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Mission (Revised 2013)

The commission on Music in Special Education, Music Therapy and Music Medicine was established in 1974. The Commission was established in order to contribute to the progressive development of music therapy and music in special education. In order to promote music in the lives of all children and adults in need of special support our mission is to:

- provide an international forum for the exchange of ideas regarding the educational and therapeutic professions, and their place within each country's musical culture;
- increase the visibility of international research and best practices in the fields of special music education, music therapy, and music medicine;
- stimulate international research connections and the initiation of international practice and education projects (e.g. exchange programs) between commission members;
- share contemporary technologies and products that enhance the musical lives of children and adults in need of special support;
- provide support for music educators and music therapists new to their professions via mentoring in both research and best practices, networking at seminar meetings and the world conference; as well as, between meetings; and
- inform those responsible for funding and policy making of the significance of music for children and adults in need of special support.

Vision (Revised 2013)

- to promote and advocate for students in need of special support —to ensure they are afforded the same quality music education as that of typical developing students;
- to share international perspectives on the current research in special music education, music therapy, and music medicine;
- to enhance the quality of life for all children and adults in need of special support by sharing international practices in special music education, music therapy, and music medicine; and
- to improve professional training/education of practitioners working in special music education, music therapy and music medicine.

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I. Music Education and Music Therapy for Students with Exceptionalities

Lessons Learned Along the Way:
A Researcher's Journey from Field to Findings

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In this paper, I explore the journey of a qualitative research study with participants from a secondary classroom of learners with special needs. As the teacher-researcher, I taught music once a week for most of the school year. Upon completion of the study, initial data analysis revealed the joys and tensions of learner engagement when composing with music software. The role of the teacher and her mastery of teaching this diverse group of learners were also informative. However, as the data analysis continued, ethical issues arose including the positioning of participant voice in balance with researcher voice/bias. The [re]visiting of data with a new perspective that included the questioning of my initial assumptions proved to be both enlightening and humbling.

Keywords: *narrative inquiry, special needs, music education, recursive data analysis, ethical tensions*

In this paper, I follow my journey as a qualitative researcher from the field through the recursive process of data analysis that led me to transformative understandings (Barone, 2001, 2007; Kinchloe, 2003). The nature of qualitative research, particularly narrative inquiry (Barrett & Stauffer, 2009, 2012; Clandinin, 2007; Reissman, 2008), requires the researcher to acknowledge her own history, presence, and bias onsite (to self) and in publication (to reader) (Barone, 2000a/1992; Peshkin, 1988). The longitudinal nature of qualitative research (Lincoln & Guba, 1985) and the relational nature of narrative inquiry (Clandinin & Connelly, 2000; Witherell & Noddings, 1991) contribute to the subjective and personal attachment to participants. Further, the findings may foster more transformation for the researcher than for the participants. Thus, the researcher seeks to share the study through rich description (Geertz, 1973) with space for readers to enter into the story from their own vantage points (Barone, 2000b/1990). It is in the sharing of the story that others may identify with it, find resonance for their own life and work (Denzin & Lincoln, 2000), and ultimately, further the conversation (Barone, 2007).

I engaged in a qualitative research study in a secondary school classroom for learners with special needs over the course of several months (November through May). The challenges that these learners faced required them to be in a self-contained classroom and prohibited their full inclusion through participation in the school music classes of choir and band (Florian, 2007; Jellison, 2006). The teacher and I had previously worked together in an elementary school and she invited me to come to her classroom once a week to "do music with her kids."

The year progressed with me learning more about her students' capabilities and musical interests in order to design musical activities that would be engaging and span a wide range of skill sets. We listened, described, and danced to popular music, followed musical maps, and composed music using Super Duper Music Looper. The students enjoyed the composition projects and I found them to be the most suitable for their strengths: working alone or with peers of their choice rather than whole group activities, multiple entry points for each musician, opportunity for personal expression, and—due to the software—immediate success coupled with a sense that what they were creating was "cool."

Data collection included my participation as teacher-researcher as I taught music once a week. I also functioned as a participant-observer as I would spend a good part of the day observing and interacting with students during non-musical activities. Video recording often became intrusive, thus onsite data recording was kept to a minimum. I wore an audio recorder but would occasionally make videos with student permission. I kept extensive field notes and corresponded weekly with the teacher regarding what had happened each day and dialogue regarding the musical project planned for the following week. Our email correspondence and onsite conversations each week were a rich source of data.

Ongoing Data Analysis

In the initial data analysis and through my lived experience during the study, I was pleased to learn how much the students were able to accomplish when composing music with Super Duper Music Looper. In juxtaposition with this, I was dismayed by the limitations of the physical classroom, the lack of access to computers and appropriate software, and the technical problems that we experienced daily that, to me, seemed unnecessary. In spite of student successes, I found myself caught up with the technical problems that brought on daily frustrations to the point of student meltdowns. I presented initial findings at a music technology conference (Blair, 2008a) with much attention on the tensions in this setting. While true to the study, my experience with these participants had also been extremely rewarding and I sought to create a better balance in future presentations (Blair, 2008b).

This recursive return to data and analysis (Nichols, 2012) led me to focus on the teacher, a gifted and caring teacher of learners with special needs (Blair, 2009). Her self-described aim was to love children like a mother, thus establishing a sense of trust and unconditional love that enabled her students to take the risks necessary to learn. She understood the frustrations her students felt daily and knew that their success in school was limited or non-existent. She loved the "unlovable" and was unrelenting in her patient interaction and as an advocate for them among her school administrators. The students knew she had their best interests at heart. They recognized the peace and acceptance that they felt when they walked in the door; she had not only changed her classroom into a "family room" but had taken a disparate group of learners and created a tightly knit community.

Participant Voice

As a researcher who highly respects the voice of the participants, I struggled to find an appropriate way to represent the narratives of these students in the midst of the ethical tensions (Banks & Banks, 1998; Josselson, 2007; Lewis & Porter, 2007) that I felt throughout the study (Blair, 2010a). None were highly verbal yet their agency regarding their experience of school and music was evident. I found it difficult to balance participant voice, to include triumphs but also the extreme extenuating circumstances that confounded the students' ability to learn. I was committed to representing these students' stories in positive ways yet in order to tell their story of school, personal hardships were thickly embedded in the tale. These and my own felt tensions—due to the minimal access to both music and technology (Challis, 2009)—exacerbated my attempts to stay "out of the way" in draft after narrative draft (Smith, 2009).

I explored other narrative inquirers' publications to creatively arrange text on the written page. I considered dual formats such as Gottlieb and Graham's (1993) "Parallel Worlds," Lather and Smithies' (1997) "Troubling the Angels," and Tanaka's (1997) "Pico College." I designed multiple versions of several data sets (Blair, 2010b) that were shared in a research setting. There I was afforded the opportunity to receive feedback from both respected colleagues and newcomers to research, thus a fruitful discussion resulted regarding both rigor and readability. In Clandinin and Connelly (2000), I was reminded of the inherent role of the researcher whose voice is in the study regardless of the ways one may try to make it invisible or neutral. I was encouraged to embrace all the voices in this study and now purposefully chose a narrative model with voices embedded throughout as seen, for example, in the exemplars of Belenky et al. (1986/1997), Clandinin, et al. (2006), and Ladson-Billings (1994).

A few months later, Liora Bresler visited our campus as a guest professor (see also, Bresler, 2009); a thoughtful discussion on researcher bias and the notion of questioning our own assumptions motivated me to, yet again, revisit the data. The result was a new and humble view of not only the experience of the learners and teacher, but of everyone in the school community.

"We do the best we can with what we have every day."

This renewed lens offered an intimate look at the daily experiences of teachers and administrators who experience daily tensions and demands, with limited resources, but who do the best they can every day with what they have (Blair, 2013). After all, I knew these people well: my children attended this school and I had taught choral music there the previous year. Higgins (2007), too, challenged my unproductive connoisseur lens (Eisner, 1998),

> Artists teach us how to see more, how to notice what most people miss. And like the best artists, the best researchers use their imagination to move past the cardboard versions of things. The question for educational evaluation is not which method to choose or how to employ it, but how to notice the aspects of schools

> hidden by our stereotypes of schools, the qualities of teachers and learners obscured by our cynicism or sentimentalism, the dimensions of classrooms that are hiding in plain view. (p. 393)

Where I once had assumed non-interest, I began to see commitment, support, and flexibility that had gone unnoticed when I had viewed the data through disgruntled eyes. I took off my university professor hat and recursively approached the data as the co-teacher and friend of these former colleagues. Repositioned, I was able to enlarge my view to get a glimpse of the way the teachers experienced school, to see the ways van Manen's (1992, 2002) pedagogical thoughtfulness and Noddings' (1984/2003) vision of care were demonstrated in this community. All those with whom I interacted at this school site did what they could, with what they had available, to affect change their own corner of the world.

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Enhancing the Student Internship Experience: Working with Special Needs Students to Create a Musical Performance

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Enhancing the music education student's internship experience is a subject constantly evaluated, tweaked, and re-evaluated. In addition to preparing students for the experience academically, professors must help students overcome feelings of insecurity and self-doubt (Killian, Dye, & Wayman, 2013). Strict standards and expectations are placed on the pre-service teacher. As internships approach, outstanding potential teachers begin to emerge in the methods' classroom. These are students who display not only academic achievement, but also self-confidence, determination, and good classroom management skills.

As a part of trying to enhance the student internship experience, an individual project incorporating special needs students was given to a student showing the qualities of high academic skills, self-confidence, determination, and good classroom management skills. Combining the internship experience with working with special needs students created an additional focus to further enhance the internship experience. Identifying the emphasis in this area was important because students with special needs rarely get to have an opportunity to create and produce their own musical performance. This project was designed to incorporate music education with special needs students, specifically, students with Autism. The music student intern completing the assignment for her internship was a triple major, majoring in music education, music therapy, and psychology. The three areas of her major made her particularly qualified to pilot this project.

Participant selection procedures began with the first day of the internship. The first meeting involved the teacher for general music education classes, the teacher for the children with Autism (AU), the university supervisor, and the music education intern. These four individuals became a team, choosing which students would participate in the project. Only two qualifications were necessary to be considered for the project-all participants had a diagnosis of Autism and their schedule allowed them the availability to participate. A group of students was selected, with the average age of 8. These students, when mainstreamed, were mainstreamed into grades 1, 2 and 3, based on their differing abilities. Based on previous class participation, it was noted that all enjoyed music.

The purpose of this project was threefold:
1) To encourage the student intern to be more creative in teaching methods.
2) To encourage the student intern to involve students with disabilities.
3) To encourage the student intern to create a musical story, involving music, art, and literature.

The student was to create music to go along with the story by writing a repetitive chorus with simple, concrete words for the children to be able to sing and understand. Sound effects and Orff instruments were also to be used. The Intern was to develop lessons to teach about the story and the message it conveyed, while incorporating the music aspect of the story. The intern also worked with the art specialist to create a backdrop for the production.

Students chosen for the project came from a classroom program called the Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH). TEACCH (1970) was developed as a statewide program in North Carolina. It uses picture schedules and other visual cues that help the child work independently and organize and structure their environments. Though TEACCH tries to improve a child's adaptation and skills, it also accepts the problems associated with autism spectrum disorders.

Contrary to a common belief, children with autism do not prefer to be alone. (Autism Society of NC). Making and maintaining friendships often proves to be difficult for those with autism. For them, the quality of friendships, not the number of friends, predicts how lonely they feel. This project was an excellent way to work on developing friendships and understanding the concept. The book *Charlie Clownfish and Annie A., A Tale of Best Friends* by Suzanne Tate was adapted and used as the basis for the project. Very simple guidelines were established to engage the children with Autism: Encourage creativity, work together as a group, and to develop friendships.

The student intern then used the following steps to begin the project outlining "How to Create a Musical:"
1. Pick a grade level

2. Pick a class (or several classes that can work together).

3. Examine children's books that would be appropriate and fulfill the goals for the children. Tales with two or three main characters and repetition work best.

4. You could select one of them or let the children pick the one they want to use, from a choice of two.

5. Decide how you want to present the story. Select characters to introduce in the story. Determine if there is a repeated line that might occur throughout the story.

6. Find places in the story where a song could be used (maybe even repeated over and over again.)

7. A song might occur at the beginning as an introduction. There may be a song at the end as a coda. There might be a song repeated in the story during a repetition section. There might be one or more songs to introduce the characters.

8. To make it interesting and musical try to have at least three songs and maybe some sound effects. (Not always possible when working with special needs children).

9. A narrator, who can be exciting and hold the drama, should tell the story. The children do not usually fit this part. Generally the teacher or another adult should serve as the narrator to tell the story to keep it interesting.

10. If you want the children to be involved in the speaking, they can be given simple, one line parts that might be used within the story through repetition or to introduce a character.

11. A song or songs can be sung by the entire class. Hopefully, percussion instruments can be used to accompany the songs.

12. To enhance the drama, sound effects can be created with instruments. These sound effects can be found on special words and/or to help create a feeling, a scene or an environment, such as "the sound of raindrops falling".

13. All of the children should be involved.

14. Students with disabilities can be involved in the drama, especially with the sound effects and with the singing.

15. Songs can be created by using simple melodies. Words for the songs can be created to help tell the story. The teacher can create the words or allow the children to help with the words. If the children are involved the teacher can guide the creative process by giving suggestions or choices. The success of this depends on the age and maturity level of the children. Older children can be more successful with this activity.

16. The story can be kept simple and short. Young children, especially, have a short attention span and limited activity level.

17. Simple costumes and simple scenery can be added to enhance the story.

18. <u>The story should be performed</u>. Performance is highly motivating to the children involved. Often it is the performances throughout their life that children remember the most. Perhaps the story can be performed for a class, a grade level, several grade levels, the entire school, parents, or for a school assembly.

19. A video should be created of the performance (and maybe some of the rehearsals and the creative process). If this is done, permission slips should be obtained at the beginning.

The project continued throughout the 10 weeks of the student internship. Each week, the intern worked with the selected students during a scheduled music class. The classroom teacher for the students with autism also reviewed the story and the songs with

them on a weekly basis. This added reinforcement for what the music intern was teaching the students. By the end of the ten-week period, the students were able to get through listening to the entire book, singing the learned songs, and providing accompaniments. The entire 3rd grade was then invited to see the final production and, by the end of the presentation, the audience was participating by singing the songs along with the students with Autism. It was a wonderful testament to the power of music and working together as a group. All goals and objectives were met and the student intern had an enhanced, fulfilled internship experience.

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The Middle School Band Experiences of Adolescent Boys with Attention Deficit Hyperactivity Disorder (ADHD)

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This paper is a narrative inquiry multiple-case study that explores the middle school band experiences of three boys with ADHD, ages 13-14. The following research questions were addressed: (1) What is the nature of band participation for three adolescents who have been diagnosed with ADHD? (2) How do adolescents with ADHD, their music teachers, and their parents describe the band participation of adolescents with ADHD? (3) In what ways do adolescents with ADHD interact with their music teachers and peers in bands? Data were collected using observations, interviews, and a research journal. Noteworthy findings resulting from collective case-study analysis included valuing achievement, non-musical aspects of participation, and relationships, the use of hyperfocus, and close relationships with band directors.

Keywords: *ADHD (Attention Deficit Hyperactivity Disorder), middle school band, music experiences, valuing*

Attention Deficit Hyperactivity Disorder (ADHD) is a neurobiological disorder. It is manifest through symptoms of inattentiveness, impulsivity, and hyperactivity that are more frequent and severe than typically observed in individuals at a comparative developmental level (NIMH, 2006). Although ADHD is not limited to a particular age group, 11.2–13.6% of adolescents aged 11–17 have been diagnosed with ADHD (CDC, 2010). Adolescents with ADHD present behavioral symptoms that impact social and academic activities, as well as frequent off task behaviors. ADHD manifests itself in particular ways in a school music ensemble and creates difficulties for teachers, peers, and the individual with ADHD.

There are young people who have ADHD in inclusive classrooms. Inclusion means that children who have differences and disabilities are integrated into the main student body of a school. Existing research about the school experiences of young people with ADHD indicates that these individuals suffer from social skills deficits, peer dislike, the sense of "being different," and trouble fitting in. Teachers report increased stress in working with children who have ADHD.

Band ensembles are different from other school classes. Bands are a unique culture with a higher student-teacher ratio, more time spent with the teacher and peers, a team environment, individual and social identities, leadership structures, and achievement. Because of these differences, the research of experiences adolescents with ADHD have had in general education may not apply equally to experiences in band settings.

The purpose of this study was to discover what three middle school band students with ADHD experienced and valued, if anything, about their band participation. The following research questions were addressed: (1) What is the nature of band participation for three adolescents who have been diagnosed with ADHD? (2) How do adolescents with ADHD, their music teachers, and their parents describe the band participation of adolescents with ADHD? (3) In what ways do adolescents with ADHD interact with their music teachers and peers in bands?

This paper is a narrative inquiry multiple-case study that explores the middle school band experiences of three boys with ADHD, ages 13-14. In each case, six rehearsals and one concert were observed over a three-week period, using sequential, systematic observation with some modification and event observation. Interviews were conducted with the students, their band directors, and their mothers. I kept a research journal throughout the process as an additional data source.

All data were analyzed via coding by thematic content, sorting according to theme, selecting specific quotes, and summarizing. Some interview data appear in transcribed form without alteration or summarization in this paper. Trustworthiness procedures included member-checking, triangulation, peer debriefing, external auditing of the entire project, and clarification of researcher bias. Reliability procedures included writing detailed notes, maintaining a research journal, and jotting memos to document the process of data collection.

Participants

Charlie

Charlie Smith was a 13 year old, seventh grade boy with ADHD. Charlie did not take medication to treat his ADHD but received an IEP at school related to his diagnosis. Charlie attended a suburban middle school with an approximate seventh and eighth grade enrollment of 1200 students. Mr. Stevens, Charlie's band teacher, was an experienced director in his 18th year of public school teaching. Charlie's class was the advanced Wind Ensemble, with a combined seventh and eighth grade enrollment of 53 students. Band participation for Charlie consisted of daily band class, home practice, private lessons, festivals, and performances. Prominent themes that emerged within these areas included isolation, achievement, and behavior management.

Sam

Sam Jones was a 14 year old, eighth grade boy with ADHD. Sam took a daily low dose medication for ADHD but did not have a 504 or IEP plan in place at school. Sam attended a suburban middle school with an approximate sixth to eighth grade enrollment of 740 students. Sam joined band in fifth grade and steadily advanced in his musical skills. He said, "I was kind of 'kicked' into it by my parents. When I said I didn't really want to do it, they said, 'Uh—wrong. Bad answer!'" Sam did not take private lessons but was exposed to many bands throughout his life, because his father was a band director in a nearby town, and everyone in his family played an instrument. Mr. Lynch,

Sam's band teacher, was an experienced director in his 13th year of teaching public school music. He was a new teacher this year at Sam's middle school after having taught for 12 years in another district. Over a four year period, Sam had three different band directors. The Advanced Band, Sam's class, had an enrollment of approximately 55 students in both seventh and eighth grades combined. Band participation for Sam consisted of daily jazz and band classes, time spent "hanging out" in the band room at break times and after school, student leadership, volunteerism, home practice, festivals, and performances. Prominent themes that emerged within these areas included belonging, control, and behavior management.

Luke

Luke Miller was a 14 year old with ADHD. Luke did not take medication or have a 504 or IEP plan at school. Luke attended a suburban middle school (JFK) with an approximate seventh and eighth grade enrollment of 1,000 students. Mr. Brown, Luke's band teacher, was an experienced director in his 17th year of public school teaching. Wind Ensemble, one of Luke's many band classes, held an enrollment of 80–90 students. Luke's band participation consisted of daily jazz and band classes, percussion ensemble, time spent "hanging out" in the band room at break times and after school, student leadership, home practice, private lessons, festivals, and performances. Prominent themes that emerged within these areas included self-control, music learning, achievement, and relationships.

Findings

In this section, I present across-case findings that appear to be specific to this multiple-case study. Findings are presented in a section focused on what participants valued about their band participation and in response to the research questions and ordered by importance, with more noteworthy findings presented first.

What Adolescents with ADHD Valued

Charlie, Sam, and Luke valued various aspects of their music ensemble participation similarly to adolescent participants who did not necessarily have ADHD as reported in other research (Abril, 2011; Adderley et al., 2003; Campbell et al., 2007; Hourigan, 2007 & 2009; Parker, 2011; Scheib, 2006). This finding is noteworthy, because it suggests that although individuals who have ADHD may present behavioral challenges that impact their social, academic, and occupational successes, they value the same musical, non-musical, and social components of band membership that individuals who do not have ADHD also value.

Musical domain. All three participants in this study valued music for its own qualities. Charlie expressed music as "fun to do," and stated that he "like[s] to just sit down and play music." Sam said, "It's about having fun playing your instrument," and Luke said, he enjoyed "just playing" music. Throughout my interactions with these young men, I observed and listened to evidence that they each truly enjoyed band for the purpose of learning music, making music, and performing for others.

Participants in other research shared similar sentiments, stating that they valued band participation because in band, they were able to lose themselves in music-making (Abril, 2011), learned musical skills and liked playing music (Adderley et al., 2003), and gained meaning from performing music (Campbell et al., 2007). In Hourigan's (2007) study of an adolescent with a disability in middle school band, although the student did not articulate what he valued about the experience, tutors and the researcher each described his apparent joy in the musical experience itself, suggesting that he valued music-making. Some literature was missing evidence of adolescents' valuing music for its own sake, such as Scheib's (2006) study of one middle school band member, where non-musical aspects were the reported sole focus, and Wayman's (2004) investigation of middle school general music students, who believed music was much more valuable for listening than for performing.

Non-musical domain. Although they each specifically valued their band participation for its music learning and performance opportunities, Charlie, Sam, and Luke also valued many non-musical aspects of their participation. Charlie described his membership as "a profession," and described the feeling of personal accomplishment that he valued, stating, "I've gotten really good at what I do." Sam valued his own development as someone who could contribute to the overall group's success in a leadership role. Luke stated that he valued "learning new things and random facts," and "learn[ing] skills in life," such as "determination and hard work." Luke also indicated that personal validation was a valuable part of his band participation when he stated that his grade was a "4.0 in band…. It's perfect." Additional comments by participants indicated that Charlie, Sam, and Luke all valued band as "a break," "a time to relax," and a time to "not have to write." Personal development, stress-relief, and identity formation that resulted from their band participation was important to all three participants.

Other researchers reported varying degrees of adolescents' valuing non-musical aspects of music ensemble participation. Some reported that adolescents valued music class as "fun" and "stress-relieving," and band ensembles as a break from other classes (Adderley et al., 2003; Campbell et al., 2007). Abril (2011) noted that only one hardcore band member specifically discussed valuing non-musical aspects of participation, stating that she valued finding identity and gaining increased emotional awareness. Hourigan (2007) did not report whether the study participant who had a disability valued non-musical aspects of his band membership. Scheib's (2006) participant appeared to value her band membership for achievement, competition, and extrinsic rewards. In two studies, researchers reported that adolescents valued band participation for opportunities to increase maturity and self-confidence, learn life lessons, gain leadership skills, form identity, learn to work, and develop character (Adderley et al., 2003; Campbell et al., 2007).

Social domain. Charlie, Sam, and Luke all valued band membership for its social aspects, which included friendship, acceptance, belonging, student-teacher relationships, group identity, a sense of community, and mutual respect. Charlie indicated that he valued the group identity of being a part of his band, stating, "It's a privilege to be part of

this Wind Ensemble that I'm in." He also valued the mutual respect of being in an organized social unit, describing, "When it's our turn to play, they don't talk or anything." Sam valued belonging, friendship, and acceptance. H stated that being in band meant "being with your friends." Luke said that he valued band as a "great way to meet people," describing band peers as "family," and discussing the sense of community he felt with musicians beyond his school after having performed in honor bands.

Just as Charlie, Sam, and Luke each valued social aspects of their band participation, adolescent participants in other research reported valuing social components of being in bands. Hardcore band members in Abril's (2011) study stated that they valued peers as a family and valued working with peers collectively to meet musical goals. These sentiments were previously reported by adolescents in Adderley et al.'s (2003) study, who reported that they valued the sense of family, community, and acceptance they experienced in band, and by adolescents in Campbell et al.'s (2007) study, who reported that they valued making new friends, belonging, and feeling as if they were part of a band family. The middle school band participant in Scheib's (2006) study and student with a disability in Hourigan's study (2007) did not report valuing aspects of their band participation.

In general, Charlie, Sam, and Luke valued band participation for musical, non-musical, and social aspects similarly to adolescent participants in other research. Jellison and Flowers (1991) reported, "perhaps the most notable outcome of this study is the similarity of responses between students with disabilities and their nondisabled peers" (p. 328). In the same spirit, I assert that my study participants with potentially disabling ADHD valued the all of the same components of band participation adolescents who did not necessarily have ADHD in other research also valued.

The Nature of Band Participation

After I analyzed and reviewed the data in response to research question one, I noted two findings that appear to be specific to my study. Findings that appear to be specific to this study include close relationships with band directors and hyperfocus utilized by all three adolescents with ADHD. Findings that appear to be specific to this study include close relationships with band directors and hyperfocus utilized by all three adolescents with ADHD.

Positive band participation for Charlie, Sam, and Luke included a close relationship with their band directors. Charlie developed a relationship with his band director over time, through private lessons during a two year period. Charlie enjoyed his band director's humor and personality, and he considered Mr. Stevens to be a friend. Sam worked alongside his band director completing various band management activities during non-instructional time. Mr. Lynch was a close friend to Sam long before he became Sam's band director, and he gave Sam special privileges like exclusive use of the copier. Luke developed a close, long term relationship with his band director after starting private lessons in third grade. Mr. Brown treated Luke differently from other students in that he expected more from him and permitted rule violations in class.

Previous research about adolescent band experiences (Adderley et al., 2003; Hourigan, 2007; Scheib, 2006) does not include the finding of students having close relationships with their band directors. Other educational research about adolescents with ADHD involves findings that teachers generally have negative attitudes toward working with students who have ADHD (Berglof, 2007; Doak, 2003). Sik (2000) reported that students with ADHD believe teachers help and listen to them, but this researcher did not report closeness in the teacher–student relationship. Pugsley (2008) reported one study participant as having a closer relationship with adults rather than peers, and in music education, Moss (2009) reported adolescent band members who were blind or had visual impairments also experienced close relationships with adults—although the close relationships noted in Moss' study may have been directly related to accommodations needed for blindness. The conclusion that the three adolescents with ADHD in my study experienced close relationships with their band directors is an important contribution of this study.

