1.4	2.2	2.2	2
Dynamics	3.2	3.2	3.4	4.6	6.4	5	5	2.4	2	1.8	2.8	2.4	1.6
Harmony	3.6	3.4	1.6	4.25	2.8	4	4.4	3.8	1.6	1	1.2	1.2	1.8
Form	3.8	3.2	2.8	5	4.8	4.4	4.4	2.2	1.6	1.2	1.6	1.4	1.6
Tempo	4.6	4	4.4	5.6	6	5	6.4	3.4	1.8	1.2	2.2	1.6	2
Timbre	3.8	3.6	3.75	5	5.8	4.8	5.8	4.8**	1.4	2.4	1.8	4***	1.4
Style	4.4	3.6	3.8	5.2	5	5.2	5	3.2	1.4	1.2	2.2	2	1.8
Lyrics	4.4	4	4	6.2	3.6	5.8	6.2	3	2.6	1.6	2.4	1.6	1.6
Texture	4	3.4	4	4.6	5.4	5	5	4.8**	1.6	2.4	1.6	4.2***	1.4
Overall	4.4	4.2	4*	5.8	6.2	5.4	6.2	4.2**	2	2	2.2	2.8	1.8

* The intended high arousal component for MCRF 3 is the motor experience (crossing the midline) that is facilitated by the music. This cannot be conveyed through a recording.

* * The intended low arousal component for MCRF 8 is the motor experience (rocking) that is facilitated by the music. The instrument used for this application is the autoharp, whose textural and timbral qualities are conveyed differently through a recording than they are when experienced live.

* * * The instrument used for MCRF 12 is the ocean drum. Like the autoharp (MCRF 8), the textural and timbral qualities of an ocean drum are conveyed differently through a recording than they are when experienced live.

Upon seeing the group enter the session space, the research assistant turned on the video cameras. Once the video cameras were started, the investigator asked group members to sit on large, colored plastic dots, prearranged prior to the start of the session in a circle on the floor. Once seated, group members were given a laminated copy of the Self-Assessment Manikin (SAM) assessment tool and two colored dot stickers, after which the investigator facilitated MCRF 1 as described in the intervention manual (Appendix A). Lyrics in this song instructed the children to complete the SAM just as they did in the assessment session. At the end of the song, the investigator collected the SAM laminated papers and set them to the side for recording following session completion. The investigator then transitioned to the next module (MCRF 8) by switching instruments while providing a verbal prompt such as "Now let us do some rocking." The investigator facilitated MCRF 8 as described in the intervention manual.

The remainder of the MCRF session followed a similar sequence of MCRF application facilitation and transitions between modules. Transitions in the present study consisted of switching instruments (e.g. setting aside the autoharp and picking up the paddle drums and mallets) and offering verbal prompts (e.g. "Let's wake up our brains by crossing our bodies," "I brought a new instrument this week. Who is ready to see what it is?" "Now it's time to calm our bodies down by breathing deeply,") as appropriate to transition to the subsequent MCRF application.

During the final module (MCRF 2), the SAM assessment tool was returned to the children, who were instructed to complete it in the context of the song just as they did in the assessment session. This SAM assessment tool was identical to that used at the beginning of the session. Following the completion of application, the investigator collected the SAM

laminated papers and instructed group members to line up at the door. Group members followed the investigator back to their classroom. The investigator then returned to the session room, recorded the appropriate data collection measures (e.g., SAM ratings, GAS ratings, investigator field notes), and prepared the room and materials for the next MCRF session or, if finished for the day, packed up the materials and left the facility.

Setting. Most of the MCRF sessions were held in an outdoor patio space that was covered by an awning, fenced on three sides, and had a windowed wall on the fourth side. Prior to each session, the investigator arranged the appropriate number of floor dots in a circle on a rug placed on the floor. Measures were taken to ensure privacy, decrease ambient noise, and minimize distractions. These included closing the door to the classroom, moving furniture to allow space to sit on the floor, using floor dots to indicate where to sit on the floor, having group members face away from the windowed wall, and hiding classroom toys and other materials that may distract children (Figure 4). Due to inclement weather one session was held in the classroom. Group members still sat on the floor dots, arranged in a circle on a floor rug. Group members were surrounded on one side by a bookshelf, a second side by a wall, a third side by the windowed wall, and the fourth side was open. As with the outdoor patio sessions, measures were taken to ensure privacy, decrease ambient noise, minimize distractions, and ensure the group's orientation was as similar to the outdoor patio location as possible.

Assessment measures. Three assessment measures were utilized during the course of the MCRF sessions, all of which are provided in Appendix E. The first was the Self-Assessment Manikin (SAM) tool. The second was the modified Goal Attainment Scaling (GAS) tool. As with the SAM tool, the first and last modules in each session allowed the

investigator and research assistant to independently determine a GAS rating for each participant while the participants rated their levels of pleasure and arousal using the SAM tool. GAS and SAM data was collected on eight child participants (Figure 3). Investigator field notes provided the third assessment tool. A field note entry was completed by the investigator immediately following each MCRF session; it allowed the investigator to record observations and reflections regarding events that occurred during the session, as well as document interventionist fidelity with the MCRF protocol.

Post-MCRF Assessments

The initial and follow-up post-MCRF assessment measures are provided in Appendix E and participant involvement is diagrammed in Figure 3. Initial post-MCRF assessment measures were conducted within two weeks following completion of the MCRF sessions. The Post-MCRF Questionnaire—Parent, Child Behavior Checklist (CBCL/1.5-5) without the Language Development Survey (LDS), and Emotion Regulation Checklist (ERC) were provided to participating families (n = 8) in a self-addressed stamped envelope on the last day of the MCRF sessions. One family changed daycare providers prior to the last two MCRF sessions; this family did not complete the post-MCRF measures and their pre- and post-MCRF data were not included in the analyses. The Post-MCRF Questionnaire—Teacher, Caregiver-Teacher Report Form (C-TRF), and ERC were provided to the daycare teachers of child participants (n = 2) on the last day of the MCRF sessions. Parents and teachers were asked to complete these measures and submit them to the investigator either via post mail, by leaving them in a folder in the daycare classroom designed for the research study, or by handing them to the investigator at the beginning of the initial post-MCRF interview described below. Extra copies of the parent and teacher post-MCRF assessment

measures were also made available during the initial post-MCRF interview to allow for the possibility that the parent or teacher forgot to bring the measures.

Initial post-MCRF interviews were scheduled and conducted with the parents (n = 7) and teachers (n = 2) of child participants within two weeks following completion of the MCRF sessions. Most of the initial parent interviews were held in a library at the daycare, although one parent interview was conducted via a telephone conversation due to scheduling constraints. The initial teacher interviews were conducted in the daycare's administrative office. They were scheduled at a time that was mutually convenient for the parent, facility, and investigator. Each interview lasted approximately 15 minutes. An investigator field note was completed following each parent and teacher interview.

A second follow-up post-MCRF interview was conducted with the same parents (n = 6) and daycare teachers (n = 2) approximately one month following completion of the MCRF sessions. Due to out-of-town business travel, one parent did not participate in the follow-up post-MCRF interview despite two unsuccessful attempts to conduct a telephone interview. Interview scheduling followed the same scheduling process as for the initial post-MCRF interviews. Follow-up questions were designed to assess any carryover effects of the MCRF intervention and its perceived long-term helpfulness and meaningfulness. Interviewees were also asked to participate in member checking, a validation strategy intended to check the accuracy of the initial qualitative analyses (Creswell, 2013). During this process, interviewees were asked to review preliminary analyses of the questionnaire and interview data, reflect on the accuracy of the account, and provide comments on the analyses and what may be missing. Most of the follow-up parent and teacher interviews were conducted in the library of the daycare; however, one parent interview and one teacher interview were held in

a classroom at the daycare due to a scheduling conflict with the library. Each interview lasted for approximately 20 minutes and the investigator completed a field note following each interview. The investigator conducted all parent and teacher interviews, which were audio recorded for transcription and subsequent analysis.

Setting. The library at the daycare was an upstairs room that included two couches surrounding a coffee table, a dining room with six chairs, and several bookshelves placed along the walls (Figure 5). Most of the interviews were conducted on the couches, with the investigator ("INV") and interviewee ("INT") sitting on two different couches at an angle to each other and the audio recorder ("AR") placed on the coffee table, facing the interviewee (see markers in Figure 5). One parent interview was conducted at the dining room table to accommodate the parent's needs; the configuration mirrored that on the couches.

Figure 5. Picture of the indoor library interview space.

Data Sources

This study intentionally incorporated multiple types of evidence to understand the feasibility of the MCRF intervention for targeting ER development in typically developing preschool-aged children. This is in line with the pragmatic research approach and the utilization of a mixed methods research design. However, all data sources were directly connected to the research questions and the conceptual framework for this study (Figure 2). A list of the measures, how they fit in the study, and the data analyses utilized can be found in Table 4 and a copy of the assessment measures, questionnaires, and interview guides can be found in Appendix E.

Data Sources for Covariate Measures

Covariates are pre-existing factors participants bring to a study that may influence intervention outcomes and provide context to a research finding (Robb, 2012). The covariates identified in this study are based on factors identified in the literature that inform ER development in preschoolers. They included demographic variables, such as age, gender, ethnicity, and musical training, as well as language skills, emotion understanding, and attachment security.

Demographic information. The following demographic variables were assessed as they served as potential covariates for ER development: age and gender, which both influence the type of stress response a child utilizes (Perry et al., 1995), ethnicity, which influences a child's use of culturally defined emotion display rules (Zeman et al., 2006) and support the social construction of ER skills (Thompson & Meyer, 2007), and music training, which is considered a theoretical covariate due to the effect of music training on child development (Rauschecker, 2003; Schlaug, 2009). Basic demographic information was

Table 4

Study Measures and Associated Data Analyses

Feasibility Focus			
Approach	Measures (Recipient)	Covariate/Mediator/Moderator Assessed	Data Analyses Conducted
		Demographic information	
N/A	Pre-test (1) Pre-MCRF questionnaire (parent) (2) LDS from CBCL/1.5-5 (parent) (3) Parenting Authority Questionnaire-Revised (parent) (4) Puppet play procedure (participant)	Pre-test (1) Covariates: musical training (2) Covariates: language skills (3) Covariate: attachment security via parenting style (4) Covariate: emotion understanding	(1-4) Descriptive analyses (1, 2, 4) Series of one-way ANOVAs with Sidak adjustment to test for equivalence between groups
Quantitative	During MCRF N/A	During MCRF N/A	
	Post-test N/A	Post-test N/A	
Does the MCRF intervention show promise of being successful as a way to improve emotion regulation abilities in typically developing preschoolers? (RQ1)			
Limited efficacy	Pre-test (1) CBCL/1.5-5 (parent) (2) Emotion Regulation Checklist (parent) (3) C-TRF (teacher) (4) Emotion Regulation Checklist (teacher)	Pre-test (1a) Covariates: age, gender, culture (1b) Mediators: emotional reactivity/lability, attention problems, aggressive behaviors (2) Mediators: adaptive ER skills, emotional reactivity/lability (3) Mediators: emotional reactivity/lability, attention problems, aggressive behaviors (4) Mediators: adaptive ER skills, emotional reactivity/lability	(1a) One-way ANOVA with Sidak adjustment (age), one-way sample Chi square (ethnicity), and one-way sample binomial (gender) to test for equivalence between groups (1b-4) Descriptive analyses (1b-4) Series of repeated measures t-tests and Cohen's *d* (1a-4) Series of linear regressions to predict impact of covariates on mediators
Quantitative			

table continued

Feasibility Focus --- Approach	Measures (Recipient)	Covariate/Mediator/Moderator Assessed	Data Analyses Conducted
(con't) Limited efficacy --- Quantitative	During MCRF (5) Modified GAS tool (therapist) (6) SAM rating (participant) Post-test Same as pre-test	During MCRF (5) Mediators: current regulatory state (6) Mediator: current regulatory state Post-test Same as pre-test	(5-6) Descriptive analyses (5-6) Series of 36 repeated measures *t*-tests with Bonferroni adjustment and Cohen's *d* analyses (one for each scale at each session)
To what extent is the MCRF intervention judged as meaningful and helpful by participants and their caregivers? (RQ2)			
Acceptability --- Qualitative	Pre-test (1) Pre-MCRF questionnaire—parent (2) Pre-MCRF questionnaire—teacher (3) Student investigator field notes During MCRF (4) Student investigator field notes Post-test (5) Post-MCRF questionnaire—parent (6) Initial post-MCRF parent interview (7) One-month follow-up parent interview (8) Post-MCRF questionnaire—teacher (9) Initial post-MCRF teacher interview (10) One-month follow-up teacher interview (11) Student investigator field notes	Pre-test (1) N/A (2) N/A (3) Moderator: environment, therapist effect During MCRF (4) Moderator: environment, physical touch, therapist effect Post-test (5) N/A (6) N/A (7) N/A (8) N/A (9) N/A (10) N/A (11) Moderator: environment, therapist effect	(1-11) Modified grounded theory strategies

table continued

Feasibility Focus --- Approach	Measures (Recipient)	Covariate/Mediator/Moderator Assessed	Data Analyses Conducted
	To what extent can the MCRF intervention be integrated into an existing early childhood daycare setting? (RQ3)		
Integration --- Qualitative	<u>Pre-test</u> (1) Student investigator field notes <u>During MCRF</u> (2) Student investigator field notes <u>Post-test</u> (3) Post-MCRF questionnaire (teacher) (4) Immediate post-MCRF interview (teacher) (5) One-month follow-up interview (teacher) (6) Student investigator field notes	<u>Pre-test</u> (1) Moderator: environment, therapist effect <u>During MCRF</u> (2) Moderator: environment, physical touch, therapist effect <u>Post-test</u> (3) N/A (4) N/A (5) N/A (6) Moderator: environment, therapist effect	(1-6) Modified grounded theory strategies

collected from the parent or legal guardian ("parent") through the Child Behavior Checklist for Ages 1.5-5 (CBCL/1.5-5), for age, gender, and ethnicity, and the Pre-MCRF Questionnaire—Parent, for years of musical training, socio-economic status, developmental information (e.g. premature birth), and family information (e.g. parent marital status).

Language skills. Language skills were identified as a covariate as they influence a preschooler's ability to understand, convey, manage, and reflect on emotions (Gross & Thompson, 2007; Thompson & Meyer, 2007), a foundational skill for the regulation of emotions (Cole et al., 2008; Röll et al., 2012). Child language skills were assessed through the Language Development Survey (LDS), a sub-test of the Child Behavior Checklist for Ages 1.5-5 (CBCL/1.5-5). The LDS is a standardized form completed by a primary caregiver that provides basic screening for language delays through comparing the number of known vocabulary words and average length of word combinations to national norms. The LDS has demonstrated criterion-rated reliability, has high test-retest reliability, and is sensitive for identifying children as having language delays (Rescorla, 2005).

Emotion understanding. Emotion understanding, which influences a child's ability to analyze emotional situations (Cole et al., 2008; Stegge & Terwogt, 2007), was assessed through the widely used puppet play interview. Although there are variations in its implementation (Bisson, 2013; Gustafson, 2009; Martin et al., 2010), the general process involves reading short, age-appropriate vignettes to participants that are designed to portray happy, sad, angry, or scared emotions. Participants are then tasked with matching a prototypical drawn face or a photograph depicting those emotions to the emotion portrayed in the story. Scores of emotion perception accuracy and emotion perception bias can be assessed (Martin et al., 2010). No specific reliability and validity measures were found for

this assessment; however, the puppet play process was adapted from previous research (Denham et al., 1994; Martin et al., 2010), as were the emotion vignettes (Bisson, 2013; Widen & Russell, n.d.). Furthermore, the prototypical faces were selected from a data set with demonstrated validity based on successful participant identification of emotions and ratings of intensity and representativeness (Egger et al., 2011).

Attachment security. Attachment security strongly influences ER development (Thompson & Meyer, 2007) and parenting style is predictive of attachment security (Nair & Murray, 2005). It follows, then, that assessing parenting style can inform an understanding of a child's sense of attachment security. The Parenting Authority Questionnaire-Revised (PAQ-R) is a 30-item self-report measure of parenting style that is intended for use with parents of 3-8 year old children. Responses are in a five-point Likert-type scale (Reitman, Rhode, Hupp, & Altobello, 2002). Test items are divided into three 10-item subscales that represent Baumrind's (as defined in Reitman et al., 2002) three parenting typologies: authoritative, authoritarian, and permissive. The PAQ-R has demonstrated acceptable reliability and convergent validity (Reitman et al., 2002).

Data Sources for Research Question 1 (RQ1): Limited Efficacy

The first research question (RQ1) asked whether the MCRF intervention shows promise of being successful as a way to improve ER abilities in typically developing preschoolers. The purpose of this question was to provide limited efficacy testing as an indicator of whether the MCRF intervention warrants further testing (Bowen et al., 2009). Measuring potential mediators—third variables that help explain how and why an intervention produces an effect—assesses the changes that occur during the treatment and helps explain part or all of the effect the intervention had on outcomes (4researchers.org,

2013). An intervention is intentionally and specifically designed to target potential mediators (Robb, 2012). The five potential mediators identified in this study (current regulatory state, adaptive ER skills, emotional reactivity/lability, aggressive behaviors, and attending behaviors) were measured pre- and post-MCRF treatment as a way to assess the effectiveness of the MCRF intervention.

Adaptive ER abilities. Adaptive ER abilities are processes and behaviors that are central to the appropriate and adaptive regulation of emotions (e.g. socially appropriate emotional displays, empathy, emotion awareness) (Kim & Cicchetti, 2010). Child adaptive ER abilities were assessed through the following measures administered pre- and post-MCRF:

1. Emotion Regulation subscale score from the Emotion Regulation Checklist (ERC).
2. Internalizing Aggregate scale from the Child Behavior Checklist for Ages 1.5-5 (CBCL/1.5-5) and the Caregiver-Teacher Report Form (C-TRF). Parents complete the CBCL/1.5-5 and teachers complete the C-TRF.
3. Externalizing Aggregate scale from the CBCL/1.5-5, completed by parents, and the C-TRF, completed by teachers.
4. Total Problems score from the CBCL/1.5-5, completed by parents, and the C-TRF, completed by teachers.

The Emotion Regulation Checklist (ERC) is 24-item measure designed to assess ER processes in children. The ERC was administered to parents and teachers pre- and post-MCRF and scores were averaged for each participant. Responses are in a four-point Likert-type scale and provide scores for two subscales, Emotion Regulation (8 items) and Emotional Lability/Negativity (15 items) (Kim-Spoon, Cicchetti, & Rogosch, 2013). This measure has

previously demonstrated acceptable internal consistency reliability (Kidwell & Barnett, 2007), construct validity, and discriminant validity (Shields & Cicchetti, 1997).

The Child Behavior Checklist for Ages 1.5-5 (CBCL/1.5-5) and the Caregiver-Teacher Report Form (C-TRF) create the Achenbach System of Empirically Based Assessment (ASEBA) and are designed to assess behavioral and emotional problems in young children. The CBCL/1.5-5 is completed by a primary caregiver and the C-TRF by a teacher, counselor, or other professional familiar with the child. Both measures are designed as user-friendly and standardized assessments that do not require training to administer and score and have demonstrated good validity and reliability (Barker, Lloyd, Stewart, & Gawain Wells, 2010; Martin et al., 2010; Rescorla, 2005). Participant scores are obtained by summing ratings for items that relate to the following empirically derived syndromes: Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawn, Sleep Problems (CBCL/1.5-5 only), Attention Problems, and Aggressive Behavior. The Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawn syndromes combine to form an Internalizing scale score. The Attention Problems and Aggressive Behavior syndromes combine to form an Externalizing scale score. All test items are summed on each form to yield a Total Problems score (Rescorla, 2005). Parent and teacher syndrome and aggregate scores were averaged for each participant.

Emotional reactivity. Emotional reactivity serves a behavioral indicator of a child's hyperarousal or dissociative stress response system (Eisenberg et al., 2007; Mullin & Hinshaw; Perry & Pollard, 1998) and reflects an ability to manage high and low arousal experiences. It was assessed through the following measures administered pre- and post-MCRF:

1. Emotional Lability/Negativity subscale score from the Emotion Regulation Checklist (ERC). Parent and teacher scores were averaged for each participant.
2. Emotionally Reactive syndrome score from the CBCL/1.5-5, completed by parents, and the C-TRF, completed by teachers. Parent and teacher scores were averaged for each participant.

Aggressive behaviors. Aggressive behaviors reflect an ability to manage arousal levels as they are indicative of a child's stress response (Mullin & Hinshaw, 2007). These behaviors were assessed pre- and post-MCRF through the Aggressive Behavior syndrome score from the CBCL/1.5-5, completed by parents, and the C-TRF, completed by teachers. Parent and teacher scores were averaged for each participant.

Attending behaviors. As with emotional reactivity and aggressive behaviors, attending behaviors are indicative of a child's stress response (Eisenberg et al., 2007; Mullin & Hinshaw, 2007; Perry & Pollard, 1998). These were assessed through the Attention Problems syndrome score from the CBCL/1.5-5, completed by parents, and the C-TRF, completed by teachers, and were administered pre- and post-MCRF. Parent and teacher scores were averaged for each participant.

Current regulatory state. Theoretically, an individual's current regulatory state provides a baseline threshold for his or her ability to manage and tolerate in-the-moment arousal-inducing experiences. Thus, each child's regulatory state was assessed at the beginning and end of every MCRF session through two measures, a modified Goal Attainment Scaling (GAS) tool and the Self-Assessment Manikin (SAM) tool.

Goal Attainment Scaling (GAS) is an approach designed to measure individualized clinical progress on predetermined and operationally defined goals (MacKay & Lundie,

1998). Although the GAS is originally intended as a client-centered measure in which the client and family are involved in the goal-setting process (Tennant, 2007), a modified version of the tool was developed by the investigator to measure operationally defined investigator-observed regulation levels at the beginning and end of each session. Although this is not a standardized measurement tool, there is precedence for incorporating the GAS assessment approach in clinical research, such as with children diagnosed with sensory integration disorders (Mailloux et al., 2007) and autism (Ruble, McGrew & Toland, 2012). Furthermore, an overview of intervention studies that utilized a GAS tool as an outcome measure can be found in Becker, Stuifbergen, Rogers, & Timmerman (2000). This particular GAS measurement tool has evolved from a version previously utilized in clinical practice by the investigator and there is potential for this measure to become a clinically based outcome measurement tool. The investigator and research assistant independently rated each child participant's current regulatory state at the beginning and end of each MCRF session. Ratings were averaged, then converted to a standardized *T*-score using a formula outlined by Schlosser (2004).

The SAM is easy to use and inexpensive to administer. Furthermore, self-reported judgments on the pleasure and arousal scales correlate highly with similar ratings from more extensive semantic differential scales (Bradley & Lang, 1994). Child participants self-reported their perceived levels of pleasure and arousal on each respective 5-point Likert-type SAM scale at the beginning and end of every MCRF session.

Data Sources for Research Question 2 (RQ2): Acceptability

The second research question (RQ2) was to determine the extent the MCRF intervention was judged as meaningful and helpful. This is in line with the acceptability

focus of a feasibility study (Bowen et al., 2009). Findings were explored through qualitative data collection and analyses informed by modified grounded theory. Modified grounded theory incorporates the rigorous and systematic data collection and analyses involved in a traditional grounded theory study, but the final outcome is not the development of a new theory (Amir, 2005; O'Callaghan & Hiscock, 2007). Rather, the final outcome is the uncovering and generation of new knowledge about a phenomenon (Amir, 2005), which is appropriate given the intent of a feasibility study (Bowen et al., 2009).

Investigator field notes. Following each recruitment meeting, MCRF session, and interview the investigator recorded observations and reflections regarding events that occurred. The purpose of these fields notes was two-fold: (a) to promote reflexivity, an important component of the qualitative research process (Creswell, 2013), and (b) to record information related to the impact the environment (e.g., lighting, interruptions, pre-session events, time of day) and the investigator as interventionist may have had on client behaviors.

Pre-MCRF questionnaires. Prior to beginning the MCRF sessions, parents and teachers were asked to fill out a questionnaire with open-ended questions designed to explore their understanding of music therapy and their perception of its efficacy.

