Music Therapy for Children with Cerebral Visual Impairment

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MUSIC THERAPY FOR CHILDREN WITH CEREBRAL VISUAL IMPAIRMENT

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To my grandparents who worked hard all their lives, making it possible for their granddaughter to follow her dreams:

“here is the deepest secret nobody knows
(here is the root of the root and the bud of the bud
and the sky of the sky of a tree called life; which grows higher than the soul can hope or mind can hide)
and this is the wonder that's keeping the stars apart

i carry your heart (i carry it in my heart)"

[e.e. cummings]
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ABSTRACT

Cerebral Visual Impairment ("CVI") is defined by a deficit of vision and visual perception in children that results from damage to the brain (Dutton & Lueck, 2015). Currently, CVI is the most common cause of visual impairment in children in the developed world. The purpose of this paper is to provide an evidence-based curriculum guide to music therapy for children aged 6- to 16-years-old with visual impairments, specifically CVI. The author begins by providing a background on Perkins School for the Blind. Next, she reviews current literature on visual impairments, CVI, and music therapy. Finally, she proposes a curriculum guide for children with visual impairments, specifically CVI, and discusses effective music therapy interventions by age group.
CHAPTER 1

INTRODUCTION

Cerebral visual impairment, also referred to as “CVI,” is the most common cause of visual impairment among children in the developed world (Dutton & Lueck, 2015; Roman-Lantzy, 2007). CVI is defined by a deficit of vision and visual perception in children that results from damage to the brain (Dutton & Lueck, 2015). According to the American Foundation for the Blind (2016), the incidence of neurological visual impairment is on the rise partially due to medical advances that allow extremely premature babies who often sustain brain injuries to survive at higher rates. It is important to note that the term “CVI” is traditionally used interchangeably to describe “cortical visual impairment.” However, cerebral visual impairment is now the preferred term in the medical community, as it encompasses more than just the cortical area of the brain (Boston Children’s Hospital, 2015); therefore, this paper will use CVI to describe cerebral visual impairment.

Statement of the Problem

Perkins School for the Blind has a rich history; it was established as the first school for the blind in the United States over 175 years ago. Throughout its existence, it has produced such notable alumni as Laura Bridgman, Anne Sullivan, and -most famously- Hellen Keller. The school itself is divided into different programs to include the Infant/Toddler, Early Learning Center, Deafblind, Lower School, and Secondary programs. Since its founding, Perkins has heavily focused on children with visual impairments. Recently, however, its Lower School Program for younger students has seen a dramatic rise in children who have multiple disabilities in addition to their visual impairments. This phenomenon can be attributed to the increase in
children living with CVI, a condition that comes with a host of additional neurological and developmental issues.

The signs and behaviors of CVI are extremely individualized, meaning that they are different for each child. That being said, most individuals with CVI and multiple disabilities have very specific visual fields (usually peripheral) and experience difficulty sustaining visual attention to objects. Faces are even more complex to the child with CVI. Previous research demonstrates that these individuals benefit from visual adaptations like movement, brightly-colored and non-patterned objects, and a black background (Roman-Lantzy, 2007). Studies have also shown that children who are blind or have visual impairments typically respond well to music, which means it could be used as a tool for positive reinforcement (Standley, 1996).

Music therapists have long worked with children with a variety of disabilities, equipping them with the tools to help the CVI population in educational settings. This project aims to supply educators and clinicians with interventions involving music for children with visual impairments, with emphasis on CVI.
CHAPTER 2

REVIEW OF THE LITERATURE

Visual Impairment and CVI

According to the Individuals with Disabilities Act, or “IDEA,” vision loss is impairment in vision that, even with correction, adversely affects a child’s educational performance (Adamek & Darrow, 2010). The term “visual impairment” includes vision damage stemming from the brain and/or the eye. However, when it comes to CVI, the eyes are capable of taking a clear picture of the environment; it is the brain that has trouble interpreting this picture (Jackel, Wilson, & Hartmann, 2010).

CVI can either be caused congenitally or acquired. Congenital and perinatal causes of CVI include asphyxia and perinatal hypoxic-ischemic encephalopathy, intraventricular hemorrhage, periventricular leukomalacia, cerebral vascular accident/cerebral artery infarction, infection, structural abnormality, or metabolic conditions (Roman-Lantzy, 2007). It is possible for a person to acquire CVI throughout his or her lifetime due to traumatic brain injury.

The focus of CVI lies specifically on the visual brain, which is responsible for visual mapping, searching, giving attention to and recognizing and interpreting visual input. The processing of visual information involves up to 40 percent of the brain (American Foundation for the Blind, 2016). When this process is disrupted, the visual systems of the brain do not consistently interpret or understand what the eyes see, and visual impairment is the result. Children with damaged visual brains may experience difficulty learning and performing tasks of daily living.

These individuals may exhibit inattention to visual stimuli and preference for touch over vision when exploring objects (Adamek & Darrow, 2010; Dennison, 2003; Roman-Lantzy,
2007). They may also experience fluctuating visual performance, “depending upon the environment and the seizure activity, motor position, general health, and mood of the child” (Adamek & Darrow, 2010). These issues need to be addressed in educational and rehabilitation programs (Dutton & Lueck, 2015).

**Co-occurring Disabilities.** Children with CVI often have additional disabilities, often neurological in nature, in addition to their visual impairment. Common co-occurring diagnoses include cerebral palsy, seizure disorder, and developmental delays as a result of the damage to the brain. Cerebral palsy is the number one cause of physical disability in children (Abdel-Hamid, 2015). This condition results from disturbances in the brain such as a lack of oxygen, that occur during fetal development or infancy. Signs and symptoms consist of gross motor developmental delay, abnormal muscle tone, and growth disturbance (Abdel-Hamid, 2015). Children with cerebral palsy are also at risk for cognitive and communication impairments. Cerebral palsy is divided into smaller subsets that include spastic and hypertonic (commonly known as “flaccid”) cerebral palsy. One type of spastic cerebral palsy is called spastic quadriplegia. It is a condition characterized by stiff, quick movements, affecting both arms and legs.

Despite medical advances, the incidence of cerebral palsy has remained the same over the last four decades (Abdel-Hamid, 2015). There are approximately 2 patients diagnosed with cerebral palsy per every 1,000 live births. Furthermore, it is estimated that 15-60% of children with cerebral palsy also experience epilepsy and seizures (Abdel-Hamid, 2015).

Epilepsy is a neurological disorder characterized by seizures (Ko, 2015). In a large number of cases, the cause of the condition remains unknown. Known causes of childhood
epilepsy include inherited syndromes, congenital brain malformations, infection, and head trauma (Ko, 2015). Typically, a diagnosis of epilepsy requires the occurrence of at least two unprovoked seizures. Patients with the disease typically display very individualistic, stereotypic behaviors during seizures (Ko, 2015). These behaviors may include jerky movements, twitching, and leaning heavily toward either the right or left side of the body. Epilepsy often comes with a host of “neurobiologic, cognitive, psychological, and social” consequences (Ko, 2015).

In addition to cerebral palsy and epilepsy, children with CVI commonly experience global developmental delay. Global developmental delay is a neurological condition defined by “a significant delay in two or more domains of development, including activities of daily living as well as motor, cognitive, speech/language, and personal/social skills” (Eun & Hahn, 2015). Global developmental delay can be difficult to diagnose, and its cause remains unknown in over 60% of cases (Eun & Hahn, 2015). However, it has been established that there are prenatal, perinatal, and postnatal causes. The delay is called “global” because it usually affects all areas of child development (Eun & Hahn, 2015).

**Characteristics of CVI.** CVI is diagnosed through eye exams, a medical history of neurological problems, and the presence of certain unique visual and behavioral characteristics (Roman-Lantzy, 2007). These unique characteristics include distinct color preferences, attraction to movement, visual latency, visual field preferences, difficulties with visual and environmental complexities, light-gazing, difficulties with distant viewing, absent or atypical visual reflex responses, difficulties with visual novelty, and absence of visually guided reach (Roman-Lantzy, 2007).
Behavior exhibited by children with CVI reported by parents, teachers, and low vision specialists include: (a) variable or inconsistent visual responses to the same stimuli; (b) better responses to familiar than to novel stimuli; (c) fatiguing from visual tasks; (d) peripheral vision dominates when reaching; (e) colored stimuli elicit better responses than B&W stimuli; (f) visual attention for moving stimuli is better than for static stimuli; (g) vision for navigation is unexpectedly good; (h) difficulty seeing an object or image in a "crowded" array or a busy background; and (i) reduced responses to visual stimuli when music, voices, and other sounds are present, and often, when the child is touched. It is established that the brain plays a critical role in vision (Boston Children’s Hospital, 2015). The ability to focus on specific elements in a visual scene relates to visual processing and is necessary in order to register what an individual sees (Dutton, 2015). Visual processing deals with what, exactly, the brain chooses to give attention to.