All three adolescents with ADHD in this study hyperfocused to pursue interests and to help manage the challenges of having ADHD. Although Holmes (2005) reported hyperfocus as a coping strategy used by successful adults with ADHD, participants in the present study were adolescents. This difference suggests the use of hyperfocus by adolescents with ADHD may be a finding specific to this study when compared to the literature. Charlie, Sam, and Luke hyperfocused to channel attention. Charlie hyperfocused toward music learning and seemed to find joy in playing the clarinet. Sam hyperfocused toward controlling the classroom environment, managing his apparent dislike for distraction and disorder while successfully serving in a leadership role. Luke hyperfocused on music learning on a broader scale than Charlie, practicing for long periods, learning several instruments, and enrolling in four school ensembles. It is unclear whether participants were aware of their hyperfocusing abilities. No participants seemed typical, as defined by Scheib (2006), because all participants were high achieving musicians.

Descriptions by Adolescents with ADHD, Their Music teachers, and Their Parents

Individual statements by adolescents with ADHD, their music teachers, and their parents led to two findings specific to this study. Findings that appear to be specific to this study include diminutive descriptions of individual music abilities and the reportedly uninformed but successful use of support strategies by band directors toward adolescents with ADHD.

Charlie, Sam, and Luke described their musical skills diminutively, even when their skills were advanced. This finding directly contradicted findings reported in other research (Evangelista et al., 2008; Glen, 2006; Hoza et al., 2004; Stevens 2000). Charlie, Sam, and Luke were diminutive when speaking about their own musical skills and abilities. Charlie said, "I'm intermediate, I guess, because I am still learning…. I also need to be humble." Sam described his musical skills conservatively. He explained that he tried every day to improve but sometimes felt frustrated working out a rhythm or

difficult part and needed more work. Luke suggested that he had room to continue learning. He said, "I am not sure what my level is. I really have no clue. I am not expert yet. I need to work on ending high notes without dying out and getting more endurance." All participants described their own musical skills diminutively, opposing the findings of Glen (2006), who reported that adolescents with ADHD report their abilities as more advanced or better than they actually are.

The band directors in my study may say that they are uninformed or unprepared to use accommodation strategies that support students with ADHD, but they often use strategies well. In other literature, teachers reported lack of knowledge or preparation coupled with inability to work effectively with adolescents who had ADHD (Doak, 2003). Band teachers in particular reported frustration and job dissatisfaction when working with adolescents who had ADHD (Courtney, 2010) or off-task and inattentive behaviors, which are two possible ADHD symptoms (Heston et al., 1996). In the present study, band teachers described adolescents with ADHD in various ways, including "immature," "nerdy," "energetic," and "spazzy." Further, ADHD symptoms exhibited by all three participants were perceived by band directors as immaturity and junior high awkwardness, rather than a disorder. Although all band directors in this study seemed uninformed about ADHD, each effectively redirected adolescents with ADHD much of the time. One band director, Mr. Lynch, structured his entire classroom to minimize distraction and help all students focus better, which may have also helped Sam. Mr. Stevens described ways he worked with Charlie to minimize talking during private lessons and redirect Charlie's impulsivity. Mr. Brown said that he had to give clear direction and leave no "grey areas" in order to set Luke up for success.

Interacting With Music Teachers and Peers

Data regarding interactions between the three adolescents with ADHD in this study and their peers or band teachers yield two findings specific to this study. Positive interactions between Charlie, Sam, and Luke and their band directors is a finding specific to this study when compared to other literature. The presence of positive peer relationships with adolescents who have ADHD, resulting from advanced musical skills and leadership positions, is a second finding that appeared specific to this study when compared to the literature.

Seeking or developing close relationships. As discussed in response to research question one, I did not find literature reporting specific positive relationships between adolescents with ADHD and music teachers. When redirected by Mr. Stevens, Charlie immediately complied and behaved respectfully. Although Sam was observed sticking his tongue out at Mr. Lynch, he explained that he felt ashamed and explained that his usual behavior was much more respectful. Luke showed respect for Mr. Brown when redirected or given instructions. In other research, teachers report struggling to work with adolescents who have ADHD (Doak, 2003; Greene et al., 2002), but no other research reports specific positive interactions between adolescents with ADHD and their band teachers.

Adolescents with ADHD experience positive interactions with peers when they also have advanced musical skills and leadership positions in the band. Charlie experienced significant social isolation, and although he demonstrated advanced musical skills, he demonstrated no leadership in the ensemble; however, Sam and Luke experienced peer acceptance, demonstrated advanced musical skills, and served in leadership roles within their bands. Sam seemed to use his leadership role as a way to interact with most peers, which could mean that Sam's leadership role was a means to build relationships with individuals outside his closer circle of friends. Luke helped members of his section and advocated for them at times, using his leadership position to naturally build peer relationships. Both Sam and Luke had experienced social challenges until seventh grade, but in eighth grade, their improved musical abilities led to peer acceptance and positive social interactions. No research was found that reports improved social interactions for adolescents with ADHD when advanced skills or leadership are demonstrated; therefore this appears to be a unique finding.

Implications

Practitioners, such as band teachers and other music educators, may benefit from this study by considering the challenges and potential abilities of adolescents with ADHD who participate in music ensembles. As a band teacher and researcher, my own understanding of ADHD has broadened. I was surprised to learn that the symptoms of having ADHD did not negatively impact adolescents' overall band participation, and that participants in my study did not seem to suffer in band from academic challenges suggested in the literature as typical for adolescents with ADHD.

I suggest practitioners consider my study findings when planning classroom management and leadership positions in bands. For example, a student who has ADHD and manages impulsive behavior by fidgeting may not need severe discipline but an accommodation instead. Because each adolescent study participant experienced difficulties making new friends through seventh grade, band directors should also watch for signs of social isolation and reach out to those who may appear to be at risk. Adolescents who have ADHD may be more suited for positions of leadership than they seem, because these individuals may monitor others well and notice details. Overall, I suggest that band directors observe and get to know their band participants well in order to consider the distracting ADHD symptoms and potential strengths that may develop under a band director's mentoring.

School administrators are in a position to support students and teachers on a daily basis as well as to provide professional development opportunities for teachers and school staff members. School administrators can benefit from the findings of this study by recognizing that adolescents who have ADHD may benefit academically, socially, and personally from band participation. Charlie was reported to have worked with the school psychologist to solve peer relationship challenges in a program that was likely supported by school administrators. Understanding that adolescents who have ADHD may perform well and experience positive relationships in bands, administrators can support students who have ADHD by providing them with opportunities to enroll in band classes and by

offering peer mediation and behavior modification programs as needed. Administrators can provide professional development in working with adolescents who have ADHD to teachers and school staff members at the school and district levels to empower them to better understand and work with adolescents who have ADHD, or send teachers to specific conferences and non-district trainings focused on ADHD.

Although the findings presented in this study inform readers about what three adolescents with ADHD who participated in bands experienced and valued, additional questions remain. For example, to enjoy a positive social experience in band, do adolescents with ADHD need close relationships with band directors or leadership roles? Do musically average adolescents who have ADHD hyperfocus on music learning? Do girls with ADHD share similar experiences with their male counterparts? Do elementary and high school band members with ADHD have similar band participation experiences to the participants in the present study? Given the brief "snapshot" of adolescent band experiences represented in this study, a similar study should be planned implementing a longitudinal design to determine whether motivational, academic, social, and behavioral themes endure. A quantitative survey study could be employed to investigate the degree of band dropouts who have ADHD compared to peers who do not have ADHD to determine whether adolescents with ADHD drop out of band at a different rate than their peers.

Because all three participants in this study were high achieving musicians, additional research targeted at average musicians with ADHD would further the present study. Additional research on this topic involving adolescents with ADHD from both gender groups and additional grade levels could yield a more complete understanding of what band participation is like for adolescents with ADHD. Elementary and high school students have not yet been investigated, nor have females. A similar study should be planned with a broader range of male and female participants aged 11–17 in elementary, middle, and high schools.

Many adolescents with ADHD exhibit impulsive, off task, or distracted behavior and participate in bands. Other research indicated that students were often disorganized, bullied, ignored, treated improperly by teachers, and academically unsuccessful. In contrast, the adolescents with ADHD in this study experienced close relationships with their band directors, structure, support, varying degrees of social success, musical success, and academic success. All three adolescents with ADHD valued musical, non-musical, and social aspects of their band participation in ways that were similar to their peers who did not have ADHD as reported in other research. In response to the research questions, findings produced six unique themes when compared to other research, which revealed challenges and positive aspects of band participation for students with ADHD. Overall, through this study it has become apparent that the experiences of adolescent band students who have ADHD are similar to those of adolescents without ADHD in many ways; however, some band membership experiences of adolescents with ADHD appear unique when compared to the reported band experiences of adolescents without ADHD and to the experiences of adolescents with ADHD in other settings.

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The Effect of Music Activities in a Multi-Sensory Room for Children with Asperger's Syndrome on Behavioral Changes: A Case Study

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Researchers have shown the effectiveness of multi-sensory environments on increasing users' concentration, alertness, calmness, and general awareness of the surrounding world (Chitsey, Haight, & Jones, 2002; Davies, 2012). The purpose of the study was to explore the use of the multi-sensory environment for a 5-year old boy with Asperger's Syndrome on behavioral changes. The duration was 16 weeks with 50-minute music sessions once per week. Both qualitative and quantitative methods were used to obtain the results. The results indicated that using music activities in the multi-sensory room provided a good environment for the participant on increasing positive responses and decreasing disruptive behaviors. These findings do support the concept theory proposed that a multi-sensory room can be an effective intervention on behavioral improvement for the participant.

Keywords: *Children with autism, multi-sensory room, behavioral changes, musical activities*

Introduction

Background

According to American Association of Multi-Sensory Environments (AAMSE, 2008), a multi-sensory environment is essentially a room that blocks out outside noise and light so that the therapist or user can control variables like temperature, lighting, noise, and other sensory input. Multi-sensory environments include controls that allow users to manipulate the environment on their own, but some environments are set up so that users can simply enjoy them.

Among emerging techniques used in the treatment and education of children with autism, multisensory approaches are the most popular, incorporated into a wide range of therapy plans and special education programs. Therapists and educators use multisensory approaches to reduce the affects of sensory integration dysfunction in the motor and cognitive development of children with autism. These techniques address two or more senses simultaneously so that one sense, perhaps a stronger one, can reinforce another, taking advantage of an individual's strengths to aid in addressing his weaknesses (AAMSE, 2008). A multi-sensory room has a variety of uses which can be used by all children to develop a variety of skills but which ultimately enriches the provision for children with sensory impairment such as autism and ADHD.

Motivation of the Study

The use of multi-sensory stimulation environments in western countries has been around since 1966, basically as a relaxant environment for the elderly. Originally, it was considered as a useful leisure and recreation facility for people with learning disabilities but, increasingly, claims are being made regarding the therapeutic benefits of this intervention both with individuals who have learning disabilities and in other health care fields. In recent years, multi-sensory stimulation environments (MSE) have more grown in popularity particularly among organizations in Taiwan dedicated to children with developmental disabilities.

Music is a powerful, therapeutic, non-threatening technique that has been shown to have great impact with those on the autism spectrum disorder. Multi-sensory environments can provide children with autism opportunities to engage in self-stimulating activities that help to regulate their nervous system. Due to previous studies conducted on multi-sensory environments, further research may also support a decrease in negative behaviors. Therefore, the focus of this study was to explore the use of the multi-sensory room as a treatment tool for a child with Asperger's Syndrome.

The Purpose of the Study

The purpose of the study was to examine the use of the music activities in a multi-sensory room for a child with Asperger's Syndrome on behavioral changes. The specific purposes of the study were:

1. Evaluating the use of music activities in a multi-sensory room for a child with Asperger's Syndrome on reducing negative behaviors.
2. Evaluating the use of music in a multi-sensory room for a child with Asperger's Syndrome on enhancing positive responses.

Research Questions

According to the purposes of the study, the research questions were:

1. Will the use of music activities in a multi-sensory environment reduce negative behaviors for a child with Asperger's Syndorme?
2. Will the use of music activities in a multi-sensory environment enhance positive responses for a child with Asperger's Syndrome?

Literature Review

Children with autism spectrum disorder benefit from the use of multi-sensory environments if they are either not sensitive enough to external stimuli, or too sensitive to stimuli such as noises, touch, or light. Researchers have shown that multi-sensory environments rich with lights, textures, smell and sounds increase users' concentration,

alertness, calmness, and general awareness of the surrounding world (Chitsey, Haight, & Jones, 2002; Davies, 2012).

The Definition of Asperger's Syndrome

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (2013) eliminates Asperger's Syndrome as a formal diagnosis by incorporating it and other subtypes of autism into one diagnosis called autism spectrum disorder. According to the American Psychiatric Association, this represents an effort to more accurately diagnose all individuals showing the signs of autism. According to American Psychiatric Association (2000), Asperger's Syndrome (AS) is a neurological condition which is recognized as being at the high functioning end of autism spectrum disorder. They experience a 'triad of impairment', comprised of difficulties with: social interaction, communication and flexibility of thought. The 10th edition of International Classification of Diseases and Related Health Problems (2010) defines that Asperger's Syndrome is "a disorder of uncertain nosological validity, characterized by the same type of qualitative abnormalities of reciprocal social interaction that typify autism, together with a restricted, stereotyped, repetitive repertoire of interests and activities. It differs from autism primarily in the fact that there is no general delay or retardation in language or in cognitive development. This disorder is often associated with marked clumsiness. There is a strong tendency for the abnormalities to persist into adolescence and adult life. Psychotic episodes occasionally occur in early adult life."

Multi-Sensory Environments

A multi-sensory environment is an artificially created venue that utilizes multi-sensory equipment to stimulate the senses and promote pleasure and/or feelings of well-being. Within the multi-sensory environment, Controlled Sensory Input (CSI) is designed to promote choice, interaction, and relationships through planned stimulation of the senses (Davies, 2012).

According to Pagliano (1998), "A multi-sensory environment is a dedicated space or room . . . where stimulation can be controlled, manipulated, intensified, reduced, presented in isolation or combination, packaged for active or passive interaction and temporally matched to fit the perceived motivation, interests, leisure, relaxation, therapeutic and/or educational needs of the user. It can take a variety of physical, psychological and sociological forms" (p. 107).

The creation of a multi-sensory environment would include a variety of auditory, visual, olfactory and tactile stimulation through the use of specially designed equipment. Distinct lighting in a dark room allows persons with Cortical Visual Impairment a greater probability of seeing. Fiber optic strands encourage movement and large bubble tubes provoke interest. Items and materials used in a multi-sensory environment do not have to be expensive in order to stimulate all of the senses (Ball & Haight, 2005).

The Use of Multi-Sensory Environment for People with Disabilities

In Wagne and Delisi's book (2010), the researcher stated that sensory impairments prevent people from acquiring all the information that the environment presents. Furthermore, if more senses are engaged in receiving the information, such as sight, hearing etc. the recall of story details will be facilitated. The use of a multi-sensory environment (MSE) was originally from the concern that "people with severe and multiple handicaps often experience very limited psychological and sensory stimulation, particularly in institutionalized care, and have a limited degree of control and choice in all aspects of their lives" (Baillon, van Diepen, & Prettyman, 2002, p. 445). A study was completed in 2002 that reviewed twenty-one other studies that focused on the effects of using multi-sensory environments with people with developmental disabilities or dementia. Fourteen of the twenty-one studies demonstrated positive changes in pain management and behavior for persons with sensory deprivation (Lancioni, Cuvo, & O'Reilly, 2002).

The effect of a multi-sensory room on the disruptive and pro-social behavior of three males with autism was examined. In an ABAB reversal design, specific disruptive and pro-social behaviors were recorded for each client throughout the four 28-day periods of the study. Results indicated that the three participants had different responses to the room. There was a slight tendency for participants to engage in more pro-social behaviors while in the multi-sensory environment (McKee, et al., 2007).

A survey was conducted of special schools enrolling children with severe disabilities in Australia. More than half the 36 responding schools reported having a MSE installed. The results showed the wide range of uses and benefits. There was a widespread acceptance of the inherent value of sensory stimulation (Carter & Stephenson, 2012).

Methodology

The methodology of the study used a quantitative analysis to measure validity based on assessment scales used with a 5-pt. Likert-type scale structured observation forms by three trained observers and qualitative data using interviews with parents, classroom teachers and anecdotal unstructured observation reports from three trained observers.

The Participant and Setting

The participant was a 5-year old boy diagnosed with Asperger's Syndrome, a disorder on the autism spectrum. He was enrolled in a private kindergarten in Taichung, Taiwan, and was selected by purposive sampling due to his specific sensory needs and potential benefit from intervention.

Duration

This was a 16-week study, with 50-minute sessions once per week of specific, study-focused music activities. Prior to the formal teaching, 2 observations were taken to obtain the participants' condition.

Research Design

A single subject AB design was used to obtain the changes of the participant's behaviors. The curriculum focused on music activities using various media, such as: Corner Ballpool, Talking Cube, Circular Set of Musical Lights, Musical Jumping Pad, Star Master Projector Light Lamp, Sound Bed, Vocal Controlled Lighting System, Side Glow Optic Spray, Handmade Tactile Story Big Book and Tactile materials in the multi-sensory room.

The Curriculum Design

The curriculum framework has been tested by hands-on teaching for 10 years. The curriculum contents included a hello song, attendance song, musical movement, music appreciation, musical storytelling, relaxation time and a goodbye song.

Assessment

The assessment instruments included: pre-test and post-test forms completed by the teacher; the participant's information from the kindergarten; interview reports from the teachers and the parents at home; and teaching logs from the researcher. The measurement tool used a semi-structured observation form developed by the research team to assess the participant's behavioral changes in various qualities over the research period. The observers' ratings were based on observation forms to assess the participant's behaviors for improvement. Ratings were "positive" or "negative." It was scored on a 5-pt. Likert-type scale on a range of aspects related to behavioral responses. A score of "1" indicated the participant had 100% negative responses, such as screaming, crying and aggressive behaviors, such as hitting, self-injury, biting and kicking etc. A score of "5" showed the participant had full positive responses throughout the therapeutic session, such as showing his happiness by smiling or laughing. Each of the varied media sessions was compared to baseline sessions where a non-music experience was offered.

All intervention sessions were recorded on video and these were viewed and scored by three observers. At the end of the study, six social validity assessment reports were completed by one parent, three observers and two kindergarten teachers.

Reliability

In order to establish the reliability of the study, there were three observers for the assessment throughout the research teaching. The score of internal consistency reliability is .990; therefore, this study is reliable.

Social Validity

In order to support objective results, a feedback form was used by one parent, two kindergarten teachers, and 3 observers. All respondents gave positive support for the study, and scored various aspects on a 5-pt. Likert-type scale. A score of "1" for questions in the "goals" section indicate that the respondent strongly disagreed with whether a goal of the study had been met; a score of "5" showed that they strongly agreed that a goal had been met. A score of "1" for questions in the "Behavioral Changes" section indicate that the respondents agreed the participants regressed a lot; a score of "5" showed that they agreed that the participants progressed a lot. There was 24 scores of "5" recorded, 6 scores of "4" for progress, and no scores indicating the parent, teachers and observers felt participants had made fair progress, or had regressed (no "1" to "3" scores).

For the second session, respondents gave a score of "1" if they felt the participant had shown a high level of regression in positive behavioral changes, learning motivation and other developments; they gave "5" scores if they observed that the participants had made a high level of progress. There was 9 scores of "5" recorded, 7 scores of "4" for progress, 2 scores of "3" for no changes, and no scores indicating the parent, teacher and observers felt the participant had made regressed, or had regressed a lot (no "1" to "2" scores).

Table 1
Social Validity-Part I Goals

Items	Feedback Questions	Strongly Disagreed (1)	Disagreed (2)	No comments (3)	Agreed (4)	Strongly Agreed (5)
Part I Goals	1. The research teaching has a crucial meaning for the child with Asperger's Syndrome.	0	0	0	0	6
	2. The research goals fit the needs of the child with Asperger's Syndrome.	0	0	0	1	5
	3. Music and teaching aids in the multisensory environment have positive effects on the child with Asperger's Syndrome.	0	0	0	3	3
	4. Music and teaching aids in the multisensory environment provide a safe, not dangerous learning method and good for a child with Asperger's Syndrome.	0	0	0	2	4
	5. You accept the use of music and teaching aids in the multisensory environment to teach young children with Asperger's Syndrome.	0	0	0	0	6
	Total Percentage	0%	0%	0%	20%	80%

Table 2
Social Validity-Part II Behavioral Changes

Items	Feedback Questions	Regressed a lot (1)	Regressed (2)	No changes (3)	Progressed (4)	Progressed a lot (5)
Part II Behavioral Changes	1. After taking the research class, the participant's positive behaviors are	0	0	0	2	4
	Total Percentage	0%	0%	0%	33.33%	66.66%
	1. After taking the research class, the participant's learning motivation is	0	0	0	2	4
	Total Percentage	0%	0%	0%	33.33%	66.66%
	1. After taking the research class, the participant's other developments, such as: cognition, language, social interaction, physical movement etc. are	0	0	2	3	1
	Total Percentage	0%	0%	33.33%	50%	16.66%

If you have other thoughts or opinions other than the description above, please write down here:

Results

The results are summarized for the participant and are presented in Figure 1 and Figure 2. The comparison of pre-test and post-test is shown in Figure 1. The participant was scored on a 5-pt. Likert-type scale on a range of aspects related to behavioral changes by the kindergarten head teacher. For the criteria of behavioral changes, a score of "1" indicated the participant had full, 100% negative behaviors, such as: disruptive behaviors all the time during the school hours. A score of "5" showed the participant had full, 100% positive behaviors/responses, such as: able to be calm and attend the class.

Figure 1. Pre-test & Post-test of the participant's positive behaviors.

Compared to the baseline, the results showed a positive effect for the participant after receiving music activities in the multisensory room for 16 sessions. Not only were the negative behaviors decreased, the participant's learning motivation was increased throughout the intervention sessions.

The Changes of the Participant's Behaviors/Responses

A comparison of the participant's behaviors between the baseline (A) at the beginning and the intervention (B) at the end is shown in Figure 2. The participant's narrative is based on the observation forms from three observers, teaching log, interviews with parents and teachers as well as parental reports.

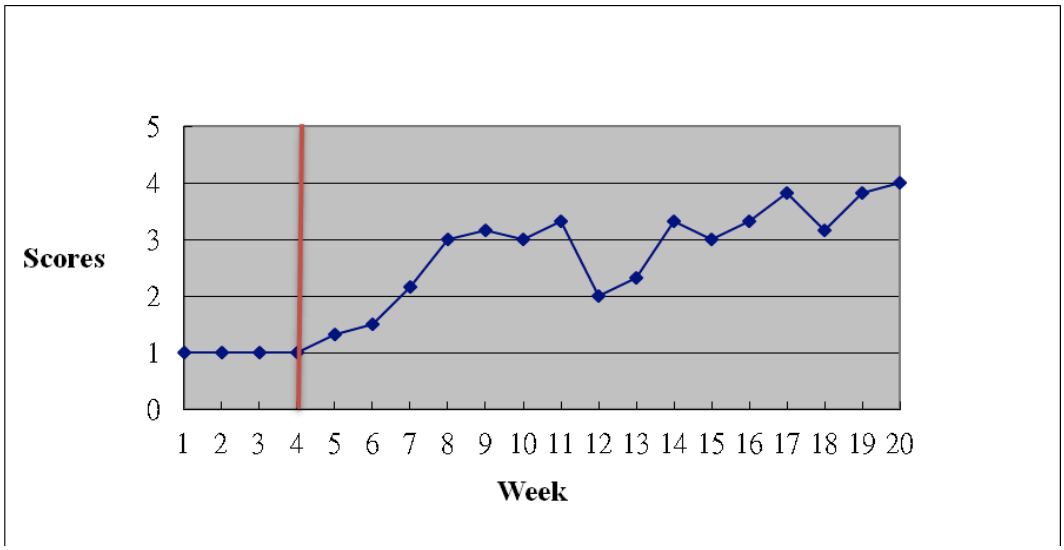

Figure 2. The weekly changes of the participant's positive behavior.

Figure 2 shows the 20-week process of the participant's behavioral changes scored by 3 observers. The average score from one at the beginning to 4 at the end indicates the results had an effective impact for the participant on positive behaviors/responses.

Baseline (A). In assessing the participant's initial behavior, prior to the formal teaching, 4 observations were taken. The participant showed negative responses and disruptive behaviors most of the time both during school days and at home. According to the kindergarten head teacher, "Every morning, when his parent took him to the kindergarten, he would sit on the floor outside of the classroom and cry for hours." From the parental report, the parent indicated that the participant would say, "I don't want to go to school" and started crying all the way to school.

Intervention (B). Prior to the start of the intervention, one free-play session of using various media was held where the participant was given the opportunity to play target media that would be used for the therapeutic session. According to the observation form, the participant liked the Circular Set of Musical Lights the most.

At week 5, the first intervention session, the participant showed his negative emotions most of the time, such as: rage and crying. According to his head teacher and the parents, the participant acted the same way every day. He would tell the parents and the teacher "I don't want to go to school; I don't want to get into the classroom; I don't want to play with other children." The participant acted the same way as usual when he first walked into the multi-sensory room. He was lying down on the floor and shouting out with anger. During the musical storytelling time, the participant's disruptive behavior stopped suddenly. He was attracted by the instrumental sound effects, so he stopped shouting and moved closer to the instructor. After the story time, the participant moved back to the classroom corner and started lying down without participation at all.

From week 6 to week 11, the participant's positive behaviors went up gradually. According to the observation forms, his positive changes were due to the use of the equipment in the multi-sensory room. He always showed his curiosity by touching the equipment when the instructor first introduced the new activity with the equipment. At this stage, the participant would spontaneously participate in his preferred activities, such as: musical storytelling time, musical game etc.

At week 12, the scores dropped from 3.33 down to 2 due to his sickness. He was not willing to do most of the activities, however he still concentrate on listening to the story that had been told four times. After he recovered from the illness, the participant was able to make more stable responses throughout the intervention sessions. Even the curve shows on Figure 2 went up and down, the participant's performance somehow still made progress at the end of the intervention.

Conclusion, Findings, and Recommendations

Conclusions

Table 2 made the conclusion of the study by comparing the participant's behavioral changes between the baseline and intervention. The multi-sensory room featured a relaxing and stimulating variety of sights, sounds and textures that help the child with Asperger's Syndrome to learn in an environment that suits his special needs. Such rooms can result in dramatic benefit to children with sensory impairment, and they can enhance development of senses such as hearing, sight, smell and touch. From the parental report, the participant's mother indicated that "he really likes it here and that's huge," "Usually, everything that I've ever tried, he's been resistant."

Table 2
The Comparison of the Participant's Behaviors

	Baseline Session (beginning)		Intervention Session (the end)	
Participant Description	Negative Behaviors & Responses	Positive Behaviors & Responses	Negative Behaviors & Responses	Positive Behaviors & Responses
Male 5-year old Asperger's Syndrome	Rage, Angry, Crying, Clamoring, Wiggling, Weepy, Passive participation	Would calm when the participant got tired	Show anger and unstable emotions when the new topic added	Calm, smiling, laughing Positive participation during the most of the activities, especially during the musical storytelling time

Findings

Results indicated that the participant had different responses to the multi-sensory room. He showed a clear pattern of decreased disruptive behavior during the intervention periods. There was a slight tendency for the participant to engage in more prosocial behaviors while in the multi-sensory room. The finding does support the contention that use of music activities in the multi-sensory room is effective intervention for negative behaviors in this participant population.