Post-MCRF questionnaires. Following completion of the MCRF sessions, parents and teachers were asked to fill out a slightly modified version of the pre-MCRF questionnaire. The same open-ended questions were used in the post-MCRF questionnaires as in the pre-MCRF questionnaires as a way to explore any changes in the understanding and perceived meaningfulness of music therapy as a result of the MCRF intervention. Two items were added to the teacher post-MCRF questionnaire pertaining to the final research question related to integration (RQ3).

Interviews. One-on-one interviews were conducted with parents and teachers in the two weeks following completion of the MCRF sessions, then again approximately one month following completion of the MCRF sessions. All interviews were audio-recorded and transcribed for coding and analysis. The purpose of these interviews was to explore the meaningfulness and helpfulness of MCRF intervention as perceived by parents and teachers, both initially and following a break from the MCRF intervention.

Data Sources for Research Question 3 (RQ3): Integration

The third research question (RQ3) was intended to explore the extent to which the MCRF intervention can be integrated into an existing early childhood daycare setting. This is in line with the integration focus of a feasibility study (Bowen et al., 2009). As with research question two, findings were explored through qualitative data collection and analyses informed by modified grounded theory. In addition, this question was used to understand the influence potential moderators had on intervention efficacy. A moderator is a third variable that influences the effect of the intervention and helps explain under what conditions an intervention produces an effect (4researchers.org, 2013). Identified moderators work by influencing or changing the strength of the relationship between the MCRF intervention and the expected outcomes. Potential moderators identified for this study (Figure 2) included the environment or setting, therapist effect, and day of the week and time of day sessions were held.

I**nvestigator field notes**. Following each recruitment meeting, MCRF session, and interview, the investigator recorded observations and reflections regarding events that occurred during the session.

Post-MCRF questionnaires. The teacher post-MCRF questionnaires were slightly

modified to incorporate two additional questions designed to explore teachers' perceptions of the benefits and ease of incorporating music therapy into a preschool setting.

Interviews. The initial and follow-up teacher post-MCRF interviews included questions designed to explore their perceptions of the benefits and ease of incorporating music therapy in a preschool setting.

CHAPTER 4

THE EFFECTIVENESS OF MCRF IN FACILITATING EMOTION REGULATION: MIXED METHODS RESULTS

This study provided a preliminary examination of the utility of using music as a way to facilitate emotion regulation (ER) development in typically developing preschool-aged children. More specifically, the purpose of this study was to explore the feasibility of a Musical Contour Regulation Facilitation (MCRF) method as a way to improve ER abilities in typically developing preschoolers by providing opportunities to practice real-time management of high and low arousal experiences. It examined the following research questions (RQ):

- RQ1: Does the MCRF intervention show promise of being successful as a way to improve emotion regulation abilities in typically developing preschoolers?
- RQ2: To what extent is the MCRF intervention judged as meaningful and helpful by participants and their caregivers?
- RQ3: To what extent can the MCRF intervention be integrated into an existing early childhood daycare setting?

This study utilized an embedded convergent mixed methods research design, a type of design in which the qualitative data were collected within a more traditional pretest-posttest quantitative design ("embedded"); the qualitative and quantitative data were collected in parallel, analyzed separately, and then merged ("convergent") (Creswell & Plano Clark, 2010) (Figure 1). Following an overview of the data analysis process, results are reported in the way analyses were conducted: qualitative findings, quantitative results, then convergent mixed methods results as they address the research questions.

Data Analyses

Qualitative Data Analysis

Qualitative data analyses followed the three phases of coding used in grounded theory as outlined by Creswell (2013) and Amir (2005). Prior to coding, transcribed data was imported into HyperRESEARCH, version 3.5.2 (ResearchWare, Inc., 2013), a computer assisted qualitative data analysis tool used to code the data and facilitate discovery of patterns and themes. First, open coding was conducted on data from investigator field notes, questionnaires, and interviews to develop salient information categories (Creswell, 2013). This is in line with an inductive open coding approach that allows for the creation of categories from the data (Amir, 2005). Second, axial coding was conducted to connect identified categories with the data sources (Amir, 2005; Creswell, 2013). Third, selective coding was conducted to identify core categories that emerged (Amir, 2005) and to generate statements or themes about how they related to other categories that emerged (Amir, 2005; Creswell, 2013). Memoing, a qualitative technique whereby the researcher records thoughts and ideas during the coding process, was incorporated throughout the coding process as a way to document ideas on the evolving understanding of the phenomenon (Creswell, 2013). These analyses were used to explore and expand understanding of the research phenomenon (i.e., the MCRF intervention) rather than contribute new theory (Amir, 2005).

Quantitative Data Analysis

Data analyses—covariate measures. Descriptive analyses were conducted on the following demographic measures: age, gender, ethnicity, emotion understanding, language skills, attachment security, socio-economic status, family composition (e.g. birth order, single or dual parent household), and musical training. Reported results included, as appropriate,

frequencies, means, standard deviations, and range of scores. In addition, equivalence between groups was assessed on the following variables through a series of one-way ANOVAs with Sidak adjustment: age, musical training (years of group music and years of music lessons), language skills (vocabulary words and phrase length), and emotion understanding (accuracy). A series of Chi-square tests were conducted to assess equivalence between groups according to group assignment, ethnicity, reported family income, gender, type of family relationship (biological or foster/adopt), and family order (oldest child, youngest child).

Data analyses—limited efficacy. A series of repeated measures *t*-tests and Cohen's *d* effect sizes were calculated on the following pre- and post-MCRF measures to assess for statistical and clinical efficacy: Emotion Regulation sub-scale and Emotional Lability/Negativity sub-scale of the ERC (averaged parent and teacher scores); the averaged parent and teacher Internalizing aggregate scores, Externalizing aggregate scores, Total Problems scores, Emotionally Reactive syndrome scores, Aggressive Behavior syndrome scores, and Attention Problems syndrome scores from, respectively, the CBCL/1.5-5 and the C-TRF. In addition, a series of linear regressions were conducted on all pre- and post-MCRF aggregate and syndrome scores to explore the efficacy of the MCRF intervention while controlling for covariate measures.

Data analyses were also conducted on GAS *T*-score ratings and the pleasure and arousal SAM sub-scale scores to explore whether there were differences in participant regulatory state over the course of the MCRF sessions and, if so, where that difference was observed. A series of repeated measures *t*-tests and Cohen's *d* effect sizes were conducted for pre- and post-session scores for each scale at each session to assess for statistical and clinical

efficacy. In order to reduce concern about Type II error, repeated measures *t*-tests were conducted with a Bonferroni adjustment.

Convergent Mixed Methods Data Analysis

This study incorporated an embedded convergent mixed methods research design in which the qualitative data were collected within a more traditional pretest-posttest quantitative design ("embedded") and the qualitative and quantitative data were collected in parallel, analyzed separately, and then merged ("convergent") (Creswell & Plano Clark, 2010) (Figure 1). In this study, qualitative analyses were conducted first, followed by quantitative analyses, then results from both analyses were merged during a combined analysis to address the limited efficacy (RQ1) and acceptability (RQ2) research questions. The quantitative data held primary priority to address RQ1 and qualitative findings were compared to the statistical results as a way to describe how parents and teachers perceived the effectiveness of the MCRF intervention, explore what, if any, long-term effects were noted, and provide a more comprehensive understanding of the efficacy of the approach. A different convergent approach was utilized to explore the acceptability of the MCRF intervention (RQ2). The qualitative data held primary priority to address this research question and observations were made about connections between those results and other study findings. No mixed methods data analyses were utilized to address the ease of integration (RQ3) research question.

Validity Approaches

Several validity approaches were utilized with the intention of checking the accuracy of the qualitative findings (Creswell, 2014). Information on the validity and reliability of the quantitative measures are reported in the data sources section above. Qualitative data

collection processes involved the use of multiple and different sources, such as interviews and questionnaires, in a validity approach known as triangulation (Creswell, 2013). In addition, member checking was utilized as part of the follow-up post-MCRF interviews. Following preliminary analyses of the initial interview question responses, interviewees were presented with some of the initial major findings and themes that emerged and were provided an opportunity to comment on the findings (Creswell, 2013, 2014). Interviewee comments were audio-recorded for transcription and subsequent analysis. Analyses and interpretations were modified based on feedback and comments from the interviewees. Finally, peer debriefing was incorporated through discussions with a research mentor of the investigator about qualitative findings and interpretations (Creswell, 2014). This occurred on a regular basis during the data analysis and interpretation process through scheduled phone calls, online video chat meetings (e.g. Skype), and email communications.

Qualitative Findings

Qualitative data analyses in this study utilized a modified grounded theory approach, which incorporates the rigorous and systematic processes involved in a grounded theory study, but does not seek the development of a new theory (Amir, 2005; O'Callaghan & Hiscock, 2007). Although a new theory is not discovered, this approach still allows the investigator to uncover and generate more information about a phenomenon (Amir, 2005), which is appropriate given the intent of a feasibility study (Bowen et al., 2009). Qualitative analyses were conducted on the following measures: investigator field notes, parent and teacher questionnaires (pre-MCRF and post-MCRF), and parent and teacher interviews (initial and follow-up) (Table 2). Three themes emerged from the grounded theory-based analysis that relate to perceptions and observations about the MCRF sessions: (a) beliefs in

music's importance, (b) changes observed following the sessions, and (c) hesitations and confusions about the sessions. Information was also generated about the integration of music and a music-based program at the daycare that concerned benefits, challenges, and suggestions for implementation. Table 5 identifies the themes and sub-themes that emerged from these analyses.

Perceptions and Observations

Beliefs in music's importance. Parents and teachers identified seven ways in which they believed in the importance and helpfulness of music. Two of these sub-themes spoke broadly as to how music is important and helpful and how it facilitates child development in general. The other sub-themes were more specific and addressed how music helps the development of emotion regulation, cognitive, emotion, and social skills in preschool-aged children. These sentiments were expressed during the interviews and in written questionnaire responses with statements such as:

> [parent] *I believe music would be a way for him to control his emotions and stuff like that. And also, even if he doesn't know how to sing or play an instrument, just the fact that he learns to appreciate music...that is, like, I think a big gain. So I think it's very important.*

> [parent] *I definitely think that music will be helpful to any kid manage their emotions. I mean, like, if they're happy definitely sing, or something, and you know like you just let it out, you just don't keep it in, inside, becoming private and all that. And even if you're angry or feeling sad, you can sing or let it out, even listen to a song. You know, it makes you feel better.*

> [teacher] *And I think it would be a big benefit because, maybe you might have a child who has some type of emotional issue and as a teacher if you were taught in...with music there's, I think there's a way of, you know, maybe handling a child who does have that emotion to help them regulate themselves, to help them to calm themselves, to help them soothe themselves and relax themselves.*

> [parent] *I understand music to be very helpful in leading little kids to manage their emotions. I believe that music can help them to learn to explore and control their emotions and react to them in a better manner (e.g. no tantrums, etc.)*

Table 5

Results from Modified Grounded Theory Analyses

	Frequency of Mentions				
Theme	Parent	% Parent	Teacher	% Teacher	Total
Perceptions and Observations					
Beliefs in music's importance					
Music helps the development of ER skills.	8	80%	2	20%	10
Music helps development.	3	33.3%	6	66.7%	9
Music is important and helpful	7	100%	0	0%	7
Music helps the development of cognitive skills.	2	28.6%	5	71.4%	7
Music helps the development of emotion skills.	3	50%	3	50%	6
Music helps the development of social skills.	0	0%	1	100%	1
Music can help development in clinical situations.	1	100%	0	0%	1
Changes observed following the sessions					
Emotion-related changes.	17	60.7%	11	39.3%	28
Improved ER skills.	6	46.2%	7	53.8%	13
Improved peer interactions.	4	44.4%	5	55.6%	9
Musical and creative changes.	5	55.6%	4	44.4%	9
Cognitive changes.	0	0%	1	100%	1
Hesitations or confusions about the sessions					
I did not notice a change.	13	100%	0	0%	13
Multiple factors may have contributed to the change.	10	100%	0	0%	10
I am confused or unsure.	5	100%	0	0%	5
Integration of a music-based approach					
Benefits					
Desire for a music program.	13	72.2%	5	27.8%	18
Ease of integration	3	60%	2	40%	5
Helpful for classroom management	2	50%	2	50%	4

table continued

Theme	Frequency of Mentions				
	Parent	% Parent	Teacher	%Teacher	Total
Challenges					
Accessibility of services	0	0%	2	100%	2
Cost	2	100%	0	0%	2
Logistical challenges	0	0%	1	100%	1
Suggestions					
Need for parent and teacher training	5	50%	5	50%	10
Small group helped	0	0%	2	100%	2

[teacher] *(T)hey can learn so much through the music with the vocabulary and the different...different things like that. I know, like, even though I have a horrendous singing voice, that if I start singing (*snaps*) it grabs their attention. Like, if they're running around and you can make up any song and then they'll repeat it and they remember it months later and you're like "who taught you that song?" Oh yeah, me, I made it up.*

[parent] *Music can help preschool-aged children to be more cheerful, help them to calm down, focus, and be more patient.*

Changes observed following intervention completion. In addition to addressing beliefs about the importance of music, parents and teachers noted changes they observed in the child participants following completion of the MCRF sessions. The most common change reported was an emotion-based one, noted most frequently as an increase in a child's expression of emotions:

[parent] *(H)e's more...articulate in emotions, like being happy, sad, mad. And he even talked to his little brother about it. You know, they have dolls, Mickey Mouse and Minnie, Goofy, so he's like "Minnie's happy today," "Mickey's sad," so...there's an understanding of emotions, I guess.*

[parent] *(S)he's showing a lot of concern about other children and other people.*

The teachers in particular observed changes in the arousal level of child participants, both immediately following the MCRF session and a steady change throughout the month in which sessions occurred:

[teacher] *And then there was some of the children, when they came back from the group they were a little bit...I guess calmer, or they, like, transitions a little bit…they went right back to their centers instead of having to be told "okay, go here" "do this" they just automatically continued on with whatever their day was doing.*

[teacher] *Overall the class was a bit more...I don't want to say quieter cause they're like, three years old, but it was a little bit less chaotic in a sense that it wasn't so overwhelming with noise level and things like that.*

[teacher] *I notice that from the groups, he would come back a lot more calmer, more relaxed….(l)ike less frustration. Just like when he came back he was in a more calm mood. I think having the music made him probably understand how to be more calm, more relaxed, more soothing, more like a calm down time for him. His afternoons were a lot less chaos, a lot more calm.*

Most of the parents interviewed (n = 6) reported other emotion-related differences observed in their children. These included reporting on fewer tantrums at home as well as an increased ability to verbally express feelings and frustrations:

[parent] *(S)he has been more stable at home. We haven't had as many big blow-up tantrums. Um, and I had originally thought it was because her father had come home from being away, but even now we're, we're, we're back into normal routine again, the tantrums haven't come back. So, yeah, she does seem a little bit more calm, which is good.*

[parent] *I think that's very important that he can, he can control, I mean, be more reasonable. Before he cry and we don't know why he cry, and now he, he tell me why and he can, like I said, he said "mommy you so mean" or "you hurt my feeling." He can express his own feeling more.*

[parent] *(W)ell at home, quite often there are days when she's super happy, like she's really excited. She runs around, crazy, very very...I don't know...activated. But she's been a bit more...I don't know...she has been more calm. Which is nice. She's still very, she's still very happy.*

Other non-emotion based changes were reported in areas such as improved peer

interactions and musical or creative types of changes:

> [parent] *(W)e had a playdate this last weekend, and the two children hadn't been socialized very well, they were stay-at-home kids and, you know, one of them bit (child's name) to the point where she had teeth marks in her hand. She didn't retaliate, she didn't hit, she didn't scream at this kid. The other little girl was throwing things and was quite aggressive as well. (My child) didn't retaliate. I was amazed.*

> [teacher] *(T)here was one child who...he's not from the states…so at first I was a little cautious with him, because he never really says anything in class. Or he'll say, like, one word kinds of things…But then afterwards he's been talking a lot more and he's been trying to interact and play more, and he, like, when we do…we have this game where we do freeze dance and we tell them, "okay, when it's frozen you count to number five before we start the music again." And now he's actually participating rather than just, you know, running around the class.*

Hesitations or confusions. Most of the parents (n = 7) remarked at least once on not noticing a change in their child, being confused or unsure as to the purpose of the sessions, which kept them from knowing what to comment on, or acknowledging that other factors may have contributed to any changes they did observe. It should be noted that this theme only emerged from the parents and did not appear in any of the teacher interviews or questionnaire responses. Parent hesitations and confusions about the sessions were expressed with statements such as:

> [parent] *He appeared to be in high spirits throughout the duration. But it could have been due to some other factors as well.*

> [parent] *I'm not exactly sure because his behavior was not changed, so I'm not exactly sure whether there was a positive or a negative impact.*

> [parent] *But I'm not sure what was done or what domains it was targeting. So I'm not expecting any changes as a result.*

> [parent] *(H)e's always a happy kid. He doesn't really have too many of the sad moments, or anything like that, so I personally didn't see too much change.*

> [parent] *I'm not sure if it's a result of getting older and maturing or from music or, I'm not sure, but there's definitely been improvement.*

> [parent] *I would imagine, at least with "Joey", that probably right after the group there*

was probably a difference or during the group there was a difference. But long-term, even like long-term as in a few hours later, it probably wasn't...at the forefront.

Integration of a Music-based Approach

Benefits. The most common sentiment expressed by parents and teachers alike was a desire for a music program at the preschool. Although a few parents and teachers commented that a music program may help with classroom management and would be easy to integrate, most statements centered on a desire to see a regularly offered music program at the preschool, with statements such as:

[parent] *I would like them to have music here, like music programs for them, like whenever possible.*

[parent] *I think they should have the music program on their weekly or daily schedule, like every day 20 minutes or 30 minutes for singing or dancing or anything, yeah. I think it's good for them. I don't know if they have it now or not, but, I think it they should have.*

[parent] *I think music can be really helpful for, I do think it can be helpful for mood regulation and even just, like, setting the tone in a room, like even when you walk into the lobby, I love how they would have, like, the soothing music, but they don't seem to do too much with the music in the classrooms, so I think just more...any...just more exposure I think would be good.*

[parent] *I think it would be nice for them to have something every day where there's consistent...music. I'm not sure if there's any consistency at the moment.*

Challenges. A small number of parents (n = 2) and teachers (n = 1) commented on challenges that may be associated with implementing a music program, primarily in the areas of cost and accessibility of services:

[parent] *(I)f it's a problem of it being costly, part of the money, I mean, we pay extra for the enrichment, like now "Joey's" doing soccer and we pay extra. So I guess it can be covered by whatever the parents can pay.*

[teacher] *Well I think the biggest costs would probably be the training of the teachers.*

[teacher] *(I)t's very difficult to find...people who are just gonna come to the school to do, like, one hour or two hour classes.*

Suggestions. Parents and teachers shared suggestions related to implementing a music program at the preschool, in particular about the need for parent and teacher training. This included training the teachers to implement music in their classroom and get comfortable with their singing voices, as well as providing parents with information and training about the music program, how it might help their child, and suggestions for using music at home:

> [parent] *I think the teacher training, that would be an important one. And not just CDs. I could see some teachers maybe relying just on the CDs and that wouldn't be...it's not the same.*
>
> [parent] *So I guess it would've been helpful for me to have, probably, more information so I could maybe probe him more about what he was doing.*
>
> [parent] *I wish I'd have known, or tried doing some kind of music to calm her down earlier, I think it's really good.*
>
> [parent] *I think that would be so useful for teachers…Like not only are you helping kids and parents, but it's also teachers. Have you got a problem classroom? Here, here are some ideas that you probably haven't thought about.*
>
> [teacher] *A music group can easily be integrated in a preschool classroom if the teacher is trained and flexible enough to learn and teach music to the class. Music is another expression of art but many teachers need to be retrained from the idea of just playing a CD and having the children use instruments.*

Summary Statement

Overall, parents and teachers indicated a strong belief in the importance of music for preschool-aged children and its ability to facilitate child development both in general and in more specific, skill-based ways. They expressed a strong interest and desire for a consistent music program at the preschool, despite confusions or hesitations about the benefits these particular sessions had on the child participants, as well as some concern about cost and accessibility of services. Parents and teachers reported observing behavioral changes in the children who participated. The most common changes were reported in the emotion domain, although improvements were also noted for ER skills, peer interactions, and musicality.

Quantitative Results

A series of statistical tests were conducted on measures provided before and after the 11 MCRF sessions, as well as on measures assessed at the beginning and end of each MCRF session (Table 2). Quantitative data analyses were conducted on the following pre- and post-MCRF measures: parent- and teacher-completed questionnaires, parent- and teacher-completed Emotion Regulation Checklist (ERC), parent-completed Child Behavior Checklist for Ages 1.5-5 (CBCL/1.5-5) and teacher-completed Caregiver-Teacher Report Form (C-TRF). Analyses were also conducted on the following pre- and post-session measures: interventionist- and research assistant-completed Goal Attainment Scaling (GAS) tool, child participant-completed Self-Assessment Manikin (SAM) tool. See Appendix E for a copy of study measures. Results are reported by type of statistical analyses conducted.

Statistical and Clinical Efficacy: Pre-test and Post-test

A series of repeated measures *t*-tests and Cohen's *d* effect sizes were calculated on the pre- and post-MCRF measures to assess for statistical and clinical efficacy. The results of the repeated measures *t*-tests indicated a statistically significant decrease in the Total Problems averaged sub scale score from the CBCL/1.5-5 and the C-TRF ($t = 2.543$, $p < .05$), although all other pre- and post-MCRF measures were non-significant. Results from the Cohen's *d* analyses yielded large effect sizes for two of the eight measures and medium effect sizes for the remaining six measures. Large effect sizes were found in the averaged Total Problems scale scores ($d = 0.899$, 95% CI from 0.62 to 17.19) and Internalizing aggregate sub scale scores ($d = 0.832$, 95% CI from -0.01 to 6.20) from the CBCL/1.5-5 and C-TRF. These two measures also yielded medium effect sizes for the averaged Externalizing aggregate scores ($d = 0.754$, 95% CI from -0.30 to 5.80), Aggressive Behavior syndrome scores ($d = 0.739$, 95%

CI from -0.28 to 4.53), Emotionally Reactive syndrome scores (d = 0.710, 95% CI from -0.17 to 2.04), and Attention Problems syndrome scores (d = 0.598, 95% CI from -0.30 to 1.80). In addition, the ERC showed medium effect sizes for the averaged Emotion Regulation sub scale scores (d = 0.746, 95% CI from -3.31 to 0.19) and the Lability/Negativity sub scale scores (d = 0.516, 95% CI from -1.24 to 5.24). Results from these analyses are reported in Table 6.

Linear Regression Results: Pre-test and Post-test

A series of linear regressions were conducted to explore the efficacy of the MCRF intervention as measured by the sub scale, aggregate, and syndrome scores from the ERC, CBCL/1.5-5, and C-TRF checklists, while controlling for the covariate measures of gender, ethnicity, language skills (combined phrase length and vocabulary words), and music experiences (combined years of group music and years of music lessons). Covariate measures of age, emotion understanding, attachment security, socio-economic status, and family composition were not incorporated in the linear regression analyses due to a lack of variability among the participants. No statistically significant results were found (p = .05 level) in any of the linear regression analyses. Results from these analyses are reported in Table 7.