On April 30, 2005, members of the group Focus on Visual Impairments (“FOVI”) organized the Summit on Cortical/ Cerebral Visual Impairment. There, Mary T. Morse proposed (1) commonly known characteristics of CVI and (2) characteristics of CVI that are not commonly addressed. Commonly known characteristics include wide variations in functional use of vision, a person’s ability to “efficiently use vision on a consistent basis,” an individual’s ability to manage “multisensory demands,” and the tendency to use peripheral vision (Morse, 2005). Morse (2005) also talks about how people with CVI may be interested in sounds and respond to intonations versus actual words.

Morse describes two different subsets of individuals with CVI who have characteristics that are not commonly addressed. The first subset may have Prosopagnosia, or difficulty or inability to recognize familiar faces. The second subset may experience Facial Agnosia, or difficulty or inability to recognize any face (Morse, 2005). In the latter case, the face might as
well be an object from the individual’s with CVI perspective. Generally speaking, the face is extremely complex (Yang & Huang, 1994). And, as Morse (2005) notes, “the implications of not being able to discriminate one face from another can have a major impact on communication, social interaction, eye contact, orientation and mobility, and other critical areas of functioning and learning.”

Implications for Education and Rehabilitation

Vision plays a critical role in a child’s growth and development (Adamek & Darrow, 2010). Children who are blind often differ from their sighted-peers in the following developmental areas: (1) sensory; (2) motor; (3) cognitive; (4) social; and (5) language (Strickling, 2016). CVI and visual loss at large can be congenital or acquired, with the age of onset having important implications for a student’s education (Adamek & Darrow, 2010). In other words, children who are born with visual impairments learn about the world differently than those who have acquired loss in vision later on.

Most people who are identified as blind actually possess residual vision. Adamek and Darrow (2010) write that ‘visual efficacy’ and ‘functional vision’ are terms that describe how well a person utilizes his or her residual sight. Visual efficiency includes “specific skills such as paying attention to visual stimuli, adapting to varied visual stimuli in environments, controlling eye movements, and processing visual information,” while functional vision “is residual vision sufficient for the execution of daily living tasks” (Adamek & Darrow, 2010).

According to Boston Children’s Hospital (2015), partial recovery of vision in children with CVI is actually possible: “improvements are seen in visual acuity, orienting to peripheral stimuli, attention to and reaching for objects and for social gaze.” Boston Children’s Hospital
recommends that teachers of students with CVI assess functional visual behaviors and, “often in conjunction with other therapists, devise interventions appropriate for the specific needs of the child.”

Because children with CVI present with complicated issues, experts recommend a team approach to education and rehabilitation. Jackel, Wilson, and Hartmann (2010) took a survey of 80 parents of children with CVI. The children had concurrent disabilities of cerebral palsy, learning disabilities, expressive and receptive language disabilities, and social disabilities (Jackel, Wilson, & Hartmann, 2010). The survey included questions pertaining to parents’ suspicions of CVI, diagnosis and information provided, etiology and visual inventory, and, most importantly for this paper’s purpose, education and related services (Jackel, Wilson, & Hartmann, 2010).

Most parents participating in the survey reported that that their children received occupational therapy, physical therapy, services of a teacher of students with visual impairments, and speech therapy. Less than 50% of parents said their children received orientation and mobility services, among others. Some parents also stated that their children got services like a consultation from an occupational therapist or a teacher of students with visual impairments, music therapy, play therapy, and vision therapy (Jackel, Wilson, & Hartmann, 2010). 16% of the parents thought that their children could benefit from a teacher of visual impairments because they were not currently receiving those services. One parent reported that “the child’s teacher of students with visual impairments was not trained in CVI and that vision services needed to be increased” (Jackel, Wilson, & Hartmann, 2010).
Vision Intervention

In “Vision and the Brain: Understanding Cerebral Visual Impairment in Children,” Marieke Steendam (2015) defines vision intervention as “a diagnostic approach to teaching that involves continually monitoring the reactions of the child to visual stimuli by the instructor.” Steendam continues: “the instructor chooses to offer a certain visual stimulus in a certain way, the child reacts spontaneously, and the instructor makes adjustments that continue to engage the child and promote vision use in such a way that vision use becomes more refined and applied.”

Steendam (2015) also describes how effective vision intervention involves regular sessions of direct teaching. Such sessions consist of the “systematic presentation of specific materials to the child in order to elicit visual responses or the systematic promotion of potentially productive visual skills and behaviors that the child has developed but hardly uses in the absence of special sessions of vision intervention.” Ideally, a person who is familiar with the student (preferably an instructor) should be present in one-to-one sessions.

Spontaneous recovery of visual functions is possible in children who are blind due to cerebral damage (Groenendaal, F. & Van Hoff-van Duin, 1990). On one hand, Groenendaal and Van Hoff-van Duin (1990) could not find the cause for their infant subjects’ partial recovery of visual functioning. On the other hand, Werth and Moehrenschlager (1998) concluded that stimulation of cerebrally blind areas can lead to the development of visual functions in children with brain damage. In their study, 15 out of 22 children (infants) who received systematic visual training recovered from blindness in 3 months (Werth & Moehrenschlager, 1998). Before training, subjects underwent measurements of their visual fields and functional luminance difference thresholds and visual acuity testing. The extent of the visual field and functional
luminance difference thresholds (basically, maximum light intensity a child can handle), were measured by arc perimetry before and after visual training (Werth & Moehrenschlager, 1998).

Essentially, an arc perimeter is a computerized mechanism that measures an individual’s visual field by flashing light targets and recording eye movements toward a target. Werth & Moehrenschlager (1998) only considered a target detected if it elicited eye movement toward the target followed by fixation in at least 3 successive trials. They used arc perimetry to measure functional luminance difference thresholds as well. Visual acuity was measured through what they call “a forced-choice preferential looking technique.” Experimenters presented cards to children that featured targets on one side. A child detected the target when he or she directed his or her gaze toward and fixated on the target for 2 successive trials (Werth & Moehrenschlager, 1998).

The visual training procedure took place in a dark room with the child on his or her back (Werth & Moehrenschlager, 1998). The child’s blind visual field was stimulated by slowly moving a light from the peripheral field to the center of the field (Werth & Moehrenschlager, 1998). Once a child gazed toward and fixated on the target, he or she could look at it for 2 seconds. The light was then removed, and after 5 seconds, re-presented (Werth & Moehrenschlager, 1998). A child was not given a reward for looking (Werth & Moehrenschlager, 1998). Training occurred every day for 30 minutes. There were 74-107 trials per sessions, and researchers recorded whether the child gazed at the target for each trial (Werth & Moehrenschlager, 1998). A child was tested perimetrically as soon as they shifted toward a target; visual field was measured 4 weeks into training (Werth & Moehrenschlager, 1998).

Prior to the visual training, subjects only occasional displayed spontaneous eye movements toward a target in the blind areas of their visual fields. Werth & Moehrenschlager
(1998) saw a significant difference in children who received training between frequency of eye movements directed towards the target and spontaneous eye movements in the same direction. Also after training, 5 out of 15 children who recovered from cerebral blindness experienced a rise in functional luminance difference threshold in their previously blind areas.

Boot et al. (2010) and Lam et al. (2010) also discuss the neuroscience behind CVI and effects of intervention. Boot et al. (2010) gathered studies on the types of visual dysfunctions that can be found based upon whether CVI was caused in pre- peri- or post-natal phases. van den Hout et al. (2004) used magnetic resonance imaging to determine visual perceptual impairment in 5-year-old children with perinatal brain damage. They found that children with right-sided parenchymal hemorrhages were at risk for visual spatial difficulties, poor pragmatic skills, and social and emotional issues (van den Hout et al., 2004).