Limitations and Recommendations

The study offered a multi-sensory environment of interactive sensory experiences and possibilities with special needs equipment that benefit for the participant. However, valid empirical research in this area is limited and argument can be made with methodological problems such as the absence of a control condition, small numbers of participants, different types of samples and difficulty in measuring relevant outcomes. The length of data collection was not extensive enough to note a significant change in behavior following intervention. Individuals with autism require a daily routine and structured activity due to their sensitive nervous system, making any changes in scheduling difficult. Therefore, recommendations include a longer period of data collection to allow patterns of behavior to be established and adjustments to schedule changes to occur.

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Pre-Service Music and Special Educators Co-Teaching

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Since the passage of the Individuals with Disabilities Education Act (IDEA) in 1990, there has been an increased emphasis on full inclusion whenever possible for students with disabilities in the United States. The No Child Left Behind Act of 2001 supported full inclusion in K-12 classrooms as well. Since then teachers have explored various ways of achieving inclusion. Cooperative teaching or co-teaching has become increasingly popular method in schools around the globe (Takala & Uusitalo-Malmivaara, 2012; Gargiulo & Metcalf, 2010; Friend & Cook, 2007; Scruggs, Mastropieri, & McDuffie, 2007).

Co-teaching is one method of providing services without removing the student from the general classroom. Cook and Friend (1995) identified guidelines that were successful in early work on collaboration and inclusion in the UK and the US. Co-teaching should involve two or more educators or other certified staff with a commitment to share responsibility for instruction in one classroom of a single group of students. Specific content is the focus, for example, learning to play the recorder in the general music class. Resources are shared to help provide for a diversity of learning styles. In a rehearsal this might include a communication device wired into a sound system or a projector if the student types responses to enable all students to see or hear everyone's contribution to a discussion about interpreting a particular phrase. Typically communication devices stay in the special education classroom and sound systems reside in the music classroom. Finally, each teacher's level of participation may vary depending on the content of the lesson each day.

Friend and Cook (2007) caution that true co-teaching is more than collaboration team teaching or inclusion, although it includes all three. Co-teaching reduces the stigma of students with disabilities being identified as different, especially requiring different curriculum. In a co-taught classroom there is a development of respect and understanding for students with disabilities by their typical peers. An inclusive classroom that uses the same curriculum for typical students and students with disabilities is more heterogeneous which helps to develop a community within the classroom. This is ideal for children with disabilities who not only need the educational benefits of learning the grade-level curriculum but also benefits all students by offering them the chance to personally know individuals with disabilities.

With two or more professionals in the classroom all students will receive improved instruction and more opportunities for additional attention. This includes students who are gifted and talented, of average ability, students at risk for failure and students with disabilities. Children with disabilities benefit from less fragmentation of their school day caused by pulling them out for various services. I first saw this in action

at the Henry Viscardi School for Students with Severe Physical Disabilities in Long Island, NY. Physical therapists came into the general classroom and were doing stretching exercises on students while the classroom teacher delivered a math lesson. All professionals planned together to make sure the many complicated types of therapy could be delivered seamlessly with the educational curriculum. I used an electronic instrument, the SoundBeam, with several students and worked with the occupational therapist to find musical ways the SoundBeam could be used to also meet therapy goals. For example, a student was working on increased eyebrow movement so she would eventually be able to access a computer and playing the SoundBeam in music class helped her to develop strong muscles in her eyebrow, strong enough to write her first e-mail on a computer thanking her occupational therapist for helping her to be able to easily communicate with others!

Occasionally music teachers express frustration with professionals in the school building who compromise the music curriculum and performance goals by holding students with disabilities back from music. When special educators co-teach with the music teacher they gain a new understanding of what is involved in music. Deaf educators begin to understand that children with hearing loss can learn to be musical and that musicality is experienced in many more ways than just through the sense of hearing. Children in general music are active through movement, listening to music by holding a balloon with rice inside next to a speaker to feel vibrations of the recording and learning to read music notation. In addition, both music and special educators learn the classroom expectations for music and behavior.

Teaching music can sometimes be an isolating experience. Our rooms are often tucked away at the end of the building to shelter others from the sound we make. Having another teacher in the room to witness great lessons or rehearsals or lessons that crash can offer us another person to talk to so we can better understand why a lesson went the way that it did in our classroom. Special educators are very savvy about understanding what makes a lesson click or not. Getting feedback from them could potentially improve your teaching in ways you might never expect. Imagine someone with specialized experience in behavior helping you to figure out why it is so hard to gain the attention of your band when you change pieces in a rehearsal?

Learning to Co-Teach in Music

I teach a course at Illinois State University for undergraduate music and special educators. Twelve of each are accepted into the course and are paired together for field experiences in our lab school or in local schools with inclusive classrooms. Placements are made considering the specialty of the music education major (band, choral, general music or strings) and the specialty of the special education major (learning and behavior, deaf and hard of hearing or low vision and blindness). Pairs work with local cooperating teachers and are allowed to teach lessons or work one-on-one with students with disabilities. The pairs plan and teach together working on full inclusion while making sure both partners have teaching opportunities in the general music classroom. This can be challenging with special educators who are anxious about their musical abilities. The

class becomes comfortable singing and being musical through the semester and they present a concert for local children with disabilities as part of the course requirements. Still, singing alone can be unrealistic for some special education students, however they can learn to play instruments, model movement and explain music notation.

The Co-Teaching Approaches

There are many different ways co-teaching can occur in the classroom and teachers may decide to use a variety of approaches according to student needs. In fact teachers should avoid using only one or two most of the time. Cook & Friend (1993) identified the most commonly used approaches.

One teach, one observe. In this approach one teacher leads the instruction while the other one circulates and collects data on one student, a small group or across the entire class. Often students in beginning band with specific learning disabilities struggle with reading music notation. There are a number of visual cues that special educators can watch for in students with LDs in your band: rubbing the eyes, writing the names of notes underneath each note, watching a peer's fingers move instead of the music and of course giving up easily and either faking it or not participating altogether. The special educator can watch for these signs and intervene or the two of you can discuss a more inclusive way to teach your beginners.

One teach, one support. One teacher in this approach takes the instructional lead while the other teacher provides support and assistance to struggling students. Often the special educator is used in this role but teams should be careful not to relegate the special educator to a role of supporting all the time. Using the example above of the struggling readers in beginning band, the special educator might lead a lesson sharing strategies for alternative ways to read and process music notation. During the lesson the music teacher can then provide support to students who need the sort f support the music specialist is best at providing.

Station teaching. Many excellent general music teachers use stations meant to focus the attention of students on a particular activity. For example, there may be an area of the classroom where students sit on the floor and listen to storybooks read or look at visuals. After experiencing that activity the teacher might then transition to another part of the room where there is open space for movement and students might learn a dance, move to music played form a recording or experience another activity that requires active movement. Then knowledge learned form the movement activity might be transferred to Orff instruments and students move to an area of the room where the instruments are set up and finally end up back on the floor in the same space the book was read to discuss what they learned in the lesson before dismissal. These are stations and teachers can easily divide up activities based on their skills and interests.

Parallel teaching. In parallel teaching instruction is planned jointly but the class is split into two and each teacher works with half of the group. Half of a music technology class might be composing and the other half might be working on identifying

scenes in a silent movie to compose music. Either group might need the expertise of either the special educator or the music educator depending on the task.

Alternative teaching. This approach works well when teachers need to closely observe a smaller group or spend time with drill and practice types of learning. For example, the special educator may lead the chorus through a piece they have been working on while the music teacher meets with a pair of musically gifted students to work on a duet they are preparing for the same piece. This allows the special educator to experience the music curriculum from a different perspective and provide learning strategies for all students to learn to memorize the music or another aspect that the special educator feels comfortable leading. Teachers will need to be careful that the small group is not always the group with students who have disabilities.

Team teaching. When teachers truly team-teach they are both sharing instructional activities equally. This is helpful when the special educator can explain or adapt instruction as the music teacher models. For example, in an orchestra class the music teacher might be holding up a violin and explaining how to vibrato but not necessarily in a way that the student with vision loss understands. The special educator describes how to vibrato using language that is less focused on visual vocabulary, which helps the student with vision loss, but also several sighted typical students as well.

Pre-Service Teachers Comfort Levels with Co-Teaching Arrangements

Each of my co-teaching pairs taught a minimum of three lessons. All pairs planned together each week and pairs were given flexibility to choose which approach they felt was most effective to use. Not surprisingly, some special education pre-service teachers preferred to either observe or assist in music classes. Some were even cautious about supporting students with disabilities in music. One vision student who was particularly reluctant to be active in the music class wrote in his reflections about why he was often hesitant to do much with Alyssa, a third graders who is blind, "Alyssa followed the lyrics in Braille. I was also able to practice some orientation and mobility with Alyssa. I was a bit awkward with it, not having had that course yet."

Team teaching was the third most preferred approach after one teach, one observe and one teach, one assist. Special educators who are confident teachers were quite comfortable team teaching. Several special educators had a significant musical background or experiences teaching music in summer camps to children with disabilities. These students were the most willing to team-teach lending their particular expertise in adapting instruction for the less confident music teacher.

The fourth approach used by pre-service teachers is station teaching. Typically this occurred in a general music classroom and the special educator would read a storybook or lead a movement activity. Two pairs used alternative teaching to provide extra attention to a struggling student or group of students. Parallel teaching was not used by my students, most likely because the expertise must be equal among the two teachers

with plenty of experience teaching a particular class together so that a style between the two develops along with trust.

Reflections

Two groups of co-teachers were particularly effective. One was actually a group of two music teachers and one special educator. The setting was third grade general music and the three taught a four-week unit on composing using graphic notation. The special educator was comfortable with the content and she learned to compose her own piece using graphic notation that she modeled to the students. Small groups of third graders were organized and all three teachers set up each group to include one student with a disability. All three teachers monitored all groups and met to develop strategies to support all students who struggled. The teachers were pleasantly surprised that some of the students with disabilities managed quite well and some typical students struggled. The special educator provided unique insights into presenting universally designed lessons that helped all students to become engaged and less frustrated.

The other group was a pair of fairly seasoned pre-service teachers who had many hours of experience teaching children. They did not have experience teaching kindergarten children with emotional/behavioral disturbance but quickly developed teaching strategies that worked. The cooperating music teacher provided some needed support for the team based on her expertise as a result of degrees in both music and special education. Cooperating teachers provided detailed feedback to all teachers but the one with a special education masters degree was exceptional, "Great job co-teaching. I liked it that one of you is leading and one is supporting each time. Just make sure you have thought through how that supporting teacher can help out with the lessons....can they use visuals for the sped students, help teach an instrument part, hand out materials, etc."

This pair of pre-service teachers was also exceptional, and collaborated very well. It does take teachers who enjoy teaching together that like to collaborate to make co-teaching work the best. The pre-service special educator wrote in his final reflection, "Myself and Eileen have developed a very collaborative relationship as co-teachers. We have worked out a system that has been successful in the classroom. After she comes up with the lesson we will be teaching, I then make a visual support because numerous students in the class benefit from a visual support. This week seemed to be the most well-behaved class that we have had yet so I think it shows that our practices for behavior from previous weeks are showing progress."

Final Thoughts

Music teachers cannot possibly know everything there is to know about expert inclusion of students with disabilities. Experience teaching students are the biggest help but even so, it is virtually impossible to stay current on recent trends in special education and special education law. Special educators and therapists who regularly work with specific students have insight into their Individual Education Plan (IEP) along with

dozens of strategies to try when a student struggles. Asking for help is important for successful inclusion. Perhaps the special educator who co-teaches with you can provide an education to your students and for you at the same time. We can learn to be better teachers of students with disabilities and typical students by co-teaching with other professionals and they might learn to bring music into their classrooms more often too!

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Effects of Music Activities on Social Behavior of Children with autism spectrum disorder (ASD) while Participating in Circle Time at a Learning Center in an Elementary School

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Awareness and understanding of autism spectrum disorder (ASD) is increasing in recent years. Leo Kanner (1943) first described autism as a neurobiological disorder that falls across a wide spectrum from severe to mild impairments that affect social interaction and communication. Those in the autism spectrum show restricted range of activities and interests. Impairments in the social domain include limitations in eye gaze and facial expressions, few peer relationships, and lack of social or emotional reciprocity. This study investigated recommended music teaching techniques to engage students with ASD to focus attention and participate in small group activities. Observational results showed that when students were actively involved in making music they showed 81% on-task behavior compared to 53% attentiveness during non-music classes. Positive and active teacher modeling appeared to influence student participation in small group music activities. Seven to eleven year olds paid most attention when playing instruments and singing with pictured illustrations and hand puppets. Therapists and educators are encouraged to model positive and clear, physical actions for clients in this population.

Kanner (1943) first defined autism disorder as a wide spectrum from mild to severe impairments affecting social interaction and communication. Those in the autism spectrum show restricted range of activities and interests. Impairments in the social domain include limitations in eye gaze and facial expressions, few peer relationships, and lack of social or emotional reciprocity (Bernier, Webb, & Dawson, 2006). ASD occurs three or four more times in boys than girls (Fombonne, 1999). Kern, Rivera, Chandler, & Humpal (2013) made a cross-sectional survey of music therapists in the USA (N = 328) and found a ten-fold increase in ASD prevalence over 4 decades that now affects 1 in 88 individuals (male, 1 in 54; female 1 in 252) across all ethnic and socioeconomic groups in the United States (Center for Disease and Control and Prevention, 2012). Due to expanding boundaries of the autism spectrum and broader definitions, the US Center for Disease and Control and Prevention just released data (2014) that l in 68 students are affected with ASD in America. As channels are opening more for students with disabilities, higher education in the US has increasing numbers of students with disabilities that attend college. Times have never been better for special students to continue their education (Pope, 2013).

Teaching students with this disability focuses on basic techniques of communicating often done through imitation. Imitation probably serves initially as a basis for social reciprocity and connectedness with others, as well as the child's ability to differentiate self from others (Trevarthen, Kokkinaki, & Fiamenghi (1999). Imitation skills emerge early in life and are thought to play a role in the development of social

engagement. Children with autism perform worse in imitative actions than those with mental retardation and communication disorders at 2 years of age (Stone, Ousley, & Littleford, 1997). Young infants smile more and direct more attention to happy faces than to a neutral or sad expression (Rochat & Striano, 1999). Williams et al (2001) postulate that imitation deficits observed in autism are the results of an impairment in the ability to map other complex actions onto a reference for the self. More research is needed to explore the role that social motivation can have in the growth and development of those with autism (Bernier, Webb, & Dawson, 2006).

Social interactions and communicating with others is a usual stumbling block for those with ASD. Working with others in or out of the classroom becomes problematic. When failing to make joint attention bids for social reasons like showing and sharing, children with ASD miss out on rich opportunities to learn about affective expressions and experiences of others (Dawson, Toth, Abbott, et al., 2004). Joint attention responses improve across time for those with autism but initiation of attending with others tends to remain impaired (Mundy, 2003). Allowing students with autism choices in stimulating items (such as choice of animals to sing about in "Old MacDonald") functions as motivation to participate in group activities (Koegel & Koegel, 1995).

Verbal thought and visual thinking work via different brain systems, and in autism, systems that process visual-spatial problems are intact and functional (Grandin, 1995). Most verbal people with autism are visual thinkers. Learning through visual cues can facilitate verbal production for those with autism. Consequently, teachers who use visuals with these special populations can be more effective than without any visual stimuli (Notbohm, 2012).

Three recent texts provide insight into how persons with autism think. *Carly's Voice* (Fleischmann, 2012) is a book by a teenage girl with autism and her father. Carly likes different types of music depending on how she feels and likes music with a beat or bass when she needs to stim (create output to block sensory input). Music at night that has calming voices like panpipes helps Carly sleep and stay asleep. Carly says she learns constantly although she doesn't overtly respond and urges teachers to continue teaching in spite of limited reactions. The well-known adult with autism, Temple Grandin (2013) introduces neuroimaging advances and genetic research that link brain science to behavior and argues for ways to treat those with autism on specific symptoms rather than an umbrella approach.

Higashida (2013) is a 13 year-old Japanese boy with ASD who says that it feels so good and free to jump and clap. While he has semi-detached feelings about flow of time, spinning around makes him feel so good, like bliss, and gives him the feeling of freedom as when in water. He is more relaxed when moving. He finds it easier to read picture books and short sentences. He sees details before the whole picture. While he likes to learn, it is harder to learn alone without the help of others. He writes that he does obsessive behaviors to relieve tension and not go crazy.

Kern, Rivera, Chandler, & Humpal (2013) published a professional call for more research on evidence-based interventions that can improve independence and social responsibility of individuals with ASD. Their survey found most goal areas were for communication and social skills. Over half US music therapists used behavioral techniques in their clinical approach. Music therapy techniques used by music therapists when working with individuals with ASD were, from most to least used: singing and vocalization, instrument play, movement and dance, music improvisation, song writing and composition, listening to live music, and listening to pre-recorded music.

Based on recent research, this study set out to explore the effects of music activities on social behavior or attentiveness of children with ASD while participating in circle time of a life skills class in an elementary school. Following survey data reported in 2013, an educator used singing, movement and dance, playing instruments, and visual props to motivate small groups of second through fifth graders to use social communication skills during music activities.

Method

Subjects in this study were four-eleven children enrolled in a life skills cohort in an elementary school. Subjects were all students with an IEP and varied with academic and social skills that were 3 standard deviations below average IQ for ages 7-11. Trained special educators worked one-on-one and in small groups during school, and most of students in life skills blended into regular classrooms for certain subjects like physical education, library, music, art, recess, and sometimes social science and science.

The music teacher taught music once weekly during circle time for life skills students. Groups of students ranged from 4 to 11 students and sat in a semi-circle formation so social interaction could occur. Specially trained educators sat usually one-on-one behind students during circle time. Given students' lack of ability to initiate activities, the music teacher lead a variety of seven music activities: sing, move, sing and move, listen, sing with illustrated picture books and hand puppets, hear instructional directions, respond to flash cards, and play hand held percussion instruments. Music teacher maintained a cheerful attitude with all students by rotating in front of each person to provide individual attention, give clear modeling for students to imitate, and use student's names for social connections.

Materials. Musical materials included illustrated songbooks with large pictures that visualized song lyrics. *Don Gato* (Manders, 2003), *Puff the Magic Dragon* (Yarrow, 2007), and *There was an old lady who swallowed a fly* (Adams, 1973) and companion hand puppet (Alma's Design, 2012) were references used. Folk dances were simplified from existing CD recordings; "Hokey Pokey" and "Seven Jumps" came from *Children's Dances of Terra Del Zur* (Shenanigans, 1994) and "Chimes of Dunkirk" from *Chimes of Dunkirk* (New England Dancing Masters, 1990). Flash cards and accompanied songs by Hannibal (2012) covered basic topics of food groups, manners, and money.

Observers. Two trained observers who were part of the teaching staff used the Observation Form for Small Group On-Task to record student attentiveness, frequency of music teacher reinforcement, and types of musical activities. Observers sat on one side of the learning circle to collect data on students' and music teacher's behavior.

Results

Results from observational data in Table 1 show 81% mean on-task or attentiveness of students in the learning center during music lessons. High on-task ranged from 75% during singing to 95% when playing instruments. Second highest attentiveness of 87% occurred when students watched large picture books or hand puppets and listened to the teacher sing. Students were encouraged to sing as they viewed these visual stimuli that aided their understanding of the song lyrics. The moving activity was simplified folk dances done to pre-recorded music and led by the teacher.

Table 1
Mean Percentages of (A) Teaching Time and (B) Student On-task across 7 Music Activities in ten 30-minute lessons

Music Activities	Teaching Time (A)	On-task (B)	Products (A x B)
Sing and Move	47	81	3807
Singing	16	75	1200
Listen	15	87	1305
Moving	9	79	711
Flash Cards	5	81	405
Play Instruments	4	96	380
Instruct	4	80	320
Totals	100	578	8128
Grand Mean%	100%	82%	81%

Music activities were chosen that involved active student participation like singing, moving, and looking at pictures or flash cards. Research with elementary school children has shown that active involvement during music classes maintains high student attention (Moore, 2002). That is, when students move while singing there is higher attention than when only singing. Results in this study reflect similar findings that when students sang and moved they were on-task 81% compared to on-task of 75% when just singing. Out of the 7 music activities used in this study, only instruction time by the teacher demanded passive attention, and it was used only 4% of teaching time. Playing musical percussion instruments, such as, small drums, maracas, and tambourines, required students to keep the beat with singing or recorded music and showed the highest participation of 95% from students.

Observational data taken on the same students in non-music activities like listening to story reading showed students were only 53% on-task. While listening was passive and making music was active, the contrast of 53% attentiveness in non-music lessons compared to 81% paying attention in music lessons is clearly different. Observers showed 90% agreement in data collected.

In this study music activities of singing, singing with movements, and listening to songs with picture books or hand puppets took 78% of teaching time with 81% student on-task behavior. Other music activities were moving or dancing to recorded music, teacher instruction, flash card instruction, and playing instruments used only 22% of teaching time and held 84% student attention. Correlation of student on-task and rate of teacher's positive reinforcement was $r = .95$ using the Pearson "Product-Moment" formula. Increased student attentiveness related positively to more positive feedback from the music teacher.

Number of students in observed life skills music class varied from 4 to 11 with a mean of 6 students per group (see Table 2). Data reflected that 70% of music lessons were taught with small groups of 4-6 students. Groups of 4 students were observed 33% of the time, while groups of 5 students occurred 22% of music circle time and groups of 6 students were held 15% of observed teaching/learning time. Somewhat larger groups of 7-11 students occurred less frequently, however, attentiveness to music activities remained generally high at 80% on-task.

Table 2
Number of Students by Number of Observational 20-Second Intervals and Percentage of Time Observed

Group Size	Observation Intervals	Percentage of Time
4	76	33
5	51	22
6	36	15
7	3	1
8	22	9
9	24	10
10	19	8
11	5	2
Total	236	100

Discussion

Findings from this study show that working in small groups allows individual attention by the teacher to each child and high levels of student participation result. By simplifying dance moves and using repetitive movement patterns, students with ASD have better opportunities to succeed in movements. Selecting active music tasks with positive teacher modeling can lead to high student attentiveness. Using a variety of music activities that change in ten-minute rotation during a lesson can stimulate students to continue attending to the tasks at hand. Positive attitude by the teacher mirrors smiling faces and happy involvement in students and begins to open the closed barrier of socialization with special students.

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Instruments and Alternative Educational Resources on Teaching Music for Students With Vision Loss

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This work is part of the Postdoctoral Education project, which describes the steps of creation, construction and use of alternative musical instruments, as well as teaching resources that can be used on teaching music for students with vision loss in the perspective of the CLATEC Musical Approach. The Charter of the Salamanca Statement (1994) represents an important milestone for the promotion of inclusive education, which states that all students should learn together, regardless of their difficulties and differences. The Law of Guidelines and Bases of Brazilian education (LDBEM. N. 9.394, 1996), which maintains a close relationship with international guidelines, determines the new direction of Brazilian education. It officiated, in basic education schools, obligatoriness on teaching the curriculum component of art and music. During the research process various whistles and flutes of different profiles were built with PVC pipes and fittings, sizes and technical possibilities in the progressive way of music education. Given the above, we can conclude that in Brazil it is imperative to think of significant examples in promoting music education in an inclusive context, and that there are many people who have a vision loss in this country.

Keywords: *Alternative instruments, teaching resources, music in special/inclusive education*

Introduction

This work is part of the Postdoctoral Education project, which describes the steps of creation, construction and use of alternative musical instruments (percussion, wind and strings), as well as teaching resources that can be used on teaching music for students with vision loss in the perspective of the CLATEC Musical Approach. This approach, according to Trindade (2008), represents the activities of musical instrument construction, literature, appreciation, art, creation and performance to be developed on teaching music in basic education.

In particular, this small cutout has two objectives: to present the family of flutes (slide whistles, water flute, whistles and block flutes) as models of alternative instruments to be created in the classroom; to show a kit of teaching materials to be constructed and used on teaching music for students with vision loss. We intend to answer the question "how to promote music education for students with vision loss by applying varied musical activities on equal opportunities and conditions?"

In Brazil, with an absence of solid paths that can meet the challenges of teaching music to students with vision loss in the context of the regular classroom, it is appropriate and we

support companies in international and national legislation that defend the right of everyone to education.

In the 2010 Census, the Brazilian population was comprised of 190 million people. Approximately 23.9% of this population (45.6 million people) had at least one disability - visual, auditory, motor and/or mental. Vision loss was the most frequent, reaching 35 million people, among them: 528, 624 were blind; 6,056,684 had great difficulty seeing, and 29,206,180 had some difficulty seeing (IBGE, 2010). Thus, there is a need to think about promoting meaningful examples for teaching music to people with visual disabilities in inclusive education.

Theoretical Foundation

The Charter of the Salamanca Statement (1994) represents an important milestone for the promotion of inclusive education, which states that all students should learn together, regardless of their difficulties and differences. Schools must recognize and meet the needs of their students, adapting to various learning styles and rhythms. Likewise, it must ensure a quality education, with appropriate curricula, favorable school organization, teaching strategies and learning resources that meet the needs of those involved (1994, p. 11).

As for the International Society for Music Education (1998), its 5th mission states "ISME believes that the implementation effort is needed to meet the musical needs of all learners, including those with special needs..." In addition, in the 7th mission, "ISME believes that all students should have extensive opportunities for active participation as listeners, performers, composers and improvisers" (McCarthy, 2004, p. 178). We also added the active participation of building instruments, possible to be performed in inclusive education.

The Convention on the Rights of Persons with Disabilities (UN 2006), recognizes "... that disability is an evolving concept and that disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others. In Article 24, Participant States shall take appropriate measures, including "facilitating the learning of Braille, alternative script, modes, means and formats of augmentative and alternative communication and orientation and mobility skills...” In this Convention, concepts about communication, reasonable adjustment and universal design guided our creations instruments and materials. (Art. 2)

The Law of Guidelines and Bases of Brazilian education (LDBEM. 9,394, 1996), which maintains a close relationship with international guidelines, determines the new direction of Brazilian education. It officiated, in basic education schools, obligatoriness on teaching the curriculum component of art and music (Art. 26). In Article 58, the concept of special education refers to the type of education offered preferably in the regular education for learners with special needs. In Article 59, "education systems to ensure students with special needs: I - curricula, methods, techniques, educational resources and organization specific to meet their needs."

Rules Regarding the Brazilian Association of Technical Standards (ABNT NBR 9050) 2004, " establishes criteria and technical parameters to be observed when the project construction, installation and adaptation of buildings, furniture, equipment spaces and urban conditions accessibility" (p. 1). These standards guided us about the concepts of related expressions in the construction of musical learning materials, also in terms of technical aids and assistive technology. We use primarily the rules relating to symbols, pictures, visual and tactile signals, guiding text, tactile maps and plans, among others.