Statistical and Clinical Efficacy: Pre-session and Post-session

Data analyses were also conducted on Goal Attainment Scaling (GAS) T-score ratings and the pleasure and arousal sub-scale scores from the Self Assessment Manikin (SAM) to explore whether there were differences in participant regulatory state over the course of the MCRF sessions and, if so, where that difference was observed. A series of repeated measures t-tests on the three scales yielded no statistically significant results (p = .05 level) for

Table 6

Statistical and Clinical Efficacy Results on Pre- and Post-MCRF Measures

Tests and Indicators	N	Pretest *M* (*SD*)	Posttest *M* (*SD*)	*t*	*df*	*p*	*d*	95% CI
Emotion Regulation Indicators								
ERC: Emotion Regulation subscale	8	26.94 (1.78)	28.50 (1.34)	-2.110	7	0.073	0.746	-3.31, 0.19
ERC: Lability/Negativity subscale	8	26.50 (5.06)	24.50 (4.42)	1.461	7	0.188	0.516	-1.24, 5.24
CBCL/C-TRF: Emotionally Reactive syndrome scale	8	1.56 (1.35)	0.63 (0.52)	2.007	7	0.085	0.710	-0.17, 2.04
Behavioral Indicators								
CBCL/C-TRF: Aggressive Behavior syndrome score	8	6.19 (3.84)	4.06 (2.85)	2.090	7	0.075	0.739	-0.28, 4.53
CBCL/C-TRF: Attention Problems syndrome scale	8	3.50 (1.36)	2.75 (1.54)	1.692	7	0.134	0.598	-0.30, 1.80
Problems Indicators								
CBCL/C-TRF: Internalizing aggregate scale	8	6.03 (3.37)	2.94 (2.43)	2.354	7	0.051	0.832	-0.01, 6.20
CBCL/C-TRF: Externalizing aggregate scale	8	9.56 (4.22)	6.81 (4.16)	2.134	7	0.070	0.754	-0.30, 5.80
CBCL/C-TRF: Total Problems scale	8	22.72 (9.24)	13.81 (6.87)	2.543	7	0.039*	0.899	0.62, 17.19

* $p < .05$

NOTE: ERC = Emotion Regulation Checklist, CBCL = combined Child Behavior Checklist and Caregiver-Teacher Report Form

Table 7

Linear Regression Results

Tests, Indicators, and Covariates	*F*	*df*	*p*	*R2*
Emotion Regulation Indicators				
ERC: Emotion Regulation subscale				
Gender	1.506	2,5	0.308	0.376
Ethnicity	3.704	3,4	0.119	0.735
Language Skills	7.442	3,3	0.067	0.882
Music Experience	0.170	3,4	0.911	0.113
ERC: Lability/Negativity subscale				
Gender	5.020	2,5	0.064	0.668
Ethnicity	4.223	3,4	0.099	0.760
Language Skills	1.338	3,3	0.408	0.572
Music Experience	1.505	3,4	0.342	0.530
CBCL/C-TRF: Emotionally Reactive syndrome scale				
Gender	0.206	2,5	0.820	0.076
Ethnicity	0.572	3,4	0.663	0.300
Language Skills	0.205	3,3	0.887	0.170
Music Experience	1.333	3,4	0.381	0.500
Behavioral Indicators				
CBCL/C-TRF: Aggressive Behavior syndrome score				
Gender	2.776	2,5	0.155	0.526
Ethnicity	1.133	3,4	0.436	0.459
Language Skills	0.565	3,3	0.675	0.361
Music Experience	1.075	3,4	0.454	0.446
CBCL/C-TRF: Attention Problems syndrome scale				
Gender	3.474	2,5	0.113	0.582
Ethnicity	0.963	3,4	0.492	0.419
Language Skills	1.248	3,3	0.430	0.555
Music Experience	1.343	3,4	0.379	0.502
Problems Indicators				
CBCL/C-TRF: Internalizing aggregate scale				

table continued

Tests, Indicators, and Covariates	*F*	*df*	*p*	*R2*
Gender	0.499	2,5	0.634	0.166
Ethnicity	0.178	3,4	0.906	0.118
Language Skills	0.642	3,3	0.638	0.391
Music Experience	0.253	3,4	0.856	0.160
CBCL/C-TRF: Externalizing aggregate scale				
Gender	2.830	2,5	0.151	0.531
Ethnicity	0.854	3,4	0.533	0.391
Language Skills	0.368	3,3	0.784	0.269
Music Experience	0.841	3,4	0.538	0.387
CBCL/C-TRF: Total Problems scale				
Gender	0.614	2,5	0.577	0.197
Ethnicity	0.334	3,4	0.803	0.200
Language Skills	0.320	3,3	0.813	0.242
Music Experience	0.491	3,4	0.707	0.269

differences in participant regulatory state in any of the MCRF sessions. Results from the Cohen's *d* analyses yielded large effect sizes in arousal across three of the 11 MCRF sessions: MCRF 4 ($d = 0.883$, 95% CI from -0.07 to 2.93), MCRF 7 ($d = 0.821$, 95% CI from -0.14 to 2.28), and MCRF 11 ($d = 0.912$, 95% CI from -0.08 to 1.08). Medium effect sizes were yielded in arousal across four of the 11 sessions: MCRF 2 ($d = 0.504$, 95% CI from -1.99 to 0.49), MCRF 5 ($d = 0.544$, 95% CI from -2.31 to 0.60), MCRF 8 ($d = 0.645$, 95% CI from -0.21 to 0.88), and MCRF 10 ($d = 0.523$, 95% CI from -1.75 to 0.59). The SAM yielded medium effect sizes in valence scores in three of the 11 MCRF sessions, MCRF 2 ($d = 0.645$, 95% CI from -2.01 to 0.26), MCRF 4 ($d = 0.577$, 95% CI from -0.60 to 2.60), and MCRF 12 ($d = 0.730$, 95% CI from -0.28 to 1.08). There was a medium effect size for GAS scores in

one session, MCRF 11 (d = 0.598, 95% CI from -13.78 to 3.78). No discernible patterns of change were observed in terms of strength of clinical efficacy nor in direction of change (e.g., more excited or more calm, happier or sadder, more or less observed regulation); however, the largest effect sizes occurred when child participants, using the SAM, self-reported feeling calmer. Results from these analyses are reported in Table 8.

Convergent Mixed Methods Results

Research Question 1: Limited Efficacy

The first research question (RQ1) utilized a convergent mixed methods analysis to examine whether the MCRF intervention shows promise of being successful as a way to improve ER abilities in typically developing preschoolers. This was explored by comparing qualitative themes to quantitative results and reflecting on which were congruent and which discrepant. First, qualitative themes related to "changes observed following the sessions" and "hesitations or confusions about the session" (Table 5) were identified. Other qualitative themes were not included in this convergent analysis as they were either connected to a different research question or related to parent and teacher beliefs, which cannot be reflected in quantitative results measuring actual change. Second, identified qualitative themes were connected to quantitative findings that reported on a similar phenomenon. For example, parents and teachers reported observing improvements in ER skills, a qualitative theme that is comparable to the quantitative finding of a medium effect size for improved ER skills. Third, comparisons between the qualitative themes and quantitative findings were noted to be either congruent or discrepant. Finally, possible explanations were proposed for comparisons identified as discrepant. Results from this convergent analysis are reported in Table 9.

Approximately half of the findings were congruent in that changes in the emotion

Table 8

Statistical and Clinical Efficacy as Measured By Current Regulatory State

Measure and MCRF Session Number	N	Presession *M* (*SD*)	Postsession *M* (*SD*)	*t*	*df*	*p*	*d*	95% CI	Direction of Change
Self-Assessment Manikin (Arousal Scale)									
MCRF Session 1	7	2.57 (1.99)	2.86 (1.86)	-1.000	6	0.356	0.378	-0.99, 0.41	Excited
MCRF Session 2	8	3.13 (1.73)	3.88 (1.46)	-1.426	7	0.197	0.504	-1.99, 0.49	Excited
MCRF Session 3	7	3.29 (1.80)	2.86 (2.04)	0.626	6	0.555	0.237	-1.25, 2.11	Calm
MCRF Session 4	7	4.57 (0.54)	3.14 (1.57)	2.335	6	0.058	0.883	-0.07, 2.93	Calm
MCRF Session 5	7	3.00 (1.92)	3.86 (1.86)	-1.441	6	0.200	0.544	-2.31, 0.60	Excited
MCRF Session 7	7	3.64 (1.55)	2.57 (1.81)	2.173	6	0.073	0.821	-0.14, 2.28	Calm
MCRF Session 8	6	4.17 (1.60)	3.83 (1.60)	1.581	5	0.175	0.645	-0.21, 0.88	Calm
MCRF Session 9	7	2.71 (2.14)	2.43 (1.90)	0.311	6	0.766	0.118	-1.96, 2.53	Calm
MCRF Session 10	6	3.75 (1.08)	4.33 (1.21)	-1.282	5	0.256	0.523	-1.75, 0.59	Excited
MCRF Session 11	6	3.92 (1.63)	3.42 (1.56)	2.236	5	0.076	0.912	-0.08, 1.08	Calm
MCRF Session 12	5	4.10 (1.75)	4.40 (0.65)	-0.309	4	0.772	0.138	-2.99, 2.39	Excited
Self-Assessment Manikin (Valence Scale)									
MCRF Session 1	7	3.00 (1.73)	3.86 (1.95)	-1.114	6	0.308	0.421	-2.74, 1.03	Happy
MCRF Session 2	8	3.50 (1.85)	4.38 (1.41)	-1.825	7	0.111	0.645	-2.01, 0.26	Happy
MCRF Session 3	7	4.00 (1.73)	3.14 (2.04)	0.915	6	0.395	0.346	-1.44, 3.15	Sad
MCRF Session 4	7	5.00 (0.00)	4.00 (1.73)	1.528	6	0.177	0.577	-0.60, 2.60	Sad
MCRF Session 5	7	3.71 (2.22)	3.71 (2.22)	0.000	6	1.000	0.000	-2.14, 2.14	No change
MCRF Session 7	7	4.43 (1.51)	3.86 (1.95)	1.000	6	0.356	0.378	-0.83, 1.97	Sad

table continued

Measure and MCRF Session Number	N	Presession *M* (*SD*)	Postsession *M* (*SD*)	*t*	*df*	*p*	*d*	95% CI	Direction of Change
MCRF Session 8	6	4.33 (1.63)	4.33 (1.63)	—	—	—	—	—	No change
MCRF Session 9	7	4.43 (1.51)	3.86 (1.95)	1.000	6	0.356	0.378	-0.83, 1.97	Sad
MCRF Session 10	6	4.67 (0.82)	5.00 (0.00)	-1.000	5	0.363	0.408	-1.19, 0.52	Happy
MCRF Session 11	6	4.25 (1.61)	3.67 (2.07)	1.000	5	0.363	0.408	-0.92, 2.08	Sad
MCRF Session 12	5	5.00 (0.00)	4.60 (0.55)	1.633	4	0.178	0.730	-0.28, 1.08	Sad
Goal Attainment Scaling *T*-scores									
MCRF Session 1	7	66.43 (4.76)	65.00 (11.18)	0.420	6	0.689	0.159	-6.89, 9,75	Less regulation
MCRF Session 2	8	66.88 (4.58)	68.13 (3.72)	-0.607	7	0.563	0.215	-6.12, 3.62	More regulation
MCRF Session 3	7	67.14 (7.56)	70.00 (0.00)	-1.000	6	0.356	0.378	-9.85, 4.13	More regulation
MCRF Session 4	7	68.57 (3.78)	70.00 (0.00)	-1.000	6	0.356	0.378	-4.92, 2.07	More regulation
MCRF Session 5	6	70.00 (0.00)	69.17 (2.04)	1.000	5	0.363	0.408	-1.31, 2.98	Less regulation
MCRF Session 7	7	66.43 (9.45)	68.57 (3.78)	-1.000	6	0.356	0.378	-7.39, 3.10	More regulation
MCRF Session 8	6	66.67 (8.16)	65.83 (8.01)	1.000	5	0.363	0.408	-1.31, 2.98	Less regulation
MCRF Session 9	7	64.29 (9.76)	61.43 (10.69)	1.000	6	0.356	0.378	-4.13, 9.85	Less regulation
MCRF Session 10	6	70.00 (0.00)	66.67 (8.16)	1.000	5	0.363	0.408	-5.24, 11.90	Less regulation
MCRF Session 11	6	61.67 (9.83)	66.67 (8.16)	-1.464	5	0.203	0.598	-13.78, 3.78	More regulation
MCRF Session 12	5	66.00 (5.48)	62.00 (8.37)	1.000	4	0.374	0.447	-7.11, 15.11	Less regulation

Table 9

Qualitative and Quantitative Results to Support Limited Efficacy (RQ1)

Qualitative Themes	#	Qualitative Quotes	Quantitative Correlations and Researcher Comments	Congruent/ Discrepant	Explanation
Emotion-related changes (6 parents, 2 teachers)	28	"He expresses, you know, mad, sad, happy, things like that. It gave him an insight to emotional awareness." (P) "I'm not sure whether they were due to the music program or were they just because of his grandmas, but he's different, much happier these days." (P) "And she's showing—I don't know if it's about getting older as well—but she's showing a lot of concern about other children and other people." (P) "The children in the class that participated were very excited when it was time for the class. They were interested in the class." (ID Pre3)	Decrease in total problems was statistically ($t(7) = 2.543$, $p < .05$) and clinically significant ($d = 0.90$, 95% CIs [0.62, 17.19]) Large effect size for decreased internalizing problems($d = 0.83$, 95% CIs [-0.01, 6.20]). Medium effect sizes for decreases in emotional lability ($d = 0.52$, 95% CIs [-1.24, 5.24]), emotion reactivity ($d = 0.71$, 95% CIs [-0.17, 2.04]), and externalizing problems ($d = 0.75$, 95% CIs [-0.30, 5.80]).	Congruent	N/A
Improved ER skills (2 parents, 2 teachers)	13	"Well I have noticed that she does seem to be a bit more calm." (P) "It's like I said, he can be patient. I think that's very important that he can control, I mean, be more reasonable. Before he cry and we don't know why he cry and now he tells me why." (P) "There was one child who participated who was something…excited easily…But he was a little bit calmer when he came back." (T) "I noticed that from the groups he would come back a lot more calmer, more relaxed." (T)	Increase in emotion regulation was moderately clinically significant ($d = 0.75$, 95% CIs [-3.31, 0.19]).	Congruent	N/A
I did not notice a change (5 parents, 0 teachers)	13	"I'm not exactly sure because his behavior was not changed, so I'm not exactly sure whether there was a positive or a negative impact." (P) "He's always a happy kid…I personally didn't see too much change." (P)	Very few statistically significant results	Discrepant	May relate to study limitations: lack of parent training component, small sample size.

table continued

Qualitative Themes	#	Qualitative Quotes	Quantitative Correlations and Researcher Comments	Congruent/ Discrepant	Explanation
Multiple factors may contribute to change (5 parents, 0 teachers)	10	"He appeared to be in high spirits throughout the duration. But it could have been due to some other factors as well." (P) "I'm not sure if it's a result of getting older and maturing or from music, but there's definitely been an improvement." (P)	N/A	Discrepant	Moderators and covariates may have influenced observed changes.
Improved peer interactions (2 parents, 2 teachers)	9	"She has a little brother and she's so patient with him." (P) "We noticed that he interacted more with his peers, more calmly. He interacted not having so much frustration…He was able to deal with the situations easier when interacting with peers and interacting with teachers." (T)	Decrease in aggressive behaviors was moderately clinically significant (d = 0.74, 95% CIs [-0.28, 4.53]).	Congruent	N/A
Musical and creative changes (3 parents, 1 teacher)	9	"My child now like singing and dancing." (P) "He is being more creative…in terms of the singing and just kind of expressing himself that way." (P)	N/A	N/A	N/A
I am confused or unsure (3 parents, 0 teachers)	5	"I'm not sure what was done of what domains it was targeting. So I'm not expecting any changes as a result." (P)	N/A	Discrepant	Potential new moderator to incorporate into conceptual framework (parent knowledge)
Cognitive changes (0 parents, 1 teachers)	1	"It was easier for them to learn certain things with the songs like when we start letters and things." (T)	Medium effect size for decreases in attention problems (d = 0.60, 95% CIs [-0.30, 1.80]).	Congruent	N/A

domain, ER skills, peer interactions, and cognition were observed by both parents and teachers, as well as noted in pre-MCRF and post-MCRF statistical and clinical efficacy results. Discrepancies were noted when comparing quantitative results to parent comments on not observing changes, acknowledging that other factors may have contributed to perceived changes, and being confused as to the study process and purpose. These discrepancies may be addressed in the following ways: (a) by considering how moderators and covariates potentially influenced treatment results (e.g., time of day, child temperament); (b) by adding a new "parent knowledge" moderator to the conceptual framework, as perhaps parent knowledge about the purpose and process of MCRF sessions may inform observations of their child's behaviors; and (c) by acknowledging limitations to the study, in particular the lack of parent training and the small sample size. Overall, though, these results indicate that the MCRF intervention does show promise of being successful, and perhaps improved with modifications to the conceptual framework and study design.

Research Question 2: Acceptability

The second research question addressed the acceptability of the MCRF intervention and asked the extent to which the intervention is judged as meaningful and helpful by participants and their caregivers. This question was explored through a convergent mixed methods analysis. Qualitative themes were identified that examined beliefs shared by parents and teachers about how important and helpful they felt music was for preschoolers and child development. Researcher reflections were noted on the connection between these findings and other study results (e.g., quantitative analysis results). A visual representation of this analysis is provided in Figure 6, with researcher reflections identified by gray speech bubbles.

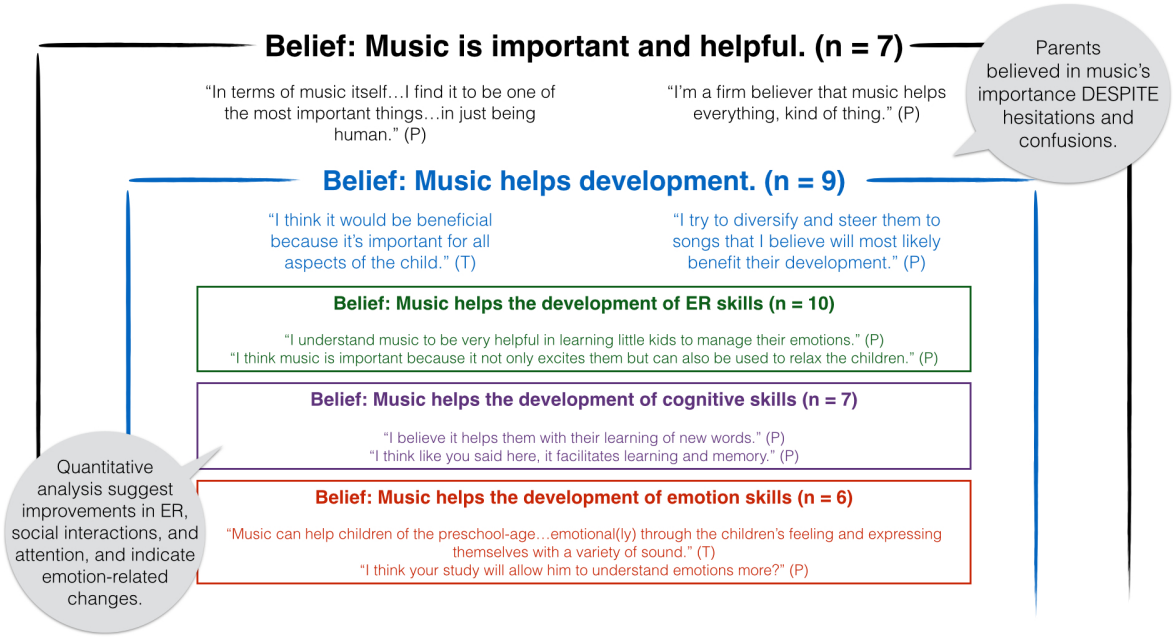


Figure 6. Parent and teacher beliefs about music's importance and helpfulness (RQ2).

As indicated previously, some oral and written comments addressed the importance of music in general terms. However, these comments became more narrow and specific in that parents and teachers felt music helped child development, particularly in the areas of developing ER, cognitive, and emotion skills. These specific beliefs are reflected in the quantitative analysis results suggesting positive changes in ER skills, peer interactions, attention skills, and emotion skills following the completion of the MCRF intervention (Table 6). Furthermore, parents expressed believing in music's importance and helpfulness despite their reported hesitations and confusions about the impact the MCRF intervention had on their child. Overall, these results support that parents and teachers judge a music-based program as having a meaningful impact on children, although it should be noted that their

beliefs were not specific to the MCRF intervention.

Research Question 3: Integration

The third research question asked the extent to which the MCRF intervention can be integrated into an existing early childhood daycare setting. The themes and sub-themes related to this question emerged through the qualitative analyses and are reported in Table 10. In general, parents and teachers expressed a strong interest and desire for a consistent music program at the preschool, despite some concern about cost and accessibility of services. Suggestions were made that may influence and perhaps strengthen the integration of the MCRF intervention in subsequent attempts, such as incorporating a parent and/or teacher training component, especially, if MCRF sessions are not able to be held regularly. Teachers indicated that the MCRF sessions became a regular part of the children's routine and noted that having smaller groups for the sessions may have been particularly beneficial for some of the children.

Table 10

Parent and Teacher Ideas on Integration (RQ3)

Themes	Responses	Frequency
Benefits		
Desire for a music program	"I would like them to have music here, music programs for them, whenever possible." (P) "This school has done a lot overall, but music-wise I don't know that they've done anything. And I think that's important." (P) "I know that in some classrooms the teachers sing to them, in others they just put on a CD or something…but I think it would be nice for them to have something every day where there's consistent music." (P) "I think they should have the music program on their weekly or daily schedule, like every day 20 minutes or 30 minutes for singing or dancing or anything. I think it's good for them. I don't know if they have it now or not, but I think they should have." (P)	18
Ease of integration	"In the beginning it was something new, so they were…but as time went on they came back and they were like 'okay we did music, now we're gonna go back to centers,' like it became part of their routine almost." (T)	5
Helpful for classroom management	"I don't think I've thought about this from a teacher perspective as much, and I can imagine getting kids involved in doing those types of things…(it) would be a nice way to promote harmony and get kids working together at the same tempo on similar types of activities." (P)	4
Challenges		
Accessibility of services	"Well I think the biggest costs would probably be the training of the teachers, unless…luckily we're at the university where maybe we can get some of the students to come over. I'm sure their schedules are pretty tight probably as well." (T)	2
Cost	"If it's a problem of it being costly, part of the money…we pay extra for the enrichment, like now (he's) doing soccer and we pay extra, so I guess it can be covered by whatever the parents can pay." (P)	2
Logistical challenges	"I remember we went to watch…the orchestra practice. And just exposing them to different things would be great…We walked over there, they sat down, and we walked back. It's just a matter of organization and planning it." (T)	1
Suggestions		
Need for parent and teacher training	"I wish I'd have know, or tried doing some kind of music to calm her down earlier, I think it's really good." (P)	10

table continued

Themes	Responses	Frequency
	"I think the teacher training, that would be an important one…and not just CDs. I could see some teachers maybe relying just on the CDs and that wouldn't be…it's not the same." (P)	
Small group helped	"There was a few children who tended to be better with smaller groups…so that helped." (T)	2

CHAPTER 5

THE FEASIBILITY OF MCRF IN FACILITATING EMOTION REGULATION DEVELOPMENT IN PRESCHOOLERS: DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

This study explored the feasibility of the Musical Contour Regulation Facilitation (MCRF) method as a way to improve emotion regulation (ER) abilities in typically developing preschoolers. The intent of the MCRF intervention is to provide opportunities for preschool-aged children to practice real-time management of high and low arousal experiences and through this practice, to improve their ability to tolerate high and changing arousal levels. If the intent of a feasibility study is to explore the general question of whether an intervention can work within a particular context, results of the present study indicate that the MCRF intervention can work with typically developing children in a daycare setting. More specifically, there was moderate to strong clinical effect size evidence, as well as some statistical evidence, to indicate the MCRF intervention shows promise of being successful as a way to improve ER abilities in preschoolers (RQ1). The majority of parents and teachers observed behavioral changes in the children, especially immediately following an MCRF session. However, their judgments on the meaningfulness and helpfulness of a music-based approach seemed to originate more from their beliefs that music positively impacts child development and less on the benefits of the MCRF intervention specifically (RQ2). Finally, parents and teachers expressed an overwhelmingly strong desire for a music program at the preschool. They indicated few barriers to such a program and offered suggestions for any barriers, such as offsetting costs by leveraging local resources (RQ3). Overall, results support the conceptual framework supporting the development and study of the MCRF intervention,

provide a foundation and rationale for future study of this treatment approach, and produce suggestions for modifying the intervention and how it is studied in subsequent explorations.