Lam et al. (2010) conducted a longitudinal case study of a young boy with CVI and highlighted intervention approaches that remained consistently effective. The boy’s case of CVI resulted from periventricular white-matter pathology (Lam et al., 2010). Lam et al. (2010) found that his visual acuities increased throughout the case study, despite previous reports that children with his pathology are less likely to improve than other children with CVI. Effective interventions included using tactile stimuli, verbal, and visual cues to promote mobility, simplifying the environment, and encouraging touch with both hands (Lam et al., 2010).

**CVI Assessment: Phases I, II, and III.** At the Summit on CVI, Christine Roman (2005) discussed her CVI Range Scale and Resolution Chart. Roman’s tools include “a set of observable characteristics and phases indicative of CVI” which are used to plan educational interventions. Here, interventions are designed according to “the presence, absence, and degree of each CVI
characteristic.” Assessing a child according to Roman’s scale means measuring his or her visual skills on a scale from 1-10. These skills are based on ten characteristics: (1) color preference; (2) attraction to movement; (3) visual latency; (4) atypical visual fields; (5) difficulties with visual complexity; (6) light-gazing behavior; (7) difficulties with distance viewing; (8) atypical visual reflexive responses; (9) difficulties with visual novelty; and (10) atypical visual motor or look-and-reach pattern (Roman-Lantzy & Lantzy, 2010). Roman proposes that interventions based on CVI-specific characteristics yield better results regarding visual rehabilitation than interventions based on more general principles of visual impairment (Dennison & Luecek, 2005). She outlines three phases of CVI. Each phase has its own goals and supports.

Phase I includes individuals who have a CVI range of 0 to 3. The overall goal of this phase is to “facilitate the development of consistent visual responses” (Roman-Lantzy & Lantzy, 2010). Supports for individuals in Phase I consist of familiar single-color objects, objects with movement properties, non-patterned objects, objects without sensory properties, and objects paired with light (Roman-Lantzy & Lantzy, 2010). Individuals in Phase I require strict control of their environment in order to establish or maintain visual attention. They do not exhibit visual curiosity (Roman-Lantzy & Lantzy, 2010).

Phase II consists of people with a CVI range of 3 to 7. Individuals in the second phase are capable of pairing vision with some functional action and maintaining visual attention to either activate or obtain an object (Roman-Lantzy & Lantzy, 2010). Additionally, these individuals can “locate or fixate on an object when the object is beyond arm’s reach or has increased visual complexity” and “may begin to attend visually to materials that are two dimensional” (Roman-Lantzy & Lantzy, 2010). During this phase individuals still require environmental supports, especially when it comes to new environments and activities.
Finally, Phase III includes individuals with a CVI range of 7 to 10. People in this phase typically use their vision for most tasks (Roman-Lantzy & Lantzy, 2010). However, individuals still experience difficulty in distance viewing (beyond 20 feet), visual field functioning, using complex materials, and using accurate visually-guided reach (Roman-Lantzy & Lantzy, 2010). Individuals of all ages in Phase III display visual curiosity in a variety of environments. They require few environmental adaptations (Roman-Lantzy & Lantzy, 2010). Roman believes that as vision improves so do other areas of a child’s development.

**Promoting Visual Attention.** It is well established that visual attention plays a key role in overall development. A typically-developing individual has the ability to visually attend at birth. This ability matures at 4 weeks. Additionally, normally functioning adults voluntarily utilize visual fixation and can easily select and attend to objects in their environments (Zoltan, 1996). By contrast, someone with brain injury may experience difficulty in visually attending to objects in his or her environment. More specifically, they might not be able to obtain or sustain fixation (Zoltan, 1996).

There is little known about how to increase children’s with CVI visual attention in a way that stimulates the use of their residual vision (Cohen-Maitre, 2002). Although studies on music therapy and CVI are rare, there has been some research conducted related to interventions outside of music therapy with children with CVI. Most children with CVI who have been featured in studies have multiple disabilities.

For instance, Luecek, Dornbusch, & Hart (1999) describe a vision intervention with a 1-year-old student with CVI who initially did not follow objects. However, after 3 ½ months of intervention, he began to follow toys and people and showed greater attention to objects in his
environment. During a vision intervention, it is important to remember that children with CVI often have visual preferences. For instance, a child with CVI may like to look at the color red but not the color blue. On a similar note, it helps to present objects on a plain black background. Steendam (2015) sets forth three focus areas in vision intervention, one of which is increasing the duration of visual activities. This focus includes fixating for longer periods. As a child’s skills related to visual tasks increases so does the length of time he or she can maintain visual attention.

In addition to focus areas in vision intervention, Steendam (2015) discusses variables influencing interventions. For example, motivating a child to look is a main goal of intervention. This task may be accomplished by using a child’s preferred toys or instruments. Additionally, a positive relationship between staff and the child with CVI encourages the child to learn. Steendam (2015) stresses the importance of making visual activities fun for children. Another important consideration is that often the child’s usual environment needs to be altered (i.e. removing people or objects from the classroom). Although there are no set rules for what materials to use in interventions, Steendam (2015) recommends materials, such as familiar objects, that encourage active participation.

A study conducted by Tsai, Meng, Wu, Jang, and Su (2013) on visual rehabilitation found “visual training and the possibility of brain plasticity in a child with severe visual impairment” to be valuable. The authors argue that for the importance of increasing residual vision for children with severe visual impairment. The study utilized an AB single-subject design to explore the impacts of visual fixation training in a 6-year-old boy with a severe visual impairment. In the same study, the authors used behavioral measures to evaluate the subject’s length of visual fixation. During the fixation intervention, the researchers used a video camera to
record sessions. After sessions, an author and the mother of the subject reviewed video to calculate the length of time the subject focused on visual targets (Tsai, Meng, Wu, Jang, and Su, 2013). Each training session lasted approximately 40 minutes.

**Music Therapy**

Music therapy itself is a broad field and thus requires a broad definition. In his book *Defining Music Therapy*, Bruscia (1998) states that music therapy is a “systematic process of intervention wherein the therapist helps the client to promote health, using music experiences and the relationships that develop through them as dynamic forces of change.” Music therapists work with many different populations to include infants, children, adolescents, young adults, and older adults. They commonly work in private practice, educational, medical, mental health, rehabilitation, and geriatric settings. Music therapists address a multitude of goals within these settings, such as communication, social, motor, cognitive, coping, and academic goals—just to name a few.

**Music Therapy in Special Education.** In their well-known book *Creative Music Therapy: Individualized Treatment for the Handicapped Child*, Paul Nordoff and Clive Robbins (1977) introduce the concept of what they call the “Music Child.” Nordoff and Robbins (1977) define the Music Child as “the individualized musicality inborn in each child.” They believe that there exists an entity in each child that responds to, remembers, and enjoys musical experiences (Nordoff & Robbins, 1977). They discuss music’s positive effects on children with severe delays, including those who are deaf and blind. Related to the Music Child is the importance of relationship in music therapy.
Music therapists have worked in special education since the establishment of music therapy as a profession (McFerran & Shanahan, 2011). In this setting, music therapists work alongside teachers to help address instructional needs for students with disabilities. They usually work with behavioral designs on communication, social, and physical goals (McFerran & Shanahan, 2011). Children who have visual impairments benefit from music therapy when they develop their auditory and musical abilities. More specifically, their music therapists “contribute to mobility training when unsure or rigid movements become more fluid and natural through intervention with music.” (Hanser, 1999). Despite decades worth of work, there is little documented research on using music therapy with individuals who are blind or have other visual impairments.

**Music as Contingency.** Here, music serves as a positive reinforcement. A multitude of psychologists, behaviorists, educators, and music therapists have written on the topic of positive reinforcement.

Music Therapy Professor Suzanne Hanser (1999) writes the following five rules for using contingent music to reinforce desired behavior. The first rule is “a clear relationship must be established between the occurrence of a target behavior and its musical consequence. The therapist must specify exactly how and when the music contingency will be administered” (p. 136). Second, “the behavior which earns contingent music should have a high probability of occurrence” (p. 136). Third, “the music consequence should be offered immediately after the occurrence of the specific behavior” (p. 136). Fourth, “there should be a direct, positive relationship between behavioral improvement and the desirability of the musical consequence. The number of correct response might yield the number of seconds allowed for music listening”
(p. 136). Finally, the fifth rule is “the selected consequence should be available only after the desired response” (p. 137).