On teaching music, Brazilian guiding documents are: National Curriculum for Early Childhood Education (1998a), the National Curriculum of Elementary School (1997, 1998b) and High School (1999) indicate the objectives, content and musical approaches to be applied in basic education, of contextualized ways with the languages of the area of art, with other areas of knowledge and cross-cutting issues. The authors Julio Feliz (2000), Serge Durin (1996), Margaret McLean (1984) Helium and St. Anne (2011) advocate the practice of building instruments in music education. Thus, they solidified our defense regarding this activity, present in all ethnic cultures.

Regarding the use of teaching resources with signage in Braille musicography, the *Novo manual internacional de musicografia Braille* under the coordination of Glory Baptist Maria Mota (2004) made a difference, especially for being the national reference of this area. As teaching resources that have elements of music theory, we used the book *Teoria da Música* by Bohumil Med (1996), by presenting signs, symbols and musical concepts used in teaching music. The choice of these two books was defined by seven criteria: musical and educational functionality; musical technique credibility; availability at the domestic market; possible adaptations resources through tactile, visual, and kinesthetic; possibilities to support teaching students with and without vision loss; construction possibilities on the part of educators, and direct accessibility to other supporting references.

Thus, it is obvious that education and, consequently, teaching music must suit all people, including those who have disabilities. Likewise, everyone has the right to receive quality instruction through curriculum offerings, methods, techniques, resources and specific organizations that may suit their individual educational needs and/or collective. Even though laws, guidelines and missions do not guarantee the education we want, we believe we can build paths based on these documents, as a way we can support and give credence to our claims, since these documents were fruits of many claims of people who fought incessantly.

Methodology

During the research process various whistles and flutes of different profiles were built with PVC pipes and fittings, sizes and technical possibilities in the progressive way of music education. These instruments have been tested in the classroom with students with vision loss and students without vision loss. In parallel, we built and tested numerous educational materials, also the perspectives of technical aids and assistive technology for learners to meet people with vision loss in music education, based on the CLATEC Musical Approach.

These flutes may present themselves physically as a piston flute, as water flute (use of a water container or similar), or as whistle and block flute. In piston flute or bezel is adapted, a stopper rod inside the tube is used, causing a movement back and forth. This move, in line with the breath at one end of the tube (PVC pipe) emits the sound of a flute, displaying different notes not temperate.

As for water flute, the bezel is replaced by a water bottle or other container. By placing the flute body inside the bottle, and the top end, while blowing send the bottle moves upward and downward, the volume of water being filled in the tube will cause the sound to be low, medium or acute. One can also set a blow ball (bladder) in the body of the pipe. This ball should contain water and to blow, it is necessary to manipulate it with the intention of bringing greater or lesser volume of water in the barrel. As for the whistles, they have only one or two sounds. Only the Block Flutes have holes in their bodies, depending on the amount of notes to play. In Figure 1, we present three sets of flutes as possible models to be built in the classroom.

a. Piston Flutes vertically		b. Water pipes vertically, using bottles and / or ball blow (bladder)		c. Transversal Block Flutes, 1998 (soprano and contralto)
				

Figure 1. Piston Flutes, Water Flutes and Block Flutes.
Source: Instruments and photos of the author.

To build these instruments few tools are required: a ruler, a hacksaw, small scissors and sandpaper. As for materials, are needed: PVC pipes and fittings (knees, caps or caps and tees) of varying sizes. These flutes emit bass, midrange and treble of different durations. Likewise, they emit sounds up and down (continuous and interrupted) and not too spicy notes. Thus, it is possible to work many musical concepts using this instrument, by exercise: rhythmic and melodic at different heights, running notes and sound movement.

To enrich the musical activities in music education we advocate the creation, construction and use of instructional materials. These provide support for ordinary learners and/or special needs learners. We elaborated cartouches or card sizes ranging from a sheet of A4 paper craft until his eighth of being used in the horizontal or vertical. Three-dimensional objects were also created. In Figure 2 we present some teaching materials able to be worked in

the classroom with students with visual deficiency and sighted using the basic instruments like flutes.

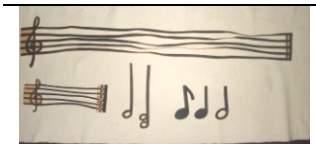	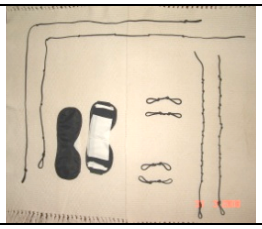	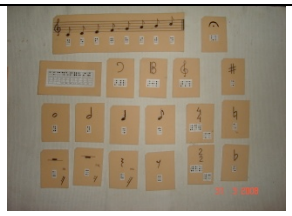	
a. Tactile Pentagram	b. Diatonic Scale	c. Musical graphic /tactile symbols	d. Double Ring for body exercise.

Figure 2. Alternative Educational Resources
Source: Teaching tools and photos of the author.

Cards can be made of cardboard, cardstock or PVA to signal different musical sound profiles. Its signs should be displayed in different colors and embossed for better perception of those involved. These are materials that signal:

a) Sound durations: straight lines long, medium and short;
b) Sound heights: severe sloping lines, medium and high;
c) Sound profiles: continuous, wavy, etc. interrupted;
d) Sound lines: continuous, ascending and descending;
e) Musical Notes: musicographies written in ink and in Braille;
f) Musical forms: AB, ABA;
g) Random sounds: different symbols in different spaces;
h) Musical excerpts: written in both musicographies.

In the activity of appreciation, these flutes can be used to display and demonstrate the melodic contour/rhythm to be played alone or as part of a musical work. In literature activities, we conduct research on its origins and forms of building them and using them. In technical activities, we can perform varied exercises of repetition and dictation. In creation activities, occasional notes and melodic lines can be part of building songs or arrangements. And, in the activity of performance, they may be part of the instrumental ensemble to be presented.

Conclusion

Given the above, we can conclude that in Brazil it is imperative to think of significant examples in promoting music education in an inclusive context, and that there are many people who have visual deficiency in this country. Based on documents guiding the national education of educators who support the activity of constructing instruments on teaching music and documents relating to Braille musicography it is possible to present alternative musical instruments (flutes and whistles) that can be constructed in the classroom. Likewise, it is important to build educational materials appropriate to meet the teaching of technical activities in the context of inclusive education. An example of the possibilities of working the CLATEC Musical Approach was also presented in this paper in order to answer the question earlier presented.

We understand that "thinking about hearing the musical diversity of the world" is, first of all, thinking about the people that do not have broad access to music education. It is also

considering creating, building and using musical instruments and teaching resources for alternative viable opportunities to these students to express their distinctive songs. This is why we think music education in the context of regular school, where respect for difference and acceptance of persons with disabilities should do this as part of human diversity. Likewise, in this space that respects the equal opportunities of making music, so with the free accessibility in all musical activities. Thus, we can, in the near future, have the opportunity to hear the musical diversity of these people still living on the margins of society.

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II. Music Therapy for Older Adults

Profiles of Older Adults in Musical Activity Participation and Quality of Life

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According to the definition of the World Health Organization, Taiwan become an aging society in 1993 and soon will become an elderly society, as the aging population was 11.5% in 2013. Quality of life for older adults is no longer a personal or family issue, but an objective issue for the society, nation, and even the world. Based on the literature, leisure activities of older adults were categorized into diversions and social activities. Diversions included watching TV, chatting, and walking while social activities contained religious activities, voluntary works, group activities, leisure courses, visiting relatives, playing with grandchildren and so on. The purpose of the study was aimed to investigate the role of musical activities in the profiles of older adults who perceived high quality of life. Researchers sampled representative older adults from three major metropolitan areas in Taiwan. Older adults who self-reported having high quality of life were a few among valid questionnaires. Researchers applied Fuzzy Set/Qualitative Comparative Analysis (fsQCA) to extract variables, including gender, education, religion, disease, residential status, employment, income, and musical activity participation. All the variables were standardized and analyzed to narrate the profile of older adults who had high quality of life. Furthermore, researchers found the key variables of the profiles and sorted the logic among variables. Through the test of fsQCA, the findings were as follows:a) Single variable: "living with someone" was the only required variable for older adults who perceived high quality of life. Other variables were sufficient conditions or included in variable aggregations. b) Older adults who reported high quality of life in Environment: Six profiles were extracted from empirical data. Male and female each had three profiles, and musical activity participation was included in four profiles. c) Older adults who had high quality of life in Health: Four profiles were figured. Male and female each had two profiles while musical activity participation was only included in one. d) Older adults who perceived high quality of life in Social Relationship: Among extracted three profiles, musical activity participation was included in two profiles. According to the results, older adults who attended musical activities had higher quality of life. Moreover, older adults who had religion but no musical activities also perceived high quality of life. Therefore, participation of musical activities was recommended to higher one's quality of life whether with or without having religions.

Keywords: *fsQCA, musical activity participation, older adults, quality of life*

Introduction

Taiwan has an increasing aging population in these years, and the Ministry of the Interior (2013) indicated that older adults over 65 years of age were 2,694,406 and

occupy 11.5% of the total population. Taiwan is already an "Elderly Society" based on the definition of the WHO (World Health Organization) and apparently steps into the next stage. The needs of older adults should be fulfilled more than social welfare. Therefore, Taiwan government proclaimed a white paper of senior education in 2006 (Huang & Huang, 2006), and the policy of senior population was shifted from social welfare to education (MOE, 2010a). In other words, quality of life (QoL) of older adults was discussed widely (Wang, 2010).

Quality of life (QoL) was an important, complicated, and broad concept, and researchers discussed the concepts from emotions, social activities, happiness, and functions of daily life. Factors related to QoL included social support, family support, health condition, marriage status, religions, social-economic status and so on (Philip, 2006). In fact, research findings had big differences among various age groups of research participants. For older adults, QoL was shifting to self-actualization and achieving goals of career development.

The assessment of QoL for older adults included physical and psychological conditions. As the promotion of government in health management and care, psychological condition did not gain as much attention as personal physical conditions. QoL for older adults was not only satisfaction in material condition but also achieving self-defined goals. Music played an important role in education and people's life from ancient time, and it also had great power in various functions. The study was aimed to draw the profiles of older adults in musical activities and QoL.

Aging happened both biologically and psychologically. Biological aging was obvious such as losing reproduction ability, growing grey hair, decreasing physiological functions, or having chronic diseases (Huang, 2008). Older adults faced the physiological changes as well as psychological developments. As Erikson (1963) pointed out, older adults stepped in to the last stage of psychosocial development, which was known as "integrity vs. despair," and they had to develop their ego integrity. Older adults examined their whole life, and they would readily accept death if they felt satisfied about what they had achieved, on the other hand, they might be disappointed when they found not having opportunity to make changes (Erikson, Erikson, & Kivnick, 1986). In psychological development, older adults needed to resolve three risks: a) ego differentiation versus work-role preoccupation, b) body transcendence versus body preoccupation, and c) ego transcendence versus ego preoccupation (Peck, 1955). If older adults had good ego differentiation, then they would be more satisfied with their current status.

Marker events defined stages in one's life, such as getting married, obtaining a job, losing spouse, retiring and so on (Chiu, 1991). Huang (2008) indicated three markers for being older adults: a) retirement, b) become grandparents, c) losing parents and become the eldest generation in the family. Tasks of social development for older adults included a) remaining healthy, b) adapting social status after retirement, c) adapting single life after losing spouse, d) accepting self and others and joining activities with same aged group, e) re-evaluating financial status, f) seeking different ways of achievement, g) changing life style and building up a satisfying one, and h) seeking the

true meaning of life and facing the end of time (Chiu, 1991; Tsai, 1995; Schein, 1978). Profiles of older adults in their social roles were drawn as mentioned above.

"Happiness" was defined as QoL by Aristotle (384~322 B.C.) in ancient Greek. Aristotle believed that happiness was spiritual activities, in contrast of good health, fortune, and good looking could make one happy but not required conditions (Hwa, 2004). Education has been a major way to improve one's QoL, and older adults can grow and gain self-actualization through life-long learning (Peterson, 1985). Four learning needs of older adults were coping, expressive, contributive, and influence needs (Peterson, 1983). Older adults might give up hobbies due to busy work when they were young and wanted to pick up or foster a new one, and that created expressive needs. From the view of utilizationism, music was a great channel to fulfill expressive needs of older adults (Gaston, 1968; Hargreaves & North, 1999; Merriam, 1964).

From cultural anthropological view, Merriam (1964) believed that music provided important functions, such as emotional expression, aesthetic enjoyment, entertainment, communication, symbolic representation, physical response, enforcing conformity to social norms, validation of social institutions and religious rituals, contributions to the continuity and stability of culture, and contributions to the integration of society. Hargreaves and North (1999) asserted that music was not only a channel for expressing emotions but also a bridge among people for communication and understanding.

Most people seek happiness in their lifetime. In extension of happiness, QoL had a wide range of context, including wealth, employment, built environment, physical and mental health, education, recreation and leisure time, and social belongings (Abbey & Andrews, 1985; Campbell, Converse, & Rodgers, 1976). Ferrans and Powers (1992) indicated that a good life depended on personal experience of happiness, which was related to satisfaction of health, social-economic, spiritual, and family life. Moreover, Arrude and Moraes (2001) asserted that QoL was personal perception, and good quality of life meant someone believed that he or she reached the comfortable status in physical, mental, and social aspects. Meeberg (1993) proposed that QoL was not only the satisfaction of someone's own life but also others' expectations. Nevertheless, Allison, Locker, and Feine (1997) believed that quality of life was a unique developing process related to self-adaption, coping, expectation, uncertainty, self-control, self-concept, and self-efficacy.
Music activities played various roles in daily life of older adults. Aligned with other variables, researchers attempted to portrait profiles of older adults who perceived good QoL and identify the status of music activities in their profiles.

Methodology

Research Participants

A survey study was conducted, and older adults aged over 55 were the target population. Research participants were purposive sampled from "Active Aging Learning Centers" and choirs in Taipei, Taichung, and Kaohsiung. Two hundred and fifty surveys

were sent with a 75.2% return rate while valid surveys were 131 after discarding the invalid ones.

Instruments and Variables

The surveys of QoL included two types, identified as "general" and "specific disease." The former one meant to survey general population and measure health conditions of often-seen disease patients. The latter one was specifically designed for patients with certain diseases. There were 13 general QoL surveys, including PAMIE in 1972 and WHOQOL-100 by WHO in 1993.

WHO aimed to collect the QoL data all over the world and build up a database for analysis and comparisons. The WHOQOL survey contained more than 100 items in six domains, which were physical condition, psychological condition, independence, social relationship, environment, and spiritual/religion/faith. Furthermore, WHO authorized Taiwan Research Team to revise and develop the survey as WHOQOL-BREF for specific use in Taiwan (Yao, 2002).

WHOQOL-BREF was the major instrument for data collection. The variables included QoL, gender, education, religion, current condition of disease, residential status, employment, and monthly income. A factorial analysis was conducted for extracting the factors of QoL, and calibrate function of fsQCA was utilized to code the degree of membership. For independent variables, researchers assigned membership numbers to variables based on their attributes and logics of fsQCA. The values of variables were presented in Table 1. Moreover, Cronbach's α was obtained for extracted factors," Environment, Health conditions, and Social relationship," as .834, .787, and .789.

Table 1
Values of Variables

Variables		Fuzzy-set Assessment
		Q5 Do you enjoy life ?
	Environment	Q6 Do you think your life is meaningful?
DV		Q12Do you have enough income for daily use?
QoL		Q13Can you easily access the information for daily life?
		Q14Do you have leisure activities?
		Q15Are you capable to move?
	Health Condition	Q2Do you consider yourself healthy?
		Q7Are you capable to be attentive?
		Q10Are you energetic every day?
		Q16Do you sleep well?
	Social Relationship	Q18Are you satisfied with your work?
		Q19Do you like yourself?
		Q20Are you satisfied with your interpersonal relationship?
		Q22Are you satisfied with the supports from friends?
	Music Activities	Have you learned instruments or voice?
		Are you learning instruments or voice?
		Did you attend concerts in a year?
		Did you attend any music group in a year?
		0 items = 0.01; 1 item = 0.7; 2 items = 0.8; 3 items = 0.9; 4 items = 1

	Gender	Male = 0.01; Female = 0.99
IV	Education	High school diploma and under = 0.0; Bachelor degree and higher = 0.99
	Religion	No religion = 0.01; Having religions = 0.99
	Disease	No disease = 0.01; Having disease = 0.99
	Residential	Living alone = 0.01; Living with someone = 0.99
	Employment	Unemployment = 0.01; With Employment (including housewife) = 0.99
	Monthly Income	22 levels

Fuzzy Set Qualitative Comparison Analysis

Qualitative Comparison Analysis included "Crisp set" and "Fuzzyset." Crisp set was based on the classical set theory that the membership of elements in a set was assessed in binary terms according to a bivalent condition-- an element was either 0 (in) or 1 (out), in other words, "belonged" or "not belonged" to the set (Ragin & Rihoux, 2004). For example, older adults were categorized into "participate" and "not participate" music activities. Fuzzy sets were sets whose elements had degrees of membership and allowed elements to be partially in a set. The membership value can range from 0 (not an element of the set) to 1 (a member of the set). A membership function was the relationship between the values of an element and its degree of membership in a set. The degrees of membership were constructed by the researchers based on the research purposes and the property (attribute) of the variables, although the construct rules should be explained for understanding and verification.

Fuzzy set Qualitative Comparison Analysis (fsQCA) was viewed as the bridge of quantitative and qualitative analyses. It was different from Regression analysis or analysis of variables. Traditional statistics meant to examine the significance of influential degree of single independent variable to the dependent variables, moreover, "probability measure function" was used to show the uncertainty. On the other hand, fuzzy set theory took "membership function" to present the uncertainty of membership of "sets of independent variables" to dependent variables (Woodside & Zhang, 2012). Parameter value was obtained through the adjustment of upper threshold, lower threshold, and medium value, in order to present the differences of degree. The fuzzy data would be recalculated and turned into a truth table to show the complicated relationship among the original data. In other words, calculation of truth table could help researchers to analyze the relationship between "sets of reasons" and the consequences.

Researchers utilized statistics to build relationship models of independent and dependent variables in order to examine the significant influence of single variable to the event. Nevertheless, we could not testify the necessity or sufficiency of single variable or sets of variables. Therefore, fsQCA helped researchers to explore the necessity and sufficiency of variables to the consequences. Theoretically, necessity meant one thing (X) leading to the certain result (Y), so we could say X was necessary to make Y happen, although it was seldom found in the social science studies. Sufficiency meant one thing (X) caused certain outcome (Y) although X was not the only reason to make Y happen (Ragin, 2008). Latter hypothesis was more often seen in the social science studies,

therefore this study aimed to explore the practical causality on QoL of older adults and their participation in music activities.

fsQCA applied the fundamental theory of Boolean algebra to integrate all the reasons and consequences of the events and form relative sets (Ragin, 2008), and it was suitable to explain the reality of the society. fsQCA was employed in the study to understand the role of music activities in the profile of older adults' quality of life, and further examine whether music activities were necessity or sufficiency.

Procedure of Data Analysis

Statistical Software, SPSS 12.0, was utilized to extract factors of QoL items and examine the reliability and validity. Furthermore, researchers ranked QoL items based on the extracted value and built up the fuzzy sets (Ragin & Rihoux, 2008). Researchers transferred the data into fuzzy sets and turned them into truth table through Boolean Algebra, and then causality combinations of QoL of older adults were analyzed through standard model. There were eight independent variables in QoL profile, and 256 combinations were found in the truth table. But the researchers found the profile theoretical combinations were much more than the practical combinations, so the few amount combinations or inconsistent with practical combinations were emitted from the truth table. Acceptable profiles were those with high consistency (higher than .75) and assigned as number 1, unacceptable profiles were assigned as 0. Standard model analysis of fsQCA was applied to draw the profiles of older adults' QoL and explore the role of music activities in the profiles.

Data Analysis and Results

Demographic Information

There were 37 males and 94 females from valid surveys. Sixty percent of respondents obtained a bachelor degree or higher. Two-thirds of respondents had some kind of religions. Half of the respondents had diseases. Most respondents were employed (80.9%) and living with someone (93.9). Among those who were employed, 39.7% of respondents had monthly income less than NT (20,000~USD 660), 30.5% had monthly income at NT level (20,000 to 60,000~USD 1,979) and 29.8% had monthly income above NT. Additionally, there were 36.6% of respondents that never attended any music activities (See Table 2).

Necessity of QoL

Consistency and coverage were two important indicators for juding the necessity and sufficiency of single variable or sets of variables in fsQCA (Ragin, 2008). Consistency aimed to assess the degree of relationship between the independent variable sets and the consequences. In other words, it could testify the impact of an independent variable (X) or a set of independent variables (X1, X2, X3...etc) to a consequence (Y).

Generally speaking, a value bigger than .75 was able to explain the practical phenomenon, but single independent variable needed to acquire .9 to be necessity of depedent variable. Coverage was evaluated after consistency to examine the degree of explanation of variable sets to practical situation. The value of coverage was usually 1/3 of the consistency.

Table 2
Demographic Information of Respondents

Item	Category	Frequency	Percentage
Gender	Male	37	28.2
	Female	94	71.8
Education	High School Diploma and under (L)	55	42.0
	Bachelor Degree and higher (H)	76	58.0
Religion	No	36	27.5
	Yes	95	72.5
Disease	No	63	48.1
	Yes	68	51.9
Residential Status	Living alone	8	6.1
	Living with someone	123	93.9
Employment	No	25	19.1
	Yes	106	80.9
Monthly Income	NT.20000 and under	52	39.7
	NT.20000~60000	40	30.5
	NT.60000 and higher	39	29.8
Participation of Music Activities	No	48	36.6
	One	25	19.1
	Two	24	18.3
	Three	19	14.5
	Four	15	11.5

Analysis of single variable showed that “living with someone” was the only necessity to QoL with over .9 consistency (See Table 3). It pointed out that older audlts must not live alone in order to obtain good environment, health condition, and social relationship. The results confirmed the study of MOE (2010b) saying older adults who lived with family members were happier than those who lived alone.

Profiles of QoL

Researchers transferred all the independent and dependent variables into a fuzzy set and turned into truth table through fsQCA. Although 256 profiels of QoL were obtained from 8 independent variables, 27 profiles were discussed after filtering with 2 cases as lower threhold and 94 cases (71.8%) were covered. Profiles of older adults with high QoL were selected with the standard of .9 consistency, and the meanings of the profiles were discussed as follows.

Table 3
Analysis of Necessity of QoL

QoL	Environment		Health Condition		Social Relationship	
Variable	Consistency	Coverage	Consistency	Coverage	Consistency	Coverage
Female	0.678	0.508	0.653	0.519	0.671	0.480
Male	0.337	0.629	0.357	0.707	0.347	0.617
Education (H)	0.621	0.574	0.558	0.547	0.558	0.493
Religion (Y)	0.697	0.517	0.702	0.553	0.723	0.512
Disease (N)	0.544	0.605	0.614	0.723	0.565	0.600
Live with Someone	0.975	0.561	0.947	0.577	0.963	0.529
Employment (Y)	0.865	0.577	0.840	0.593	0.872	0.554
Income (H)	0.598	0.624	0.549	0.608	0.572	0.570
Music Activities (Y)	0.604	0.612	0.564	0.606	0.583	0.564

Environment

Six profiles of older adults with high QoL were protrated as Figure 1. In the profiles, “living with someone” and “employed” were required. Furthermore, better educated female participants reported obtaining high QoL in the condition of having religions but no music activities. In constrast, less educated female participants perceived high QoL by attending music activities but no specific religion. Moreover, better eduated male participants reported good QoL when they had either religions or attending music activities, while those who with less education and disease required both.

“No disease” was an extra requirement for female participants to perceive good QoL. Female participants with less education and low income needed religions and music activities to acquire good QoL. On the other hand, female participants with same education background but high income could perceive good QoL by attending music activities. From male point of view, those who reported good QoL with better education also believed “no disease” was the necessary element. Apprently, females considered more health issues than males, and malees with higher education gave more attentions to health conditions than those who were less educated.

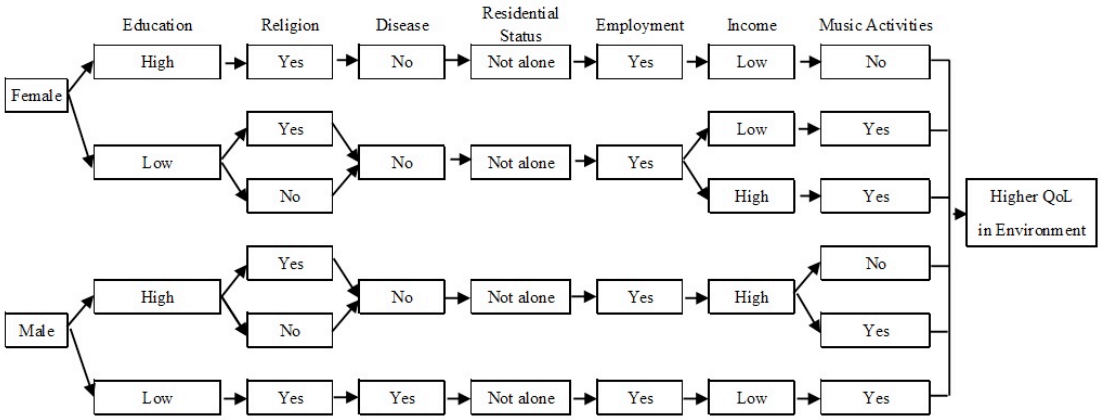

Figure 1. Profiles of QoL in Environment.

Health Conditions

Older adults had four profiles in health conditions, and "liveing with someone" and "no disease" were required for good QoL. In further analysis, those who obtained good QoL were less educated females with low income and well educated males with high income. The profiles showed that having a religion or participating music activities could acquire good QoL for older adults.

The profiles of female presented the combinations of religion, employment, and music activities. Females with religions would participate music activities to acquire good QoL when they were unemployed. For those who were employed, they reported to obtain good QoL when they had music activities even without any religion. The profiles of males were rather simple, although unemployment was equal to low QoL in the analysis. As mentioned above, males showed their life focuses on careers, and retirement meant a crisis for them apprently. Please see Figure 2.

Researchers considered the cases showed in the profiles as well as those not. For example, well-educated females with high income and less educated males with low income were missing in the profiles of good QoL. The reasons of their absences in the profiles of good QoL would be discussed in the further studies.