The present study fills a demand to explore intervention strategies that support learning adaptive ER strategies in a way that mirrors the typical developmental trajectory. This need exists in part because there are several childhood disorders and mental health problems related to atypical ER development, but also because of limitations to current treatment approaches. Maladaptive ER skills significantly impact multiple areas in child development, including but not limited to the ability to learn in school, the ability to form and maintain healthy relationships with peers and adults, and the ability to manage and inhibit behavioral responses. Current therapeutic options exist for children at-risk for maladaptive ER development (Izard et al., 2008; Johnson, 2012; Webster-Stratton & Reid, 2003), but they have several key limitations. One, they only target verbal, top-down ER strategies and do not include the more intentional practice of ER management. Two, there is a disconnect between the timing of the intervention strategies and the occurrence of an emotionally stressful situation. This does not provide the child with an opportunity to practice handling emotionally arousing experiences in real-time, a process necessary for internalizing ER strategies. Three, current options lack the caregiver-child interactive component through which ER skills are modeled, learned, and practiced. The MCRF intervention was designed to address these limitations by providing real-time, adult-child interactive opportunities to practice tolerating emotionally arousing experiences through the mechanism of music.

Study outcomes support the use of music-based experiences as the therapeutic mechanism. It is well documented in the literature that preschool-aged children are inherently musical, are primed to process music, and that music has a prevalent role in their lives

(Lamont, 2008; Marsh & Young, 2006; McDonald & Simon, 1989; Trehub, 2003, 2006). Furthermore, there is a well-established, though not completely understood, connection between music and emotions (Juslin & Sloboda, 2010). This connection is apparent in infancy (Parncutt, 2006) and can be observed in natural caregiver-infant interactions (Cross, 2003; Marsh & Young, 2006; Trainor & Schmidt, 2003; Trehub, 2003). Thus, the literature on music development and music-induced emotions, as well as the results of the present study, lend support for using music as a therapeutic mechanism to target an emotion-based treatment goal in preschool-aged children.

In addition to supporting the use of music as the therapeutic mechanism, results from the present study support the notion that ER skills can develop through adult-child interactive practice and may not necessarily require verbal- or behavioral-based strategies. Repetition of a behavior or skill leads to learning and is a fundamental tenet of therapy. The brain is plastic and learning that occurs due to practice is indicative of cortical reorganization (Thaut, 2005), which translates to therapeutic change. This was the intention of the MCRF intervention—that through the practice of experiencing an alteration between high and low arousal experiences, the child will over time become accustomed to handling "stress" and the changing emotional and physiological sensations that occur during the ER process. The concept of incorporating repetition to effect therapeutic change is also a mechanism thought to underlie other comparable treatment approaches, such as exposure therapy (De Raedt, 2006; Jaycox et al., 1998), and has been written about in the music therapy literature as well (Thaut, 2005). The brain's malleability to experiences is especially apparent during child development (Perry & Pollard, 1998), which may in part explain why changes were observed in typically developing children following a short period of time.

The focus on typically developing children rather than children who have difficulty regulating their emotions was intentional and served multiple purposes. One, a feasibility study is an important first step in a phased research agenda (Shoemark, 2013) and the purpose of the present study was to explore whether the MCRF intervention is worth further investigation. Given the positive results, subsequent studies can examine the efficacy and understanding of participant experience with a population at-risk for atypical ER development. Two, the focus on typically developing children is congruent with the third step in Thaut's (2000) Rational-Scientific Mediating Model. This step, the Mediating Model, is intended to systematically examine the influence of music on typical behavior function, thus providing a foundation and rationale for future inquiry with clinical populations. Three, results provide preliminary normative data upon which results in subsequent studies can be compared. Thus, by focusing on typically developing children, the results and findings from the present study provide a foundation and rationale for future investigations of the MCRF intervention for children who have clinical needs.

Although the inspiration to develop the MCRF intervention was based on a need to develop a therapeutic option for children at-risk for developing maladaptive ER skills, it is worth noting that it showed promise of being successful for typically developing children as well. While it is beyond the scope of this study to determine why an intervention may also support typical development, there are possible considerations. It may be partially due to utilizing a theory-based approach in developing the MCRF intervention. The music experiences composed for this study were based on an outline of the Therapeutic Function of Music (TFM) for the intervention model (Hanson-Abromeit, 2013). Their design was grounded on findings from an analysis of research that explored how to structure music to be

arousing or calming for a preschool-aged child, while maintaining its developmental appropriateness. This "ante-hoc" analysis of the therapeutic mechanism (Hanson-Abromeit, in press) brought a level of intentionality to the MCRF intervention and its connection to the treatment goal. Furthermore, the outcomes from the present study support that the music experiences utilized in the MCRF intervention functioned as intended.

Clinical Effectiveness of Musical Contour Regulation Facilitation

Interesting patterns are observed when analyzing effect size results, specifically in the child self-reported arousal ratings from each MCRF session (Table 8) and the changes in ER, behavioral, and problems indicators across treatment (Table 6). Large effect sizes were found for MCRF sessions 4, 7, and 11; in each instance, child participants self-reported feeling calmer at the end of the session. Although premature to state why this occurred, a couple potential explanations exist. The first relates to the concept of novelty. Within the MCRF intervention, new applications were introduced after every third session; in other words, applications were identical for MCRF sessions 1-3, MCRF sessions 4-6, MCRF sessions 7-9, and MCRF sessions 10-12. Given that two of the three times large effect sizes emerged occurred at the beginning of a new sequence of applications, perhaps the novelty of the new music experiences contributed to their increased clinical effect. The weekly schedule may have influenced outcomes as well. All three sessions occurred near the beginning of the week following a two- to four-day break. MCRF sessions 7 and 11 were held on a Monday and, although MCRF session 4 was held on a Tuesday, no sessions were facilitated the day prior. However, another session that was held on a Monday (MCRF 2) did not show the same pattern. Although purely speculative, it may have been too early in the study process for the pattern to emerge as the children may have still been acclimating to the MCRF intervention

and developing rapport with the interventionist.

The second pattern that emerged relates to the change in indicators across treatment, specifically the lower effect size that was reported for lability/negativity, as well as for attention problems (Table 6). It may be that the MCRF intervention does not target these specific mediators as effectively as it does others. Emotional lability and attention were included as potential mediators in the conceptual framework (Figure 2) based on research suggesting they are indicative of a child's hyperarousal or dissociative stress response system (Eisenberg et al., 2007; Mullin & Hinshaw, 2007; Perry & Pollard, 1998). It may be that other behaviors and indicators are more sensitive to a music-based treatment approach. For example, there is a significant amount of literature that explores the effect of music on attention (Thaut & Gardiner, 2014), but it largely revolves around using music to train attention skills, as opposed to using music to train another skill (i.e., ER) and measuring outcomes through attention behaviors. Furthermore, it may be that these indicators are not the most appropriate to measure changes in ER skills. For example, there are researchers who differentiate between emotional lability and emotion regulation, stating that lability—a behavior more closely connected to reactivity—is a different construct than regulation (Kim-Spoon et al., 2013). While related, lability may not be an appropriate indicator to measure change in regulation. Thus, although premature to exclude attention and emotional lability as mediators based on these observations, subsequent studies should make note of whether the MCRF intervention makes a significant difference in these two indicators, then make suggestions for adjusting the conceptual framework and study measures accordingly.

Impact of Perceptions on Outcomes

One of the more intriguing results that emerged from this study concerned the

connection between the parents' perceptions of the importance of music and their observations of changes in their children. Despite (a) any confusion about what their children were experiencing during the MCRF sessions, (b) a lack of observing changes in their child during the study, or (c) an awareness that there were other factors (e.g., maturation) that may have influenced any perceived changes, parents consistently expressed a belief that music is important and helpful for child development. Perhaps only parents who believed in the benefits of music would enroll their child in a music-based study; however, parents who declined participating only cited scheduling conflicts. Furthermore, some child-based research explores the connection between parent perceptions of treatment and actual outcomes. For example, in an older study, Frentz & Kelley (1986) wrote that parent perceptions of their own child's behavior following one of five treatment methods had no effect on their acceptability of the different methods, a statement congruent with this study's findings.

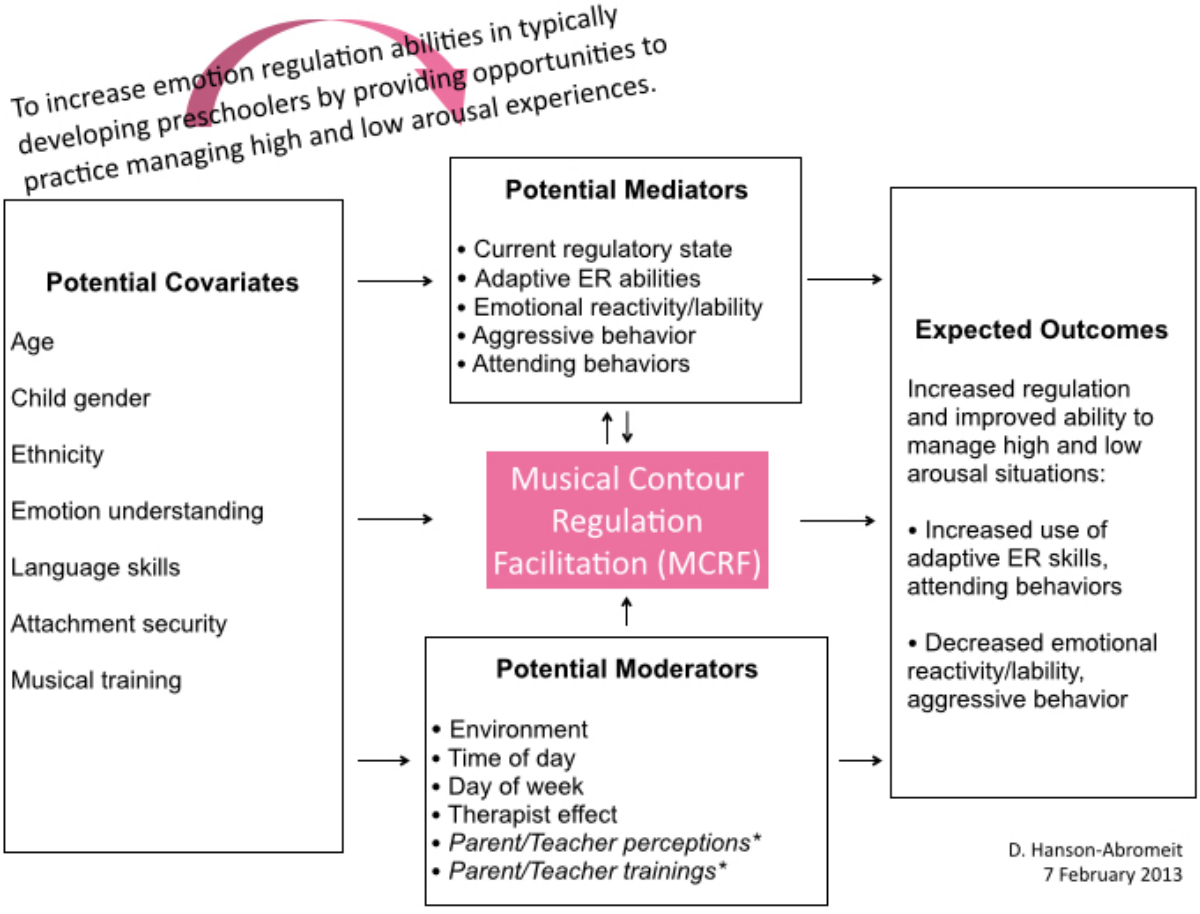
Music therapy researchers are beginning to more formally consider parent perceptions of treatment. This has been explored in early intervention research (Warren & Nugent, 2010), hospice research (Lindenfelser, Grocke, & McFerran, 2008), and autism research (Allgood, 2005). For example, parents in the Warren & Nugent (2010) study reported similar feelings as parents in the present study; they felt the music therapy sessions helped extend their child's development, particularly in the area of communication skills, but also in academic learning and creativity. However, one major difference exists between these studies and the present study—unlike parents in the present study, the parents in previously published research were active participants in the music therapy sessions. This was not feasible in the present study as the MCRF sessions were facilitated at a preschool during typical preschool

hours, a time when parents were likely at work and unable to directly participate in sessions. However, it may be worthwhile to continue to assess parent perceptions of treatment in subsequent studies. This could serve to inform the parents of the study and mitigate their confusion, it could promote the effectiveness of the MCRF intervention (Brown, Deacon, Abramowitz, Dammann, & Whiteside, 2007), and would function as a way to continue to monitor and understand the participant experience (Shoemark, 2013).

Suggestions

Part of the rationale for conducting a feasibility study involved viewing it in the context of a larger research agenda, as an initial investigation of the MCRF intervention to determine whether it warrants further study (Shoemark, 2013). Results support future exploration of the MCRF intervention, with some modifications. More information should be provided to parents and teachers about the MCRF intervention. This can include a brief outline of the theory supporting this approach, a description and demonstration of the music experiences that are utilized, an overview of behavioral changes that may be expected, and suggestions for how to use music-based strategies at home or in the classroom to support ER development. Hard or electronic copies of the information may be beneficial, as would in-person trainings that could provide parents and teachers an opportunity to clarify information, ask questions, and learn from each other. Although this modification is primarily based on parent and teacher comments during the post-MCRF interviews, there is precedence for the utilization of parent and teacher trainings in current intervention strategies that target ER development in preschool-aged children (Betty, 2013; Izard et al., 2008; Johnson, 2012; Webster-Stratton & Reid, 2003). This modification—as well as the suggestion to continue assessing parent perceptions and, by extension, teacher perceptions—

may be considered moderators in the conceptual framework for the MCRF intervention since they could influence its effectiveness. A modified conceptual framework is provided in Figure 7.



* Indicates new items

Figure 7. Modified conceptual framework for exploring the feasibility of utilizing the Musical Contour Regulation Facilitation (MCRF) intervention to improve ER abilities in typically developing preschoolers.

A second potential adjustment could occur with the MCRF intervention itself following an exploration of the fidelity of the treatment approach. While study results provide some limited efficacy support, another important next step in a phased research agenda will be to examine the characteristics of the music stimulus and how they contributed to the responses of the child participants, as well as any modifications made by the interventionist to accommodate the responses and needs of the child participants in-the-moment. This exploration will serve a couple functions. It will allow for the development of clearer, more explicit guidelines when creating new music-based applications to incorporate into the MCRF intervention. In addition, it will serve to identify strategies for facilitating the successful implementation of the MCRF intervention, as well as for handling child behaviors during a session. Ultimately, assessing the fidelity of the MCRF intervention will both increase the dependability of the music stimulus utilized in the method and facilitate training future interventionists in its implementation.

A third suggestion centers on future efficacy studies. Following the scientific logic underlying Thaut's (2000) Rational-Scientific Mediating Model, the next step in the research process is the clinical research model. As has been noted, many children in therapy have difficulty regulating their emotions due to atypical ER development. Maladaptive ER is seen in children with aggression-related behavioral problems (Mullin & Hinshaw, 2007; Stegge & Terwogt, 2007), childhood depression (Stegge & Terwogt, 2007), and is implicated in disorders such as Attention-Deficit/Hyperactivity disorder (Masao, 2004; Mullin & Hinshaw, 2007) and Autism Spectrum Disorders (Masao, 2004). Subsequent investigations can begin exploring the efficacy of the MCRF intervention plan with preschool-aged children at-risk for developing maladaptive ER skills. Given the inclusion of parent and teacher perceptions

as a moderator, these studies should continue to utilize a mixed methods research design, which will help shape an understanding of the variables that influence the efficacy of the MCRF intervention plan (Shoemark, 2013). In addition, future studies should incorporate other research design elements that contribute towards a stronger efficacy study, such as the inclusion of a control group, a direct comparison group, a larger sample size—given that clinical effect sizes emerged, it is recommended that no fewer that nine participants be incorporated in future studies—and randomization.

Limitations

No study is without limitations. Some limitations in the present study reflect drawbacks to conducting a feasibility study. These include limited external validity due, in part, to the utilization of a small sample size. However, the sample size limitation may be mitigated in part by the inclusion of effect size calculations, especially given that moderate to large effect sizes emerged (Gold, 2004) across all analyzed scores. Still, the statistical and clinical efficacy results should be interpreted with caution, for several reasons. Although an attempt was made to control for variables such as developmental maturation (i.e., the study was limited to a month-long treatment), there can be no explicit understanding of whether observed and measured changes resulted from the MCRF intervention or from another factor. This is especially true given there was no control group. Furthermore, this study does not provide information about the efficacy of the MCRF intervention as compared to other comparable treatment approaches. Finally, there are limitations related to participant characteristics. This study was conducted with typically developing children at a single daycare site in the southeastern United States. Furthermore, participants were from stable family situations, based on number of parents and their relationship status, and in a moderate

to high socioeconomic status bracket. Given the small scope of the population and the lack of randomization, generalizability to other populations and areas is unknown.

Conclusions

The present study explored the feasibility of the Musical Contour Regulation Facilitation (MCRF) method as a way to improve emotion regulation (ER) abilities in typically developing preschoolers. Overall, results indicated moderate to strong clinical significance, as well as some statistical significance, to support that the MCRF intervention shows promise of being successful as a way to improve ER abilities and warrants further study. It is particularly enticing that clinical changes in ER skills occurred for a group of children who did not have clinical needs as the impact may be more potent when the MCRF intervention is facilitated with a group of preschoolers at-risk for atypical ER development. Other study findings indicated that parents and teachers believe in the importance and helpfulness of a music-based approach. Not only did they express an overwhelmingly strong desire for a music program at the preschool, but they also requested more information and training about the MCRF intervention plan in particular.

In addition to the promising clinical results, the present study contributes to the music therapy literature in some key ways. First, it incorporates emerging trends in research, such as the implementation of a mixed methods research design, the utilization of a feasibility study, and the development and incorporation of a conceptual framework. Second, it provides a model for the development and implementation of an intervention manual. Finally, to this author's knowledge it is the first music therapy study to incorporate an analysis of the therapeutic function of music in the development of an intervention strategy.

In conclusion, this study provides an important first step in understanding a music-

based treatment approach that has the potential to influence ER development in preschool-aged children. Although some treatment strategies exist, there is a need for more, especially given how important adaptive ER skills are for a child's mental health, responses to stress, capacity to develop healthy relationships, and ability to learn in school. Given that music may naturally facilitate ER processes (Sena Moore, 2013), incorporating a music-based treatment approach fulfills the need to employ a method that mirrors adaptive ER developmental patterns by providing real-time, adult-child interactive opportunities to manage emotionally arousing experiences.

APPENDIX A

MUSICAL CONTOUR REGULATION FACILITATION (MCRF) INTERVENTION MANUAL

MUSICAL CONTOUR REGULATION FACILITATION (MCRF) INTERVENTION MANUAL

This intervention manual is designed to provide a clear and detailed description of the Musical Contour Regulation Facilitation (MCRF) intervention protocol. The purpose of creating this manual is to improve intervention transparency and subsequent transfer of music-based interventions to clinical practice (Robb, Burns, & Carpenter, 2011). The information included in this manual adheres to music-specific intervention reporting guidelines outlined by Robb, Burns, and Carpenter (2011).

Intervention Theory

The MCRF intervention is designed to use the contour and temporal structure of a music therapy session to manipulate the arousal levels of children. The intention of the music stimulus in this method is not to induce or elicit specific emotions; rather, it is to use the contour and temporal structure of a music therapy session to alternate between high-arousal and low-arousal states in a way that theoretically mirrors the changing flow of the caregiver-infant interaction. It aims to musically imitate interactions that occur during infancy and allow for the development and later internalization of appropriate emotion regulation (ER) skills. In essence, the Musical Contour Regulation Facilitation (MCRF) intervention seeks to use the music stimulus to manipulate the arousal levels of preschoolers, exposing them to an alternation of arousing and calming musical experiences. This strategy builds on the works of Berlyne (1971), Meyer (1956), and others (Juslin & Sloboda, 2010) as it is intended to manipulate one property of the emotion process, the physiologic aspect (Juslin & Sloboda, 2010; Koole, 2009; Zelazo & Cunningham, 2007), through music-based experiences.

Music stimuli for the MCRF intervention was composed to be developmentally

appropriate for preschool children living in a Western culture and to contain musical characteristics that are high arousal, low arousal, or neutral arousal. An analysis of the Therapeutic Function of Music (Hanson-Abromeit, 2013; Hanson-Abromeit, in press) helped determine how to structure the music stimulus to be developmentally appropriate ("neutral arousal") and to have either an arousing ("high arousal") or calming ("low arousal") effect (Table 1). It is expected that exposing children to an alternation of high and low arousal experiences will provide opportunities for them to practice managing high and low arousal situations. Furthermore, it is expected that over time, this practice will lead to improvements in ER skills and in their ability to manage high and low arousal situations as measured by an increased use of adaptive ER skills, increased attending behaviors, decreased emotional reactivity, and decreased aggressive behaviors (Figure 2).

Intervention Content

The MCRF intervention includes seven music-based modules intended to manipulate child arousal in the contour identified in Figure 8. Specific details related to music selection, music structure, delivery method and schedule, materials, and intervention strategies for the specific applications are described in subsequent pages.

Intervention Delivery Schedule

Sessions were conducted approximately three times a week for four weeks. Measures were taken to ensure that the intervention delivery schedule was as consistent as possible across each group and over the course of the sessions (e.g. same room, same setup, same equipment, same group order). Each MCRF application lasted approximately 2-3 minutes; each MCRF session lasted approximately 20 minutes.

The first three modules (MCRF 1, MCRF 8, and MCRF 3) and the final two modules

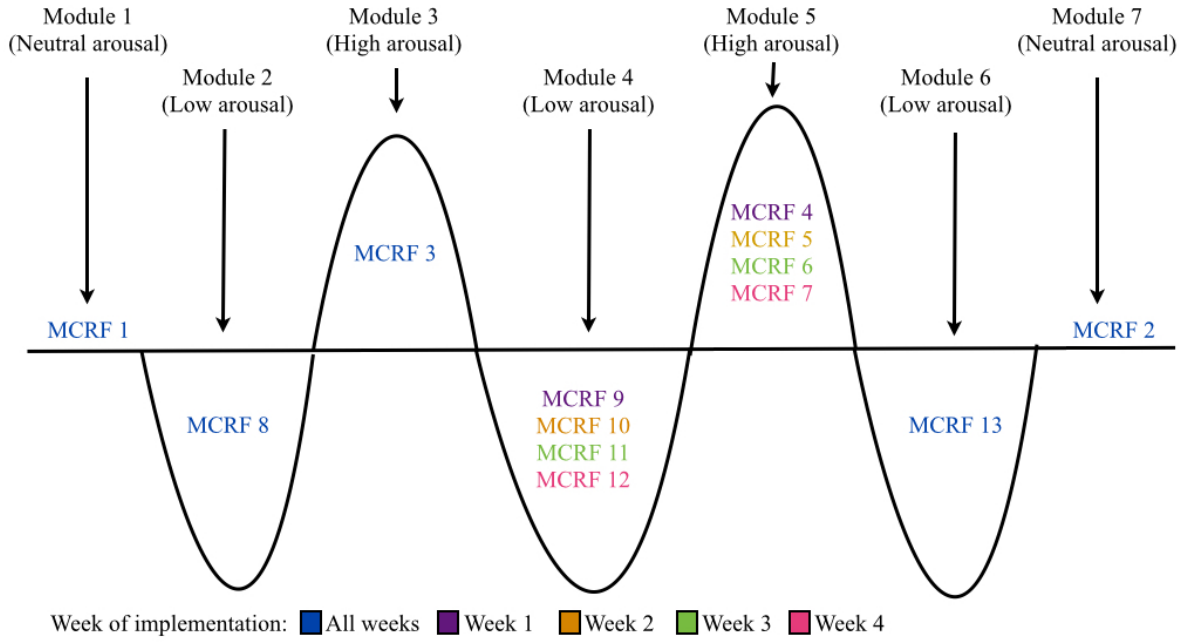


Figure 8. Representation of the contour of a session in the Musical Contour Regulation Facilitation (MCRF) intervention.

(MCRF 13 and MCRF 2) were consistent across the 12 sessions. The purpose of this built-in repetition was to facilitate a supportive environment through the predictability of a similar opening and closing sequence of modules throughout the process. Music-based applications utilized for the middle two modules in the MCRF intervention were changed every week in the following order: week one (sessions 1-3) incorporated MCRF applications 9 and 4, week two (sessions 4-6) incorporated MCRF applications 10 and 5, week three (sessions 7-9) incorporated MCRF applications 11 and 6, and week four (sessions 10-12) incorporated

MCRF applications 12 and 7. The purpose of changing the applications was to incorporate variety and challenge in the process. All music was pre-composed by the researcher.