In addition to Hanser’s words on contingency, Madsen and Madsen (1974) write that “the basic premise of reinforcement teaching is to arrange the stimuli of the external world to shape the behavior of students- to structure the environment so that the student receives approval/disapproval reinforcements contingent on appropriate…behavior.” They also list five techniques useful in structuring contingencies: (1) approval (rewards); (2) withholding of approval; (3) disapproval; (4) threat of disapproval; and (5) ignoring. Approval is “anything that is generally thought to be related to ‘happiness’” (Madsen & Madsen, 1974). Madsen and Madsen state that an educator should consider whether a particular reward is positive for his or her student. For instance, if a student does not like pizza, it would not behoove of a teacher to reward the student with a pizza party. Additionally, rewards must come after, not before, the desired behavior (Madsen & Madsen, 1974).

Music can serve as a reward following a desired behavior in a plethora of situations (Hillmer, 2014). Music therapist Miriam Hillmer describes using this technique in a medical setting with a patient who enjoyed his music therapy sessions. It so happens that this patient also enjoyed wandering and was an unsafe walker. Each time Hillmer saw the patient began to stand up, Hillmer instructed that her patient needed to sit down in order for the music to start. As a result, the patient would sit back down (Hillmer, 2014). In this example, Hillmer chose a reward that was highly positive to her patient, and she only gave it to him or her when he or she performed the desired behavior.

In addition to encouraging impulse control, contingent music has helped children with cerebral palsy acquire proper head placement (Wolfe, 1980). Later, a study exploring music
therapy in the Neonatal Intensive Care Unit (commonly called the NICU) found that contingent
music increased pacifier sucking rate of premature infants (Standley et al., 2010). Similarly,
there have been studies where using music as a reward for eye movement has increased eye
movement in patients (Lancioni et al., 2009). Moreover, in a meta-analysis, Standley (1996)
discovered that contingent music had significant impacts in physical rehabilitation and medical
health. Thus, music as contingency is a powerful teaching tool. Hanser (1999) offers that music
may be so successful across populations, ages, and settings because it appeals to a wide variety
of people. Patient-preferred music specifically has been shown to improve mood and work
performance (Lesiek, 2010).

Music and Visual Impairment. Music is an incredible tool for children with visual
impairments. Indeed many children who are blind have a positive relationship with music (Erin,
2010). In fact, neurological research suggests that people who are blind tend to have a larger area
of their brains responsive to auditory stimuli as compared to people with sight. This finding
means that people who are blind often experience functional advantages in localization and
attention to sound (Erin, 2010).

Lanners, Piccioni, Fea, and Gorgen (1999) advocate for the “harmonization” of a child’s
cognitive and motor development through simultaneous tactile, auditory, and visual information.
They specifically cite the use of visual stimulation training as part of music therapy sessions
(Lanners et al, 1999). In their study, the authors reviewed the clinical history of infants and
children with CVI, aged 7-months- to 4-years-old, and documented the results of visual
rehabilitation administered through an early intervention program. To begin, they analyzed
children’s clinical records and assessed each child’s sight (Lanners et al., 1999). Each visual
assessment consisted of offering a child different types of visual stimuli and observing his or her visual behavior in play situations under spontaneous, induced, and guided conditions (Lanners et al., 1999). Upon reviewing the children’s records, Lanners et al. (1999) found that brain oxygenation failure accounted for 46% of the children’s cases of CVI. All children in the study suffered from neurological disorders, and approximately 80% of cases involved epilepsy (Lanners et al., 1999). Lanners et al. (1999) also examined whether visual rehabilitation made a difference in children’s visual functioning.

In the study, visual rehabilitation was addressed through the early intervention ‘early low vision training’ method proposed by Barraga (Lanners et al., 1999). The main goal of this approach is to make the child aware of his or her residual vision (Lanners & Goergen, 2001). When planning the intervention, it is crucial that the therapist take into account the age of the child, his or her developmental stage, pathologies, and individual characteristics, as well as have thorough knowledge of the child’s medical history (Lanners & Goergen, 2001). Visual rehabilitation in early intervention is based on observations of children’s spontaneous visual behaviors within their natural environments, with reports from parents being especially helpful.

During a functional evaluation, clinicians assess factors like visual tracking, gaze-shifting, etc. Of particular interest to the present study is the evaluation of fixation, which Lanners & Goergen (2001) define as “fixing the eyes so that the projection of the object looked at falls on the fovea centralis” (p. 3). They continue: “this reaction is observed to assess the presence or absence of the gaze, the way in which it is manifested, whether it lasts for a moment or for some time, whether it is central or parafoveal, and whether it occurs only when there is a source of light or in the presence of any kind of stimulus” (p. 3). After thorough assessment, rehabilitation is implemented according to the results. It is imperative that visual stimuli are
meaningful and based on child’s preferences so that he or she is motivated to use any residual sight (Lanners & Goergen, 2001). Instead of using strict rehabilitative exercises, the authors made visual training into a game, using appropriate lighting, strong contrasts, and bright colors (Lanners & Goergen, 2001). Using this model, educators should find strategies and materials that make it easier for children to use residual vision in specific situations.

Similar to Lanners et al., Fazzi et al. (2005) designed an early intervention study that was partially inspired by Barraga’s visual training method. They used different models for children depending on whether they were peripherally blind or had CVI. In children with CVI and multiples disabilities, Fazzi et al. (2005) employed an intervention for visual, motor and cognitive development. Like other mentioned studies on CVI, the authors emphasize environmental characteristics. They advocate for a child’s need for time to visually respond and reinforcement of responses (Fazzi et al., 2005). Fazzi et al. (2005) found early intervention services for infants with visual impairments mandatory.

Although Lanners et al. (1999) and Fazzi et al. (2005) studied infants and toddlers, their research can be applied to work with older children with CVI, especially those with profound low vision. Lanners et al. (1999) describe this category of children as having limited visual performance and benefiting from a dark room, light box, bright colors, big and or small surfaces, and moving details.

Although there is little written documentation on the use of music therapy with children with visual impairments, and on young children with visual impairments in general (Robb, 2003), a variety of educational and therapeutic objectives for this population can be addressed through music therapy (Adamek & Darrow, 2010). Gourgey (1998), for instance, writes that music therapy interventions can be used to help children with visual impairments explore their
environment, decrease or distinguish stereotypic behaviors, and teach social awareness. Music therapy interventions can also decrease social isolation in these children (Gourgey, 1998). Choir singing has also been shown to decrease feelings of isolation and result in emotional and health benefits (Dingle et al., 2013). Most children with vision loss who receive music therapy services have accompanying disabilities. Codd (2000) lists the following ways in which music can be used to accomplish objectives for these kids: (a) as a structured activity; (b) as a stimulus cue or prompt for sound localization and other listening tasks; (c) as contingency; and (d) as a part of music appreciation and enjoyment.

Regarding education, Adamek and Darrow (2010) write that nearly all state and private schools for students with visual impairments still include music as an important part of the curriculum. The well-known Perkins School for the Blind, once home to Hellen Keller, Anne Sullivan, and Laura Bridgman, provides music therapy services to all students attending its Lower School program. The program also houses a chorus and hosts monthly concerts for students and staff. Conway and Hodgman (2008) found that members of an intergenerational choir experienced a better understanding of others on self-reported measures of musical and social connections and respect.

The Perkins School for the Blind Lower School’s music therapists, Lisa Martino and Michael Bertolami, (2002) describe the music therapy community in Massachusetts as strong, vibrant, and continuing to grow. At Perkins, music therapists operate as part of an interdisciplinary team that also includes teachers, psychologists, speech and language pathologists, occupational therapists, physical therapists, physical education, orientation and mobility instruction, and art (Bertolami & Martino, 2002). These professionals come together during individual education plan (“IEP”) to discuss an individual student’s educational goals. A
student may be working toward a goal of having to make choices and communicate his or her needs, in which case, “the student can be given options during music therapy such as choosing an instrument to play or asking for a particular song” (Fater, 2012). In regard to functional vision, music has been used to help students with visual impairments sustain and enhance attention, which are important skills for learning. On the topic of attention, Husain and colleagues (2002) suggest that listening to music impacts arousal and mood, influencing a variety of cognitive tasks. The purpose of this paper was to provide an evidence-based curriculum guide for music therapy for children with CVI.
CHAPTER 3
MUSIC THERAPY CURRICULUM FOR CHILDREN WITH CVI

OVERVIEW

The Lower School Curriculum

The Lower School Program’s purpose is to educate the whole child (Perkins School for the Blind, 2016) and was a curriculum with traditional academics as well as self-help and social skills that encourage independence (Perkins School for the Blind, 2016). Academic training includes reading, writing, math, science, history, and social studies, while cultural education consists of art, music therapy, chorus, and piano lessons. Students also learn to use assistive technology and improve motor skills, balance, and coordination in the adapted physical education program (Perkins School for the Blind, 2016).