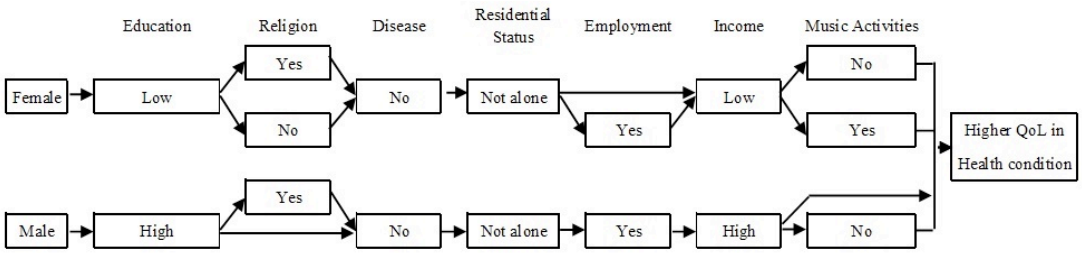

Figure 2. Profiles of QoL in Physical and Psychological Conditions.

Social Relationship

The results of anlaysis in social relationship were presented in Figure 3. Older

adults obtained three profiles in social relationship of good QoL, and required elements included “living with someone,” “low income,” and “less education.” In the cases of male participants, who were less educated with low income and disease, they would acquire good QoL when they were employed, living with someone, attending music activities, and having religions. Female participants presented more complicated situations. Female participants who were less educated with low income must be healthy (no disease) and live with someone, and choose from either music acitivity or religion in order to acquire good QoL in social relationship.

Profiles of female in social relationship had similarities with health conditions. Religions, employment, and music acitivies became the required elements, and the combinations were consistent to health conditions. Nevertheless, “no disease” was one of the required elements in the profile, which was similar to environment section and in contrast to the male profiles. The neglect of health condition protracted males‘ figure in the family or society. Male participants preceived good QoL in the conditions of living with someone, having relgions, employed, participating music activities even they had disease and low income. The well educated and high income participants were missing in the profiles. Whether their absence reflected the pressure of social relationship or not, the further research would carry on the discussion.

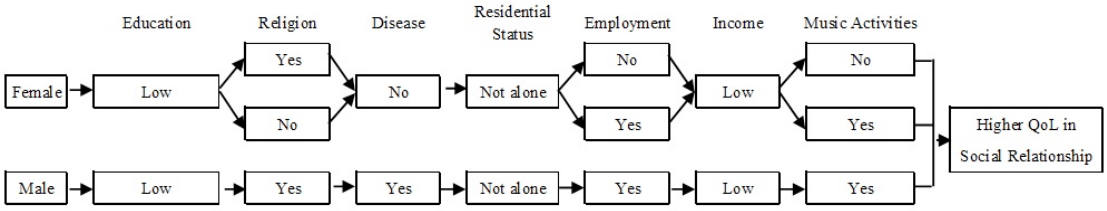

Figure 3. Profiles of QoL in Social Relationship.

Discussion and Recommendations

Recent research regarding older adults in Taiwan were focuses on health, mental conditions, socail-economic status, marital status, social interaction, socail support, life events, religions, value, gender, self-esteem, and coping (Chang, 2011; Chen & Lin, 2006; Tsai & Wang, 2011; Shu, 2010). The results of above studies were various, and significances were not found among every single variable and QoL of older adults. In the way of simplifying older adults to one profile and examining its relationship with single variable through regression or ANOVA, it was difficult to make praxial recommendations although it was still scientific. Therefore, researchers took a different perspective to extract 13 profiles of older adults in good QoL through fsQCA.

Literature showed that researchers were interested in influences of music therapy to special groups of older adults (Chen, 2008; Tsai & Wang, 2011), but few studies investigated the impact of attending music activites to older adults. Poeple could express ones self, release emtions, and recall happy experiences, moreover, they could acquire sympathetic responses to other and further sooth emotions, feel relaxed, safe, and happiness. According to the 13 profiles of good QoL in the study, there were 7 profiles

(53.8%) were related to older adults who attending music activities. In other words, particiapting music activities played an important role in good quality of lif for older adults. Another interesting finding was that religions and music activities seemed to be interchangeable in the profiles of good QoL for older adults in Taiwan.

Based on the findings of the study, researchers recommended that government should promote well-designed life-long education. Other than travel, medical care, consuming, leisure, social skills, and information technology, government should integrate the domestic music resources in the region in order to provide more music activities for older adults. Through music activities, older adults could express themselves, higher self-esteem, release anxiety, extend social relationship, coping one's role in the society. More important, they could integrate their life and fulfill the satisfaction.

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The Effect of Patient Preferred Live versus Recorded Music on Non-Responsive Patients' Physiological and Behavioral States

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The purpose of this study was to examine the effect of music therapy interventions utilizing two types of patient-preferred music—recorded and live—on the behavior states, respiration rates and heart rates of hospice patients who were labeled by a nurse or family support counselor as non-responsive. Non-responsive was defined as not reacting to vocal stimulation. Each participant participated in sessions that were 40 minutes in length occurring on two consecutive days. The counterbalanced design for this study was Day 1: ABCA and Day 2: ACBA, with A-initial baseline condition, B-participant-preferred recorded music, C-participant-preferred live music, A-return to baseline condition, and patient-preferred live and recorded music conditions was alternated between days. Sessions were videotaped for analysis and coded to measure the time participants spent in each of the eight behavior states according to the behavioral state coding system (Guess et al., 1990). Results indicated that the patient-preferred live music condition was significantly more effective in eliciting participants' most alert states than the patient-preferred recorded music condition or the baseline condition. Further analysis revealed no significant difference between the baseline, patient-preferred live music or participant-preferred recorded music conditions on participants' respiration or heart rates. The live versus recorded music findings of the present study have important implications for the role of music therapists in hospice programs and for the use of nonverbal forms of communication to increase the alert responses of patients with end-of-life diagnoses.

Advancements in technology have afforded humans the opportunity to benefit life-extending interventions. As a result, dying has often become synonymous with failure. Because of the focus on life extending techniques, members of the medical community may easily lose touch with the skills necessary to care for their dying patients. It is essential that those involved in the healthcare field, not just physicians, have the skills necessary to care for patients in their final phase of life (EPEC, 1999). If caregivers, patients, and family members feel confident in the care patients are receiving, the process can be a positive experience and can allow both patient and family members an opportunity to create meaningful memories.

There is no uniform dying process and individuals uniquely approach their own death. There are some events, however, that can be expected with dying patients. Those who are experiencing the final phase of life begin to eat less and sleep more, become more sensitive to light, communicate less and may appear confused or disoriented (Karnes, 2005). As individuals acknowledge they are dying, they begin to withdraw from the world and the people around them. On the outside, it may appear as if nothing is going on; however, on the inside, the sorting out of one's life is occurring.

In many cases, patients become difficult to arouse. This inability to react to environmental stimuli is called non-responsiveness. In the hospice setting, the term non-responsive is somewhat misleading. Patients in the final days of their life often exhibit what some may label a non-responsive state. Other terms sometimes used to describe this state are "low-awareness states," "coma-like state," "minimal awareness state" or "vegetative state." It is possible, and important to note, that in the hospice setting the patient is responding to the treatment provided but not in an overt manner. Internally, the patient is reacting to the stimulus physiologically or emotionally. Externally, the patient may be responding behaviorally. These overt behaviors are similar to patients in comas or other low-awareness states.

Wachkoma is a severe, persistent vegetative state and is considered one of the most serious neurological syndromes resulting in non-responsiveness (Herkenrath, 2005). Patients in this state are unable to perceive and/or communicate with their environment. Herkenrath (2005) found that, through music therapy, access to these patients' consciousness is possible. Magee (2005) further corroborates the effectiveness of music therapy through a case study in which a client's non-responsive diagnosis was contradicted by her responses to music; consequently, her diagnosis was changed from non-responsive to a minimally conscious state.

Although we have no way of knowing what non-responsive patients hear, experience indicates their level of awareness may be greater than their ability to respond (EPEC, 1999). Individuals who are experiencing the end stages of life are usually able to process aurally, and therefore, may benefit from music therapy. One way to evaluate a patient's mental awareness and physical activity levels is by observing their behavioral states.

Wolff (1959) has been credited as the first researcher to label and describe the behavior states of newborns. Although his Behavior State Classification System was originally used to observe the amount of time infants spent in each behavior throughout the day, assessing behavior states can also be used to measure the reaction of non-responsive patients to music therapy (Guess, Mulligan-Ault, Roberts, Struth, Siegel-Causey, Thompson, Bronicki & Guy, 1988). Music therapists have often utilized live music to positively stimulate a patient's environment.

Since the beginning of the 20th century, music therapists have promoted the use of live music. In 1983, Bailey compared the effects of live versus recorded music on hospitalized cancer patients. Results indicated that live music was effective in relieving tension and promoting vigor (Bailey, 1983). Brotons, Koger and Pickett-Cooper (1997) found that six of seven studies addressing social and emotional goals of patients with dementia used live music. Hunter and Sahler (2006) found statistically significant differences for live music versus recorded music or no music on the heart rate and behavioral states of participants in a neonatal intensive care unit. Participating in live, active music making increases quality of life for older adults in an intergenerational choir program (Belgrave, 2009). Participants in Belgrave's study reported feeling an increased sense of usefulness and perceived personal benefits from interacting with the younger

members of the choir. Live music provides a flexibility that is not possible when using recorded music.

While a substantial body of literature reflects and promotes the advantages of live music, the benefits of recorded music are valid and must not be dismissed. In an effort to optimize self-care, music therapists can empower patients and families, through education, to utilize music techniques effectively on their own. Individuals focusing on relaxation, pain re-direction and anxiety reduction, for example, could benefit from training by a music therapist.

Although individuals in the end stages of life have great difficulty and possibly little desire to communicate verbally with others, they do communicate non-verbally through their behaviors and actions. People experiencing the final phases of life may be found reaching out to someone or something unseen, waving, laughing, smiling or attempting to get out of bed (Callanan & Kelley, 1992). Cessation of eating is another characteristic of individuals in their last hours of living as well as clenching their teeth to express their desire for no food (ELNEC, 2000). These non-verbal forms of communication are important indicators of what the person is experiencing. Non-verbal communication can also be a meaningful, non-traditional mode of expression.

Music's ability to function as a form of non-verbal communication creates a meaningful opportunity for expression at a time when care is of critical importance. Careful observation of these musically induced, oftentimes acute, responses require a trained eye. The combined effects of live music and observation of both physiological and non-verbal responses may significantly affect the quality of life in persons who are experiencing end-of-life processes. Where opportunities exist to enhance personal dignity, provide human compassion and elevate the human experience, music therapists must explore interventions and evaluate their effectiveness, even for those who may appear non-responsive.

This study addresses the needs of the non-responsive patient in the hospice setting regarding the use of live versus recorded music. Although research exists regarding the non-responsive patient and live versus recorded music, no studies could be found which examined the effects of live versus recorded music on participants' alert states. Because participants in the present study were unable to communicate perceived effectiveness, their nonverbal behaviors were analyzed using physiological measures, and a standardized behavioral coding system. Music therapists and other members of the healthcare field can benefit from research confirming the efficacy of music with non-responsive patients. The research questions for the study were:

1. What is the effect of participant-preferred live versus recorded music on non-responsive patients' behavior states?
2. What is the effect of participant-preferred live or recorded music on participants' heart rate and respiration rate?

Method

Participants

This study was conducted with patients from a hospice located in North Florida. Criteria for this study required participants to be identified as non-responsive by a registered nurse or family support counselor. Non-responsive was defined as patients who are comatose or whose disease has progressed to the extent that they are not responding to verbal stimuli. The age of participants ranged from 64-90 with a mean age of 75 years old. Diagnoses of patients consisted of Alzheimer's disease, senile dementia, and debility unspecified.

Clinical Setting

Music therapy sessions were held in either the participants' private room in an assisted living center or in their home. Participants were either in bed or in a wheelchair. The music therapist conducted sessions bedside or sitting across from them if the participant was seated in a chair or wheelchair.

This study required the use of a classical guitar for live music accompaniment and a CD player for recorded music. Songs from each patient's genre of preference were used. Genre preferences ranged from oldies (1920s–1950s), jazz, country, gospel and folk music. Patient-preferred music was determined either through previous knowledge of patient preferences or through information given to the researcher by family members.

A video recorder was also used to allow for further analyses of patients' behavior states away from the music therapy session. A watch was utilized to time the interventions. The music therapist also used a stethoscope and stopwatch to obtain accurate heart and respiration rates.

Description of Dependent Variables

Behavior states. One of the dependent variables for this particular study was participants' observed behavior states. Behavioral states consisted of eight observable levels of behavior ranging from sleep to full awake. These eight states are categorized according to four levels: sleep state, indeterminate state, preferred awake state, and other awake state. They are further divided into two sub-categories of active behavior or inactive behavior. The sleep state is labeled as either asleep inactive or sleep active. The intermediate state is identified as drowsy or daze. Preferred awake state is identified as either awake inactive-alert or awake active-alert. Other awake states are identified as either awake-active/stereotypy or crying/agitated. Each state is determined by a list of observable behaviors related to each state (Guess, Causey, Roberts, Rues, Thompson & Causey, 1990).

Behavior states were determined and coded by raters using a Behavior State Observation Sheet. Sessions were recorded using a Sony digital video camera to allow for

later analysis. Videotapes were edited and viewed without sound for the 30-minutes of treatment so that raters were not influenced by the music therapist's musicality or behavior state of the participant in the opening or closing portions of the session. The researcher and the reliability observer participated in a behavior state training program which included identifying behaviors of each category in the behavior state coding system. Furthermore, the researcher and reliability observers applied the behavior state coding system to training videotapes to reach a reliability of 85%. Once this reliability was achieved, the observers began coding the data. Inter-observer reliability was measured by number of agreements divided by the total number of agreements plus the total number of disagreements. The researcher and observers watched videotapes while listening to a compact disc with a recorded voice indicating periods for observing and recording. For each 30-minute session, the rater observed for 10 seconds and then recorded for five seconds for a total of 60 observation intervals. Data sheets were labeled with participant number and treatment number that corresponded to the videotape excerpt.

Heart rate. A participant's heart rate was calculated by counting number of heartbeats for 15 seconds and multiplying that number by four. A participant's respiratory rate was calculated by counting the patient's respiration rate for 15 seconds and multiplying that number by four.

Independent Variable

The independent variable for this study was the type of preferred music (live or recorded) provided to each participant during the music therapy session. Two types of music were used: patient-preferred live or recorded music. The music therapist who provided the live music also produced a recorded version of each song for the recorded variable.

Design

The design for this study was Day 1: ABCA and Day 2: ACBA, with A-initial baseline condition, B-participant-preferred recorded music, C-participant-preferred live music, A-return to baseline condition, and patient-preferred live and recorded music conditions alternated between days. Each participant participated in sessions that were 40 minutes in length occurring on two consecutive days. While an intervening baseline is often recommended between experimental conditions, the clinical supervisor requested a maximum of 40-minute sessions with a minimum of 20-minute interventions.

Procedures

Each session began with the music therapist giving the patient a verbal greeting, brief introduction and informing the patient of what would be occurring that day. Participants' heart and respiration rates and observed behavior states were recorded at beginning of session. After five minutes of no music, the participants' heart and respiration rates and behavioral states were recorded again to determine baseline data.

The following 15 minutes consisted of the music therapist providing patient-preferred music (either recorded or live). At the end of the music conditions, the participants' heart and respiration rates and behavioral states were recorded and again after the return to baseline condition.

Baseline condition. Baseline condition was determined by the researcher recording the participants' heart rates, respiration rates and behavior states with no music provided to the participants.

Musical condition one. The live music condition consisted of the researcher singing songs of the participants' preferred music genre with guitar accompaniment for fifteen minutes.

Musical condition two. The recorded music condition consisted of the researcher playing recorded songs of the participants' preferred music genre using a CD player for fifteen minutes. The songs used for this condition were the same as those used in the live music condition, and were sung by the researcher.

Results

Research Question One: What is the effect of participant-preferred live versus recorded music on non-responsive patients' behavior states?

Data were analyzed using a One-Way within-subjects ANOVA to determine if either participant-preferred live or recorded music as more effective than the baseline condition in affecting patients' behavior state. Results of the analysis showed that participant-preferred live music was significantly more effective in eliciting a more alert behavior state among participants ($df = 3$, $F = 5.61$, $p = .00$) than the recorded ($df = 1$, $F = 1.79$, $p = .21$) or baseline ($df = 1$, $F = .30$, $p = .60$) condition (See Table 1).

Table 1
Means and Standard Deviations for percentage of time spent in combined alert states for the two baseline conditions and for the two music conditions

Conditions	Mean Score	SD
Initial Baseline Condition	1.89	2.19
Recorded Music Condition	4.17	6.16
Live Music Condition	5.78	4.95
Return to Baseline Condition	1.61	2.15

Research Question Two: What is the effect of participant-preferred live or recorded music on participants' heart rate?

A one-way ANOVA revealed no significant difference between the baseline, patient-preferred live music, or participant-preferred recorded music conditions on participants' heart rate. A one-way ANOVA revealed no significant difference between the baseline, patient-preferred live music, or patient-preferred recorded music conditions on participants' heart rate.

Discussion

The purpose of this study was to determine the effectiveness of participant-preferred live versus recorded music to elicit alert responses as evidenced by behavior states, heart rate and respiration rate in non-responsive patients. Results indicated that the patient-preferred live music condition was significantly more effective in eliciting participants' most alert states than the patient-preferred recorded music condition or the baseline condition. Further analysis revealed no significant difference between the baseline, patient-preferred live music or participant-preferred recorded music conditions on participants' respiration or heart rates. The live versus recorded music findings of the present study have important implications for the role of music therapists in hospice programs and for the use of nonverbal forms of communication to increase the alert responses of patients with end-of-life diagnoses.

Results of the present study are similar to those of Bailey (1983) who examined the use of live music versus tape-recorded music on the stress level of hospitalized cancer patients. Bailey found that participants listening to live music reported significantly less tension-anxiety and more vigor than participants listening to taped music. Additionally, participants in Bailey's study reported significantly more changes in physical discomfort and in mood when receiving music therapy. Live music proved more beneficial for pre-term infants in a neonatal intensive care unit than recorded music in a study by Arnon, et al. (2006). Live music had a significant effect on patients' behavioral and physiological states at the 30-minute interval after the therapy ended than the recorded music. The no-music conditions had no significant effect on any of the dependent variables (Arnon, et al. 2006). As in the present study, medical personnel and family members preferred live music to recorded music and considered live music therapy more effective than other therapies offered to their loved ones. The novelties of a one-on-one, informal, personal music intervention positively affect quality of life, relationships with caregivers and positively impact emotions. Moreover, they tend to elevate human interaction, enhance communication and enrich the dynamic between the caregiver and patient (van der Vleuten, Visser, & Meeuwesen, 2012).

Limitations of the Present Study

Multiple factors may have contributed to the results and lack of significant difference in participants' physiological states between the baseline and recorded music condition. First, affecting change in these two physiological measures is difficult. Secondly, sample size, patient environment, and varied levels of non-responsiveness for participants are all facts that may have contributed to the results. For this study, sample size was limited to nine participants, although 12 were defined as appropriate. Legal guardians had hesitations to grant consent due to the videotaping of each session and cognitive condition of the patient. Thirdly, participants for this study lived in nursing homes, assisted living facilities and private residences. Some sessions were held in participants' room, in a general living area, or with family members or caregivers present. Additional environmental stimuli were difficult to control not only from participant to participant, but also from session to session. These factors must be taken into

consideration when comparing behavior and physiological states from one session to another, at different times and in a variety of environments. Future researchers should attempt to conduct observation of behavior states when participants can receive all experimental conditions in a single session or in a controlled environment.

This study demonstrates the opportunities and challenges that frequently characterize clinical research. As evidenced by above, investigating real-world situations affords its' own types of challenges and opportunities. Operational definitions, geographical locations, constantly changing environments and the individuality of the human condition provide distinctive implications for the researcher's quest for knowledge. The challenges of clinical research deserve consideration when developing future design.

Suggestions for Future Research

Replications of this study using participant-preferred music with non-responsive patients should be conducted not only with individuals who are non-responsive due to end-of-life diagnoses but also with those who are non-responsive due to other conditions such as coma, low-awareness or vegetative states. Future researchers could explore the benefits of music in positively altering and stimulating behavior states of other individuals who are non-responsive. Music with such non-responsive patients could then be examined for rehabilitative purposes rather than palliative.

Findings from this study indicate that participant-preferred live music is more beneficial than participant-preferred recorded music or no music at all. This finding further confirms the benefits of employing music with those patients who are unable to respond verbally. The data regarding live participant-preferred music further corroborate the findings of previous music therapy research exploring the effectiveness of live music (Bailey, 1983; Arnon, et al. 2006). Many of these previous studies demonstrate the effectiveness of live music to effectively engage the client (Belgrave, 2009; Herkenrath, 2005; Magee, 2005; Van der Vleuten, Visser & Meeuwesen, 2012).

Results from this study confirm past research and encourage further research in employing live music with non-responsive patients. Participant-preferred live music elicited a more preferred participant behavior state. This finding is likely due to the human element that only a live voice can provide. Live music also allows the opportunity for the therapist to interact with the patient in a specific personalized way on a moment-by-moment basis. The live versus recorded music findings of the present study have important implications for the role of music therapists in hospice programs and for the use of non-verbal forms of communication to increase the alert responses of patients with end-of-life diagnoses.

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III. Music and Medicine

Effect of Music-Assisted Relaxation Pre-Operative Training on Adolescent Idiopathic Scoliosis (AIS) Patients' Pain and Stress Perception after Spinal Fusion (SF) Surgery-Preliminary Results

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Spinal fusion (SF) for adolescent idiopathic scoliosis (AIS) is one of the most painful surgeries experienced by adolescents and it is the 5th most costly pediatric inpatient condition in the US. High postoperative pain scores are associated with more frequent atelectasis, longer length of stay, and decreased patient satisfaction. The purpose of this study was to evaluate the effectiveness of pre-operative music-assisted relaxation training on AIS patients' pain and stress perception after spinal fusion surgery. The research team developed a 12-minute video training program that provided information about music-assisted relaxation with opportunities to practice the technique prior to surgery. Subjects were randomly assigned to the experimental group that watched the video or to the control group that did not watch the video. All subjects received a live music therapy session on post-operative day 2 when they were sitting up in a chair for the first time after surgery. Patients' pain and stress scores were recorded pre- and post music therapy session. Preliminary data indicate a trend towards greater decrease in pain and stress change scores for subjects in the experimental group.

Introduction

Spinal fusion (SF) for adolescent idiopathic scoliosis (AIS) is one of the most painful surgeries experienced by adolescents. Our pilot work corroborates other studies reporting mean postoperative pain scores above 5, on a 0-10 scale (Kleiber & Adamek, 2012; Kleiber, Suwanraj, Dolan, Berg & Kleese, 2007; Kotzer, 2000; LaMontagne, Hepworth, Cohen & Salisbury, 2003). High postoperative pain scores are associated with more frequent atelectasis, longer length of stay, and decreased patient satisfaction (Puntillo & Weiss, 1994). In addition, SF surgery for AIS is the 5th most costly pediatric inpatient condition in the US, after respiratory distress syndrome in newborns, pneumonia, chemotherapy and acute respiratory failure (Keren, Luan, Localio, Hall, McLeod, Dai & Srivastava, 2012).

Review of Literature

Teaching pain coping strategies (Logan & Rose, 2005) and anxiety reducing strategies (Gillies, Smith & Parry-Jones, 1999; Caumo et al., 2000) can positively impact postoperative pain. Introducing pain coping strategies to adolescent surgical patients is

particularly challenging because of the natural development of the adolescent psyche. (McGrath & Pisterman, 1991). Additionally, adolescents have been shown to respond differently to surgical experiences (Tripp, Stanish, Reardon, Coady & Sullivan, 2003).

Several independent groups of researchers found that children undergoing SF for AIS report high levels of pain intensity in the immediate postoperative period (Kleiber et al., 2007; Kotzer, 2000; LaMontagne et al., 2003). Physical therapy protocol for SF patients involves a 30-minute session sitting upright in a chair on post-operative day 2. This is usually a very painful and stressful time for the patients as it is their first time out of the bed after surgery. The patients often complain, cry, and become increasingly anxious while in the chair. Parents become anxious since they have difficulty watching their child endure the painful situation. Usually pain medication does not manage the extreme pain experienced by most of the adolescents, so additional coping strategies are needed.

Bandura's theory of self-efficacy proposes that when individuals are able to practice a skill and experience a positive outcome they are more likely to initiate use of the skill in the future (Bandura, 1986). The theory also proposes that individuals' "buy in" to learning and using new skills can be enhanced with modeling. The best time to present preoperative coping information to adolescents is about one week before surgery (LeRoy, 2003). Often the adolescent's preoperative visit is the time when information about anesthesia, what to expect in the hospital, pain management and recovery is covered.

Adolescents who undergo SF surgery typically have experienced a healthy development and may have difficulty coping with the post-surgical pain association with their surgery. Robb's contextual support model (2003) proposes that contextual support affects a child's ability to cope with hospitalization by buffering the negative effects of stress and increasing the child's engagement with the environment. According to this model, music therapy is utilized to re-engage patients with the environment through: (a) Structure: music interventions provide children with opportunities for success and mastery within the environment, (b) Autonomy Support: music interventions provide children opportunities to make choices and direct the course of activities, and (c) Involvement: within the session the therapist expresses unconditional acceptance of children and reinforce their efforts.

Music therapy has been shown to be an effective non-pharmacological approach for pain management in many clinical and research reports (Brandt, 2013; Ghetti, 2013; Heiderscheit, 2013; Whitehead-Plaux, 2013). Music therapy is an intervention shown to decrease postoperative pain intensity in adults (Allred, 2010; Easter, 2010; Good et al., 2002, 2010) and children (Bradt, 2012; Nilsson, 2009). Our clinical experience and quality improvement data suggest that music therapy, as an adjunct to the usual pharmacological treatment, may reduce perceived pain in adolescents following surgery for AIS.

Over the past three years we have used music-assisted relaxation during post-operative music therapy to help AIS patients manage pain, however we have found that when the adolescents are sitting in the chair and in pain on post-operative day two, they are unable learn new techniques to help them cope. In an effort to help these patients develop coping skills to utilize after surgery, our team investigated ways to teach skills prior to surgery. When asked in an interview process, previous SF patients had mainly positive responses when asked about their recollection of the benefits of music therapy after surgery (Kleiber & Adamek, 2012). In a nine-month feasibility study, our team developed and piloted a pre-operation training program with 10 SF patients. Patients were able to learn and practice music-assisted relaxation via a pre-operative web-based training program that we developed. Many patients found that the training helped them engage in the relaxation process during post-operative live music therapy while sitting in the chair for the first time after surgery. Results from this study yielded positive results from most of the patients and their parents, who were typically in the patients' room during the music therapy session while the patients were in the chair. Based on the information gathered in the pilot study and feasibility study, we developed a protocol to be tested for effectiveness in a randomized controlled study. The protocol includes having the patients view a training video during the pre-operation clinic visit, typically the day prior to surgery. The training videos are used and to familiarize the patients with music therapy and to teach the patients music-assisted relaxation and breathing techniques prior to surgery.