Setting

MCRF sessions were facilitated in an outdoor patio space at a preschool facility in a large metropolitan city in the southeastern United States. Children and the interventionist sat in a circle on the floor. Measures were taken to ensure privacy, decrease ambient noise, and minimize distractions. These included closing the door to the classroom door, moving furniture to allow space to sit on the floor, using floor dots to indicate where to sit on the floor, having group members face away from the windowed wall, and hiding classroom toys and other materials that may distract children (Figure 4). Due to inclement weather one session was held in the classroom. Measures were taken to ensure that session conditions were as similar to the outdoor patio location as possible.

Intervention Implementation

The MCRF session began when the investigator went to the children's classroom(s) to invite children assigned to the scheduled group to join her for music. Participants who indicated assent followed the investigator to the outdoor patio space where the session was held. The interventionist asked the group to sit on a large, colored plastic dot, prearranged prior to the start of the session in a circle on the floor. Once seated, group members were given a laminated copy of the Self-Assessment Manikin (SAM) assessment tool and two colored dot stickers, after which the investigator facilitated MCRF application 1 as described below. Lyrics in this song instruct the children to complete the SAM. At the end of the song, the interventionist collected the SAM laminated papers and set them to the side for recording following session completion. The interventionist then transitioned to the next module

(MCRF application 8) by switching instruments while providing a verbal prompt such as "Now let us do some rocking." The interventionist facilitated MCRF application 8 as described below.

The remainder of the MCRF session followed a similar sequence of MCRF application facilitation and transitions between modules. The MCRF module sequence is described in detail above. Transitions in the present study consisted of switching instruments (e.g. setting aside the autoharp and picking up the paddle drums and mallets) and offering verbal prompts (e.g. "Let's wake up our brains by crossing our bodies," "I brought a new instrument this week. Who is ready to see what it is?" "Now it's time to calm our bodies down by breathing deeply") as appropriate to transition to the subsequent application.

During the final module (MCRF 2), the SAM assessment tool was returned to the children, who were instructed to complete it in the context of the song. Following the completion of the song, the interventionist collected the SAM laminated papers and instructed group members to line up at the door. Group members followed the interventionist back to their classroom. The interventionist then returned to the session room, recorded the appropriate data collection measures (e.g. SAM ratings, GAS ratings, investigator field notes), and prepared the room and materials for the next MCRF session or, if finished for the day, packed up the materials and left the facility.

Interventionist

The interventionist in this study was a board certified music therapist who was a Ph.D. candidate, has advanced clinical training in neurorehabilitation and preventive therapeutic treatment, and over 10 years of clinical experience. The same interventionist facilitated all MCRF sessions throughout the study.

Fidelity

Development and utilization of a manualized protocol and utilization of a single interventionist were strategies to ensure fidelity of MCRF delivery. The manualized protocol helped to ensure adherence to MCRF applications. Utilizing a single interventionist helped control for differences associated with individual practitioners, thus reducing differences within the intervention that are based on therapist effect.

Unit of Delivery

This MCRF intervention was provided to three groups of children. Two groups had three child participants and one group had two child participants.

MCRF Application 1

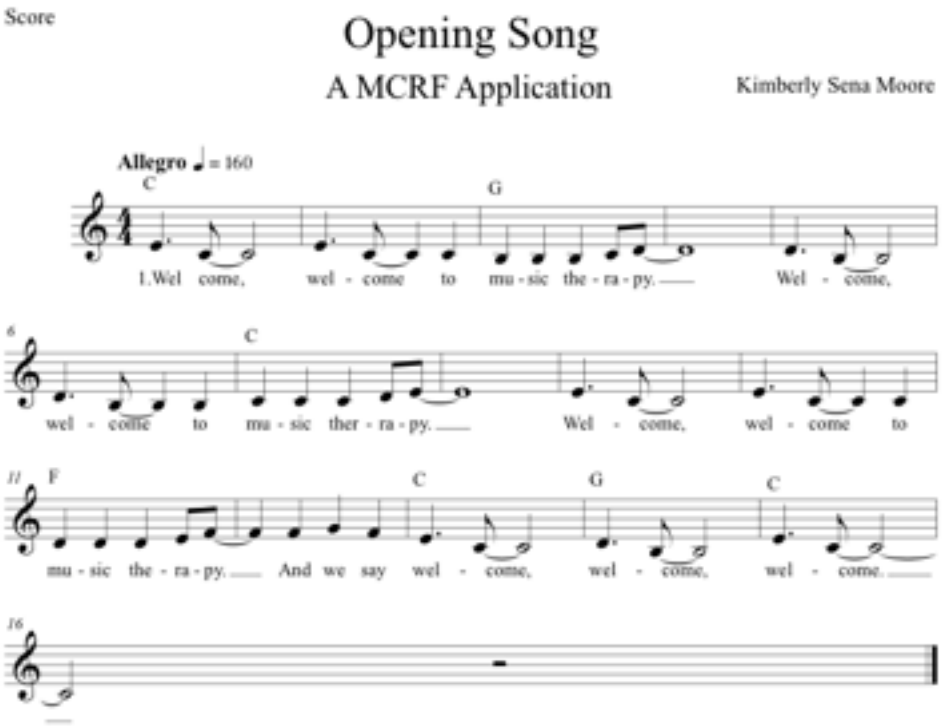
Application Name: Opening Song

Intervention Strategy: Group singing

Therapeutic Intent

The purpose of the opening application is three-fold: 1) as a "neutral arousal" application it functions as a musical transition to the session, 2) it provides an opportunity for the therapist to collect Goal Attainment Scaling (GAS) ratings for each child at the beginning of the session, and 3) it provides an opportunity for group children to self-rate their pleasure and arousal states at the beginning of the session using the pleasure and arousal sub-scales of the Self-Assessment Manikin (SAM).

Music



Verse 1: Welcome, welcome to music therapy. (repeat 2 times)

And we sing welcome, welcome, welcome.

Verse 2: Tell me (name of child 1) how you feel today.

Tell me (name of child 2) how you feel today.

Tell me (name of child 3) how you feel today.

As we sing welcome, welcome, welcome.

Verse 3: Put a dot on your robot, show me how you feel. (repeat 2 times)

As we sing welcome, welcome, welcome.

Directions: Provide group members with a laminated copy of the Self-Assessment Manikin (SAM) assessment tool and two colored dots. Begin playing the song; directions are embedded in the lyrics. At the completion of the song, collect the SAM laminated papers.

Accompaniment pattern: Bass pluck fingerpicking

Music Delivery Method: Live guitar delivered by the interventionist. Live singing delivered by the interventionist and children.

Intended arousal level: Neutral arousal

TFM guidelines followed: Melodic and rhythmic repetition, consonant harmonies, easy-to-follow contour, simple binary rhythms, moderate volume level, moderate tempo.

Therapist Effectiveness: If needed, allow time for client response following a prompt, such as "how you feel today" or "show me how you feel," by vamping guitar chord. In addition, sung prompts can be reinforced with verbal prompts (e.g. "how do you feel, (child 1)?").

Intervention Materials: Guitar, SAM rating sheet for each child, two colored dots per child

MCRF Application 2

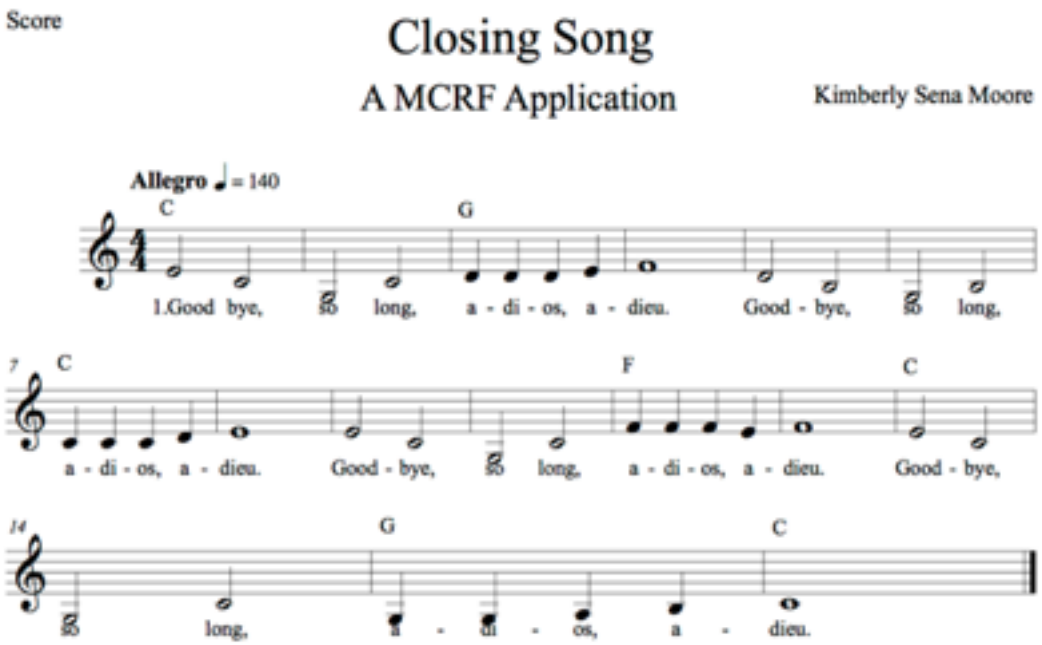
Application Name: Closing Song

Intervention Strategy: Group singing

Therapeutic Intent

The purpose of the closing application is three-fold: 1) as a "neutral arousal" application it functions as a musical transition from the music therapy session, 2) it provides an opportunity for the therapist to collect GAS ratings for each child at the end of the session, and 3) it provides an opportunity for group children to self-rate their pleasure and arousal states at the end of the session using the pleasure and arousal sub-scales of the Self-Assessment Manikin (SAM).

Music



Verse 1:

Goodbye, so long, adios, adieu. (repeat 3 times)

Verse 2: Tell me (name of child 1) how you feel right now.

Tell me (name of child 2) how you feel right now.

Tell me (name of child 3) how you feel right now.

Now let's say goodbye, so long, adios, adieu.

Verse 3: Put your dot on your robot to show me how you feel. (repeat 2 times)

Now let's say goodbye, so long, adios, adieu.

Directions: Provide group members with a laminated copy of the Self-Assessment Manikin (SAM) assessment tool and two colored dots. Begin playing the song; directions are embedded in the lyrics. At the completion of the song, collect the SAM laminated papers and set them to the side.

Accompaniment pattern: Alternating bass pluck fingerpicking

Music Delivery Method: Live guitar delivered by the interventionist. Live singing delivered by the interventionist and children.

Intended arousal level: Neutral arousal

TFM guidelines followed: Melodic and rhythmic repetition, consonant harmonies, easy-to-follow contour, simple binary rhythms, moderate volume level, moderate tempo.

Therapist Effectiveness: If needed, allow time for client response following a prompt, such as "how you feel right now?" or "show me how you feel," by vamping guitar chord. In addition, sung prompts can be reinforced with verbal prompts (e.g. "how do you feel, (child 1)?").

Intervention Materials: Guitar, SAM rating sheet for each child, two colored dots per child

MCRF Application 3

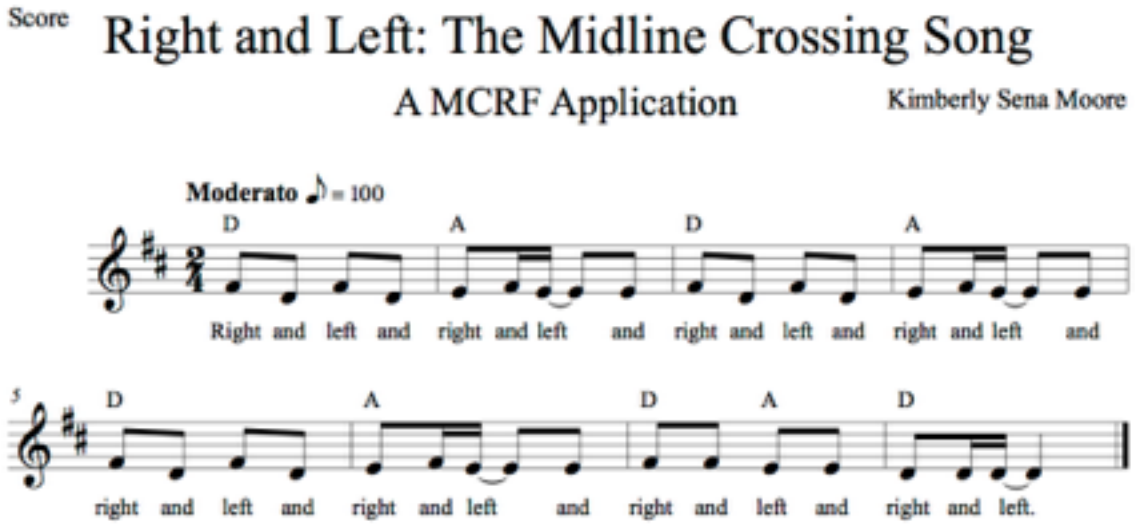
Application Name: Crossing the Midline (drums)

Intervention Strategy: Instrument play

Therapeutic Intent

To provide a stimulating, high arousal experience.

Music



Lyric variation: Right and left (child name) crosses his/her arms, as

Right and left (child name) plays the drum.

She/he goes right and left and right and left, and

Right and left and right and left.

Transition variation: Right and left and right and left and

Right and left and right and left and

Right and left and right and left, now

Pass the drum to (child 2 name) on your right/left.

Directions: Interventionist holds one paddle drum in each hand and child holds one mallet in each hand. Interventionist holds paddle drum in right hand at shoulder height and instructs

client to cross his or her body to hit the drum with the mallet. When successful, alternate so paddle drum in right hand is on interventionist lap and paddle drum in left hand is shoulder height. If needed, re-instruct child to cross his or her body to hit the drum with the mallet. Continue alternation with, as needed, verbal prompts of "right and left and right and..." until pattern is rhythmically steady. When child is crossing body to play paddle drums in a steady beat fashion, interventionist begins singing song. Remainder of instructions are embedded in the lyrics.

Accompaniment pattern: N/A

Music Delivery Method: Live singing delivered by the interventionist.

Intended arousal level: High arousal

TFM guidelines followed: Fast tempo, frequent harmonic changes, staccato articulations.

Therapist Effectiveness: To increase the complexity of the experience, spontaneously move the paddle drums up and down on a vertical plane, change the far or close the drum is held on the horizontal plane, and/or incorporate sudden tempo changes. To decrease the complexity of the experience, keep the paddle drums on the same horizontal plane, decrease the tempo, provide a verbal or visual prompt, and/or pause following a prompt to allow for processing time.

Intervention Materials: 2 paddle drums with mallets

MCRF Application 4

Application Name: Shake Song (Movement)

Intervention Strategy: Music and movement

Therapeutic Intent

To provide a stimulating, high arousal experience.

Music

Lyric variations: Shake your (insert body part), shake your . . .

Wiggle your (insert body part), wiggle your . . .

Bounce up and down, bounce up and down . . .

Directions: Instruct children to stand. Instructions embedded in lyrics.

Accompaniment pattern: Modified calypso strum

Music Delivery Method: Live guitar playing and singing by the interventionist.

Intended arousal level: High arousal

TFM guidelines followed: Fast tempo, syncopated accompaniment pattern, sudden pitch changes, wide skips, staccato articulation, and abrupt attacks.

Therapist Effectiveness: N/A

Intervention Materials: Guitar

MCRF Application 5

Application Name: Follow the Leader (Instrumental)

Intervention Strategy: Instrumental improvisation

Therapeutic Intent

To provide a stimulating, high arousal experience.

Directions: Set floor drum in middle of circle. Spend 30 seconds allowing children to explore sounds that can be created on the drum. Transition to a follow-the-leader group improvisation experience by instructing clients to "copy me." Lead them through a sequence of novel and unexpected ways of playing the drum (e.g. loud rumble, sounds and silences, alternative large elephant sounds and small mouse sounds, steady rhythms, sounds bursts, etc.). If successful and/or with practice, allow children to take turns as the "leader" so that the group follows how he or she is playing the drum.

Accompaniment pattern: N/A

Music Delivery Method: Instrument playing by the interventionist and children.

Intended arousal level: High arousal

TFM guidelines followed: Complex rhythmical patterns and sudden and unexpected rhythmic, tempo, articulation, and stylistic changes.

Therapist Effectiveness: N/A

Intervention Materials: Large floor drum

MCRF Application 6

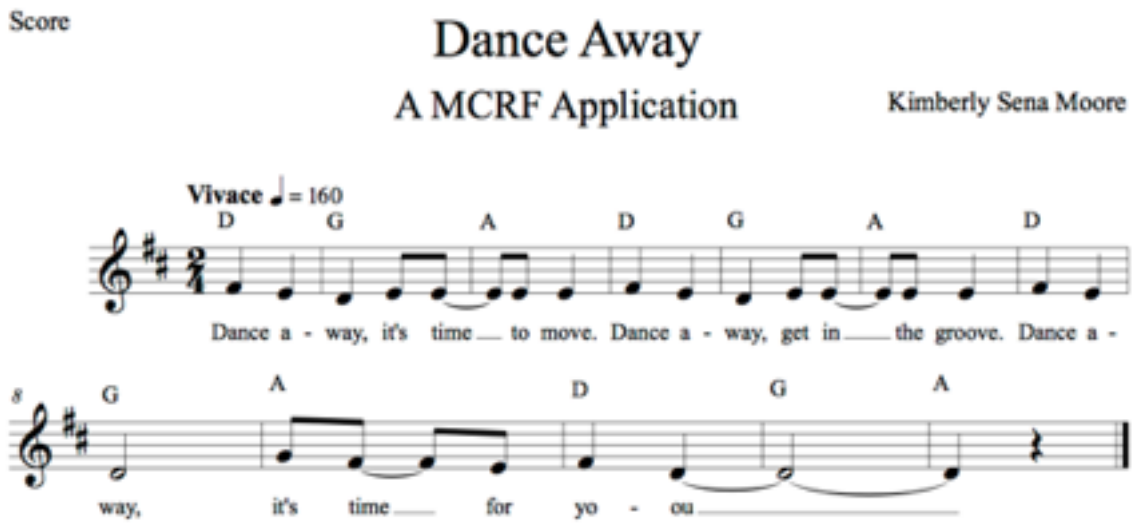
Application Name: Dance Away (start and stop)

Intervention Strategy: Music and movement

Therapeutic Intent

To provide a stimulating, high arousal experience.

Music



Lyric variation 1: Shake your (insert body part), it's time to move.

Shake your (insert body part), get in the groove.

Shake your (insert body part), it's time for you.

Lyric variation 2: Wiggle your (insert body part), it's time to move.

Wiggle your (insert body part), get in the groove.

Wiggle your (insert body part), it's time for you.

Directions: Instruct children to stand, to listen to the music, and to move when the music plays and freeze when the music stops. Remainder of movement instructions embedded in lyrics. Throughout application, spontaneously stop music, then resume playing after all clients have "frozen" their movements.

Accompaniment pattern: Bass strum

Music Delivery Method: Live guitar playing and singing by the interventionist.

Intended arousal level: High arousal

TFM guidelines followed: Fast tempo, ternary harmonic structure, unexpected rhythmic pauses, staccato articulations, abrupt attacks.

Therapist Effectiveness: Allow time for clients to "freeze." Incorporate verbal prompts as needed. To lower arousal level, slow down tempo, reduce number of "freeze" moments, and/or repeat embedded movement instructions. To increase arousal level, increase tempo and/or increase number of "freeze" moments.

Intervention Materials: Guitar

MCRF Application 7

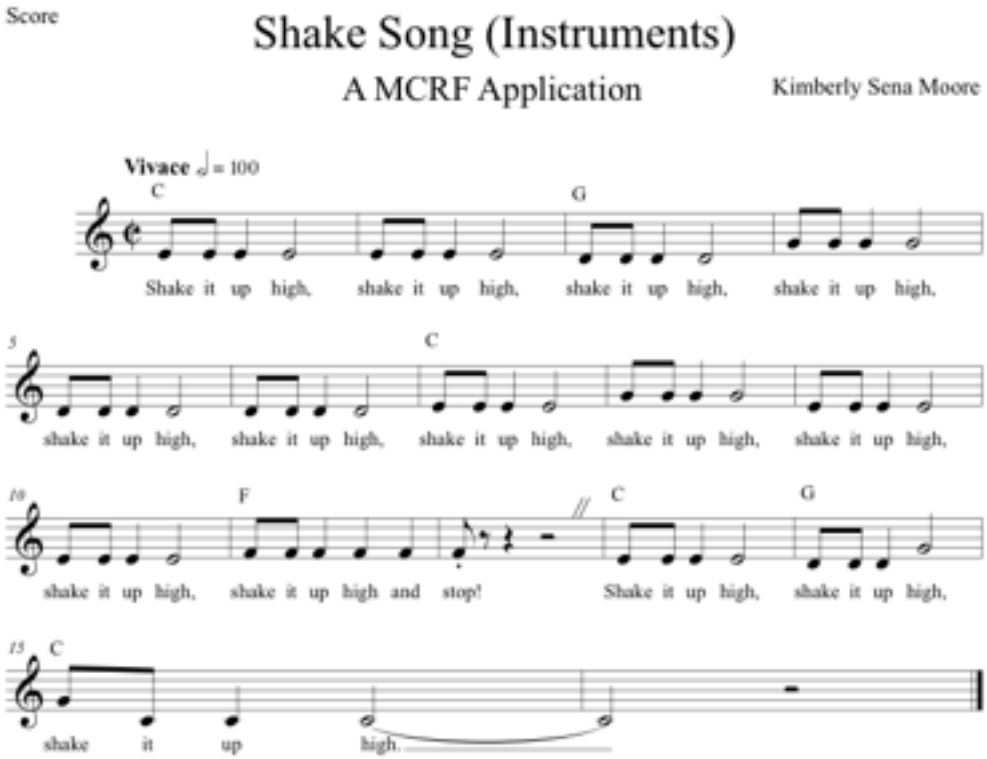
Application Name: Shake Song (Instruments)

Intervention Strategy: Instrument play

Therapeutic Intent

To provide a stimulating, high arousal experience.

Music



Lyric variations: Shake it down low . . .

Shake it near your (insert body part) . . .

Shake it to the side . . .

Shake it all around . . .

Directions: Instructions embedded in lyrics.

Accompaniment pattern: Modified calypso strum

Music Delivery Method: Live guitar playing and singing by the interventionist. Instrument play by children.

Intended arousal level: High arousal

TFM guidelines followed: Fast tempo, syncopated accompaniment pattern, sudden pitch changes, wide skips, staccato articulation, abrupt attacks, and unexpected lyrical instructions.

Therapist Effectiveness: N/A

Intervention Materials: Guitar, small hand percussion shakers (e.g. egg shakers, jingle bells)

MCRF Application 8

Application Name: The Rocking Song

Intervention Strategy: Music and movement

Therapeutic Intent

To provide a calming, low arousal experience.

Music

Directions: Children and interventionist sit cross-legged on the floor. Interventionist instructs children to rock side-to-side with verbal prompt "side...to side...to side..." spoken in rhythmic fashion (i.e., "side" spoken on beats 1 and 4, "to" spoken on beats 3 and 6). When group is entrained to the rhythmic movement pattern, begin autoharp accompaniment to match tempo, then follow with sung lyrics.

Accompaniment pattern: Tenuto strum on beats 1 and 4, light strum on beats 3 and 6

Music Delivery Method: Live autoharp delivered by the interventionist. Live singing delivered by the interventionist and children.

Intended arousal level: Low arousal

TFM guidelines followed: Soft loudness level, little rhythmic, tempo, or loudness changes,

and a ritardando at end of song.