The Expanded Core Curriculum. Currently, the core curriculum consists of English language arts, math, science, health, physical education, fine arts, social studies, economics, business studies, vocational education, and history (American Foundation for the Blind, 2016). In addition to adopting the core curriculum, Perkins teaches the Expanded Core Curriculum, or “ECC.” The ECC is a program of study specifically designed to meet the unique needs of children with visual impairments. It is used as the basis for assessing students, planning goals, and providing instruction (American Foundation for the Blind, 2016). The curriculum consists of the following areas: compensatory or functional academic skills, such as communication; orientation and mobility; social interaction skills; independent living skills; recreation and leisure skills; career education; use of assistive technology; sensory efficiency skills; and self-determination (American Foundation for the Blind, 2016).
Compensatory skills differ from functional skills. Compensatory skills are ones that are necessary for children with visual impairments to access the entire core curriculum. Functional skills are necessary for students with multiple disabilities in order to play, socialize, and tend to daily living skills as independently as possible (American Foundation for the Blind, 2016). Orientation and mobility involve children learning about their bodies and how they move and travel in space. Learning social skills is another crucial component of the ECC. These skills must be “carefully, consciously, and sequentially taught” to children with visual impairments (American Foundation for the Blind, 2016). Recreation and leisure skills must also be deliberately taught since these children cannot learn about activities by seeing them. Sensory efficiency skills involve learning about using senses other than sight, such as touch and hearing, in order to identify objects and people. Finally, the self-determination aspect of the ECC fosters children’s ability to control their lives and interact fully in the world around them (American Foundation for the Blind, 2016).

Music therapy addresses most, if not all, of these areas. In fact, each intervention provided below fits more than one category of the ECC. All incorporate self-determination. As a result, the interventions below also follow the recommendation of Lanners et al. (1999) regarding the development of children with CVI by harmonizing cognitive and motor development through simultaneous tactile, auditory, and visual information.

**Documentation.** Music therapists at the Lower School use the same method of documentation for all age groups. They keep form’s in each student’s file stating individual IEP goals for music therapy. They track student progress throughout the year by marking how many times a student has achieved his or her goals during sessions. Every quarter, music therapists are
responsible for entering progress notes for all students. There, they indicate whether a student is just starting, making progress toward, or has reached his/her goals, followed by writing a paragraph with evidence to support claims.
CHAPTER 4

CURRICULUM FOR AGES 6-8

The youngest students currently attending the Lower School Program are 6-years-old. Prior to this, students were enrolled in the Infant Toddler and Early Learning Center programs. Because the effects of CVI vary so greatly from one child to the next, students require different levels of assistance in the music room. Some students within this age range are verbal; others are nonverbal and just learning to communicate. All of the following activities can be adjusted to meet each child’s individual needs.

Environmental Adaptations for CVI

Many students in this age group are likely in Phase I of the CVI Range Scale (Roman-Lantzy, 2007). Therefore, music therapists should adapt their environments as much as possible for these children. First, color-code tactile symbols to match the child’s visual preferences. Often these children are attracted to simple, single-colored (commonly red or yellow) objects (Roman-Lantzy, 2007). Accordingly, a music therapist could cover tactile symbols in bright yellow or red paper and glue them onto a black surface. If a child with CVI uses picture symbols, make the backgrounds of the pictures yellow.

Second, hold up tactile or picture symbols related to musical activities on a black background in the subject’s visual field. Third, allow time for the subject to gaze on a symbol before proceeding with any musical activity. For instance, present the ‘parachute’ symbol on the black background in the subject’s visual field, and immediately after he or she looks, begin the parachute song. If the subject takes more than a few seconds to look, disrupting the flow of the group session, use a hand-over-hand method to assist him or her in feeling the symbol before the
activity. Because children with visual impairments tend to share a positive relationship with music (Erin, 2010), the music therapy room is an ideal location to promote looking behaviors.

In addition to visual adaptations, the music therapist should consider the importance of structure and routine for children with CVI, especially when they are young. These factors are established through a firm schedule of musical activities repeated each session.

Social/ Emotional Interventions

“I Like It.” This activity encourages social interaction between students in a group and requires them to use both receptive and expressive language. Before any session, the music therapist arranges students’ chairs in a half circle formation, and places his or her chair at the front of the room. Students and the music therapist are facing each other. To begin the “I Like It” activity, the music therapist must think of an appropriate topic relevant to the group. He or she may decide on favorite weather, approaching holidays, special events at school, food, and/ or students’ class schedules. Often times, children enter the music room talking about an activity from a previous class. When this happens, the music therapist can easily use a topic related to that conversation.

To perform the song “I Like It,” the music therapist strums a simple I-IV-V-I chord progression on guitar and sings the following lyrics: “I like it, I like it. I really really really like it. Tell me, do you like it too?” These lyrics constitute the chorus section of the song. After playing the chorus section once or twice, the music therapist begins to fingerpick the same chord progression quietly. The change in music provides a stimulus cue helpful to this population (Codding, 2000). The therapist then asks a student waiting patiently to name something he or she likes related to the topic. For example, if the topic is weather, the music therapist will ask
“<student’s name>, what is your favorite kind of weather?” Higher-functioning students may respond without further prompting. If the student seems unsure of an answer (i.e. requires extra time), the music therapist can provide additional verbal prompts such as “what is the weather like right now?” These types of verbal cues particularly benefit children with CVI (Lam et al., 2010). After the student states a favorite type of weather, he or she must orient his or her body toward a peer, state the peer’s name, and ask “do you like sunny weather too?” That peer then orients his or her body toward the original speaker and replies with “yes” or “no.” After going through this cycle once, the music therapist repeats it until all students in the group have had a turn.

This activity addresses communication as well as social interaction skills and can easily be adjusted for nonverbal children. In that case, the music therapist can consult a speech therapist about appropriate topics. Often, students have certain pages on their electronic communication devices, and the speech therapist is most familiar with them. Usually, students who communicate through devices have “friends” and “music” pages. The “friends” page includes photos and names of a student’s classmates, while the “music” page contains music activities (i.e. “hello song,” “instruments,” etc.). If a child has a “school” page listing different classes, the music therapist could use “I Like It” to talk about favorite classes at school. Once a student selects a class on his/her communication device, a teaching assistant in the room can bring up the student’s “friends” page. From there, the student can select the name of a friend. The music therapist will facilitate asking the friend whether he or she likes the same class. Children with CVI and residual sight can be prompted to point or turn their bodies to the friend they have selected.
**Ukulele Passing Song.** This activity addresses turn-taking, orientation toward peers, choice-making, fine motor skills, and impulse control. Here, the music therapist tunes ukulele strings to G-C-E-A so that students can automatically play a chord. Next, the music therapist strums the ukulele and sings a song with instructions. An example of lyrics follow: “Hey hey hey. You can play. Strumming along on ukulele today. Pick a friend to pass it to. Yeah yeah yeah. It’s what we do.” The therapist should choose a melody that fits with just one chord. Then, he or she stops strumming and passes the instrument to a student who appears to be calm in order to encourage attention behaviors. He or she will model how to call a student by name and bring him or her the ukulele. The music therapist will then assist the student in strumming or plucking strings. This intervention is especially beneficial for children with CVI since they commonly have cerebral palsy. Music in general can encourage these students to remain engaged physically (Wolfe, 1980). Strumming the ukulele makes a pleasant sound, motivating children to use fine motor skills to play. After a student has his or her turn, he or she must choose a peer to pass the ukulele to.