Purpose Statement

The purpose of this study was to evaluate the effectiveness of pre-operative music-assisted relaxation training on AIS patients' pain and stress perception after spinal fusion surgery.

Method

The research team developed a 12 minute video training program that provided the following: 1) a brief description of music therapy in the pediatric hospital, 2) a brief description of music-assisted relaxation, 3) a demonstration and an opportunity to practice music-assisted relaxation and breathing techniques with quiet guitar music and breathing cues, 4) a sample music therapy session with AIS patient to give the patient a better idea of the music therapy session after surgery. We also developed an informational video for parents to help them understand some potential reactions of their child after surgery and what to expect from the post-operation music therapy session.

AIS patients who were scheduled for spinal fusion surgery were approached for participation in this study during their pre-operation clinic visit. This visit was typically the day prior to surgery. Those who agreed to participate were randomly assigned into either a treatment or control group. Patients in the treatment group viewed the training video and they had the opportunity to practice the breathing technique along with the video. The pre-operation training session took approximately 20-30 minutes. Patients in the control group did not view the training videos.

All participants received live a music-assisted relaxation session on day two post-operation in their hospital room for approximately 30 minutes, while they sat in a chair for the first time after surgery. Data collection included self-reported pain (pre/post music therapy session), self-reported stress (pre/post music therapy session), and observations of distress behaviors and relaxed behaviors (during the music therapy session) using time sampling for 30-second intervals. Individual pain and stress change scores (difference between self-report before MT starts and immediately after MT) were the primary outcome measures. A 0-to-10 Visual Analog Scale (VAS) was used to measure the variable of pain and stress, with anchors of "no pain at all (or no stress at all)" to "pain as bad as it could be (or very bad stress)". Distress and relaxed behaviors were also recorded by a trained data-taker throughout the music therapy session. The music therapist and data-takers did not know if the patients were in the experimental or treatment condition.

Results

The preliminary results presented in this report are from a total of 14 subjects, seven in the experimental group and seven in the control group. The target number of subjects upon completion of this project is 36 subjects with 18 in each group. Each subject was asked to rate their pain and their stress on a 10 point scale at the beginning of the music therapy session and at the end of the music therapy session during the first time the patient was placed in a chair after surgery on post operative day two. The mean change scores were compared to determine any preliminary differences or trends between the conditions. Change scores refer to a decrease in the perception of pain or stress. None of the patients noted increased pain or stress after the music therapy session. The mean change score for pain for the experimental group was 4 points, and the mean change score for pain for the control group was 2.7 points. The mean change score for stress for the experimental group was 3.8 and the mean change score for stress for the control group was 2.8. (See Table 1.)

Table 1
Mean Change Scores

Groups	N	Mean
Pain Change		
Exp	7	4.0
Control	7	2.7
Stress Change		
Exp	7	3.8
Control	7	2.8

For the experimental group, changes in pain perception ranged from 0 to a change of 10, with other change scores in the middle range (a 5 or 6 point decrease in pain perception). More specifically, one subject had the same amount of perceived pain pre and post music therapy session, three subjects had a 5-6 point decrease in pain, and one subject had a 10 point decrease in pain (no pain at all) at the end of the music therapy session. For the control group, changes in pain perception ranged from 0 to a change of

6. More specifically, four subjects had a 0-2 change in pain perception, and three subjects had a 4-6 change in pain perception. (See Table 2.)

For the experimental group, decreases in stress perception ranged from 0-9 points, with three subjects having 0-2 point change in stress (one subject reported no stress pre and post), two subjects reporting a 4 point decrease in stress, and two subjects reporting an 8-9 point decrease in stress. For the control group, changes in stress perception ranged from 1-5 points, with three subjects reporting a 1-2 point decrease, three subjects reporting a 3-4 point decrease and one subject reporting a 5 point decrease in stress. (See Table 2.)

Table 2
Individual Subjects' Change Scores

Condition	Subject #	Sex	Pain Score Change	Stress Score Change
Experimental	1	F	0	-2
	5	F	-6	-9
	8	F	-5	-4
	10	M	-10	-8
	11	F	-5	0
Control	2	F	0	-4
	4	F	-1	-2
	7	F	-1	-1
	9	F	-4	-5
	12	F	-5	-4
	13	M	-6	-3
	14	F	-2	-1

Distress related behaviors and relax related behaviors were also observed and coded in a time sampling procedure throughout the music therapy session. Distressed behaviors included whimpering/crying, tight face/hands, fidgeting hands/eyes, and holding breath. Relaxed behaviors included calm/regular breathing and relaxed face/hands. The data for these behavioral observations have not yet been analyzed due to the small sample size at this point.

Discussion

The purpose of this study was to evaluate the effectiveness of pre-operative music-assisted relaxation training on AIS patients' pain and stress perception after spinal fusion surgery. Since all subjects received a 30-minute music therapy session while sitting in the chair for the first time after surgery, it was expected that both groups would have a decrease in perceived pain and stress, which was the case. Although the data are preliminary, with fewer than half of the projected number of subjects, the data show some trending towards differences between the groups. The experimental group has a larger mean difference score between pre and post scores for pain and for stress. In addition, the experimental group had more high change scores (5 and above) than the control group for both pain and stress.

Another difference in the groups appears to be related to the length of time needed by the subject to engage in the music-assisted relaxation and breathing techniques with the music therapist. Subjects who had viewed the training video were familiar with the concept of music-assisted relaxation with controlled breathing, and they knew what to expect from the music therapy session. Many of these subjects began the breathing as directed as soon as the music therapist directed them to begin. Some even started utilizing the breathing techniques as soon as they saw the music therapist enter the room. Subjects in the control group took longer to engage with the music therapist in the music-assisted relaxation techniques. Specific data were not taken on the length of time needed by the patient to engage with the therapist, however this was noted in discussion with the music therapists on the research team.

The age span of subjects ranged from 10-18 years old. Anecdotal evidence seems to indicate that the younger patients (10-12 years of age) had more difficulty coping with the pain and stress of post-operative pain than the older patients. These younger patients had smaller change scores and exhibited more distress behaviors than the older subjects. Although the ages are not noted in this report, this was brought up in discussion with the music therapists who worked with the patients. Ages and distress/relaxed behaviors will all be reported when all subjects have completed the study.

Based on these preliminary data, the use of the pre-operation video training tool seems to be assisting many AIS patients with coping with stress and pain after their SF surgery. We will continue this investigation until we reach the target of 36 subjects, reporting on change scores for pain and stress as well as distress behaviors and relaxed behaviors exhibited by the patients. Data collection is expected to be complete within the next 15 months. A full analysis of group differences will be completed at that time. Additional information about subject demographics and parent perceptions will also be reported.

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Analysis of Hearing Musicians and Roadies in Brazil

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The sonorous particularity determined by the style of music performed exposes professionals to variable levels of loudness, especially overloading their hearing system. In search of checking the hearing risk as well as the effects of the exposure on individuals who do or do not use hearing protection, musicians from two Hardcore bands and their advisors (roadies) were submitted to a Hearing Test. Also, their noise exposure levels were measured. Based on these results, the study showed that there was a significant change in hearing threshold and noise exposure levels. However, the adoption of preventive measures applicable to each professional's reality, associated with the awareness of the influence of excessive exposure in their body, is necessary to maintain the quality of life and work of music professionals.

Keywords: *hearing, musician, roadies, hardcore, preventive and educative actions*

Introduction

Music is a human activity where the experience and knowledge intertwine, integrating affection and cognition in a holistic[1] perspective of human development (Gardner, 1997). The musician is a person who pursues his/her activity, as a rule, under intense sound levels, both in presentations and in practical training, for several hours. (Paixão et al., 2004). Each musician also has his/her own style of playing the instrument, often intense and aggressive, resulting in excessive exposure, affecting not only him/herself, but also the other musicians around (Kahari et al., 2001a). Furthermore, it has been observed that the amplifiers used with modern musical instruments have become too powerful; hence the risk of auditory effects resulting from exposure to amplified music is real, both for the musician, and for the concert goers, sound technicians, audio operators, including their advisors - also known as roadies[2] (El Dib, 2008; Mendes & Morata, 2007). In addition, the musicians often hear other people playing, and may have a noisy life in general (Andrade et al., 2002; Chasin, 1996). According to a comparative study among three musical styles, Rock and Roll has the highest intensity levels: 112dB (A), with peaks that can reach 150 dB (A) (Russo et al., 1995b; Sallows, 2001).

Studies done with musicians showed that the Temporary Threshold Shift (TTS) is one of the main effects caused by high sound pressure levels (Mordini, Branco & Rodrigues, 1994; Pfeiffer et al., 2007; Russo et al., 1995b;). The TTS is characterized by a gradual decrease in the hearing sensitivity due to the time of exposure to a continuous and intense noise. This reduction is a post-stimulatory and temporary phenomenon because the hearing sensitivity is restored after some hours of rest, which may be extended to a few days (Russo et al., 1993a). These changes may be reversible, but depending on the intensity and duration to which the individual was exposed to such noise, it can cause the Noise-Induced Hearing Loss – NIHL (Hausler, 2004).

The NIHL is considered one of the most prevalent occupational illnesses in the world (Dias et al., 2006, p.65). "It is characterized by the hearing loss caused by a prolonged exposure to noise, as a sensorineural hearing loss type[3], usually bilateral, presenting as main characteristics the irreversibility and the gradual progression along with the time of exposure to risk". Once the exposure ceases, there will not be a progression of hearing loss (American College of Occupational and Environmental Medicine 2003; Ministry of Health, 2006; Ministry of Labour and Employment, 1998a).

As there is no treatment for hearing loss resulting from harmful exposures yet, it is of great importance to prevent the problem by adopting measures such as: awareness of the risk related to exposure, acoustic treatment on presentation environment, audiologic monitoring through the use of tonal audiometry, besides the use of hearing protection equipment (Maia & Russo, 2008; Ministry Of Health, 2006; Kahari et al., 2003b; Santoni, 2008; Toppila, Laitinen & Kuisma, 2004).

In the Brazilian labor legislation there is no specific law that protects musicians from the effects of exposure to amplified music, since the Norm (NR) 15 Ministry of Labour and Employment only applies to employees exposed to sound pressure levels who work in companies governed by the Consolidation of Labor Laws (Santoni, 2008).

Considering that music, like any other artistic activity, needs the whole person to use his/her own body as a working tool (Aguado, 2010), and the hearing is an overriding sense for musical artists, repeatedly required for professionals involved with musical support, the objective of this research was to determine the prevalence of Temporary Threshold Shift (TTS) in musicians and their advisors (roadies) for a risk hearing evaluation, as well as the effects of exposure on individuals who do or do not use hearing protection, besides measuring their noise exposure levels.

Method

Characterized as a cross-sectional study, whose data were analyzed in a single moment, the sample was composed of musicians and roadies of two bands who performed in São Paulo city (Brazil). Such bands, categorized by Hardcore style were selected by the origin arising from the Rock and Roll. Thus, participants were invited to participate in this research by electronic correspondence, receiving a newsletter about all the procedures used in the project.

Data collection was carried out at the place of presentation, preferably in closed environment, due to the fact that Rock and Roll presents a great danger to the ear of the musician such as: the frequency range of dynamic compressed sounds, narrow band amplification and amplified and re-amplified reverberation (Mordini, Branco & Rodrigues, 1994), and to the effective uptake of all propagated sounds there. The examinations were only performed in those participants who agreed with the assumptions established by the Informed Consent TCLE (Termo de Consentimento Livre e Esclarecido). Exclusion criteria were determined by the following factors: report of medical diagnosis of hearing loss by diseases that cause hearing fluctuation (Meniere's Disease and Recurrent Otitis Medium); External Otitis, Otosclerosis, Otologic Surgery, and the use of ototoxic drugs [4].

For the determination of such criterion, a questionnaire was used - to establish the general health and hearing, besides the musical/occupational exposure. In the individuals eligible, the inspection of the external acoustic meatus was performed, and any possible problems that could interfere with the results of the tests applied were checked, for example, obstruction of the external auditory canal promoted by excessive earwax. If any changes were found, the participant would be referred to an otorhinolaryngologist doctor. The equipment used for this evaluation was the otoscope by Gowllands, Model 353.

Conventional Tonal Threshold Audiometry[5], which is regarded as the most sensitive method to detect TTS in relation to High Frequency Tonal Audiometry (HFTA) (Schmuziger, Patscheke & Probst, 2007), was performed in musicians and roadies before (considered as reference exam) and after the presentation. To determine the values of TTS the differences obtained between hearing thresholds before and after the presentation were analyzed, detected by the equipment Otometrics GN (Model MADSEN Xeta), TDH 39P earphones (Telephonics) under use of Warble stimulus and portable acoustic booth AL80, calibrated according to specifications recommended by ISO 8253-1.

The measurements were performed by means of meters noise dose, called dosimeters [6], a tool that accuses the percentage of exposure to the noise level that the individual is subjected. The measurement consisted of two stages: the first was to examine the level of noise in roadies during the soundcheck, and the musicians and roadies during the presentation. In this case, the criterion of noise dose was obtained in an approximate way, through the time weighted average of the values of equivalent sound levels (Lavg) - for a day of work (8 hours) (Fernandes, 2005; Mendes, Catai & Alberti, 2009). The equipment used to obtain the sound levels were: Quest Model (Q 400), and Quest 3M (Edge Model 4), calibrated according to technical specifications determined by the manufacturer.

For statistical analysis, the parametric test (paired t) was used seeking to determine the calculation of comparison between hearing thresholds obtained before and after the presentation, besides the auditory effects of music exposure in individuals who do or do not use hearing protection. The significance level was 5% ($p < 0,05$). This study was

approved by the Ethics Committee of the Clinical Phonoaudiology Specialization Center, under protocol number 095/11.

Results

The casuistry of this study was composed of 9 male participants, being 33% (*n* = 3) corresponding to the musicians and 67% (*n* = 6) to roadies, among them: 3 Sound Technicians (50%) and 1 Sales Representative (17%) - Figure 1, with a mean age of 33.7 (minimum 22 and maximum 41 years old), mean time of activity in the music area correspondent to 15 years (average of three days and four hours worked per day and two days and two hours of rehearsal per day – weekly). Among the professionals questioned, 44% (*n* = 4) have played other musical styles, and 33% (*n* = 1) of the musicians have played another kind of musical instrument. Table 1 represents the occupational profile of the participants, obtained by questionnaire.

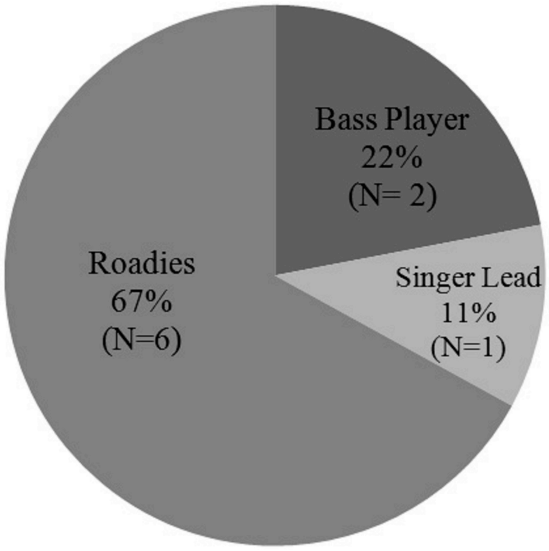

Figure 1. Characterization of the Participants, According to the Type of Musical Activity.

Table1
Occupational Profile of the Participants

Categories	**Participants**	
Activity type	Musicians (*n* =3)	Roadies (*n* = 6)
Time practice in the area	20 years*	12 years*
Have played another kind of musical instrument	33%	-
Played/Worked with other musical styles	33%	50%
Users of Hearing Protection	67%	17%

Note. * Denotes average value.

From the data obtained through the questionnaire, there was only one case compatible with exclusion criteria: External Otitis.

During the inspection of the external auditory canal (EAC), just one case with impediment for the realization of the audiologic test was detected and referred to an otorhinolaryngologist evaluation. However, because of the adhesion factors set forth above, the guest did not participate in the research.

In general comparison[7] between hearing thresholds gotten by conventional tonal threshold audiometry (before and after the exposure to music) there was a statistically significant difference in the frequencies of 1000 ($p = 0.009$) and 3000 Hz ($p = 0.007$) for the right ear, and 3000 Hz ($p = 0.016$) for the left ear (see Table 2).

Table 2
Mean, Standard Deviation (sd), Difference (dif.), and Significant Values (p) of Temporary Threshold Shift, obtained by frequency (Hz) and ear, according to the situation analysis (before and after musical exposure)

Right Ear							Left Ear						
Freq.	Before		After		dif.	p	Freq.	Before		After		dif.	p
	mean	sd	mean	sd				mean	sd	mean	sd		
500	21.11	4.17	23.89	2.20	2.78	0.013	500	20.56	5.27	22.78	5.07	2.22	0.104
1000	16.11	5.46	21.11	6.01	5.00	* 0.009	1000	16.11	7.82	20.00	7.91	3.89	0.111
2000	16.67	5.59	21.11	6.97	4.44	0.052	2000	15.00	7.50	18.33	9.01	3.33	0.141
3000	12.22	5.65	18.89	7.41	6.67	* 0.007	3000	13.89	6.51	21.11	7.82	7.22	* 0.016
4000	13.89	7.41	21.11	12.44	7.22	0.069	4000	14.44	5.27	20.56	8.46	6.11	0.093
6000	14.44	5.83	16.11	11.12	1.67	0.659	6000	13.33	5.59	16.67	9.01	3.33	0.282
8000	15.56	7.68	18.33	8.66	2.78	0.366	8000	14.44	11.30	15.00	10.00	0.56	0.824

* Significant difference

In order to assess the permanent effects of the exposure on the hearing of the participants, the auditory thresholds of individuals who use (33%), and those who do not use (67%) hearing protection were compared. As well as in the general comparative analysis, there was a significant difference in the assessment prior to the presentation between these two parameters, in the frequencies of 2000 ($p = 0.049$), 3000 ($p = 0.001$) and 8000 ($p = 0.036$) Hz just to the left ear – see Table 3. However, there was no statistically significant difference in thresholds after the presentation (see Table 4).

During sound check, the mean sound level obtained by the dosimeter installed in the participant who works in the area of sound, recorded 93.6 dB (A) staying close to the musical instruments, and 100.5 dB (A) during the show (located in front position, in a different height level in relation to the stage (raised platform), and approximately eight feet from the stage). In the musicians, the values found during the presentation corresponded to an average of 109.0 dB (A) for the bass player, and 116.4 dB (A) for the drummer.

Table 3

Mean, Standard Deviation (sd), Difference (dif.), and Significant Values (p) of Temporary Threshold Shift, obtained by frequency (Hz) and ear, obtained before the presentation, between those who use and do not use hearing protection

Right Ear							Left Ear						
Freq.	Use		Not Use		dif.	p	Freq.	Use		Not Use		dif.	p
	mean	sd	mean	sd				Mean	sd	mean	sd		
500	21.67	4.08	20.00	5.00	-1.67	0.606	500	20.83	5.85	20.00	5.00	-0.83	0.840
1000	15.00	4.47	18.33	7.64	3.33	0.425	1000	13.33	6.83	21.67	7.64	8.33	0.140
2000	15.00	5.48	20.00	5.00	5.00	0.227	2000	11.67	5.16	21.67	7.64	10.00	* 0.049
3000	10.00	4.47	16.67	5.77	6.67	0.095	3000	10.00	3.16	21.67	2.89	11.67	*0.001
4000	11.67	7.53	18.33	5.77	6.67	0.224	4000	12.50	5.24	18.33	2.89	5.83	0.122
6000	15.83	4.92	11.67	7.64	-4.17	0.345	6000	12.50	4.18	15.00	8.66	2.50	0.563
8000	14.17	2.04	18.33	14.43	4.17	0.480	8000	9.17	3.76	25.00	15.00	15.83	* 0.036

* Significant difference

Table 4

Mean, Standard Deviation (sd), Difference (dif.), and Significant Values (p) of Temporary Threshold Shift, obtained by frequency (Hz) and ear, obtained after the musical exposure, between those who use and do not use hearing protection

Right Ear							Left Ear						
Freq.	Use		Not Use		dif.	p	Freq.	Use		Not Use		dif.	p
	mean	sd	mean	sd				mean	sd	mean	sd		
500	2.50	2.74	3.33	2.89	0.83	0.685	500	1.67	4.08	3.33	2.89	1.67	0.553
1000	4.17	3.76	6.67	5.77	2.50	0.451	1000	3.33	7.53	5.00	5.00	1.67	0.743
2000	4.17	3.76	5.00	10.00	0.83	0.855	2000	2.50	7.58	5.00	0.00	2.50	0.598
3000	6.67	6.06	6.67	5.77	0.00	1.000	3000	8.33	6.06	5.00	10.00	-3.33	0.544
4000	5.83	9.70	10.00	13.23	4.17	0.603	4000	7.50	6.89	3.33	15.28	-4,17	0.575
6000	1.67	11.69	1.67	11.55	0.00	1.000	6000	4.17	9.70	1.67	7.64	-2.50	0.711
8000	2.50	8.80	3.33	10.41	0.83	0.903	8000	3.33	6.83	-5.00	5.00	-8.33	0.106

Considering that a Homogeneous Exposure Group is the foundation for assessing exposures corresponding to a group of workers engaged in similar activities, at the same time, in similar work shifts, in the same workplace, and exposed to the same agent risk (high sound pressure levels) (Netto, 2008), the average obtained for the group exposed to the same scope of action (the stage, in this case), was equivalent to 113.6 dB (A). Table 5 characterizes the area of operations of the participants who had the equipment on, the time of evaluation, and the levels recorded, correlated with the time of maximum permissible daily exposure determined by Annex 1 NR15 of the Ministry of Labour and Employment (1978b), for continuous and intermittent noise[8].

Table 5
Aspects involved in the determination of the parameters obtained, correlated to the exposure time permissible daily

Area of Expertise	State Assessment	Noise Level dB (A)	Maximum permissible daily exposure
Sound Technician	Soundcheck	93.6	2 hour and 15 minute
Sound Technician	Presentation	100.5	1 hour
Bass Player	Presentation	109.0	20 minute
Drummer	Presentation	116.4	0 minute[9]

The changes caused by the noise are not restricted to hearing only, with frequent cases of high blood pressure, stress, anxiety, depression, increased muscle tension, sleep alteration, gastritis, difficulty concentrating, among others (Santoni, 2008). Faced with such relevance, the extra auditory complaints detected by questionnaire, were distributed according to the circumstances of exposure: after joining the musical area and after the musical exposure (see Figures 2 and 3).

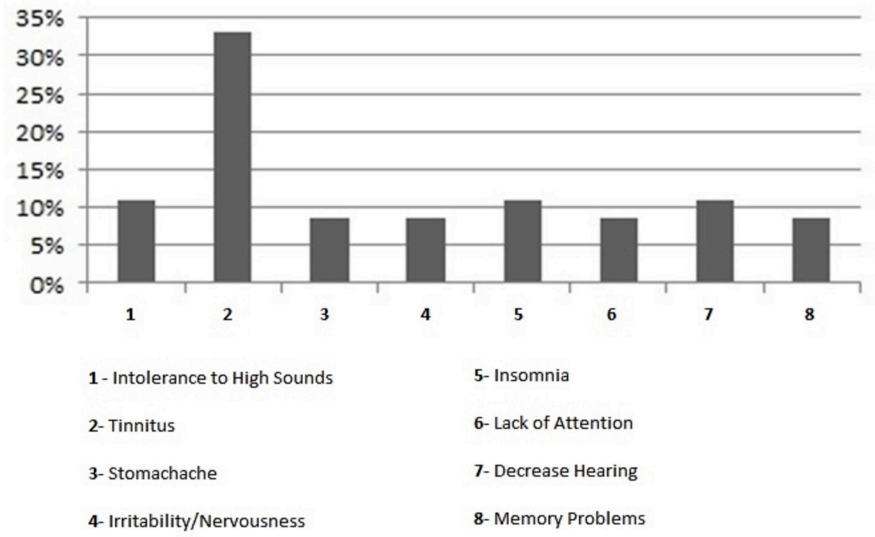

Figure 2. Auditory symptoms acquired after joining the musical area.

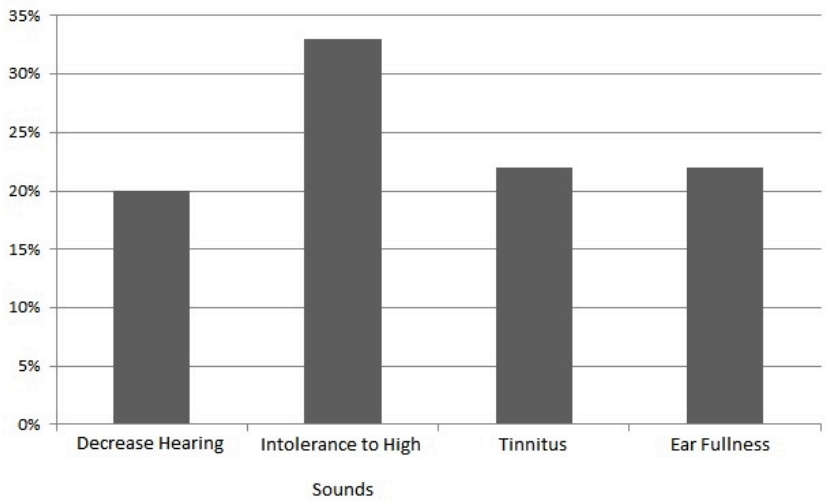

Figure 3. Auditory symptoms occurring after the musical exposure.

Discussion

The presence of temporary threshold shift (TTS) - most often in the range of 2000-6000 Hz, mainly if changes in hearing thresholds are associated with exposure to sounds over 80 dB, signals a prognosis of susceptibility to permanent sensorineural hearing loss (Azevedo, Okamoto & Bernardi, 1989; Frota & Iório, 2002). Evidenced by the comparative analysis between the hearing evaluation before and after the musical exposure, the frequencies between 1000, 2000, 3000 and 8000 Hz are those with considerable TTS, whose data found in the present study resemble the one performed in pop- rock musicians (Axelsson & Lindgren, 1977) and especially in 3000 Hz in the left ear (Barros et al., 2007). Furthermore, a study involving musicians from rock/jazz noted that, compared to women, men present worse thresholds in the left ear for frequencies of 2000-4000 Hz than the right ear (Kahari et al., 2003b).

According to a study by Cavasin et al. (2008) about the influence of the use of hearing protection in the TTS in Rock and Roll musicians, there was a significant difference in the threshold in at least one ear after the rehearsal without the use of hearing protection, whereas no musician showed significant change in the threshold after rehearsal when wearing hearing protectors. Similar findings were discovered in this study, through comparing hearing thresholds obtained before presentations. Significant results were found for the left ear in participants who do not use hearing protection. When considering analysis between the exams before and after presentations, there was no statistically significant difference, however, it was observed that individuals who do not use hearing protection had worse thresholds before exposure. Despite the small number of participants in the research, the results suggest that those individuals may be suffering from permanent hearing loss, not characterized by temporary threshold shift.