Therapist Effectiveness: N/A

Intervention Materials: Autoharp

MCRF Application 9

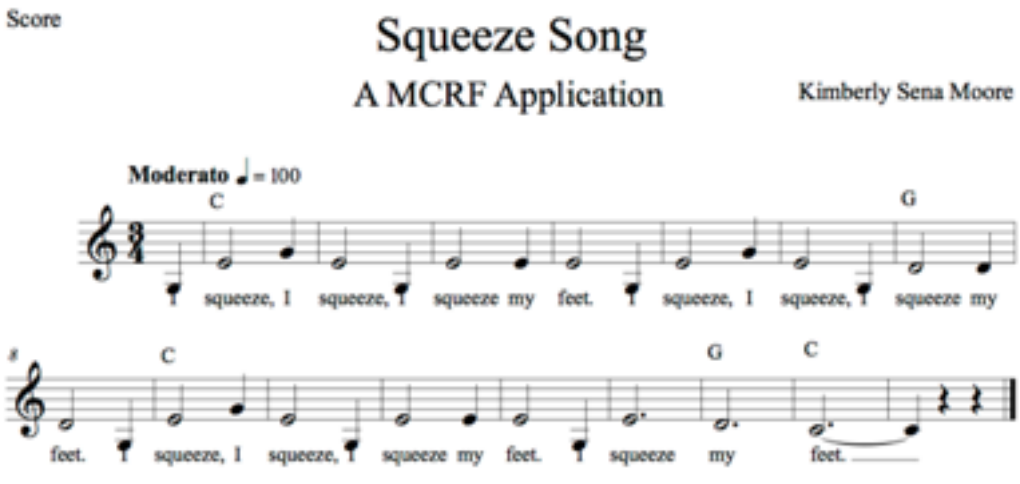
Application Name: Squeeze Song

Intervention Strategy: Self-sensory massage

Therapeutic Intent

To provide a calming, low arousal experience.

Music



Verse 1: I squeeze, I squeeze, I squeeze my feet. (repeat 2 times)

I squeeze my feet.

Verse 2: I brush, I brush, I brush my legs. (repeat 2 times)

I brush my legs.

Verse 3: I squeeze, I squeeze, I squeeze my hands. (repeat 2 times)

I squeeze my hands.

Verse 4: I brush, I brush, I brush my arms. (repeat 2 times)

I brush my arms.

Verse 5: I push, I push, I push on my head. (repeat 2 times)

I push on my head.

Directions: Interventionist instructs children to sit on the floor with legs extended, then to place one hand on each foot and rhythmically "squeeze and squeeze and squeeze..." prompted in steady and slow 3/4 pattern (i.e., with "squeeze" falling on beat 1 and "and" falling on beat 3). Once group is entrained, interventionist starts singing song. Remainder of instructions are embedded in lyrics.

Accompaniment pattern: N/A

Music Delivery Method: Live singing by the interventionist

Intended arousal level: Low arousal

TFM guidelines followed: Slow tempo, soft loudness levels, little variability, simple musical texture, legato articulations.

Therapist Effectiveness: N/A

Intervention Materials: N/A

MCRF Application 10

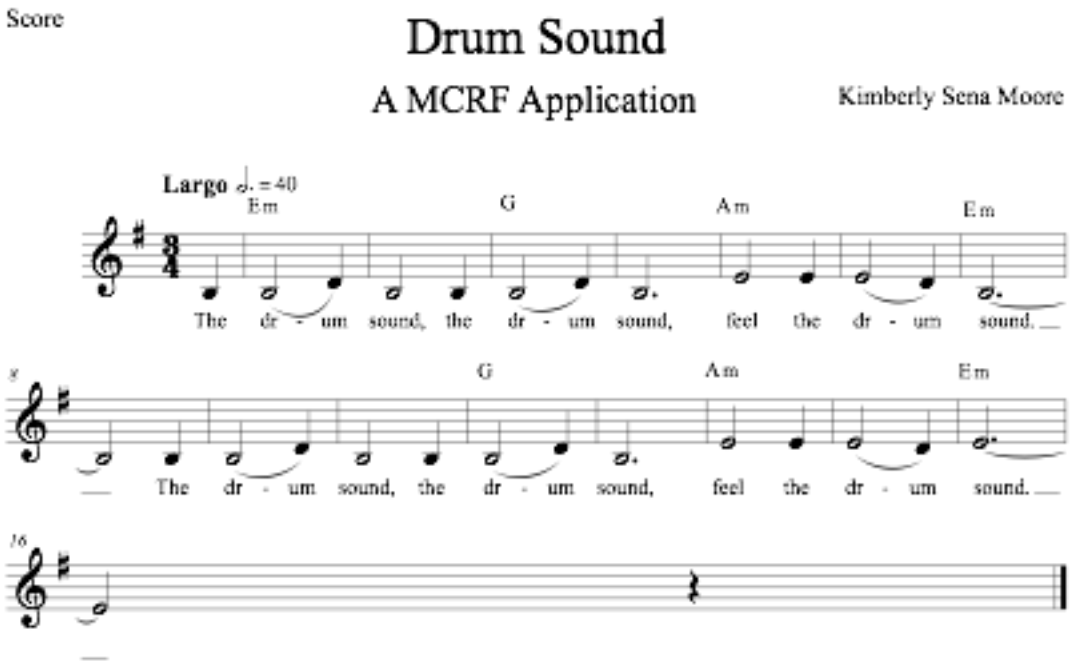
Application Name: Drum Bath

Intervention Strategy: Instrumental sensory stimulation

Therapeutic Intent

To provide a calming, low arousal experience.

Music



Directions: Instruct children to sit on floor. Place drum over the child's head and play once or twice to assess for appropriateness of sensory stimulation. If child is okay, continue playing drum in slow, steady, rhythmic pattern, then start singing song. Repeat process with next child after song is complete.

Accompaniment pattern: N/A

Music Delivery Method: Live singing by the interventionist

Intended arousal level: Low arousal

TFM guidelines followed: Slow tempo, soft loudness level, legato articulation, little musical

variability, and chant-like style.

Therapist Effectiveness: Be aware of potential sensory issues. If hypersensitivity exists, raise drum so it is further from the child's head and/or play drum more softly.

Intervention Materials: Large floor drum with mallet

MCRF Application 11

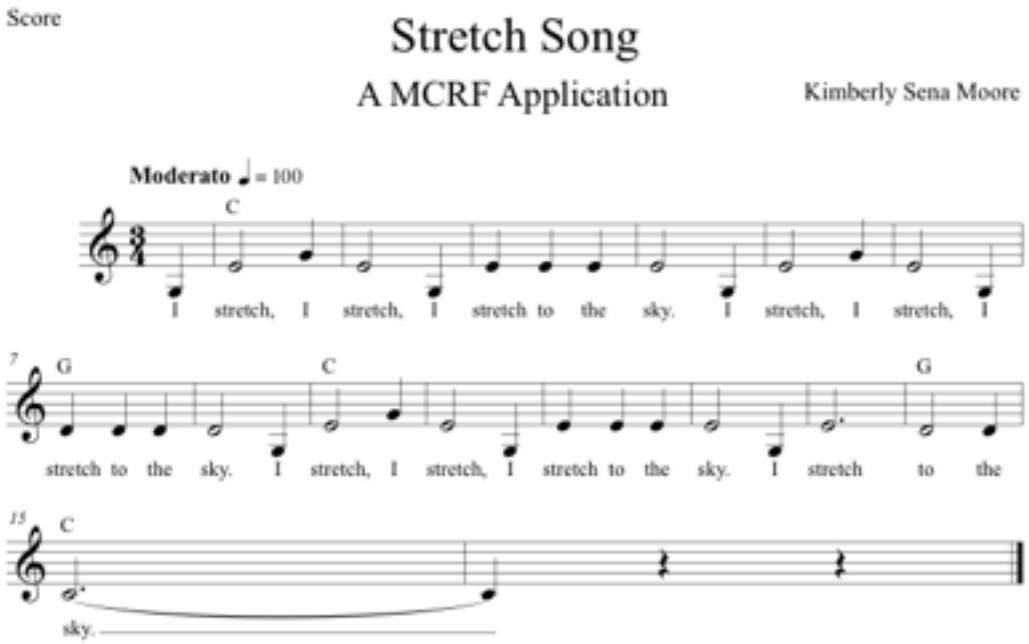
Application Name: Stretch Song

Intervention Strategy: Music and movement

Therapeutic Intent

To provide a calming, low arousal experience.

Music



Lyrics variations: I stretch, I stretch, I stretch my arms high . . .

I stretch, I stretch, I stretch to the side . . .

I stretch, I stretch, I stretch out my legs . . .

Directions: Interventionist instructs children to raise arms over head and stretch to the sky. Release arms to the ground, then start song to prompt children to reach to the sky again. Remainder of instructions are embedded in lyrics.

Accompaniment pattern: N/A

Music Delivery Method: Live singing by the interventionist

Intended arousal level: Low arousal

TFM guidelines followed: Slow tempo, soft loudness levels, little variability, simple musical texture, legato articulations.

Therapist Effectiveness: N/A

Intervention Materials: N/A

MCRF Application 12

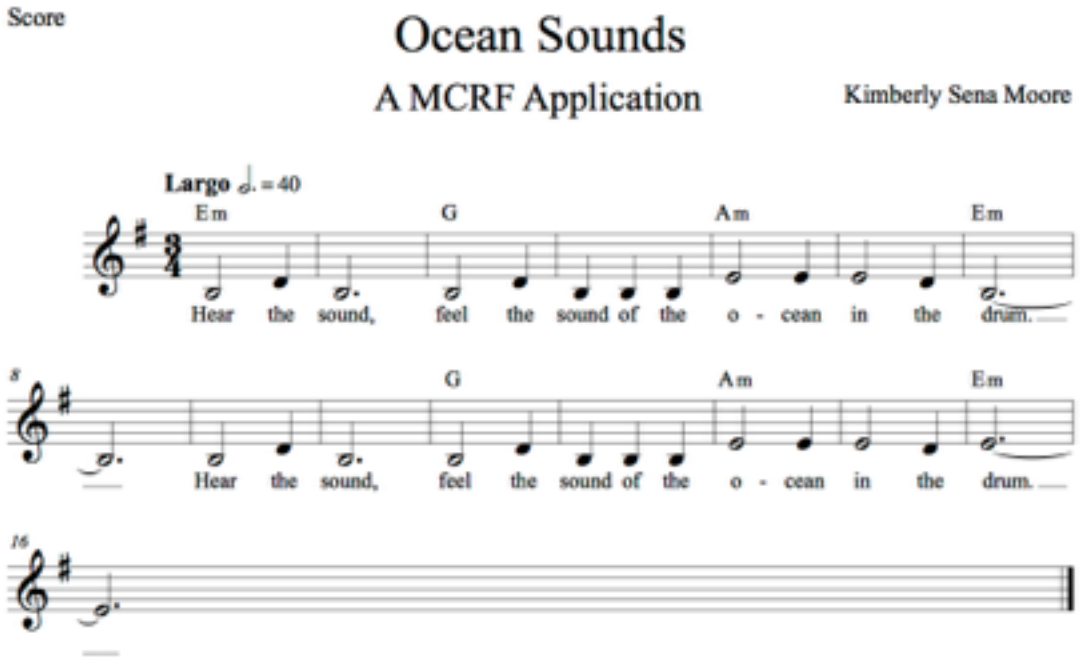
Application Name: Ocean Sounds

Intervention Strategy: Instrument play

Therapeutic Intent

To provide a calming, low arousal experience.

Music



Directions: Instruct children to sit on floor. Introduce ocean drum by allowing children to explore sound. When ready, hand ocean drum to a child and start singing song. If needed, prompt child to play slowly or more quietly. Instruct client to pass ocean drum to the next peer after song is complete and repeat process.

Accompaniment pattern: N/A

Music Delivery Method: Live singing by the interventionist. Instrument play by children.

Intended arousal level: Low arousal

TFM guidelines followed: Slow tempo, soft loudness level, legato articulation, little musical

variability, and chant-like style.

Therapist Effectiveness: Be aware of potential sensory issues. If hypersensitivity exists, instruct child to keep ocean drum as still as possible.

Intervention Materials: Ocean drum

MCRF Application 13

Application Name: Deep breathing

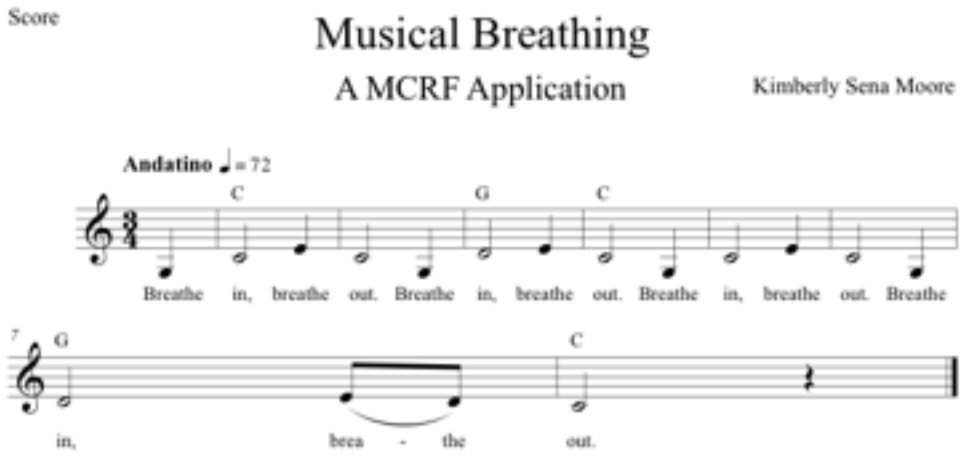
Intervention Strategy: Music-facilitated breathing

Therapeutic Intent

To provide a calming, low arousal experience.

Music

Directions: Instructions embedded in lyrics.



Accompaniment pattern: N/A

Music Delivery Method: Live singing by interventionist

Intended arousal level: Low arousal

TFM guidelines followed: Slow tempo, soft loudness level, legato articulations, and ritardando at the end.

Therapist Effectiveness: N/A

Intervention Materials: None

APPENDIX B

MCRF INTERVENTION PILOT ASSESSMENT

For the following music therapy intervention, please listen to the song and rate the arousal level of each music characteristic and the song as a whole using the following rating scale of 1-7 with 1 being "low arousal" and 7 being "high arousal."

Melody:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Pitch:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Rhythm:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Dynamics:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Harmony:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Form:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Tempo:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Timbre:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Style:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Lyrics:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Texture:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

OVERALL:

1 2 3 4 5 6 7
low arousal neutral arousal high arousal

Comments:

APPENDIX C

RECRUITMENT MATERIALS

PRESCHOOL RECRUITMENT SCRIPTS

Invitation to Preschool to Participate in a Research Study - Phone Script

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Hello (insert name),

My name is Kimberly Sena Moore. I am a music therapist and a doctoral candidate at the University of Missouri-Kansas City, currently living in Miami.

I am about to start a research study I am doing as part of my education. The purpose of this project is to study how music can be used to help preschool children learn to manage their emotions and their body's excitement levels.

I am looking for preschools who are willing to let me recruit families to participate in this music study. I am specifically looking for families who have at least one child who is three to five years old and is typically developing that they would let participate in the study.

Do you have a few minutes for me to talk with you about this study?

If preschool director says "no" to continuing the conversation: I certainly understand and appreciate your time today. Is there a better time for me to call back or would you prefer an email?

> *If preschool director says "no":* Thank you (name) for your time today and your consideration. Have a wonderful day.
>
> *If the preschool director prefers a phone call:* (Reschedule phone call) Thank you again. I look forward to talking with you on (insert date) at (insert time).
>
> *If the preschool director prefers email:* What is the best email address where I can send you information? (Collect email address). Thank you (name) for your time today. You will receive an email from me with "Invitation to participate in a music study" in the subject line. Thank you again for your time and I hope you have a wonderful day.

If preschool director says "yes" to continuing the conversation then proceed: The purpose of this study is to help me learn how music can be used to help children learn to manage their emotions and their body's excitement levels. I hope to have nine to thirty children in the study and participation is completely voluntary. If you agree to let me recruit from your preschool, children who are allowed to participate will be in a small music group with two other children during preschool hours. I will be leading music sessions with the group. We will be doing several music activities together, such as singing, playing instruments, dancing to music, and listening to music. Each session will be about 20 minutes long. I will see each group 12 times, three times a week for four weeks.

My purpose in talking with you today is to see if you are interested in learning more about the study and to answer any questions you may have. If you do want to learn more, I would welcome the opportunity to meet with you, see the school, and talk about the possibility of allowing me to do my study there.

(Answer questions. Schedule meeting, if appropriate.)

If preschool director says "yes" and a meeting is scheduled: Thank you (name) for your time today. I look forward to meeting you on (insert date) at (insert location). I will be sending an email to confirm the meeting and will attach the study's recruitment flyer and informed consent form for your review. If you have any questions between now and then, please do not hesitate to contact me at XXX-XXX-XXXX.

If a preschool director says "no": Thank you (name) for your time today and your consideration. Have a wonderful day.

Follow-up Recruitment Invitation Email to Preschool Director

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Subject line: Invitation to participate in a music study

Dear (insert name),

Thank you for your time and consideration on the phone today. As I briefly state on the phone, the purpose of this study is to help me learn how music can be used to help children learn to manage their emotions and their body's excitement levels. I hope to have nine to thirty children in the study and participation is completely voluntary. If you agree to let me recruit from your preschool, children who are allowed to participate will be in a small music group with two other children during preschool hours. I will be leading music sessions with the group. We will be doing several music activities together, such as singing, playing instruments, dancing to music, and listening to music. Each session will be about 20 minutes long. I will see each group 12 times, three times a week for four weeks.

My purpose in contacting you is to see if you are interested in learning more about the study and to answer any questions you may have. If you do want to learn more, I would welcome the opportunity to meet with you, see the school, and talk about the possibility of allowing me to do my study there. If interested, please let me know what day or times works best in your schedule for a meeting.

In the meantime, if you have any questions please call me at XXX-XXX-XXXX.

Thank you again,
Kimberly

Follow-up Recruitment Confirmation Email to Preschool Director

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Dear (insert name),

Thank you for your time and consideration on the phone today. This email is to confirm our meeting on (date) at (time). I am looking forward to touring your school and talking with you about the possibility of participating in this study.

The title of the music study is "Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study." This study has been approved by the at the University of Missouri-Kansas City. The researchers in charge of this study are Dr. Bill Everett, Professor of Musicology at the Conservatory of Music and Dance, University of Missouri-Kansas City, and Dr. Deanna Hanson-Abromeit, Assistant Professor of Music Education and Music Therapy at the School of Music, University of Kansas. The study will be run by me as a graduate student researcher qualified to conduct it.

The purpose of this study is to help me learn how music can be used to help children learn to manage their emotions and their body's excitement levels. I hope to have nine to thirty children in the study and participation is completely voluntary with written permission from the parent. If you agree to let me recruit from your preschool, children who are allowed to participate will be in a small music group with two other children during regular preschool hours at a time mutually convenient to the teacher and myself. I will be leading music sessions with each group. We will be doing several music activities together, such as singing, playing instruments, dancing to music, and listening to music. Each session will be about 20 minutes long. I will see each group 12 times, three times a week for four weeks.

Please find attached the recruitment flyer and parental informed consent document for your review. I will be happy to answer any questions you have when we meet.

In the meantime, if you have any questions please call me at XXX-XXX-XXXX.

Thank you again,
Kimberly

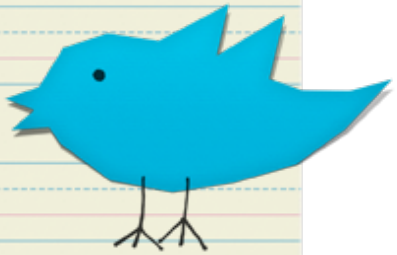
MUSIC STUDY

PRESCHOOLERS ARE BEING ASKED TO TAKE PART IN A RESEARCH STUDY:

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers; A Mixed Methods Feasibility Study

FREE 12-session music group filled with instrument playing, singing, dancing, and more!

Led by a board certified music therapist



REQUIREMENTS & ELIGIBILITY

- OPEN TO ANY TYPICALLY DEVELOPING PRESCHOOLER (AGES 3-5) FLUENT IN ENGLISH
- CHILD PARTICIPATES IN 4 WEEKS OF MUSIC GROUPS & 3 INTERVIEWS
- PARENT PARTICIPATES IN 2 INTERVIEWS & QUESTIONNAIRES

IF INTERESTED, CONTACT
KIMBERLY SENA MOORE, MM, MT-BC
XXX-XXX-XXXX

XXX-XXX-XXXX MUSIC RESEARCH
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PARTICIPANT INFORMATIONAL LETTER

April 25, 2014

Dear Preschool Parents,

My name is Kimberly Sena Moore. I am a music therapist and a doctoral candidate at the University of Missouri-Kansas City, currently living in Miami. Next fall, I will be on faculty at the University of Miami as an Assistant Professor-in-Practice of Music Therapy in the Frost School of Music.

This summer I will be doing a research study as part of my doctoral education. The purpose of this study is to help me learn how music can be used to help children learn to manage their emotions and their body's excitement levels. This study is open to any typically developing preschool child (ages 3-5) who is fluent in English. I hope to have nine to fifteen children in the study and participation is completely voluntary.

Children who participate will be in a small music group with two other children. We will be doing several music activities together, such as singing, playing instruments, dancing to music, and listening to music. Each session will be about 20 minutes long and will take place during preschool hours. I will see each group 12 times, three times a week for four weeks. In addition, I will be conducting interviews with participating children before and after the four weeks of music groups and will be asking for you to participate in two interviews (20 minutes each) and fill out some questionnaires.

Please find enclosed a flyer for the study with my contact information. You are welcome to contact me if you have questions or are interested in participating. I will also be at the preschool on Monday, May 12 and Tuesday, May 13 between 4:00 pm and 6:00 pm and will be attending the parent meeting on Wednesday, May 14 at 5:00 pm. During these on-site visits I will be available to talk with you about the study in detail and can answer any questions you may have.

I look forward to meeting you. Feel free to contact me (XXX-XXX-XXXX) if you have any questions or would like more information.

Thank you for your consideration.

Kimberly Sena Moore, MM, MT-BC

PARTICIPANT RECRUITMENT SCRIPTS

Invitation to Learn About a Research Study - In-Person Script

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Hello (insert name),

My name is Kimberly Sena Moore. I am a music therapist and a doctoral candidate at the University of Missouri-Kansas City, currently living in Miami.

Earlier this week I sent a flyer home with your child that introduced a research study I am doing as part of my education. I am inviting students from your child's preschool who are three to five years old and who are typically developing to participate in this study.

The purpose of this project is to study how music can be used to help children learn to manage their emotions and their body's excitement levels. Participation is completely voluntary. I am here today to see if you would be interested in learning more about the study?

If a parent says "yes": Thank you (parent name) for your interest. The first step is a phone call between you and me so that I can share more about the study with you.

(Collect parent contact information. Schedule follow-up phone call).

Thank you for your time today. I look forward to talking with you again on (insert date) at (insert time). If you have any questions between now and then, please call me at XXX-XXX-XXXX.

If a parent says "no": Thank you (parent name) for your time today. Have a wonderful day.

Request for Participation in a Research Study - Phone Script

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Hello (insert name),

My name is Kimberly Sena Moore. I am a music therapist and a doctoral candidate at the University of Missouri-Kansas City.

Earlier this week I sent a flyer home with your child that introduced a research study I am doing as part of my education. I am inviting students from your child's preschool who are three to five years old and who are typically developing to participate in this research.

Do you have a few minutes for me to talk with you about this study?

If parent says "no": I certainly understand and appreciate your time today. Is there a better time for me to call back?

(Reschedule phone call)

Thank you again. I look forward to talking with you on (insert date) at (insert time).

If parent says "yes" then proceed: The purpose of this study is to help me learn how music can be used to help children learn to manage their emotions and their body's excitement levels. I hope to have nine to thirty children in the study. Your participation is completely voluntary. If you agree, your child will be in a small music group with two other children. I will be leading music sessions with the group. We will be doing several music activities together, such as singing, playing instruments, dancing to music, and listening to music. Each session will be about 20 minutes long and will take place during preschool hours. I will see each group 12 times, three times a week for four weeks.

My purpose in talking with you today is to see if you are interested in learning more about the study and to answer any questions you may have. If you do want to learn more, the next step will be for us to schedule a meeting. We will talk about the research study in more detail and I can answer any questions or concerns you may have. If you choose to participate, we will also start filling out the preliminary paperwork. We will need about 60 minutes for this meeting. Most of the time will be for you to give written information about your child. If you want a shorter meeting that is around 30 minutes, you can do these forms at home and mail them to me.

(Answer questions. Schedule meeting, if appropriate.)

If a parent says "yes" and a meeting is scheduled: Thank you (parent name) for your time today. I look forward to meeting you on (insert date) at (insert location). If you have any questions between now and then, please do not hesitate to contact me at XXX-XXX-XXXX.