Orientation and mobility skills are encouraged through having children turn their bodies toward a chosen peer. The music therapist prompts the peer to speak or make a sound so that the ukulele deliverer knows where the peer is in the room. This process also promotes social awareness. If a child is in a wheelchair, commonly the case with CVI, the music therapist will place the instrument on his or her lap and push him or her over to deliver the ukulele to the chosen peer. The music therapist can provide a child with severe developmental delay with the appropriate language- “let’s go bring John the ukulele!” followed by “John, Brian is bringing you the ukulele, get ready.” In order to receive the object, the child with CVI must use auditory skills to track the location of a student delivering it.
**Jams.** Consistent with research on patient-preferred music (Lesiuk, 2010), music therapists sing familiar children’s tunes with accompaniment while students play along with a desired instrument. The process of encouraging a child to use vision in selecting an instrument choice, as well as the positive effects music-making has on relationship (Hanser, 1999), is especially beneficial to the child with CVI.

**Communication Interventions**

**Hello Song.** A greeting song that utilizes simple, repetitive lyrics and chord progressions provides a clear structure for young students with CVI. In addition to picture and tactile symbols, the music therapist can accommodate a child with CVI by recording “hello” on a bright yellow or red switch. At the Lower School, the music therapist sings “hello everybody, hello hello hello. Very glad to see you, hello hello hello. Very glad to be with you, hello hello hello.” The next part involves the child reaching out to touch tactile symbols (attached via velcro to black felt boards) denoting the day of the week and “music.” The song continues: “today is <day> that’s the day for music.” The last part of the song involves the music therapist singing to each student, “hello to <name of child>. Hello, hello hello (the child fills in this final “hello” by making a musical sound, or pressing the switch).” Not only does this intervention provide a structure for social interaction, but it also addresses sensory efficiency skills via tactile symbols and switches.

**Theme Songs.** Theme songs can be used with all children with CVI, regardless of age. For this particular age range, the music therapist writes a song about a particular topic, or “theme.” Typically, children with CVI at this age do not spontaneously suggest themes. Therefore, the music therapist uses the same strategies to decide on topics as he or she does with
“I Like It.” Theme songs can be pre-written or improvised. Also similar to “I Like It” is the structure of the theme song- the music therapist sings a chorus section related to the theme, and verses consistent with each student answering a specific question about it. An example of a topic that expressly addresses the area of self-determination is pride. The chorus section of “Brave” by Sara Bareilles works well for students who can understand its message. Here, the music therapist can ask each student about a time he or she felt proud or brave. This intervention works well for children with CVI with global developmental delay because it promotes not only language skills but also socialization.

“Copy That Beat.” This activity involves a call-and-response dialogue between the music therapist and student on the drum. The music therapist sings lyrics “can you copy that beat?” Then, he or she approaches each student individually with the drum. The music therapist plays a simple beat, perhaps three quarter notes, and the student attempts to play the same rhythm back. Once the music therapist assesses a student’s ability to properly internalize the beat, memorize it, and play it back, he or she can make rhythms more complex. Instead of three quarter notes, for example, he or she can play two sets of triplets.

More and Finished. Since children with CVI often experience global developmental delay, some students in this age range might not be able to independently communicate his or her wants or needs. It may sound counterintuitive, but music therapy is beneficial for these children even if they do not enjoy music. Consider the following example. A 6-year-old boy at the Lower School has CVI and resulting medical complexities. Possibly due to sensory issues, he becomes easily agitated during musical activities which he attends with his classroom group. He is
nonverbal and just learning to communicate with pictures. He displays his contempt for non-preferred activities by tensing his facial muscles, squealing, and lastly punching his own head. Because the student is so medically fragile, teachers take care to modify aggressive behaviors to prevent him from reaching escalated stress levels.

Guided by behavior modification principles of Madsen & Madsen (1974), the music therapist can allow the child to leave a session as a reward for communicating that desire. Immediately after observing signs of agitation, he or she could place the “finish” picture on a black felt board. Next, he or she can ask the boy to use his residual sight to look and reach out to the picture. As soon as he touches the picture with his hand, the music therapist allows him to leave the room with a teaching assistant. The same process can be used to teach children with CVI to request “more” of a preferred activity.

**Sensory Efficiency Interventions**

**Fast or Slow.** This activity works well with students who are just learning how to properly use electronic communication devices, such as an iPad. Here, the students clap to a song with lyrics about going fast or slow. After singing the chorus section, the music therapist asks each child individually whether he or she wants to clap fast or slow (both options appear on the device). Because touch and relationship to others is deeply important to children with CVI, staff members can clap with them. This intervention strengthens relations between staff members and students while also promoting choice-making skills. In an individual session with a child with CVI, the music therapist can sing any song acapella while he or she claps along with the student. Then, the pair could stop clapping until the student chooses to continue by either selecting “fast”
or “slow” on his or her device. After, the music therapist will reinforce student by clapping at the chosen speed.

**Goodbye Song.** Like a hello song, a goodbye song provides a clear structure for social interaction among students who have visual impairments and cannot see each other. As with the greeting, the music therapist can pre-record “goodbye” on a bright, single-colored switch for students with CVI to activate before leaving the room.

**Orientation and Mobility Skills**

Although Perkins employs orientation and mobility specialists with their own IEP goals, clinicians can use music to teach children with visual impairments about body awareness. Related to the previous discussion of CVI and cerebral palsy is the fact that music can prompt these children to use certain muscles (Wolfe, 1980).

**Movement Songs.** The genre of children’s music is rich with songs for moving. For a child with CVI and the disabilities that come with it, concrete songs about different body parts and respective movements may establish orientation. Raffi’s “I’m in the Mood” is an apt example; lyrics can be altered to include movements other than clapping. Music therapists can sing words like “I’m in the mood to clap my hands” and instruct teaching assistants to touch students’ hands, etc. As soon as a child touches a body part independently the music therapist provides positive feedback like “you found your feet!”
The Parachute. Interventions related to the parachute promote visual attention as well as address compensatory skills crucial for children with CVI. The parachute is visually attractive because of its bright colors, including red and yellow, and movement properties. The students and music therapist move their chairs to form a full circle. Each participant grasps a handle of the parachute, including the music therapist. The music therapist sings a song, a capella, about reaching up and down, side to side, or fast and slow, with the parachute while modeling appropriate movements. After each verse, students take turns deciding whether they want to go over or under the parachute. The process of finding and sitting on the top of the parachute, or going under, requires spatial awareness.

Pre-academic Interventions

Following the Rules. This activity encourages students to listen, wait, and take turns—skills necessary for children with visual impairment to succeed in more traditional academics. During “Following the Rules,” the music therapist picks an instrument preferred by the group. Constitent with literature on positive reinforcement (Madsen & Madsen, 1974), a student is only allowed to play the surprise instrument after following the rules listed in the song. Different goals can be addressed within the rules. A music therapist can tell children to tap their heads, while providing a musical cue by playing a set number of beats on the guitar. This rule addresses orientation, and the steady beats provide children with CVI with auditory cues.

Music and Visual Tracking: An Ineffective Pilot Intervention. The results from a pilot intervention involving the use of live contingent music versus tactile exploration to promote visual tracking in a 6-year-old child with CVI and multiple disabilities are shown in Figure 2.
During this intervention, the researcher found that the child was more motivated by the exploration of objects than by music. Exploration consisted of objects being placed on a tray attached to the child’s wheelchair and his teacher assisting him in touching them using a hand-over-hand method. Future adaptation of the activity would indicate a need to combine exploration with contingent music to facilitate learning for this child. It is important to adopt each child’s preferences.

Figure 1. Results from a case study where a child with CVI was reinforced for looking at a small red toy accordion by live music. The initial baseline phase lasted from sessions 1 to 3. The treatment phase took place sessions 4 to 9, and the final baseline period occurred in the last three sessions.
Because familiarity plays an important role in the lives of children with CVI (Steendam, 2015), music therapists should continue to carry out previously described interventions. They can expand on these activities in a way that further addresses developmental skills necessary for the CVI population in this age group. By this point, sensory efficiency and orientation and mobility skills have been taught in multiple settings. They continue to be incorporated into the following interventions belonging to other ECC areas.

**Social/ Emotional Interventions**

"**I Like It.**" Music therapists can make this same activity used for previous ages more sophisticated for older students with CVI by increasing the required number of conversational exchanges between peers. Once the students have mastered the task of providing an answer related to the topic, asking a peer for his or her opinion, and waiting for the peer’s response, they can thank the peer for expressing his or her thoughts. Again, the music therapist is providing a structured, sequential social interaction for children who cannot rely on sight alone.