Sound levels recorded by dosimetry corroborate with other studies performed in populations of musicians (Mordini, Branco & Rodrigues, 1994; Kahari et al., 2003b; Russo et al., 1995b), whose values are above the Tolerance Limit established by Annex 1

Norm 15 of the Ministry of Labour and Employment (1978b), in which the maximum permissible daily exposure to a workload of 4 hours corresponds to the level of 90 dB (A). Major differences for these noise levels may occur depending on the music place, due to different types of sound and acoustics. However, the member who was subjected to the highest sound pressure levels was the drummer. Mendes, Catai & Alberti (2009), also found similar findings in pop rock bands, indicating that the type of music performed by the group demands a lot from this specific element.

The risk of developing hearing alteration is also influenced by some factors, among them: advancing age, weekly time exposure and individual susceptibility (determines the influence of hearing loss, clarifying the fact that some musicians present more severe hearing loss than others, for a similar time of exposure and playing the same type of music (Harger & Barbosa-Branco, 2004; Nudelmann et al. 2001; Samelli & Schochat, 2000)). Furthermore, the position that the musician plays in relation to the group is also an important factor, due to sonic characteristics of other instruments played close to the musician, and the physical aspects of the environment (Chasin, 1996; Mendes, Koemler, Assencio & Ferreira, 2002; Kahari et al., 2001a).

Among the auditory complaints that have major occurrence, the tinnitus, followed by intolerance to loud sounds, insomnia and decreased hearing are among the symptoms characterized by acquisition subsequent to the entry into the musical activity, validating previous studies conducted with this public (Bogoch, House & Kudla, 2005; Marchiori & Melo, 2001; Namuur et al., 1999; Santoni, 2008). The intolerance to loud sounds, tinnitus, ear fullness/ear full sensation and decreased hearing, are among the symptoms reported after musical exposure, also evidenced in studies with musicians (Maia & Russo, 2008; Pfeiffer et al., 2007; Russo, 1995b). According to Mendes & Morata (2007), these injuries occur due to high sound pressure levels to which those professionals are exposed, ranging from 79 dB (A) to 119 dB (A), and in this study the results were equivalent to 93.6 dB(A) to 116.4 dB(A).

The adoption of measures to reduce exposure to amplified music such as changing the position of the musician in relation to the amplification boxes, achievements of acoustic modifications on the desktop and rehearsal (when possible), creating intervals during presentations (providing moments of auditory rest), wearing customized hearing protection or uniform attenuation[10], and audiologic monitoring, are among the actions suggested by several studies. Moreover, the musicians' awareness on the effects of noise exposure at high levels is critical to the success and effectiveness of the suggested measures (Graciolli, 2001; Maia & Russo, Santoni, 2008; Mendes, Catai & Alberti, 2009; Mendes & Morata, 2007; Otubo & Dell'Acqua, 2013).

Currently, there is no legislation that protects Brazilian musicians from the high sound pressure levels to which they are exposed, or any specific law on hearing conservation (Mendes & Morata, 2007). However, there is a bill (1714/2011) in pending before the House of Representatives, which mandates the adoption of security measures and occupational medicine in labor activities developed by musicians linked to any form of work.

Conclusion

There was a statistically significant difference on the assessed parameters: before and after exposure to music, and between users and no-users of hearing protection, being evident that the musicians are predisposed to auditory risks, with the presence of extra auditory symptoms suggestive of overload high sound pressure levels established by high values detected by means of specific equipment. Considering that the noise exposure is the leading preventable cause of permanent hearing loss in the world, awareness actions and preventive measures, associated with the monitoring of possible progression of hearing injury, can contribute to career longevity, while avoiding a possible social isolation imposed by hearing impairment (Otubo & Dell'Acqua, 2013; World Health Organization, 1997). However, it is of great importance that health professionals and the population exposed to amplified music work together, including partnerships with institutions that can provide physical space and support in spreading this awareness.

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Footnotes

[1] According to the Aurelio Dictionary, the meaning of the word holistic is related to the preference for all or a complete system.

[2] Roadies are specialized professionals who accompany bands on tour, perform basic and routine tasks as completing assembly of equipment, tuning instruments, sound checking at all stages, exchanging pieces, checking the specific monitors, besides paying close attention to possible incidents during concerts, such as usual breaks and failures in equipment that could jeopardize the performance of the musician (Barbosa, 2006).

[3] The Sensorineural Hearing Loss occurs when the cells and/or auditory nerve get damaged and the sound does not reach the brain (where the sound is processed). Once the hearing cells are lost and/or the nerve is injured, there is no way to recover them, characterizing the permanent loss. Usually this type of hearing loss reduces the treble sounds and may distort some sounds. It can be caused by advancing age, noise exposure and diseases like rubella during pregnancy, acoustic and cranial trauma, use of ototoxic medications, among others.

[4] Ototoxicity is defined as damage to the cochlear systems (where the auditory cells are located) and/or the vestibular (responsible for maintaining body balance) resulting from exposure to substances or drugs with toxic effects. The vast majority of ototoxicity is

temporary, and when this occurs, there is time to discontinue to use of the medication, and prevent further damage to the system. (Mitre, 2003; Queiroz, 2005).

[5] Research in auditory thresholds in the frequency range 500-8000 Hz, determining the least amount of acoustic energy audible - the hearing threshold in both ears (Lopes, 2011).

[6] Small device with the microphone positioned over the shoulder, stuck on clothing, within the auditory zone of the individual.

[7] Musicians and roadies, regardless of the use of hearing protection.

[8] In relation to industrial noise, the music is significantly more intermittent in nature, by the presence of intense periods, followed by quieter ones (Chasin, 1996).

[9] According to Norm (NR) 15 Ministry of Labour and Employment (1978b) - in its Annex 1, exposure to noise levels above 115 dB (A) is not allowed for individuals who are not adequately protected.

[10] Attenuate all frequency range of 100-8000 Hz without significantly changing the spectral shape of the original sound in the frequency.

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IV. Perception Research

Disability in the Media:
An Analysis of Disability-Related Titles in International News Reports

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The terminologies used to refer to people with disabilities often reflect attitudes toward this minority group of individuals. Of particular importance is the terminology used in the various news media, as these news sources reach a broad spectrum of the world population. The publication manual of the American Psychological Association (2009) used by social scientists, and the stylebook for the Associated Press (2013) used by news reporters, have both published guidelines for referring to people with disabilities. To better understand cultural representations of persons with disabilities, the researchers examined disability-related terminology found in international print media for the year 2012. The researchers completed a search for disability terminology used in the major international news media (BBC, CNN, US News and World Report, etc.) venues over the past 12 months. Using the writing guidelines as a reference for appropriate terminology, the researchers found the language used to refer to people with disabilities varied among countries. Some countries often used the language recommended in the APA and AP guidelines (2009), while other countries used more diverse terms. In general, the terminology used was more positive in articles about (a) individual persons with disabilities, as opposed to groups, (b) children who had disabilities, and (c) issues of mobility and human rights. In addition, some international news reports indicated more stigmatizing views than others; however, standards used for reporting on persons with disabilities are not universal, and therefore, any judgments regarding the use of terminology should be withheld. Finally, results of the study indicate that choice of terminology cannot be explained by the country source alone, but more accurately by journalists who write for the popular presses reporting international news.

To eliminate stereotypes, they must first be recognized and then challenged. The media have incredible power to influence our perception of others, particularly those with whom we have little contact. Questions have often been raised about the terminology used to refer to many minority groups in the media (Mahtani, 2001). Students are one of the most active consumers of popular media, and are consequently subject to their influences. Unfortunately, print depictions of persons with disabilities are rarely written by persons with disabilities, thus making such depictions subject to the non-disabled perspective (Haller, Dorries, & Rahn, 2006).

Referring to Persons with Disabilities

As early as 1960, Beatrice Wright (1986) in her landmark text, *Physical Disability: A Psychological Approach*, claimed the language used to refer to people with disabilities can either be empowering or devaluing. Educators understand that words have power, and a teacher's use of inappropriate disability-related terminology is generally inadvertent, and reflects a lack of awareness, not maliciousness. As with any term used to describe a group of people, deference is usually given to those being described (American Psychological Association, 2009). For

example, the evolution of terms used to describe groups of individuals based upon race and/or sexual orientation is well known. This evolution was a result of public education and self-advocacy by these groups. Guidelines for reducing biases in language have been updated over the years, and provide practical advice for writing about disability status. The World Institute on Disability (Berkeley, CA), National Organization on Disability (Washington, DC), and Disabilities Research and Information Coalition (Seattle, WA) are some of the organizations that have actively advocated for the use of appropriate non-discriminatory terminology to describe persons with a disability. Defining persons by their disability fails to recognize their humanness; what words would be used to describe the individual if he or she did not have a disability?

Most music educators and therapists today are aware of "person-first" language, putting the person before the disability, saying, for instance, "a student with autism" instead of "the autistic student." Rather than seeing the person as the disability, person-first language demonstrates that the person has many characteristics and qualities of which a disability might only be one. The purpose of this approach is not to minimize or deny a disability, but to affirm a student is more than his or her disability, so that the disability does not supersede all of the other attributes the student possesses (Adamek & Darrow, 2010; Turnbull, Turnbull, & Wehmeyer, 2010). As professionals working in schools, it is important to know and use appropriate terminology when communicating with other personnel, parents, and school administrators. Using labels and other terminology unique to disabilities demonstrates an understanding of related laws, school culture, and recent developments in the field of disability studies (Darrow, 2013). Using appropriate language also demonstrates a respect for persons with disabilities.

Disability in the News Media

Various researchers have examined the content of and the terminology used in news reports on persons with disabilities (Devotta, Wilton, & Yiannakoulias, 2013; Auslander & Gold, 1999). Frequent topics have been provision of services to people with disabilities and resulting financial considerations, or 'extraordinary' feats carried out by persons with disabilities, such as examples of extreme athleticism (Carter, Parmenter, & Watters, 1996). Researchers have also examined the disability-related terminology used specifically in newspapers. Wilkinson and McGill (2009) examined the representation of people with intellectual disabilities in a British newspaper, *The Guardian*, in 1983 and in 2001. There was more coverage of persons with autism or Down syndrome than other intellectual disabilities. Newspaper accounts were also more about children than adults, and there were fewer medically-related reports than human interest stories. They also found an increased use of 'people-first' terminology except in respect to people with autism where 'autistic' was still used predominantly as an adjective or noun (eg. 'autistic boy' or 'the autistic'). Similar findings were found in Australian and American new reports (Carter, Parmenter, & Watters, 1996; Dajani, 2001).

Haller, Dorries, and Rahn (2006) found increasing use of 'people first' language in the New York Times and Washington Post news reports during the 1990s, which they attributed to the influence of the Americans with Disabilities Act in 1990. Persons with intellectually disabilities are particularly vulnerable to depictions that are inaccurate and stigmatizing since articles about this disability group are rarely written by persons within the group. They are dependent on authors to have an accurate understanding of their disabilities and to portray them

in a way that is truthful, yet respectful of their many attributesu. Pardun (2005) found that persons with intellectual disabilities were increasingly portrayed as 'one dimensional' with frequent characterizations such as vulnerable, pitiable and victims.

Devotta, Wilton, and Yiannakoulias (2013) examined the change in representations of disability and persons with disabilities in the Canadian news media between 1998 and 2008. They found a significant increase in the proportion of stories using "person first" language, and a significant increase in the proportion of "progressively" themed articles (e.g. dealing with barriers to participation, or disability awareness and inclusion), though differences were found among the news sources, with some being more sensitive to language use and themes in reporting than others. Their study was a follow up to Auslander and Gold's in 1999 who earlier examined terminology used in Canadian and Israeli news reports and found that various types of inappropriate terminology was prevalent in both countries.

Briant, Watson, and Philo (2011) also analyzed changes in the way the media are reporting on disability in five UK newspapers. They found that media coverage on disability increased dramatically between 2004-5 and 2010-11 with over 30% more articles covering disability themes. This increase in coverage was accompanied by a positive change in journalists' use of terminologies regarding disabilities; however, terms such as 'cripple,' and representation of persons with disabilities as 'sufferers' or 'victims' were still evident.

Terms such as 'suffers from (name any disability)' is particularly harmful to the representation of persons with disabilities. In a recent New York Times opinion piece, Edgin and Fernandez (2014) challenged biologist Richard Dawkins' recent response to a woman's hypothetical question about whether to carry to term a child with Down syndrome. Dawkins responded to the woman on Twitter: "Abort it and try again. It would be immoral to bring it into the world if you have the choice." Responding to the resulting controversy, he further suggested that his view was rooted in the 'moral principle of reducing overall suffering whenever possible,' implying that individuals born with Down syndrome and their families 'suffer.' The use of terms such as 'suffering' and 'victims' in reference to persons with disabilities are generally the result of individuals' lack of experience interacting with persons who have disabilities, or their lack of information on the psychological state of most persons with disabilities. There are no data to support the notion that people with disabilities 'suffer' any more than persons without disabilities, although it is a common misperception that they do.

Missing from the literature are studies that address the nature of news titles found in international reports on disability. Titles are a fruitful data source, and perhaps particularly important given that many readers do not read an article in its entirety, but often do view and read titles of news reports, or titles given in summary listings of news reports. It is also questionable as to the number of persons who read disability news items without having a professional or personal interest in the topic of disability. Therefore, to better understand cultural representations of persons with disabilities, the purpose of the present study was to examine disability-related terminology used specifically in international news media titles.

Method

In order to investigate contemporary terminology used by various countries, the researchers completed a search for disability terminology used in major international print venues over the past 12 months. The researchers specifically analyzed the titles of news articles, which differentiated the present study from earlier research in which entire articles were analyzed. The rationale for including titles only as the source of data was due to the habits of many news readers who read titles, though often do not read the accompanying articles. An additional rationale was that many editors edit titles for print efficiency, resulting in greater misuse of disability terms.

A total of 50 international news titles were used for the data analysis. Articles were selected on the following criteria: (1) a disability or disability group was in explicit in the article title, (2) the news reports were from major presses: BBC, CNN, US News and World Report, (3) the news reports were not medical reports, but articles related to community life and meant for the general public readership.

Results

Overall, the use of terminology varied among the countries, with some countries using language recommended in the APA manual (2009) used by researchers in the social sciences, and other countries using more diverse terms. Examples of international news titles are shown in Table 1. In general, the terminology used was more appropriate according to APA and AP guidelines for writing about persons with disabilities in articles about (a) individual persons with disabilities, as opposed to groups, (b) children who had disabilities, as opposed to adults, and (c) issues of mobility and human rights. A word cloud of terms is illustrated in Figure 1. Overall, significantly more inappropriate terms were found than appropriate terms according to APA and AP guidelines. See Table 2.

Table 1
Example of Article Titles from International News Media

Handless Model is an Overnight Star
Deciding to Marry a Quadriplegic: Couple Tells Love Story
Crippling Multiple Sclerosis Takes Filmmaker on Wild Ride to be Independent
Fla. Teacher Accused of Feeding Autistic Boy Hot-Sauced Laced Crayons Rehired
Help for Emma Sought: Deaf Child Suffers from Cerebral Palsy
Health: Loners May Suffer from Autism
Adrianne Haslet-Davis, Boston Bombing Amputee, Dances Again at TED
Cerebral Palsy Victim Sues City Over Medical Marijuana
50 Million People in Latin America Suffering from Disability
California Man With Half an Arm Sues Starbucks, Alleging Discrimination

Figure 1. Word cloud illustrating terminology used in international news titles.

Table 2
Means, SDs, and t-test for Appropriate and Inappropriate Terms According to APA Publication Manual (2009)

Category of Words	Mean	SD	*t*	*df*	*p*
Appropriate Terms	2.47	4.98			
Inappropriate Terms	4.26	5.78			
			2.90	98	.05*

Note. * Indicates significantly more inappropriate terms than appropriate terms used in international news titles.

The intent of the researchers was not to compare one country against another, as standards for reporting on persons with disabilities are not universal. In addition, a comparison would not have been appropriate since countries were not equally represented in the articles that met the researchers' criteria for inclusion. The intent of the present study was to capture a global picture of how disability is viewed through the lens of world news reports. Reports from some countries indicated what could be considered more stigmatizing views than others; though again, standards used for reporting on persons with disabilities are not universal, and therefore, any judgments should be withheld. All countries were represented among the articles whose titles could be considered stigmatizing by the standards for reporting outlined in the APA manual (2009) and AP guidelines (2013). These results indicate that the choice of terminology cannot be explained by the country source alone, but rather by the journalists who write for popular presses reporting international news.

Discussion

The contributions of persons with disabilities to society will continue to be overlooked or underestimated if negative portrayals persist in the media. The language used in popular news reports has a significant influence on readers' image of and attitudes toward persons with disabilities. Individuals in countries where the rights of persons with disabilities are not yet fully realized are particularly vulnerable. Media stories, and even the mere titles of these stories, have the potential to influence thinking and establish social norms. People with disabilities have endured misrepresentation, defamation, and lack of representation in the media news and entertainment (Wilkinson & McGill, 2008). While the American with Disabilities Act has

enlightened many citizens in the US, stereotypes about disability remain even in a country with laws to protect the rights of individuals with disabilities. Disability stereotypes are formed and reinforced by media coverage that fails to embrace less stigmatizing terminology and promote an image of normalization for persons with disabilities. The media can serve as a powerful force in raising public awareness and promoting a more accurate image individuals with disabilities.

Disability portrayals in the news media are a fact of life, and though some title terminology was appropriate according to APA and AP guidelines, persons with disabilities were often portrayed as superhuman—a different type of stereotype that can also create unrealistic expectations regarding persons with disabilities. News reports remain one of the major public information sources about disabilities (Darrow, 2013). News reports will continue to be written by persons who have little experience with disability; and thus, it is likely the news media will continue to unwittingly perpetuate negative stereotypic portrayals of people with disabilities. Clearly, news reports constitute a major segment of the popular media. It is imperative then, that music educators and therapists learn to recognize discriminating and/or stereotypic portrayals of persons with disability in the media, and particularly in the arts, question these stereotypes, and be mindful never to propagate such stereotypes in their teaching and writing. Most importantly, teachers must take advantage of every opportunity to highlight portrayals of persons with disabilities that are realistic and affirming. The acceptance of persons with disabilities will be positively influenced if educators, and the students they teach, continue to challenge stigmas associated with disabilities.

When teachers and therapists create accepting environments and model terminology that affirms students' abilities rather than their disabilities, musical learning is also more likely to take place. All students learn better when they are respected and accepted for their individuality. Looking beyond a student's disability opens the possibility of seeing the student as a developing musician, our ultimate goal for all students. Beyond the classroom however, teachers and therapists must be vigilant, and protect, as well as promote, images that accurately reflect individuals with disabilities. All citizens are better served by doing so.

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The Study of Musicality as an Aesthetic Cognitive Capacity in the Work in Music Therapy

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This work presents the results of an empirical pilot research project with video and audio. The analysis tool used was the Ethnographic Descriptive Approach to Video Microanalysis, which allows the researcher to identify interactions taking place but are partially or entirely outside the researcher's awareness field either because they are acquired data or because of blind spots in how they are perceived. This study reflects on specific aspects of musical therapy practice related to music in music therapy. Results are based on empirical research and can't be generalized as a whole, but allow to identify the peculiarities of the music therapist's musical practice in terms of listening and musical construction as a function of the goals established for each person treated with music therapy. This involves a musical practice based on Perception Aesthetics, a distinct education in musicality for the professional music therapist.

Introduction

The study of clinical music therapy works based on empirical research is a fertile ground for understanding the complexity present in Music in Music Therapy. In this text we approach the problems involved in understanding the musical practice in health services and so deepen the knowledge required for understanding the therapeutic validity of the musical experience in this context. Jonathan (J) and Thiago (T) were collaborators in this research.

Music and music therapy aren't linked simply by the word "music." This link is not expletive, so that music does not explain music therapy nor vice-versa. These areas, when brought together, outline the forces at play, "forces that aren't sound become sound and sound forces become forces that aren't sound" (Craveiro de Sá, 2003, p. 40-41). This shows the importance of understanding the human experience with music and in this study music is considered in the aspects of musical cognition, musicality and aesthetic cognition.

The expression "musical cognition" is recent and is rooted in the question: What knowledge is acquired with music? In the search for answers, some knowledge areas where brought together and the expressions Music Cognitive Psychology, Cognitive Sciences and Music Cognition, according to Ilari (2009) might be synonymous. Neuro-scientific studies involving the brain and music approach this environment and sustain that musical thinking processes seem to relate to the other thought processes in the human mind, including non-musical processes (Piazzetta, 2011). These investigations of the musical mind are contained in an understanding of musicality.

The word for musicality in Portuguese is *musicalidade,* which contains the suffix *–dade,* to indicate a word qualifying something. In this case, it qualifies the musical practice. For Music Philosophy, this word can be understood more broadly as a constituent of the human being. Music without man is unthinkable, just as man does not exist without music, in such a way that

music is considered a human cognitive capacity (Queiroz, 2003; Zuckerkandl, 1973). A cognitive capacity working with a very singular element: *sound*, musical or not. This characteristic relates to a field discovered recently: aesthetics as sensations, instead of Art Philosophy alone (Camargo, 2009). Aesthetics as sensation builds the idea of Aesthetic Cognition.

At first glance, the words "cognition" and "aesthetics" seem to oppose each other. The former involves the process of logical conceptual thought and the latter, in this study, involves pre-conceptual perception and sensation processes. For Camargo (2010) those words complement each other, since the elaboration of concepts, explanations, identification of our surroundings takes place primarily through what is felt by the body, the perception and in the ways the body interacts with its surroundings. We refer to Alexander Baumgarten's thought (18th century) about feeling and aesthetics and approach the topic of the sensory experience. After this brief introduction of the terminology used in the research environment, it is important to present the pilot project and its main objective: to observe and describe musicality as a form of sensory cognition of two participants of the Music Therapy Support and Study Center – CAEMT "J" and "T" for the purpose of deepening the understanding of the relationship between musicality and the sensory side to build the base for better understanding the role of musicality of people when receiving music therapeutic treatment (Piazzetta 2011, 2012). Results indicated two analysis categories: *spontaneous changes* and *playfulness*. Also aesthetic signs of *emotivity* and *surface manifestation* composing the category *sensitivity* (Piazzetta, 2012).

How were those results reached? We applied the tool *Ethnographic Descriptive Approach to Video Microanalysis.* For this analysis, it became necessary to conduct a specific study of this tool and also to have talks and exchanges with researchers at different scientific meetings where partial results of this study were presented. The study continues with the intention to present the theoretical foundation for this research and describe the path adopted to treat the data.

Aesthetic Cognition, Artistic Experience, Sensory Experience

In the work with music therapy, everyone has a chance to be with music, everyone can engage the musical experience: by playing, singing, drumming the feet to the beat, moving the body to the rhythm. In music therapy, also, musical experiences are aesthetic and sensory in nature. Approaching the aesthetic experience may take place through cognition, and as such it is indispensable to consider sensory and logical aspects as complementary. For Camargo (2010), talking/writing about the sensory experience is challenging, since it exists at a pre-conceptual level prior to the activity of logical thinking in a dimension of feeling for the sake of feeling. It is epiphanic in nature, never expected nor anticipated, as when one is overwhelmed. Describing these experiences requires words that shelter their pre-conceptual condition. We describe them through the words *sensory, meaningless* and *unconceivable*. Sensory because it's in the realm of what can be sensed. Meaningless because it has no prior meaning. Unconceivable because it hasn't been conceived yet (Camargo, 2010).

Kenny (2006) defends music's natural aesthetic character and presents a basic premise: *the music therapist is an artist.* Western society dictates that artists are people trained in producing art. They don't talk about health. In other cultures, a time for pleasure is a time for health, and

music is part of the time for pleasure. People find meaning for life when they participate in musical activities in a community.

Validating the aesthetic experience as a supporting element in maintaining health is not easy and is not something cultural only. Research in this area is difficult and involves functional investigations and not only brain structures. In this sense, they are unique for each person and theories may not be subject to generalization. It is an interdisciplinary field that links culture, values, beliefs, personality, temperament, perception, skills, education and attitudes. Through the aesthetic experience each person will find their own references in the universe. They find the meaning of their lives in their day-to-day lives (Kenny, 2006).

The sounds produced in the music therapeutic work aren't always beautiful, but "*the music therapist listens to this expression as a deep representation of human experience"* and that presents a unique beauty. The music therapist and the client work together to create and experiment beauty, "*they find symbolic shapes, patterns, structures, textures in the improvised songs, which convey important meanings. They listen to healing themes in recorded pieces that refer to life outside the session"* (Kenny, 2006, p.64). Music and Music Therapy complement each other in what is sound and what is not.

Musical Cognition

What knowledge is acquired through music? If one considers the music therapeutic environment, one learns about each person's way of being and everyone can learn about themselves. Recent studies about music and the brain strive to map the brain's function when it experiences music. Science learns more and more the human brain's function in areas that aren't musical alone (Levitin, 2010)

When the human brain learns music, it develops and expands its capacities. Studies involving Williams Syndrome (SW) patients reveal, according to this neuroscientist, that these patient's brain build and function are different[i]. It may be for this reason that these patients display such contradiction in their capacity to understand complex musical themes coupled with some incapacity to carry out simple activities involving motor coordination. The brain's most widely used region by those patients in musical processing is the cerebellum, unlike other people, who use the frontal lobe.

This information about the function of the musical brain in William's Syndrome patients is important to understand the differences between J's capacity to understand musical sound and his way of producing music. If no musical intervention by the music therapist occurs, J can remain for a long time repeating the same sounds as if in a random or automated mode. What draws J's attention may not be a theme having a beginning, a middle and an end. What keeps J in this musical sound universe and affects him? It is necessary to keep in mind that musical processing, in these patients, takes place via the cerebellum, which is a center for emotions.

Musicality is part of the musical cognition processing. For Zuckerlandl (1973), people use the musical thinking to produce music. This type of thought is pre-conceptual, so that people can understand the "dynamic qualities" of the musical note (Piazzetta, 2011a). This idea refers to

what Levitin (2010) states about William's patients processing music in their cerebellum. Pre-conceptual processing happens through emotions. The brain processes music through understanding the sound patterns apprehended by thought and expected in the act of listening. When a break occurs in this pattern, the system needs to adjust to the new reality and move on in the understanding of the musical experience.

Video and Audio Microanalysis

The microanalysis has a long history and is systematically used in related disciplines, such as psychotherapy, pedagogical disciplines such as in special education, and at academic level in music psychology. The specific object for microanalysis must be understood and defined as minute changes in relations or interactions between people or minute changes in music and in the dynamic forces. For the clinical practice, it is highly important to be capable of consciously perceive and critically analyze the therapeutic process and with these abilities adequately react to very small changes in the social, musical and emotional behavior of the experiences in a therapeutic context. The ethnographic approach for video microanalysis was described by Holck (2007).