If a parent says "no": Thank you (parent name) for your time today and your consideration. Have a wonderful day.

APPENDIX D

INFORMED CONSENT AND CHILD ASSENT

WILLINGNESS TO PARTICIPATE

Willingness to Participate in a Research Study

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Kimberly Sena Moore, Graduate Student
Ph.D. Candidate, Music Education and Music Therapy
Conservatory of Music and Dance, University of Missouri-Kansas City
School of Education, University of Missouri-Kansas City

William A. Everett, Ph.D.
Professor of Musicology
Conservatory of Music and Dance, University of Missouri-Kansas City

Deanna Hanson-Abromeit, Ph.D.
Assistant Professor of Music Education and Music Therapy
School of Music, The University of Kansas

The UMiami-Cantebury at Gables daycare ("Daycare") (1150 Stanford Dr., Coral Gables FL, 33146, 305/284-5437) agrees to participate in the UMKC SSIRB-approved study titled "Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study." The Daycare will allow the study's researchers to recruit families to participate in the study. The following classroom teachers have agreed to participate in the study:

_____ _____

_____ _____

_____ _____
Signature of Daycare Representative Date

_____ _____
Signature of Student Investigator Date

_____ _____
Signature of Daycare Teacher Date

_____ _____
Signature of Daycare Teacher Date

_____ _____
Signature of Daycare Teacher Date

_____ _____
Signature of Daycare Teacher Date

Consent for Participation in a Research Study - Teacher

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Kimberly Sena Moore, Graduate Student
Ph.D. Candidate, Music Education and Music Therapy
Conservatory of Music and Dance, University of Missouri-Kansas City
School of Education, University of Missouri-Kansas City

Bill Everett, Ph.D.
Professor of Musicology
Conservatory of Music and Dance, University of Missouri-Kansas City

Deanna Hanson-Abromeit, Ph.D.
Assistant Professor of Music Education and Music Therapy
School of Music, The University of Kansas

Request to Participate

You are being asked to take part in a research study because you are a preschool classroom teacher.

The researchers in charge of this study are Dr. Bill Everett, Professor of Musicology at the Conservatory of Music and Dance, University of Missouri-Kansas City, and Dr. Deanna Hanson-Abromeit, Assistant Professor of Music Education and Music Therapy at the School of Music, University of Kansas. The study will be run by Kimberly Sena Moore, a graduate student researcher qualified to conduct this study. Other qualified people may also work with them.

The study team is asking you to take part in this research study because you are a preschool teacher of 3 to 5 year olds. Research studies only include people who choose to take part. This document is called a consent form. Please read this consent form carefully and take your time making your decision. The student researcher will go over this consent form with you. Ask her to explain anything that you do not understand. Think about it and talk it over with your family and friends before you decide if you want to take part in this research study. This consent form explains what to expect: the procedures and any risks and benefits if you agree to be in the study.

Background

This study is looking at how music may help a child's developing skills to manage their emotions. This is also called emotion regulation. Emotion regulation is how we handle and change our emotional response to experiences (like counting to 10 when angry, singing a lullaby or rocking a crying baby). Some children have a hard time learning these skills due to challenges like having autism or experiencing trauma. Research has already been done to show that music can change emotions, even in children. The researchers of this study want to learn how music can be used to help children develop emotion regulation skills.

There will be about 4 teachers participating in this study and about 9 to 30 preschool students participating.

Purpose

The purpose of this study is to see if music can help children regulate their emotions and the way music may do this.

Procedures

This study will have three steps: 1) pre-music study assessments, 2) the music study procedure, and 3) post-music study assessments.

1) Pre-Music Study Assessments

After getting consent from the parents of students in your class, you will be asked to complete several forms about how your preschool students behave during school. This is important to the study because it will provide more accurate information about you students. You will only be filling out forms for students whose parents gave permission for them to participate. It should take you about 45 minutes to one hour to complete the forms. Please return the completed forms to the student researcher in the envelope she gives to you.

2) Music Study Procedure

The children in your classroom whose parents gave their consent will be part of a music group with up to two other children. The student researcher will meet with each group three times a week for four weeks. Each of the music sessions will last about 20 minutes. Session will be during regular preschool hours in one of the classrooms at the preschool. You will not be asked to do anything during the music study procedure.

3) Post-Music Study Assessments

Immediate post-music study assessments. After the music groups are over, you will receive several forms to fill out. These will be very similar to the forms you filled out at the beginning of the study. It will take you about 45 minutes to complete them. You will be asked to complete these forms and return them to the student researcher during your interview (see below).

In addition, you will be asked to participate in an interview. The interview will let you talk about how helpful and important you thought the music was. The interview will take place at the preschool and last about 20 minutes and will be scheduled at your convenience.

All the interviews will be audio recorded. This is important because it will help the student researcher type out exactly what was said during the interview, which will help during analysis.

Follow-up post-music study assessments. You will be interviewed a second time about a month after the first interview. The reason you will be interviewed again is to see what long-term thoughts you have about the music sessions. In addition, you will be shown some of the answers you shared during your first interview. You will be able to check that they are accurate and you can share more information, if you choose. These interviews will be done just like the first ones. They will also be audio recorded, just like the first interview.

If you agree to participate, you will be involved in this study for about two to three hours. Participation in the study is completely voluntary. You may refuse to participate at any time during the study. You may also refuse to answer certain questions. You have the right to stop at any time during the study procedures.

Risks and Inconveniences

This research is considered to be minimal risk. That means that the risks of taking part in this research study are not expected to be more than the risks in your daily life. There are no other known risks to you if you choose to take part in this study.

However, it is unlikely that there are absolutely no risks related with a study. It is possible to feel uncomfortable talking about personal information and thoughts when filling out forms or during the interviews. This consent form states that you may refuse to answer certain questions if it is uncomfortable to you.

Benefits

This study may help us learn how music can be used as a way to help children develop emotion regulation skills. Your involvement in the study may help teachers and caregivers of children who have difficulty with emotion regulation skills (for example children with autism or those who have experienced trauma).

Fees and Expenses

There are no expenses for you to participate in this study.

Compensation

Your classroom will receive a $25 gift card to a local store such as Target.

Alternatives to Study Participation

The alternative is to not participate.

Confidentiality

While we will do our best to keep the information you share with us confidential, it cannot be absolutely guaranteed. Individuals from the University of Missouri-Kansas City Institutional Review Board (a committee that reviews and approves research studies), Research Protections Program, and Federal regulatory agencies may look at records related to this study to make sure we are doing proper, safe research, and protecting human participants. The results of this research may be published or presented to others. You will not be named in any reports of the results.

To ensure confidentiality, all data collected from you (e.g. responses to questions, interview answers) will be assigned a code number. The master list of participant names and code numbers will be held separate from the raw data by the student investigator in a locked filing cabinet.

All electronic data related to the study, such as audio recordings and paperwork, will be saved on a jump drive and an external hard drive. All jump drives, external hard drives, and hard copies will be stored in a locked cabinet. This locked cabinet will be in a private location NOT located at the preschool. No one at the preschool will see or have access to your data.

If you withdraw from the study at any time during the study procedures, your data will not be kept. It will be destroyed once you withdraw.

Contacts for Questions about the Study

You should contact the Office of UMKC's Social Sciences Institutional Review Board at 816-235-5927 if you have any questions, concerns or complaints about your rights as a research subject. You may call the principal investigator, Dr. Bill Everett, at (816) 235-2857 if you have any questions about this study. You may also call him if any problems come up.

Voluntary Participation

Taking part in this research study is voluntary. If you choose to be in the study, you are free to stop participating at any time and for any reason. If you choose not to be in the study or decide to stop participating, your decision will not affect any benefits you are entitled to. The researchers may stop the study or take you out of the study at any time if they decide that it is in your best interest to do so.

You have read this Consent Form or it has been read to you. You have been told why this research is being done and what will happen if you take part in the study, including the risks and benefits. You have had the chance to ask questions, and you may ask questions at any time in the future by calling Dr. Bill Everett at (816) 235-2857. By signing this consent form, you volunteer and consent to take part in this research study. Study staff will give you a copy of this consent form.

Audio Recorded Interviews
Audio recording the interviews is important because it will help the researchers know exactly what was said during the interview. All interviews will be audio taped for the researchers to listen to and take notes. If you do not give permission for this recording, you cannot participate in the research.

_____ I agree to allow the researchers to audio record my interviews (please use your initials).

It is optional to give permission for the researchers to use the audio recordings for future educational or research purposes. You do not have to give permission for future educational or research purposes to participate in the study.

I give permission for the researchers to use the audio recordings for (please use your initials):

_____ (Optional) Professional Presentations (e.g. conferences and trainings). The audio recordings will be kept in a secure location. It is possible that your name will be heard. Any other identifying information will not be disclosed.

_____ (Optional) Educational Purposes (e.g. class lectures and training). The audio recordings will be kept in a secure location. It is possible that your name will be heard. Any other identifying information will not be disclosed.

_____ (Optional) Future Research. The audio recordings will be kept in a secure location. It is possible that your name will be heard. Any other identifying information will not be disclosed.

_____	_____
Signature of Teacher	Date
_____	_____
Printed Name of Teacher	Date
_____	_____
Signature of Student Investigator	Date

Consent for Participation in a Research Study

Musical Contour Regulation Facilitation (MCRF) to Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Kimberly Sena Moore, Graduate Student
Ph.D. Candidate, Music Education and Music Therapy
Conservatory of Music and Dance, University of Missouri-Kansas City
School of Education, University of Missouri-Kansas City

Bill Everett, Ph.D.
Professor of Musicology
Conservatory of Music and Dance, University of Missouri-Kansas City

Deanna Hanson-Abromeit, Ph.D.
Assistant Professor of Music Education and Music Therapy
School of Music, The University of Kansas

Request to Participate

You are being asked to take part in a research study. Your child's preschool director and classroom teacher have agreed for this study to take place at your child's preschool center.

The researchers in charge of this study are Dr. Bill Everett, Professor of Musicology at the Conservatory of Music and Dance, University of Missouri-Kansas City, and Dr. Deanna Hanson-Abromeit, Assistant Professor of Music Education and Music Therapy at the School of Music, University of Kansas. The study will be run by Kimberly Sena Moore, a graduate student researcher qualified to conduct this study. Other qualified people may also work with them.

The study team is asking your child to take part in this research study because he or she is 3 to 5 years old and is developing as expected. Research studies only include people who choose to take part. This document is called a consent form. Please read this consent form carefully and take your time making your decision. The student researcher will go over this consent form with you. Ask her to explain anything that you do not understand. Think about it and talk it over with your family and friends before you decide if you want to take part in this research study. This consent form explains what to expect: the procedures and any risks and benefits if you agree for your child to be in the study.

Background

This study is looking at how music may help a child's developing skills to manage their emotions. This is also called emotion regulation. Emotion regulation is how we handle and change our emotional response to experiences (like counting to 10 when angry, singing a lullaby or rocking a crying baby). Some children have a hard time learning these skills due to challenges like having autism or experiencing trauma. Research has already been done to show that music can change emotions, even in children. The researchers of this study want to learn how music can be used to help children develop emotion regulation skills.

Your child is being asked to participate because he or she is 3 to 5 years and is developing as expected. Your child will be one of 9 to 30 participants in this study.

Purpose

The purpose of this study is to see if music can help children regulate their emotions and the way music may do this.

Procedures

This study will have three steps: 1) pre-music study assessments, 2) the music study procedure, and 3) post-music study assessments.

1) Pre-Music Study Assessments

After getting your consent, the student researcher will provide you with four forms to fill out about your child. These will provide the student researcher with information about your child. It will take about one (1) hour to complete them all. Please return the completed forms to the student researcher prior to leaving. You can also take the forms with you, complete them at home, and mail them to the student research using the self-addressed stamped envelope she gives you.

The student researcher will also be giving your child's teacher three similar forms. The reason you and your child's teacher are filling out similar forms is because you can provide information about how your child behaves outside of school, but the teacher can provide information about how your child behaves during school. This is important to the study because it will provide more accurate information about your child.

Assessment session. The student researcher will schedule an individual assessment session with your child. This will happen during regular preschool hours. During the assessment session, the student researcher will introduce herself to your child. She will also introduce the study to your child. Finally, the student researcher will show your child one of the tasks he or she will use in the music study (a self-report task) and will do an assessment called the puppet play interview. The assessment session will last about 30 minutes.

The puppet play interview has been used a lot with preschoolers. Your child and the student researcher will sit on the floor. The student researcher will show your child four faces that show four different emotions: happy, sad, angry, and scared. Then she will ask your child to identify each feeling. The student researcher will say, "Show me the _____face" and will ask your child to point to the face that matches the emotion. Next, the student researcher will show your child a hand puppet with no face. Your child will listen to a short story that describes a happy, sad, angry, or scared emotion. When the story is finished, the student researcher will ask your child to show her which emotion the story shared by putting one of the faces on the puppet. This will happen eight times and your child will hear each story two times.

The student researcher will then show your child one of the tasks he or she will use during the music study. This task is called a self-report measure. It will help your child show the student researcher how he or she is feeling. The name of this measure is the Self-Assessment Manikin (SAM). The SAM shows pictures of robots. One set of robot pictures will help your child share how happy or sad he or she feels. The second set of robot pictures will help your child share how energetic or calm he or she feels. The student researcher will show your child these robot pictures. She will ask your child to "show me how you feel" by pointing to the robot that most closely matches how he or she feels. This will happen two times, once for the happy/sad robot pictures and a second time for the energetic/calm robot pictures. Next, the student researcher will share the songs that will be used with the SAM. She will provide your child with two col-

ored dot stickers. She will instruct your child to listen to a song. When your child hears the words "show me how you feel" in the song, he or she will place a colored dot on the robot just like he or she did before. There are two different songs that will use the SAM. Your child will listen to both songs and will practice putting the dots on the SAM robots for each song. When we are finished, the assessment session will be over. The student researcher will return your child to his or her classroom.

2) Music Study Procedure

Your child will be part of a music group with up to two other children. The student researcher will meet with your child's group three times a week for four weeks. Each of the music sessions will last about 20 minutes. Sessions will be during regular preschool hours in one of the classrooms at the preschool.

The music study procedure will use a method created for this study called Musical Contour Regulation Facilitation (MCRF). Each session will include seven age-appropriate music activities. These can include singing, listening to music, moving to music, and playing instruments. During the session the student researcher will be changing the excitement level of your child by alternating between high energy music experiences (e.g. dancing to music, playing new instruments) and calm, low energy music experiences (e.g. singing lullabies, playing an ocean drum). Regardless of whether they are high energy or low energy, all the music experiences will be appropriate for preschoolers.

The session will begin when the student researcher goes to your child's classroom and asks him or her to join the student researcher for music. When the group enters the session room, the student researcher will have the children sit in a circle on the floor. Although the student researcher will be the only one working with your child, there will be three research assistants in the room. These research assistants will be videotaping all the sessions. The videotaping is important because it lets the researchers observe 1) what the student researcher does to make the MCRF method better and 2) how and why the music works. The videos will also help show others (e.g. in a college class, at a conference presentation, or in a training session) examples of what we did or what the music did should you give your permission in this consent form. These videos could also be used in a future research study should you give your permission in this consent form.

The videotaping will start when the group enters the session room. Once seated, each child will be given the SAM and two colored dots. They will put their dots on the SAM robot that matches how they feel when the words in the song tell them to. The student researcher will then lead five music experiences. These five experiences will alternate between high energy ones and calming, low energy ones. The first music experience will be low energy (1), the second will be high energy (2), the third low energy (3), the fourth high energy (4), and the last one low energy (5). The music experiences may include things like:

- Singing together
- Rocking to music
- Playing instruments, such as ocean drums or egg shakers
- Dancing to music
- Listening to music

There will be one last song after the final calming experience (5). The last song is very similar to the first song and it will use the SAM robots just like the first song. After the last song is over, the student researcher will return your child to his or her classroom.

In addition to the videotaping and the SAM robots, the student researcher will be using two other measures during the music sessions. The first is called Goal Attainment Scaling (GAS). The GAS will

help the student researcher rate your child's excitement level at the beginning and end of each session. This is very similar to what your child will do with the SAM robots. The research assistants who are videotaping the sessions will also fill out the GAS tool. Having more than one person do a GAS rating will help make the results more consistent. The second measure is student researcher's field notes. These notes will help the student researcher remember details and events that happened during the session.

3) Post-Music Study Assessments

The last step is the post-music study assessments. Some of these will happen in the weeks immediately after the 12 music sessions are finished (immediate post-music study assessments). Others will happen about a month later (follow-up post-music study assessments).

Immediate post-music study assessments. After the music study is over, the student researcher will mail you three forms to fill out. These will be very similar to the forms you filled out at the beginning of the study. It will take you about 45 minutes to complete them. You will be asked to complete these forms and return them to the student researcher during your interview (see below). Your child's teacher will also be asked to fill out forms similar to what he or she filled out at the beginning of the study.

In addition, the student researcher will be doing interviews with you, your child, and your child's teacher. These interviews will let you all talk about how helpful and important you thought the music was. The interview with your child will take about 10 minutes. It will happen during regular preschool hours. The student researcher will work with the preschool to schedule the interview. The interview with you and your child's teacher will take place at the preschool. It will last about 20 minutes and will be scheduled at your convenience.

All the interviews will be audio recorded. This is important because it will help the student researcher type out exactly what was said during the interview, which will help during analysis.

Follow-up post-music study assessments. The student researcher will be interviewing you, your child, and your child's teacher a second time about a month after the first interview. The reason you will be interviewed again is to see what long-term thoughts you have about the music sessions. In addition, the student researcher will show you some of the answers you shared during your first interview. You will be able to check that they are accurate and you can share more information, if you so choose. These interviews will be done just like the first ones were. They will also be audio recorded, just like the first interview. Finally, the student researcher can talk with you about your child's response to the music. This talk will not be audio recorded.

If you agree to participate, you will be involved in this study for about three hours. Your child will be involved in this study for about seven to eight hours. Your child's teacher will be involved in this study for about two to three hours.

Participation in the study is completely voluntary. You and your child may refuse to participate at any time during the study. You and your child may also refuse to answer certain questions. You and your child have the right to ask to stop at any time during the study's procedures.

Risks and Inconveniences

This research is considered to be minimal risk. That means that the risks of taking part in this research study are not expected to be more than the risks in your daily life. There are no other known risks to you if you choose to take part in this study.

However, it is unlikely that there are absolutely no risks related with a study. In this study, there is a chance that your child could become highly stimulated and/or disruptive due to: 1) the change in routine that will occur because the student researcher is removing your child from his or her regular schedule or 2) your child participating in experiences that are meant to be high energy. The student researcher has a lot of experience working with children who show disruptive behaviors. She will be continually monitoring your child for signs that indicate he or she is unwilling to continue participating in the session. Participation in the sessions will be voluntary.

It is also possible to feel uncomfortable talking about personal information and thoughts (such as those about your child) when filling out forms or during the interviews. This informed consent states that you and your child may refuse to answer certain questions if it is uncomfortable to you.

Benefits

Your child may benefit from this study through participating in music experiences. Research continues to support the positive effect participating in music has on child development. Your involvement in the study may also help children who have difficulty with emotion regulation skills (for example children with autism or those who have experienced trauma). This study will help us learn how music can be used as a way to help these children develop emotion regulation skills.

Fees and Expenses

You will not have any expenses if you participate in this study.

Compensation

After you have finished all of the steps in the study, your child will receive a small musical instrument. You will also be entered in a raffle to win one of three $25 gift certificates to a local store such as Target.

Alternatives to Study Participation

Since the research study is testing the use of music, the only alternative to participating is to not participate. However, participating in this study will not stop you from being in other music groups.

Confidentiality

While we will do our best to keep the information you share with us confidential, it cannot be absolutely guaranteed. Individuals from the University of Missouri-Kansas City Institutional Review Board (a committee that reviews and approves research studies), Research Protections Program, and Federal regulatory agencies may look at records related to this study to make sure we are doing proper, safe research, and protecting human participants. The results of this research may be published or presented to others. You will not be named in any reports of the results.

To ensure confidentiality, all data collected on you (e.g. responses to questions, interview answers) will be assigned a code number. The master list of participant names and code numbers will be held separate from the raw data by the student investigator in a locked filing cabinet.

All electronic data related to the study, such as videotaped footage, audio recordings, and paperwork, will be saved on a jump drive and an external hard drive. All jump drives, external hard drives, video cameras,

and hard copies will be stored in a locked cabinet. This locked cabinet will be a in private location NOT located at the preschool. No one at the preschool will see your or your child's data.

The videos will be kept after the study is finished if you give us permission on this consent form. They will be kept for future educational or research purposes. It is your choice whether to give permission for your child's video to be kept and used for future educational or research purposes. There is a chance that your child's face will be seen on the video and your child's name will be heard. If you do not give permission, but the video includes other children who have given permission, your child's face will be blurred and his or her name will be scrambled after this study is over.

If you withdraw from the study at any time during the study procedures, your data will not be kept. It will be destroyed once you withdraw. The only exception will be for videotapes if they include other children in the study. If this happens, those videos will be kept, but your child's face will be blurred and his or her name will be scrambled.

Contacts for Questions about the Study

You should contact the Office of UMKC's Social Sciences Institutional Review Board at 816-235-5927 if you have any questions, concerns or complaints about your rights as a research subject. You may call the principal investigator, Dr. Bill Everett, at (816) 235-2857 if you have any questions about this study. You may also call him if any problems come up.

Voluntary Participation

Taking part in this research study is voluntary. If you choose to be in the study, you are free to stop participating at any time and for any reason. If you choose not to be in the study or decide to stop participating, your decision will not affect any benefits you are entitled to. The researchers may stop the study or take you out of the study at any time if they decide that it is in your best interest to do so. They may do this for medical or administrative reasons or if you no longer meet the study criteria. You will be told of any important findings developed during the course of this research.

You have read this Consent Form or it has been read to you. You have been told why this research is being done and what will happen if you take part in the study, including the risks and benefits. You have had the chance to ask questions, and you may ask questions at any time in the future by calling Dr. Bill Everett at (816) 235-2857. By signing this consent form, you volunteer and consent to take part in this research study. Study staff will give you a copy of this consent form.

Video Recorded Sessions
Video recording the music sessions are an important part of helping the researchers understand how music helps preschool aged children regulate their emotions. All music sessions will be video recorded. If you do not give permission for this recording, your child cannot participate in the research.

_____ I agree to allow the researchers to videotape my child during the music sessions as part of this study (please use your initials).

It is optional to give permission for the researchers to use the videotaped footage for future educational or research purposes. If you do not give permission, but the video includes other children who have given permission, your child's face will be blurred and his or her name will be scrambled after this study is over.

I give permission for the researcher to use the video recordings for (please use your initials):

_____ (Optional) Professional Presentations (e.g. conferences and trainings). The video recordings will be kept in a secure location. It is possible that your child's name will be used and their face will be recognizable. Any other identifying information will not be disclosed.

_____ **(**Optional) Educational Purposes (e.g. class lectures and training). The video recordings will be kept in a secure location. It is possible that your child's name will be used and their face will be recognizable. Any other identifying information will not be disclosed.

_____ (Optional) Future Research. The video recordings will be kept in a secure location. It is possible that your child's name will be used and their face will be recognizable. Any other identifying information will not be disclosed.

Audio Recorded Interviews
Audio recording the interviews is important because it will help the researchers know exactly what was said during the interview. All interviews will be audio taped for the researchers to listen to and take notes. If you do not give permission for this recording, your child cannot participate in the research.

_____ I agree to allow the researchers to audio record my child's interviews (please use your initials).

_____ I agree to allow the researchers to audio record my interviews (please use your initials).

It is optional to give permission for the researchers to use the audio recordings for future educational or research purposes.

I give permission for the researchers to use the audio recordings for (please use your initials):

_____ (Optional) Professional Presentations (e.g. conferences and trainings). The audio recordings will be kept in a secure location. It is possible that your child's name will be heard. Any other identifying information will not be disclosed.

_____ (Optional) Educational Purposes (e.g. class lectures and training). The audio recordings will be kept in a secure location. It is possible that your child's name will be heard. Any other identifying information will not be disclosed.

_____ (Optional) Future Research. The audio recordings will be kept in a secure location. It is possible that your child's name will be heard. Any other identifying information will not be disclosed.