**The Feelings Song.** At this age, most students at Perkins are at least starting to learn how to identify and articulate emotions, making it a good time to introduce the “feelings song.” The lyrics of the song’s chorus section follow: “Lets sing about our feelings today. Lets sing about our feelings. Lets share some thoughts about our feelings today.” After the whole group sings the chorus, each student takes a turn singing a different verse, filling in their own feelings. They sing: “I feel <name of emotion> because <reason for emotion>. When <repeat reason>, I feel
Often students with severe disabilities require assistance from the music therapist in stating (1) his or her feeling; and/ or (2) the reason for that feeling. Due to inadequate expressive language skills, one student at the Lower School often confuses “happy” with “sad.” For example, she often sings “I feel sad” despite smiling and talking about a preferred person, object, or activity. She is then cued to use the word congruent with her facial affect.

The feelings song not only helps students express themselves, but it also requires them to listen to peers’ emotions, to increase social awareness. It is the responsibility of the music therapist to assure students that feelings of sadness and anger are acceptable in the setting.

Jams. Music therapists continue to use patient-preferred music for instrumental jams. Genres such as pop, reggae, and country are more age-appropriate than early childhood tunes.

Communication Interventions

Hello Song. In addition to “I Like It” and the feelings song, the music therapist can add more layers to the same hello song he or she used with children aged 6 to 8 years. Instead of responding to the music therapist singing “hello” to each student, students could be required to choose a friend to greet during their turns, either verbally or through a communication device. Children who have mastered making 1-step choices on devices can now move to two steps. Where at first a student might have only selected “hello” on a device, he or she could now select “hello, <name of classmate>.”

“Copy that Beat.” Music therapists take the basic formula they used with students in the previous age group and introduce leadership tasks. Students, as opposed to clinicians, take turns
initiating beats for the group to follow. This activity benefits children with CVI by promoting attention, useful for the continued development of vision (Steendam, 2015).

**Academic Interventions**

**Counting Games.** Music therapists at Lower School learn about a child’s academic abilities by attending team meetings and reading progress notes and IEP profiles. Counting games can be simple or slightly more complex depending on an individual student’s mathematic skills. Claves and rhythm sticks work well for carrying out addition and subtraction problems in the music room. Like a theme song, the music therapist can write a chorus section, this time about counting. But instead of verses consisting of students sharing opinions, they will entail the music therapist approaching each child and providing a concrete math problem using chosen instruments. Consider a child who can add and subtract numbers up to 10. The music therapist could hand him or her two claves, add two more, and take away one. After, the child feels how many claves are left in his or her hand he or she provides the music therapist with this number. This activity provides a child with CVI, and any type of visual impairment, with a method of understanding math concepts.
CHAPTER 6

CURRICULUM FOR AGES 12-14

Social/ Emotional Interventions

Drum Turns. This intervention encourages children to wait and listen for their names. Lyrics can be as simple as “let’s take turns on the drum today, everybody play today!” Here, everyone plays. The song continues with the music therapist calling for a student to take a turn. After each line naming a student, the music therapist adds a musical cue by playing the same chord three times in a row, in a rhythm he or she wants students to play on their drums. In one music therapy group at the Lower School, the student who experiences the most difficulty with this song is the child with CVI. His brain injury seems to have impaired his ability to control his impulses. Eventually, with repetition, he learned to play the drum only when he heard his name—an important skill for other settings.

The Feelings Song. From this age forward, music therapists can alter the feelings song to make it more musically interesting for older students (i.e. adding jazz chords, or altering tempo or rhythm). Additionally, the discussion around feelings becomes more complex. The music therapist asks follow-up questions about a child’s feeling. Because children with CVI typically function at a lower cognitive level than their peers, questions asked of them should be concise and involve “yes” and “no” answers. If developmental delay continues to make it difficult for a child to use expressive language, the music therapist can assist him or her by providing a relevant scenario, followed by asking how he or she would feel in that particular situation. Again, communicative devices can be incorporated for students without verbal speech.
Jams. Jams continue to utilize age-appropriate preferred music. The music therapist can request that a child who has become accustomed to picking the same instrument each time choose a new one in order to improve tolerance for flexibility.

Communication Interventions

Theme Songs. Because the Lower School provides students with so many musical experiences, they often become familiar with at least some musical elements like keys, tempo, and dynamics. Higher functioning students with CVI continue to benefit from familiar relationships but need to grow more independent. An effective intervention for older students involves each individual making a decision about a specific element of the music, essentially creating a song for the music therapist to play. At this age, students decide on themes, too, sometimes after prompting. The music therapist either selects a student to suggest a theme or asks for a volunteer.

When it comes to the musical elements of the theme song, there is one child in particular at the Lower School who is extremely musical and scats to form melodies. The music therapist will often use her melodies and lyrics, another student’s key suggestion, and the third student’s tempo and dynamics. Children who experience difficulty communicating are able to come together to make a musical product they feel positive about.

Improvisations. Musical improvisation provides students with visual impairments and multiple disabilities a creative outlet for self-expression and communication (Hanser, 1999). Because children with CVI suffer from complex neurological problems, they might have
difficulty relating to others through traditional means. In order for a group to make a cohesive piece of music, members must listen to each other and adjust their playing accordingly.

Music therapists can facilitate group instrumental improvisions in a variety of ways, but a particularly useful strategy is called progressive improvisation. Here, students choose different instruments. One student serves as the leader and tells each student, one by one, when to play. Eventually all students are engaged in the music. When the leader decides to end the improvisation, he or she calls each student out, including themselves, until there is silence. Throughout the improvisation, students pay close attention to and rhythmically and stylistically match the leader’s playing.

**Academic Interventions**

**Internalizing Rhythms.** The music therapist assigns each student to one of two groups; each group has its own rhythmic instrument. For instance, members of Group 1 only play claves, while students in Group 2 only play drums. Group 1 plays claves for eight counts, while Group 2 stays silent and counts mentally. Next, Group 2 plays drums for counts 10-16, and Group 1 silently counts. The process repeats itself until the music therapist gives a cue to stop. This game usually takes practice, and is designed to improve counting skills.

**Recreation and Leisure Skills**

Due to multiple disabilities, psychologists often predict that a student with CVI will live in a group home after his or her time at Perkins. In a group home, it is imperative that individuals find and engage in sources of entertainment. At the Lower School Program, music therapists may address recreation and leisure goals when a student demonstrates interest in a particular
instrument. For example, there is a student with CVI who likes to press different keys on a keyboard. In his individual sessions, the music therapist can teach him how to retrieve and plug in headphones so that he can play independently in other settings. Part of this intervention also involves increasing the amount of time the student is willing to spend with the keyboard. His music therapist improves this by using humor and playing sounds back to the student. Because this student finds comfort in the relationship, he may want to spend more time engaged in these activities on the instrument.
CHAPTER 7

AGES 15-16: THE TRANSITION YEAR

Generally, Perkins students spend this year preparing to leave the Lower School and entering the Secondary Program, with students aged 17- to 22-years old. By the time they reach the transition year, most students have become very familiar with the music therapy curriculum at Perkins. The main goal of this year is to further solidify social and communication skills so that the student can function as independently as possible in a new environment. The music therapist fades out goodbye songs.

Social/ Emotional Interventions

At this stage, music therapists continue to use more sophisticated greeting songs, but tend to eliminate the feelings song. However, if the students have strong feelings, they can ask peers whether they would be willing to listen to them. Working on projects that are age appropriate as they relate to typically developing peers becomes important. At this age, students have had time to think about their differences related to disability, and need to be empowered.

GarageBand and Studio Recording. In addition to its different programs, Perkins also houses the Grousbeck Center. This center is approximately a 10-minute walk from the Lower School building and contains a recording studio adapted for children with visual impairments. Music therapists can either use the Garageband App or travel to Grousbeck with the students in order to record songs. Travelling to Grousbeck is a strong option for children in transition, as it exposes them to other parts of campus.
Over the last year, a group of students preparing for transition assembled a “radio program” in which they recorded covers of preferred pop songs in the studio as well as commercials for products they enjoyed. Once the project was complete, the music therapist uploaded the broadcast onto the Perkins hard-drive so that staff and students across campus could access it. Another example related to recording involves a girl with CVI who covered an Adele song with her music therapist using GarageBand. The App contains different musical sounds which motivated her to use her residual sight as well as exercise fine motor skills to explore and select them.

Communication and Academic Interventions

Theme Songs. Themes can address feelings, especially since students no longer sing the feelings song. The music therapist can talk about more advanced concepts like feeling two emotions at once, providing examples, and asking students to share times they have experienced conflicting emotions. Theme songs also hone in on academics, especially for children with CVI since they may require strategies for language retrieval before leaving the Lower School. For these students, the music therapist can place “who,” “what,” and “where” picture cards onto a black felt board to be passed around the class. If a student experiences difficulty articulating thoughts about a theme, the music therapist might remind him or her to pay attention to these questions. Who does the student want to talk about? What activities do they participate in together? Finally, where does he or she see that person?

In addition to theme songs, drum circles, jams, and improvisations are still successful with this age group.
Recreation and Leisure Skills

Recreation and leisure skills become even more important as a child transitions from the Lower School to Secondary program. Music therapists can offer guitar or ukulele lessons in individual sessions to children who demonstrate musical skill; for them, playing in bands with friends might be the key to an enriching social life. Additionally, the music therapist can arrange preferred songs for students who wish to perform as an ensemble. The Secondary Program has a hand bell choir, so often music therapists from the Lower School will teach students in transition how to properly handle and perform on bells.
CHAPTER 8

INCLUSIVE AGE GROUPS

Although the Lower School Program does not have an intergenerational program, it does have different music groups that include children of different ages. These groups often result in the similar mental and social benefits associated with intergenerational groups (Conway & Hodgman, 2008).

Chorus

In addition to individual and group music therapy sessions, the music therapists at the Lower School Program facilitate chorus rehearsals and performances. The Lower School’s chorus meets for 30 minutes twice per week and includes children from different ages, classrooms, and abilities (although all participants are verbal). The chorus participates in two major concerts per year: the winter and spring concerts. The winter concert is actually hosted by the Secondary Program at Perkins, so Lower School students reap the benefits of exposure to older individuals. The second major performance is the spring concert at the Lower School. This concert takes place in the Lower School’s auditorium and only features students from the program. In rehearsals leading up to concerts, music therapists teach students songs by rote to accommodate individuals who are blind.

Like the adults in Dinkle et al.’s (2013) study, children who are blind often experience social isolation (Gourgey, 1998). Performing together provides students with a sense of belonging, increases self-esteem, promotes socialization, and keeps singers engaged: these are skills highly important to people with visual impairment. The benefits are most apparent in the
Lower School students who become easily agitated and even physically aggressive in other settings but remain relaxed in chorus.

**Big Music**

On Friday afternoons, the Lower School auditorium is home to a class called big music. The majority of students from the Lower School and the Early Learning Center (aged 3- to 5-years) attend, regardless of developmental level. Due to large attendance, Big music is divided into two sessions, each lasting 30 minutes. During sessions, music therapists hand out instruments to teachers, students, and other present staff. Participants engage in a sing-along with familiar songs from music therapy groups and chorus. Like music therapy sessions, Big Music is structured with a hello song, jams, and a goodbye song in order to reinforce sequencing. Because the age range of attendees starts around 3 and goes to 60 years with some teachers, children receive intergenerational social interactions and enrichment.
CHAPTER 9

CONCLUSION

CVI is currently the most common cause of visual impairment in children in the United States. Because schools such as Perkins School for the Blind traditionally focused almost exclusively on blindness and visual impairment, additional information on how to treat children with CVI is necessary. Music therapists have worked with children with multiple disabilities, specifically in the special education setting, since the start of their profession. They also have the tools to provide services for children with visual impairments. Thus, music therapists are equipped for providing effective interventions for children with CVI and the resulting disabilities.
APPENDIX A

OFFICIAL IRB APPROVAL FORM

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

APPROVAL MEMORANDUM

Date: 2/25/2016

To: Kristi Faby

Address:
Dept.: MUSIC SCHOOL

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
Using Music Therapy to Improve Functional Vision in Children with Cerebral Visual Impairment and Multiple Disabilities

The application that you submitted to this office in regard to the use of human subjects in the research proposal referenced above has been reviewed by the Human Subjects Committee at its meeting on 02/10/2016. Your project was approved by the Committee.

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

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

If the project has not been completed by 2/8/2017 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

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

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

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is FWA00000168/IRB number IRB00000446.

Cc: Jayne Standley, Advisor
HSC No. 2015.17269
APPENDIX B

INFORMED CONSENT

Parental Permission Form

Using Music Therapy to Improve Functional Vision in Children with Cerebral Visual Impairment and Multiple Disabilities

My name is Kristi Faby, and I am a Master’s student in Music Therapy from the College of Music at Florida State University and Music Therapy Intern at Perkins School for the Blind-Lower School. Your child is invited to be in a research study about the benefits of individual music therapy for children with cerebral/cortical visual impairment (“CVI”) and multiple disabilities. I am asking that your child take part because your child falls under this category and is in the age group I wish to study. I ask that you read this form and ask any questions you may have before agreeing to allow your child to take part in this study.

The study: The purpose of this study is to find out whether individual music therapy services can benefit children with CVI and multiple disabilities. It is specifically designed to find out if using music as positive reinforcement can increase the ability of a child with CVI to visually focus. If you agree to allow your child to take part, your child will be asked to undergo an initial assessment lasting approximately 30 minutes. During the assessment, your child will be asked to visually focus on several objects presented upon a black background for as long as he is able, up to ten seconds. He will also be asked to look at a person (i.e. either his classroom teacher or me) for as long as he is able, up to ten seconds. Your child will also be asked to participate in two 30-minute individual treatments per week for three months. Examples of the types of objects your child will be asked to look at include classroom items, instruments, and people. At the end of the three months, your child will be asked to participate in a final assessment to measure any improvement in visual focus. Individual music therapy treatments will be filmed, only for the purpose of this experiment.

Risks and benefits: There are no foreseeable risks in this study. The possible benefit of this study is that it may increase your child’s ability to visually focus on objects and people present in your child’s classroom environment. It may also lead to an overall increase in your child’s visual field.

Compensation: Your child will receive a small musical book or instrument for participating in this study. Your child will receive the gift even if he stops before finishing the experiment.

Confidentiality: The records of this study will be kept confidential, to the extent required by law. Any video will be recorded and stored on an iPad device that requires a password in order to be unlocked. Only the researcher will have access to the password and videos. It will not be
possible to figure out who the child in this study is. Related documents and video recordings will be kept securely for three (3) years after this study ends in a locked safe. After this amount of time, the videos on the iPad will be permanently erased, and the documents will be shredded. Data collected will be used in the researcher’s thesis, which may possibly be submitted for publication in academic journals.

**Voluntary Participation:** Your child’s participation in this study is completely voluntary. Your decision as to whether to allow your child to take part will not affect your current or future relationship with Florida State University or with Perkins School for the Blind. If you decide to allow your child to take part, your child is free to stop at any time. You are free to withdraw your child at any time without affecting your relationship with the University or Perkins.

The researcher for this study is Kristi Faby. You may reach her at…, or… You may also contact her major professor Dr. Jayne Standley, who directs the music therapy program at Florida State University, at…. Please feel free to ask any questions you have now, or at any point in the future. If you have any questions or concerns about your child's rights as a research subject, you may contact the FSU Institutional Review Board (IRB) at (850) 644-8633 or you may access their website at [http://www.fsu.research.edu](http://www.fsu.research.edu). You will be given a copy of this consent form for your records.

Please enter your child's name and sign below if you give consent for your child to participate in this study.

Your child's name: ________________________

Your signature ___________________________ Date _____________
REFERENCES


Dennison, E.M. (2003). Eye conditions in infants and young children that result in visual impairment and syndromes and other conditions that may accompany visual disorder. Logan, Utah: SKI-HI Institute.


Sapp, W. & Hatlen, P. (2010). The expanded core curriculum: Where we have been, where we are going, and how we can get there. *Journal of Visual Impairment & Blindness, 338*-348


BIOGRAPHICAL SKETCH

Kristi is a candidate for a Master of Music in Music Therapy at Florida State University. Before her graduate career, she received her Bachelor’s degree, also from Florida State University, in Psychology with minors in Religion and International Affairs, and a Global Pathways Certificate in Human Rights. She adores her family and close friends, the Seminoles (MCATDT), the beach, adventures (big and small), good food, dogs, comedy, and Boston. Kristi is passionate about music therapy and has clinical experience in rehabilitation, hospice, and medical settings. She completed her internship at Perkins School for the Blind and currently works in early intervention, providing services for infants and toddlers and their families. In the future she hopes to travel more and pursue a PhD.