_____
Name of Child

_____
Printed Name of Parent

_____ _____
Signature of Parent Date

_____ _____
Signature of Student Investigator Date

_____ _____
Signature of Faculty Adviser/Principal Investigator Date

Child Assent Description and Script

Protocol title: Musical Contour Regulation Facilitation (MCRF) To Support Emotion Regulation Development in Preschoolers: A Mixed Methods Feasibility Study

Written child assent will not be sought due to the age of the child participants (aged 3-5). Instead, child assent to participate will be obtained at regular intervals verbally, through child's participation in the MCRF sessions, and through the student investigator's continual monitoring of child behavior's that indicate assent. The following script will be utilized at the beginning of the assessment session to determine child assent to participate in the assessment session:

My name is Kimberly, and I am learning about music and your feelings. I would like your help to sing some songs and play a puppet game with me. You will show me what you know about feelings with the songs and puppet game. This will take about 30 minutes. We will go to [insert location of where the assessment will take place at the site] *to sing and play. If you don't feel like playing, you don't have to. You can stop at any time and that will be okay. Do you want to join me?*

Child assent to continue to participate in the study will be determined verbally at the end of the assessment session using the following script:

Thank you for joining me and helping me learn about what you know about feelings. I would like you to join me again for some music groups, this time with two other friends. We will be singing, playing instruments, and moving to music. Each music group will take about 20 minutes and they will help me learn more about how music helps your feelings. If you don't feel like being in music group, you don't have to. You can stop at any time and that will be okay. Do you want to be in the music group?

If a child does not agree to participate in or does not complete an assessment session, the student investigator will ask the child if he or she would like to try again another day. If the child says or indicates "yes," the assessment session will be rescheduled. If the child says or indicates "no,", then it will be determined that the child has indicated a desire not to participate and he or she will be removed from the study.

Child assent to continue study participation will be obtained on a session-by-session basis prior to each MCRF session and through the investigator's continual monitoring of child behaviors that indicate assent. Participating children will indicate assent to participate verbally (e.g. stated "yes") or nonverbally (e.g. smiling, nodding "yes") and by following the student investigator's directions to transition out of the classroom (e.g. lining up at the door, standing next to the student investigator). If a participating child does not indicate a willingness to participate in music, the student investigator will initially attempt techniques such as redirection or positive reinforcement to encourage the child to join music. If the participating child continues to exhibit an unwillingness to join the music group, the child will be given the opportunity to stay in the classroom and will resume with the next scheduled music session.

APPENDIX E

STUDY MEASURES

INTERVENTIONIST-INVESTIGATOR FIELD NOTES

Student investigator field notes will be handwritten in a designated research journal following, as appropriate, each in-person meeting, MCRF session, and interview. Each field note will include, at minimum, the following components:

1. title of the event (e.g. Pre-MCRF parent recruitment meeting)
2. date and time of the event
3. participant ID
4. description of who was present at the event (e.g. parent, teacher, child participant)
5. student investigator's observations of what transpired (e.g. quotes, interactions, nonverbal communications, physical setting)
6. student investigator's reflections on the event
7. The student investigator's observations and reflections will be written in free form fashion.

PUPPET PLAY INTERVIEW EMOTION FACES AND STORIES

Faces retrieved January 3, 2013 from http://devepi.duhs.duke.edu/NIMH_Pictures.html

Happy Faces

Sad Faces

Angry Faces

Afraid Faces

Example of Puppet Body

Puppet Play Interview—Stories

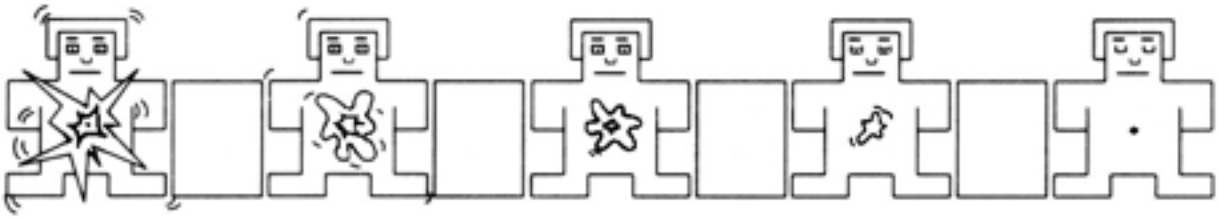
Emotion	Story*	Facial and Vocal Cues
Happy	It was Juan's/Juanita's birthday. All his/her friends came to his/her party, and they all ate birthday cake. Juan/Juanita got lots and lots of presents. Then Juan/ Juanita and his/her friends played some games.	Broad smile, relaxed vocal tone
Afraid	Juan/Juanita was in bed. He/She was all alone as it was very dark. Juan/Juanita heard something moving in the closet, and he/she wanted to hide under the bed. Then he/she heard the closet door open, and Juan/Juanita wanted to run away.	Eyes wide, mouth gaping, high-pitched vocal tone
Angry	Juan/Juanita was at daycare. He/she spent a long time building a block tower. So long that it was very tall. But then a child came and touched his/her beautiful tower. Juan/Juanita said "Be careful!" But the child knocked it down anyway. Juan/Juanita wanted to yell at that child and hit him/her.	Lips pursed, eyebrows furrowed, abrupt vocalizations, gruff and growling
Sad	Juan/Juanita went to feel his/her pet gold fish. But it was not swimming. It was not even in the fish tank. Juan/Juanita's fish had died. He/she really missed his/her fish.	Downturned mouth, downcast eyes, crying vocal tone

Note: Adapted from Bisson (2013), Denham et al. (1994), and Widen and Russell (n.d.)

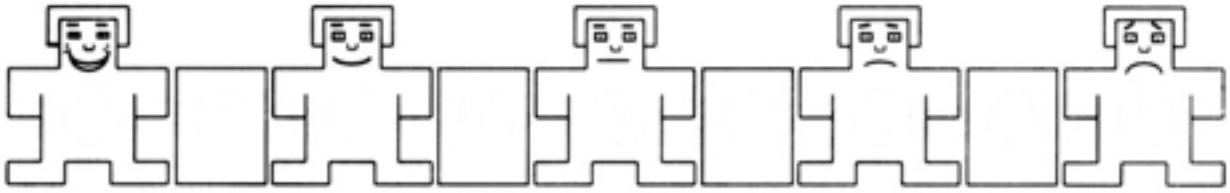
*Each story was read twice and the order was randomized for each child participant. The gender of the story character was matched to the gender of the child participant.

SELF-ASSESSMENT MANIKIN (SAM)

Show me how you feel.



Show me how you feel.



PARENT QUESTIONNAIRE (PRE-MCRF)

Participant ID: _____ Today's date: _____

Instructions: Please write your answers to the questions below. If you need more space, please use the extra pages.

Questions:

1. My child is (circle one): Biological Foster/Adopted My stepchild

2. My child was (circle one): Born pre-mature Born full-term

   If premature, how many weeks old at birth? _____

3. My child is the/an (circle one): Only child Oldest Middle child Youngest

   Number of children in the home: _____

4. My child lives in a (circle one):

   Single-parent household Dual-parent household

5. Marital status (circle ALL that apply):

   Single Married/Partnership Widowed Separated/Divorced Re-married

6. What is your average annual household income (circle one):

   < $50,000 $50,000-100,000 $100,000-150,000 $150,000-250,000 >$250,000

7. What group music classes has your child taken? (such as *Kindermusik or Music Together)*

   How many years was your child in the group music class? _____

8. What music lessons has your child had? (such as piano or violin lessons with a teacher)

   How many years did your child take music lessons? _____

Participant ID: _____

9. Please describe your understanding of how music can help preschool-aged children manage their emotions??

10. What is your opinion of how ***important*** music might be for a preschool-aged child? In what way(s)?

11. What is your opinion of how ***helpful*** music might be for a preschool-aged child? In what way(s)?

EMOTION REGULATION CHECKLIST (ERC)

Participant ID: _____ Circle one: Pre Post

Today's date: _____

Instructions: Please rate how common the following statements are about your child or student. There are no right or wrong answers. We are looking for your overall impression regarding each statement. In the right column, please CIRCLE your answer for each item:

N = Never S = Sometimes O = Often AA = Almost Always

1. Is a cheerful child.	1. N / S / O / AA
2. Exhibits wide moods swings (child's emotional state is difficult to anticipate because s/he moves quickly from positive to negative moods).	2. N / S / O / AA
3. Response positively to neutral or friendly overtures by adults.	3. N / S / O / AA
4. Transitions well from one activity to another; does not because anxious, angry, distressed or overly excited when moving from one activity to another.	4. N / S / O / AA
5. Can recover quickly from episodes of upset or distress (for example, does not pout or remain sullen, anxious or sad after emotionally distressing events).	5. N / S / O / AA
6. Is easily frustrated.	6. N / S / O / AA
7. Responds positively to neutral or friendly overtures by peers.	7. N / S / O / AA
8. Is prone to angry outbursts / tantrums easily.	8. N / S / O / AA
9. Is able to delay gratification.	9. N / S / O / AA
10. Takes pleasure in the distress of others (for example, laughs when another person gets hurt or punishes; enjoys teasing others).	10. N / S / O / AA
11. Can modulate excitement in emotionally arousing situations (for example, does not get "carried away" in high-energy play situations, or overly excited in inappropriate contexts).	11. N / S / O / AA
12. Is whiny or clingy with adults.	12. N / S / O / AA
13. Is prone to disruptive outbursts of energy and exuberance.	13. N / S / O / AA
14. Responds angrily to limit-setting by adults.	14. N / S / O / AA
15. Can say when s/he is feeling sad, angry or mad, fearful or afraid.	15. N / S / O / AA
16. Seems sad or listless.	16. N / S / O / AA

Participant ID: _____

N = Never S = Sometimes O = Often AA = Almost Always

17. Is overly exuberant when attempting to engage others in play.	17. N / S / O / AA
18. Displays flat affect (expression is vacant and inexpressive; child seems emotionally absent).	18. N / S / O / AA
19. Responds negatively to neutral or friendly overtures by peers (for example, may speak in an angry tone of voice or respond fearfully).	19. N / S / O / AA
20. Is impulsive.	20. N / S / O / AA
21. Is empathic towards others; shows concern when others are upset or distressed.	21. N / S / O / AA
22. Displays exuberance that others find intrusive or disruptive.	22. N / S / O / AA
23. Displays appropriate negative emotions (anger, fear, frustration, distress) in response to hostile, aggressive or intrusive acts by peers).	23. N / S / O / AA
24. Displays negative emotions when attempting to engage others in play.	24. N / S / O / AA

NOTE: Used with permission by D. Cicchetti, University of Minnesota

PARENTING AUTHORITY QUESTIONNAIRE—REVISED (PAQ-R)

Participant ID: _____

Today's date: _____

Instructions: For each statement below circle the number that best describes your beliefs about parenting your child. There are no right or wrong answers. We are looking for your overall impression regarding each statement. In the right column, please CIRCLE your answer for each item:

SA = Strongly Agree; A = Agree; N = Neither Agree/Disagree; D = Disagree; SD = Strongly Disagree

1. In a well-run home children should have their way as often as parents do.	1. SA / A / N / D / SD
2. It is for my childrens' own good to require them to do what I think is right, even if they don't agree.	2. SA / A / N / D / SD
3. When I ask my children to do something, I expect it to be done immediately without questions.	3. SA / A / N / D / SD
4. Once family rules have been made, I discuss the reasons for the rules with my children.	4. SA / A / N / D / SD
5. I always encourage discussion when my children feel family rules and restrictions are unfair.	5. SA / A / N / D / SD
6. Children need to be free to make their own decisions about activities, even if this disagrees with what a parent might want to do.	6. SA / A / N / D / SD
7. I do not allow my children to question the decisions that I make.	7. SA / A / N / D / SD
8. I direct the activities and decisions of my children by talking with them and using rewards and punishments.	8. SA / A / N / D / SD
9. Other parents should use more force to get their children to behave.	9. SA / A / N / D / SD
10. My children do not need to obey rules simply because people in authority have told them to.	10. SA / A / N / D / SD
11. My children know what I expect from them, but feel free to talk with me if they feel my expectations are unfair.	11. SA / A / N / D / SD
12. Smart parents should teacher their children early exactly who is the boss in the family.	12. SA / A / N / D / SD
13. I usually don't set firm guidelines for my childrens' behavior.	13. SA / A / N / D / SD

SA = Strongly Agree; A = Agree; N = Neither Agree/Disagree; D = Disagree; SD = Strongly Disagree

14. Most of the time I do what my children want when making family decisions.	14. SA / A / N / D / SD
15. I tell my children what they should do, but I explain why I want them to do it.	15. SA / A / N / D / SD
16. I get very upset if my children try to disagree with me.	16. SA / A / N / D / SD
17. Most problems in society would be solved if parents would let their children choose their activities, make their own decisions, and follow their own desires when growing up.	17. SA / A / N / D / SD
18. I let my children know what behavior is expected and if they don't follow the rules they get punished.	18. SA / A / N / D / SD
19. I allow my children to decide most things for themselves without a lot of help from me.	19. SA / A / N / D / SD
20. I listen to my children when making decisions, but I do not decide something simply because my children want it.	20. SA / A / N / D / SD
21. I do not think of myself as responsible for telling my children what to do.	21. SA / A / N / D / SD
22. I have clear standards of behavior for my children, but I am willing to change these standards to meet the needs of the child.	22. SA / A / N / D / SD
23. I expect my children to follow my directions, but I am always willing to listen to their concerns and discuss the rules with them.	23. SA / A / N / D / SD
24. I allow my children to form their own opinions about family matters and let them make their own decisions about these matters.	24. SA / A / N / D / SD
25. Most problems in society could be solved if parents were stricter when their children disobey.	25. SA / A / N / D / SD
26. I often tell my children exactly what I want them to do and how I expect them to do it.	26. SA / A / N / D / SD
27. I set firm guidelines for my children but am understanding when they disagree with me.	27. SA / A / N / D / SD
28. I do not direct the behaviors, activities or desires of my children.	28. SA / A / N / D / SD
29. My children know what I expect of them and do what is asked simply out of respect for my authority.	29. SA / A / N / D / SD
30. If I make a decision that hurts my children, I am willing to admit that I made a mistake.	30. SA / A / N / D / SD

NOTE: Retrieved from Reitman, Rhode, Hupp, & Altobello (2002)

TEACHER QUESTIONNAIRE (PRE-MCRF)

Participant IDs: _____

Today's date: _____

Classroom/Ages taught: _____

Instructions: Please write your answers to the questions below. If you need more space, please use the extra pages.

Questions:

1. Do you incorporate music in the classroom? (circle one) YES NO

   If yes, approximately how many hours a week? _____

   If yes, please describe:

2. Do your students participate in a classroom music group? (circle one) YES NO

   If yes, approximately how many hours a week? _____

   If yes, please describe:

Participant IDs: _____

3. Please describe your understanding of how music can help preschool-aged children manage their emotions?

4. What is your opinion of how ***important*** music might be for a preschooler child? In what way(s)?

5. What is your opinion of how ***helpful*** music might be for a preschooler? In what way(s)?

MODIFIED GOAL ATTAINMENT SCALING (GAS) TOOL

Reviewer name: _____ Date: _____

Session Day and Time (e.g. Monday at 9:00 am): _____

Session # (circle one): 1 2 3 4 5 6 7 8 9 10 11 12

Opening Song (Pre-Session):

Participant ID	-2	-1	0	+1	+2
001C					
002C					
003C					

Closing Song (Post-Session):

Participant ID	-2	-1	0	+1	+2
001C					
002C					
003C					

+2 (Best possible expected outcome)
Client exhibits positive affect and is able to follow therapist directions. Client appears engaged in the experience and displays no off-task behaviors. Client demonstrates the ability to identify and express personal emotion verbally (e.g. "I feel happy") and verbal expression seems congruent with observable nonverbal behaviors (e.g. is smiling).

+1 (Better than expected)
Client exhibits positive affect and is able to follow therapist directions. Client appears engaged in the experience and displays no off-task behaviors. Client demonstrates the ability to identify and verbally express a socially-generated emotion (e.g. "I'm good"), but this emotion is either generic (i.e., does not use a simple emotion word) or seems incongruent with observable nonverbal behaviors (e.g. client is frowning).

0 (Expected outcome)
Client exhibits positive or neutral affect and is able to follow therapist directions. Client appears engaged in the experience and displays no off-task behaviors.

-1 (Worse than expected outcome)
Client exhibits neutral or negative affect and is unable to follow directions, but does not show indications of being in a stress response.

-2 (Worst possible expected outcome)
Client exhibits negative affect, demonstrates a hyperarousal or dissociative stress response (e.g. running behaviors, physical aggression, or verbal aggression), and is unable to follow directions.

PARENT QUESTIONNAIRE (POST-MCRF)

Participant ID: _____ Today's date: _____

Instructions: Please write your answers to the questions below. If you need more space, please use the extra pages.

Questions:

1. Please describe your understanding of how music can help preschool-aged children manage their emotions?

2. What is your opinion of how ***important*** being involved in music was for your child? In what ways was it important or not important?

Participant ID: _____

3. What is your opinion of how ***helpful*** being involved in music was for your child? In what ways was it helpful or not helpful?

4. What other thoughts, concerns, suggestions, or ideas would you like to share about this study?

INITIAL POST-MCRF INTERVIEW QUESTIONS—PARENT

Participant ID: _____ Date: _____

Interview Start: _____ AM / PM Interview End: _____ AM / PM

Location: _____

Instructions

Thank you for coming today. I appreciate your participation in this interview. The purpose of this interview is to share your thoughts and feelings about the music study your child was been participating in. I am going to ask you five questions. There are no right or wrong answers, so simply respond as honestly as you can. Before we start, do you have any questions?

Questions

1. What impact did being involved in the music group have on your child?

2. How important or helpful do you feel being involved in the music group was for your child?

3. How important or helpful do you feel the music group was for helping your child manage or cope with his/her emotions?

4. How important or helpful do you feel the music group was for helping your child manage or cope with his/her arousal levels, such as being really excited and high energy or being calm and relaxed?

5. Is there anything you would like to see when it comes to providing music at your child's preschool? Any recommendations you have?

TEACHER QUESTIONNAIRE (POST-MCRF)

Participant IDs: _____

Today's date: _____

Instructions: Please write your answers to the questions below. If you need more space, please use the extra pages.

Questions:

1. Please describe your understanding of how music can help preschool-aged children manage their emotions?

2. What is your opinion of how ***important*** the music groups were for your students who participated? In what ways was it important or not important?

3. What is your opinion of how ***helpful*** the music groups were for your students who participated? In what ways was it helpful or not helpful?

Participant IDs: _____

4. What is your opinion of how ***easily*** or ***not easily*** a music group program can be integrated in a preschool classroom?

5. How do you feel a music group program might ***benefit*** you and your students? How do you feel it might ***not benefit*** you or your students?

6. What other thoughts, concerns, suggestions, or ideas would you like to share about this study?

INITIAL POST-MCRF INTERVIEW QUESTIONS—TEACHER

Participant ID: _____ Date: _____

Interview Start: _____ AM / PM Interview End: _____ AM / PM

Location: _____

Instructions

Thank you for coming today. I appreciate your participation in this interview. The purpose of this interview is to share your thoughts and feelings about the music group some of your students have participated in. I am going to ask you eight questions. There are no right or wrong answers, so simply respond as honestly as you can. Before we start, do you have any questions?

Questions

1. What impact did the music group have on the children in your class who participated?

2. How important or helpful do you feel being involved in the music group was for those children?

3. How important or helpful do you feel being involved in the music group was for helping those children who participated manage or cope with their emotions?

4. How important or helpful do you feel the music group was for helping those children manage or cope with their arousal levels, such as being really excited and high energy or being calm and relaxed?

5. What impact have you seen on the other children in your class, those who were not in the music group?

6. What benefits do you think might happen from providing these types of music groups at your preschool?

7. What costs or challenges do you think might happen from providing these types of music groups at your preschool?

8. Is there anything you would like to see happen when it comes to providing music groups

here? Any recommendations you have?

FOLLOW-UP POST-MCRF INTERVIEW QUESTIONS—PARENT

Participant ID: _____ Date: _____

Interview Start: _____ AM / PM Interview End: _____ AM / PM

Location: _____

Instructions

Thank you for coming today. I appreciate your participation in this interview. This is the last portion of the music study you and your child have been involved in. The purpose of this interview is to share your thoughts and feelings about the music study now that some time has passed. I am going to ask you six questions. As with before, there are no right or wrong answers. These questions are similar to those you have heard previously. You may find that some of your answers are the same and some are different. Again, there are no right or wrong answers, so simply respond as honestly as you can. Before we start, do you have any questions?

Questions

1. What impact did being involved in the music group have on your child?

2. How important or helpful do you feel being involved in the music group was for your child?

3. How important or helpful do you feel the music group was for helping your child manage or cope with his/her emotions?

4. How important or helpful do you feel the music group was for helping your child manage or cope with his/her arousal levels, such as being really excited and high energy or being calm and relaxed?

5. Have you noticed any long-term changes in your child that you think happened because he/she was involved in the music group? If so, what changes?

6. Is there anything you would like to see when it comes to providing music at your child's preschool? Any recommendations you have?

FOLLOW-UP POST-MCRF INTERVIEW QUESTIONS—TEACHER

Participant ID: _____ Date: _____

Interview Start: _____ AM / PM Interview End: _____ AM / PM

Location: _____

Instructions

Thank you for coming today. I appreciate your participation in this interview. This is the last portion of the music study you have been involved in. The purpose of this interview is to share your thoughts and feelings about the music study now that some time has passed. I am going to ask you nine questions. As with before, there are no right or wrong answers. These questions are similar to those you have heard previously. You may find that some of your answers are the same and some are different. Again, there are no right or wrong answers, so simply respond as honestly as you can. Before we start, do you have any questions?

Questions

1. What impact did the music group have on the children in your class who participated?

2. How important or helpful do you feel being involved in the music group was for those children?

3. How important or helpful do you feel being involved in the music group was for helping those children who participated manage or cope with their emotions?

4. How important or helpful do you feel the music group was for helping those children manage or cope with their arousal levels, such as being really excited and high energy or being calm and relaxed?

5. What impact have you seen in the other children in your class, those who were not in the music group?

6. Have you noticed any long-term changes in any of the children that you think happened because they were involved in the music group? If so, what changes?

7. What benefits do you think might happen from providing these types of music groups at your preschool?

8. What costs or challenges do you think might happen from providing these types of music groups at your preschool?

9. Is there anything you would like to see happen when it comes to providing music groups here? Any recommendations you have?

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VITA

Kimberly Sena Moore was born August 7, 1980 in Okinawa, Japan. She was educated in local public schools in the Washington, DC and Kansas City metro areas and graduated from Shawnee Mission South High School in 1998. She received an Aventis Scholarship to attend university and graduated cum laude from the University of Iowa in 2003. Ms. Sena Moore received other honors as an undergraduate student. She served as an undergraduate research assistant, was a Rhodes Dunlap Honors Scholar, received the Sword of Honor from Sigma Alpha Iota, and was awarded the Edwina Eustis Dick Scholarship from the American Music Therapy Association. Her degree was a Bachelor of Music in Music Therapy.

After completing her music therapy internship in San Diego and earning her Music Therapist-Board Certification (MT-BC) credential, Ms. Sena Moore began a master's program in music therapy at Colorado State University. She was awarded the Master of Music degree in Music Therapy in 2006. Her thesis research on the effectiveness of music mnemonics training on recognition memory in individuals with multiple sclerosis was published in the *Journal of Music Therapy*.

In 2005, Ms. Sena Moore launched a private music therapy practice, Neurosong Music Therapy Services, in northern Colorado, which she managed and grew until her move to Missouri in 2010. That same year, Ms. Sena Moore assumed the position of Regulatory Affairs Associate with the Certification Board for Music Therapists. She began work toward her Ph.D. in August 2011 at the University of Missouri-Kansas City, enrolling in the university's Interdisciplinary Ph.D. program (coordinating discipline of music education with an emphasis in music therapy, and co-discipline of curriculum and instruction). Upon completion of her degree requirements, Ms. Sena Moore plans to continue her career in

music therapy by teaching future music therapists at the university level, continuing her policy and advocacy work, and pursuing her research interests.

Ms. Sena Moore is a member of the American Music Therapy Association, Sigma Alpha Iota, Pi Kappa Lambda, the Society for Music Perception and Cognition, and the College Music Society.