Methodology

For this analysis we applied the *Ethnographic Descriptive Approach to Video Microanalysis* (Holck, 2007) of music therapy videos. Six music therapy sessions of J were recorded non-consecutively and analyzed according to the ethnographic descriptive approach. The analysis process comprised four stages: selection of the images, transcription, generalization standard vertical and horizontal analysis and interpretation. This descriptive tool crosses information displayed horizontally (lines) and vertically (rows). In the middle of the lines quantitative is the description, with proper language, of musical interactions between the music therapist and the patient. Around this, in the upper portion are patient's descriptions and at the bottom are the music therapist's descriptions. On those lines, criteria are placed based on the study subject. In this study: the description of body expressions, looking direction and the musical work of both. On the rows are placed the time stamps (by chronograph). Because of this descriptive specificity, sections are very short and allow to see and hear the actions of both at a certain point in time.

This tool offers another interesting feature, since the descriptions in lines and rows offer part of the results, but not the results themselves. It was necessary to revisit each description spreadsheet for study to understand what the microanalysis offers in terms of change patterns and the goal of the interaction, stage of interpretation. That meant going back to the process context for each of the participants. The descriptions of visible sensory knowledge in these experiences without the use of songs help in understanding that musicality in the context of Music Therapy is constituted as the sensory aspects of the music therapeutic interaction. The portion chosen to illustrate this article considered the experiences in instrumental improvisation. We emphasize therefore those moments where sensations become manifest, feeling for the sake of feeling, letting emotions flow, being carried by the musical flow. An exception was made for vowel sounds, since they are part of the therapeutic process approached here or when they were uttered as motivation.

Ethnographic Description ("J" record 1, 4' to 8' – 1'10'' description)

Image selection. out of six footages, four sections were selected for each patient denominating them "J" or "T" record1, 2, 3 and 4.

Section transcript (record1- 1'10"). "J" and Music therapist are sitting at the piano. Mt is at bass and "J" at the high notes. Mt begins cadence in a major tonality and maintains a rhythmic cell repeating "J" speech pattern (eighth note and quarter note), binary with attack on the second note. "J" understands the beat and interacts with both hands open at the piano and makes two-note clusters in each hand. Music therapist looks at "J"'s hands and the bodies are facing the keyboard, hunched as though willing to get closer. "J" changes rhythm to two eighth notes and Music therapist follows. "J" and Music therapist play with sounds at times randomly and at times building musical phrases with harmonic base. "J" chooses the ring fingers of each hand to play a note at each hand alternating hands. Dynamics and speed changes are present spontaneously in both and are carried out with body moving closer and further to keyboard. They make a game out the sounds and smile while they look at each other.

Generalization pattern. Music therapist and "J" maintain the same body movement coming and going from the keyboard (synchronized): *pp* closer and *fff* when farther away; *ritardandos* when closer and *accelerando* with more sounds when farther away. They exchange smiles and laugh. "J" changes the play from hands together to hands alternating when he wants to produce more different notes. After an episode of intensity and acceleration, "J" grows silent and Music therapist introduces a melodic cell that requires his attention and he utters: "*legal"* – cool. In spite of it he returns to the rhythm and intensity game.

Interpretation. "J" and Music therapist are highly integrated and available for playful activities. The additions of melodic cells by Music therapist are not followed by J, who maintains the binary pattern with alternating notes. He enjoys it and understands that there is another way of organizing sound that make sense for him. This can be observed through facial expressions and words such as "cool", but in his musical production he only produces loose notes. Understanding this difference between musical feeling and producing in musicality involves elements of motor coordination, attention and emotional aspects.

Final Considerations

The use of this methodology for ethnographic description with image and sound proved very rich for the understanding and learning about the specificity of the musical production of the session participants. Following the four methodological steps was a tiring and challenging exercise, since a) it's necessary to watch videos repeatedly with great attention, b) identify generalization patterns that conform with the research's goals, c) put in words what happens in the video portion moment after moment, d) identify the portions' most important moment from significant, communication and interaction moments between both; e) describe body movement in the video portion's context. All these actions culminate in filling out a chart that requires studying and returning to the work environment with J to build the interpretations. In this example, results indicated the sensory cognitive elements present in this process in the sensory environment – *emotive behavior* and *surface presentation* and the categories were: *spontaneous*

changes and playfulness. Musicality as an aesthetic cognitive capacity involves understanding the interaction between participants, locating and identifying the music therapist's therapeutic musical actions.

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V. Music Interventions for Various Populations

Creating and Assessing Intergenerational Music Programs

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"Somehow we have to get older people back close to growing children if are to restore a sense of community, a knowledge of the past, and a sense of the future"
~Margaret Mead~

Up until the 1990s, families consisting of older adults, adult children, and young grandchildren often lived together in one household. However, the family structure in many countries has changed over the past 40 years, with multigenerational households becoming less common. Some cultures still adhere to the traditional extended family unit, with family members of various generations living together or living in close proximity to each other. Nevertheless, contemporary technology, which allows for greater communication, along with changing values has prompted many young adults to leave the family home once they are finished with school and begin to work. This change in family living situations has contributed to an age gap between younger and older generations. This gap can result in both generations developing perceived stereotypes and misconceptions toward the other, which in turn, can contribute to negative cross-age attitudes.

> Without frequent exposure to older persons or lack of familiarity with persons older than their parents, some youth are quick to adopt stereotypes regarding aging and older persons. Children who have a positive and close relationship with their grandparents are less likely to have negative stereotypes of senior adults or fear growing older (Ohio Department on Aging, 2008).

Intergenerational programs emerged in the early 1960s to decrease this age gap between younger and older generations and to combat negative cross-age attitudes (Belgrave, Darrow, Wlodarczyk, & Walworth, 2011). In geographically large countries, such as the United States, where great distances often separate families, it has become necessary to plan for and to organize activities that bring the generations together.

Defining Intergenerational Programs

Generations United (2002, p. 1) defines intergenerational programs as "social vehicles that offer younger and older generations the opportunities to interact and become engaged in issues concerning our society." Darrow and Belgrave (2008) define intergenerational activities as any purposeful interactions between the young and older adults. The primary purpose of intergenerational programs is to structure interactions between younger and older generations utilizing a common activity to engage both groups. Activities have commonly included choirs, mentoring programs, weekly visits, as well as pen pal and reading programs. The activities employed in intergenerational programs generally become more sophisticated as the age of the younger members increases.

Though the age range in intergenerational groups varies depending on the type of program, younger generations involved in intergenerational programs cover all of the various school-age groupings: preschoolers, elementary-age children, adolescents, and college-age young adults. Older adults who participate in intergenerational programs are generally individuals 65 years or older. They may live independently in the community, in assisted living communities, or in nursing care communities. In addition, these individuals may vary anywhere along the continuum of physical and cognitive functioning levels. Some programs may be specifically designed to address the cognitive needs of the older adults, such as groups that include preschoolers and older adults with Alzheimer's disease who benefit from verbal and social stimulation. Other programs may be designed to address the emotional needs of older adults living in nursing care communities who are experiencing increased isolation. Though most intergenerational programs are created to benefit older participants, other programs—such as mentoring and educational-based intergenerational programs—are designed to meet the emotional and academic needs of the younger participants (Darrow & Belgrave, 2013).

Rationale for Intergenerational Programs

Older adults are the fastest growing segment of the society, with the number of individuals 65 and older expected to double in the next 25 years. One out of five citizens in the US will be 65 years or older by 2030 (US Census, 2012). Due to the global ageing of the population, improving intergenerational communication has become an increasingly important concern (Tomassini & Glaser, 2004). The demographic data on older adults also indicate that these individuals are a valuable resource with the potential to contribute to the well being of the younger by serving as mentors, grand-friends, and classroom volunteers. Likewise, children, adolescents and young adults can serve as a valuable resource in serving the needs of the ever-increasing population of older adults. Finally, both groups together have the potential to form valuable community partnerships that enhance local service agencies that may be experiencing gaps in services.

Many young and middle-aged adults dislike the idea of growing old; however, aging is a natural process that can only be avoided by an untimely death. Children's perceptions of older adults are often biased by ageism stereotypes, which can negatively affect psychological and cognitive functions of the elderly (Crisp & Abrams, 2008). Intergenerational programs provide opportunities to fashion and promote the image of older persons, and consequently, foster positive attitudes toward aging. Positive attitudes toward older persons internalized by adolescents, teens, and young adults may well persist into adulthood; and consequently, contribute to their self-concept as they themselves age. Various authors in the field of aging are encouraging readers to look beyond the aging stereotypes of decline and dependency and to explore the potential of older adults lives (Irving, 2014).

Benefits of Intergenerational Programs

There are numerous benefits that both younger and older generations derive from participating in intergenerational programs. Intergenerational programs offer the potential for reducing existing barriers between generations. Both generations experience purposeful interactions, and as a result discover how to relate to one another. The interactions between both

generations can also result in mutually beneficial cross-age friendships and companionship. As a result of participation in intergenerational programs, younger generations have improved their school attendance, aging attitudes, and attitudes towards community service (Abrams & Giles, 1999; Crites, 1989; Karasik & Wallingford, 2007; Peacock & O'Quinn, 2006; Stremmel, Travis, Kelly-Harrison, & Hensley, 1994; VanderVen, 1999; Zeldin, Larson, Camino, & O'Connor, 2005). Older adults have benefited from participation in intergenerational programs by having an increased sense of well-being, decreased isolation, and increased feelings of usefulness (Abrams & Giles, 1999; Crites, 1989; Jarrott, 2011; Kaplin & Larkin, 2004; Lindquist, 1986; VanderVen, 1999).

Researchers have shown that both age groups benefit from intergenerational interactions by improving cross-age attitudes (Bowers, 1998; Darrow, Johnson, & Ollenberger, 1994; Herrmann, Sispas-Herrmann, Stafford, & Herrmann, 2005; Newman & Smith, 1997). Other benefits are enhanced socialization and increased emotional support for both age groups. Both groups can learn from each other as well, such as older adults tutoring young children, or adolescents instructing older adults on the use of contemporary technology. Many older adults have experienced improved health from engagement in intergenerational groups (Glass, et al., 2004; Jarrott & Bruno, 2003). In addition, previous research has shown that positive intergenerational contact can reduce stereotypes that threaten older adults' social acceptance. (Abrams, Eller, & Bryant, 2006).

Types of Intergenerational Programs

There are four basic types of intergenerational programs: (1) the young serving older adults, (2) older adults serving the young, (3) older adults and the young serving together, (4) older adults and young the young sharing sites, such as childcare centers that exist within in senior living communities. The purposes of these programs can be: educational, social, service-oriented, and music oriented. Some intergenerational partnerships are informal, while others are well-established formal programs designed with a specific mission. The structure of an intergenerational program is most often dictated by the sponsoring agencies, though nearly all programs include a social component where the young and old spend time visiting. Young children may initially feel awkward or feel they have nothing to talk about with a person so much older; however, research has shown that with time, comfort and conversation increases (Belgrave & Darrow, 2010)

Music-based Intergenerational Groups

Music, of some style or genre, is an art form enjoyed by individuals of all ages; consequently, music is employed frequently in intergenerational programs. Music is found in all cultures, making it uniquely suited to bring diverse groups of individuals together (Darrow & Belgrave, 2008). The flexibility of music, in both sophistication and complexity, allows for younger and older generations to both participate in music-based intergenerational programs. Music is also an effective medium to meet the specific objectives of many intergenerational groups. Researchers have found that music, in all of its various forms, has the potential to increase psychosocial well-being, social interactions, and cognitive stimulation (Radocy &

Boyle, 1997). Finally, music is the great equalizer. When individuals make music together, it is difficult, and often impossible, to determine cognitive differences among the music makers.

Empirical research in music-based intergenerational programs have been conducted with older adults who live in residential programs and in the community, with younger participants including infants, elementary-age children, high school adolescents, and college-age young adults (Belgrave, 2011; Bowers, 1998; Darrow, Johnson, & Ollenberger, 1994; St. John, 2008). Music-based programs have combined community-dwelling older adults with high school adolescents and college-age young adults in intergenerational choirs that utilize the music of both generations. Older adults in community and retirement living facilities often participate in intergenerational music programs that include interventions such as instrument playing, singing, and moving to music, and academic and social skills training. Studies utilizing music-based intergenerational groups have shown a change in cross-age attitudes, an increase in children's willingness to interact with older adults, an increase in spontaneous nonverbal behaviors of older adults, and an improvement in orientation and level of alertness for older adults when interacting with children (Belgrave & Darrow, 2010; Bowers, 1998; Darrow, Belgrave, & Johnson, 2009; Darrow, Johnson, & Ollenberger, 1994; Giglio, 2006; Newman & Ward, 1992; St. John, 2008). These studies all highlight the need for evaluating the effectiveness of intergenerational programs. Determining the benefits of such programs empirically can help to promote these programs, and to solicit the funds needed to sustain them.

Evaluating Intergenerational Programs

Music researchers have utilized standardized and non-standardized assessments to measure attitudes, interactions, engagement levels, and well-being of younger and older persons involved in intergenerational programs (Bales, Eklund, & Siffin, 2000; Belgrave, 2011; Belgrave & Darrow, 2010; Bowers, 1998; Darrow, Johnson, & Ollenberger, 1994; Leitner, 1981). When choosing a standardized measure, one should select an instrument with high reliability and validity. Utilizing standardized measures allows practitioners to compare the result of their intergenerational program to other studies that used the same measures. Non-standardized measures can be created by the programmer or adapted from non-standardized measures created by other researchers. While developing one's own non-standardized measure may better capture the outcomes of the program; the practitioner may inadvertently create questions that are biased. Many outcomes such as attitudes and well-being are multifaceted; so one standardized or non-standardized measure may not fully capture all the benefits afforded to younger and older persons involved in an intergenerational program. Therefore, it is important to select a mix of standardized and non-standardized measures to evaluate the nonmusical outcomes of an intergenerational program.

Common Measures Used in Music-Based Intergenerational Programs

Some researchers have utilized the same attitudinal assessment measure for both generations (Belgrave & Darrow, 2010; Bowers, 1998; Darrow, Johnson, & Ollenberger, 1994), while other researchers have employed different assessment measures for each generation (Bales, Eklund, & Siffin, 2000; Belgrave, 2011). The *Age Group Evaluation and Description* (AGED) Inventory (Knox, Gekoski, & Kelly, 1995) has been used to measure cross-age attitudes of

younger and older persons involved in an intergenerational program (Belgrave & Darrow, 2010; Bowers, 1998; Darrow, Johnson, & Ollenberger, 1994). This attitudinal measure contains 28 pairs of bipolar adjectives rated on a 7-point Likert-type scale. The assessment consists of four subscales, two of which are evaluative—goodness and positiveness, and two of which are descriptive—vitality and maturity.

The semantic differential scale from the *Children's Attitudes Towards the Elderly* (*CATE*; Jantz, Seefeldt, Galper, & Serock, 1980) has been used to measure younger persons' attitudes towards older adults (Belgrave, 2011). This evaluative scale consists of 10 bi-polar adjectives rated on a 5-point Likert-type scale, with 1 being the most negative and 5 being the most positive. Scores of the adjectives are added together for a total score. Music researchers have developed measures that required intergenerational participants to describe the other generation. The responses were then analyzed to identify the frequency of positive and negative themes and words used to describe the other generation (Bales, Eklund, & Siffin, 2000; Belgrave & Darrow, 2010).

Cross-age interactions and engagement levels of older adult participants have been measured with the *Elder-Child Interaction Analysis* (*ECIA*; Newman & Onawola, 1989). This tool measures 32 verbal and nonverbal interactions between children and older adults during intergenerational programs. Due to the variety of behaviors identified in this assessment measure it is common for researchers to add or delete behaviors to meet the needs of the intergenerational group and setting (Angersbach & Jones-Foster, 1999; Giglio, 2006; Newman, Morris, & Streetman, 1999). Music researchers have also developed self-report assessments that examined the younger persons' willingness and comfort interacting with an older person. Self-report assessments have been collected through surveys which include questionnaires and statements answered with a Likert-type rating scale, as well as open ended questions in reflective journals that have been analyzed with a content analysis. Cross-age interactions and engagement levels have also been measured with researcher developed observational tools (Giglio, 2006; St. John, 2008; VanWeelden & Whipple, 2004).

Additionally, researchers have also measured older adults' psychosocial well-being when participating in intergenerational programs with the *Loyola Generativity Scale* (*LGS*; McAdams, de St. Aubin, & Logan, 1992) and the *Rosenberg Self-Esteem Scale* (Rosenberg, 1965). The *LGS* is a 20-item assessment that measures older adults' generative concern with another generation. Each statement is rated on a 4-point scale ranging from 0 (this statement never applies to the older adult) to 3 (this statement applies to the older adult very often or nearly always). The scores of each statement are added to create a total score. The *Rosenberg Self-Esteem Scale* contains 10 statements that measure older adults' self-esteem and self-worth. Each question is rated on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). The scores of each statement are added to create a total score.

As stated earlier, creating a music-based intergenerational program is a successful way to decrease the generation gap and improve cross-age attitudes, interactions, and well-being. It is recommended that music practitioners select appropriate evaluation measures as part of the planning and development stages when creating an intergenerational program. Once assessment measures are selected, practitioners should determine the frequency of use for the measure. For

instance an attitudinal measure may be used twice as a pre-post test to determine if cross-age attitudes changed as a result of participation in an intergenerational program. Whereas a tool that measures cross-age interactions may be used more frequently as on observational evaluation during each intergenerational meeting.

Additionally, it is also important to identify the delivery method for the evaluation process. Factors such as participants' chronological or functional age, change in sensory, cognitive, or fine motor systems, length of the evaluative tool, or the number of evaluative tools selected may influence the delivery method of the assessment measures. Practitioners may decide to deliver a long survey, or multiple surveys as an interview, rather than ask the younger or older participant to complete a 20-item survey or multiple surveys by hand. A volunteer could use an observational tool during each session; or sessions could be recorded and viewed at a later time by the practitioner.

While this article provided a selection of assessment measured used in music research, this body of literature is growing and the ways that intergenerational programming is evaluated should reflect that growth. In the future, there are other individuals such as facility staff, classroom teachers, professional collaborators, and family members that can be involved in the evaluation process, as these persons would provide a different perspective on the benefits of the program including but not limited to how younger and older persons were affected by the intergenerational music program. As the aging population grows, it is the hope of the authors that more music practitioners will continue to create a variety of music-based intergenerational programs, and implement evaluation assessments to identify non-musical and musical benefits for younger and older persons.

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The Concert Series for the Deaf and Radio Baton Project: Two Unique Music Projects With Applications for the Music Classroom

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The purpose of this paper is to describe two unique music projects developed for students who are deaf or hard of hearing. The Kean University Concert Series for the Deaf brought varied musical experiences, emphasizing the auditory, tactile, kinesthetic, and visual modalities, to children in New Jersey, Delaware, and New York. The purpose of the Radio Baton Project, an outgrowth of the concert series, was to determine if the radio baton could be used as a tool for improving the ability of students with hearing loss to maintain a steady beat. The researchers also sought to determine if the radio baton could (a) aid students in controlling performance tempo and (b) help them to perceive and gain an understanding of dynamics and pitch. Findings revealed that students were able to maintain a steady beat, but that they had difficulty with melody recognition, findings that reinforced previous research (Chen-Hafteck & Schraer-Joiner, 2011; Butler, 2004; Darrow, 1984; Jahns, 2001; Korduba, 1975; Oxenham, 2008; Rileigh & Odom, 1972). The two projects described herein had a great impact upon all who participated. They reinforce the importance of music for all children regardless of background and ability as well as the significance of a multimodal approach to music education.

Keywords*: deaf concert series, radio baton, multi-modal, steady beat, Animusic*

Introduction

For 161 years music has served as both a rehabilitative and teaching tool for the deaf and hard of hearing (Fay, 1893; Anderson, 1928; Featherstone, 1932; Darrow, 1987, 1989; Solomon, 1980; Prause 2003) For example, Turner and Bartlett (1848) not only advocated music for students with hearing loss but they greatly influenced current music teaching trends in deaf students' curricula (Darrow & Heller, 1985, p. 274). Sheldon (1997) who researched the instrumental music opportunities afforded the students at the Illinois School for the Deaf, found that those attending the concerts were impressed by the students' abilities. The aforementioned examples highlight not only the practice of incorporating music into the curriculum of students who are deaf or hard-of-hearing but also the misconceptions associated with deafness which still exist (Butler, 2004; Darrow, 1993; Graham, 1988; Hagedorn, 1994). While hearing loss can limit musical capacity, it does not mean that responses to musical stimuli are impossible. Researchers have found that children with hearing loss, whether unaided, or who use devices such as hearing aids or cochlear implants, can experience, respond to, and enjoy musical stimuli (Butler, 2004; Darrow, 1979, 1987, 1989, 1992, 1993; Gfeller, 2000; Gfeller, Witt, Spenser, Stordahl, &

Tomblin, 2000; Madsen & Mears, 1965; Schraer-Joiner & Chen-Hafteck, 2009; Solomon, 1980; Stordahl, 2002; Vongpaisal, Trehub, & Schellenberg, 2006; Vongpaisal, Trehub, Schellenberg, & Papsin, 2004; Yennari, 2010).

The purpose of this paper is to describe two unique music projects implemented between 2007-2012 for students Pre-Kindergarten-12 who are deaf or hard of hearing. The first was the Kean University Concert Series for the Deaf, the purpose of which was to bring varied musical experiences, emphasizing the auditory, tactile, kinesthetic, and visual modalities, to children with hearing loss in New Jersey, Delaware, and New York. The second, the Radio Baton Project, was a positive outgrowth of the concert series. The purpose of this project was to determine if the radio baton could be used as a successful tool for improving the ability of students with hearing loss to maintain a steady beat. The researchers also sought to determine if the radio baton could (a) aid students in controlling performance tempo and (b) help them to perceive and gain an understanding of dynamics and pitch. Encouraged by their results, the second year of collaboration included new research related to melodic recognition. The results of both projects will be presented as will practical teaching application including the ways in which teachers can replicate elements of each project.

The Concert Series for the Deaf

Participants

One hundred and fifty students, ranging in age from 3-21, from the five schools in New Jersey, Delaware, and New York participated in the Concert Series for the Deaf. A majority of the participants were severely or profoundly deafened. Severe losses, range from 71-90 dB and profound hearing losses are those of over 91 decibels. Students with such losses will typically receive little or no benefit from conventional hearing aids which only serve to amplify sound (Beiter & Brimacombe, 1993, p. 417).The listening devices utilized by participants included the cochlear implant (CI)and the bone anchored hearing aid (BAHA). The CI directly stimulates the remaining auditory nerve fibers of the inner ear while the BAHA allows sound to be conducted through the bone rather than via the middle ear - a process known as direct bone conduction. Data from the concerts were collected from observations of students' responsiveness to and engagement in musical activities. Each concert was videotaped so that Schraer-Joiner could thoroughly review concerts to ensure that all student responses were accurately documented. Concert surveys of the students, their teachers and administrators, as well as university student and faculty performers were administered both prior to and following each concert for further feedback.

Concert Development

The first concert in the series involved only the Kean University Percussion Ensemble but with each school visit we added more performances and performers from Kean University in order to provide the students with a greater range of musical opportunity. The addition of music education majors to the series allowed them the opportunities to teach and interact with the students from the school for the deaf. Thus, remaining concerts included a musical story; a radio baton performance of a composition created for a school for the deaf in southern New Jersey that

was based upon the hearing ranges of the students; and an instrument "petting zoo." Concerts were designed to accommodate the school's educational philosophy, musical interests, and ideas. This included curricular connections as well as the school's primary mode of communication (i.e. Total Communication, Cued Speech, Oral, Auditory Verbal). Appropriate tactile and visual aids were developed for each school so as to meet the needs of the Pre-Kindergarten -12 students.

The Percussion Ensemble

Percussion Ensemble performances highlighted bass drums, timpani, conga drums, drum set, and marimba because of the strong vibrations created by these instruments. During the inaugural concert observers noted the collective "ahh" from the audience when the ensemble began performing. As the performance progressed, one observer noted the students' enjoyment as evidenced by their swaying to the beat, while others patted their legs. Still other students were described as moving their arms in imitation of the conductor. Another observer marveled at the responses exclaiming, "They have music within them!" Schraer-Joiner sat on the floor with some of the Pre-Kindergarten students and modeled some of the ways in which they could better perceive the vibration - by putting their hands on the floor. Schraer-Joiner noted that "their delight was instantaneous - their eyes grew wide accompanied by huge smiles on their faces." Junior Music Education major Dale stated, "During the last song, some of the kids were really jamming to the beat. I think its great they got to see and participate in something they don't often get a chance to do."

During later concerts, the researchers intended to provide a more tactile experience for the students. For example, during the second concert the school allowed the researchers to give the students balloons to hold during the concert as a way to help promote the transmission of vibrations. The students responded by placing the balloons next to their ears or resting the balloons on their cheeks and foreheads. (It is important to note that this was not permitted at each school. In instances where balloons were not permitted students sat on wooden or tiled floors in order to promote vibration or were seated in closer proximity to the instruments and other music activities.)

Musical Stories

The purpose of the musical story was to enhance literature (stories, poems, nursery rhymes) by using instrument sounds to reinforce the characters, sounds, and action words presented within the story (Lee, 2006; Schraer-Joiner & Chen-Hafteck, 2009). The stories selected for the concert series were usually those directly related to school curriculum. One example, *Goldilocks and the Three Bears*, was selected for performance due to the students' familiarity with the story. The aforementioned fairy tale, as well as several others, was part of a story mural painted on the walls of the main hallway of the preschool. These murals were created specifically to generate discussion and questions amongst the children ultimately to develop their speech and language skills. The murals reinforced the philosophy and curriculum of the preschool program. For this particular retelling of the story, instruments were selected to represent each of the main characters. Additional instrument sounds were applied to "sound" and action words such as *ah* and *run*. The secondary purpose of the musical story was to offer

students opportunities to participate in the music making process and to provide college students with ample opportunities to interact with the children. Participating college students dressed and acted as the main characters and led the students who were deaf or hard-of-hearing in the playing of each instrument. All of the students were actively engaged in the story telling. Their facial expressions and body movements were indicators of their interest and enjoyment playing. One teacher of the deaf commented that "this opportunity for involvement was exactly what the children needed!"

The Radio Baton and the Dino Jungle Stomp

The composition, *Dino Jungle Stomp*, was created by Robert Rocco and based upon the limited hearing ranges of deaf and hard-of hearing students at a school for the deaf in southern New Jersey. He performed this piece on an instrument called a Radio Baton, a new technology that enables any person to 'conduct' music stored in a computer using two electronic batons, similar to the way a conductor leads an orchestra. This technological device was selected as it controls much lower and higher sounds than many acoustic musical instruments are capable of making and creates more intense vibrations.

Development and Background for the Dino Jungle Stomp

The radio baton controls a 10.5 octave range of acoustic material. As a result, Rocco wanted to research how the deaf might respond to much higher and lower sounds and vibrations than are normally produced via acoustic instruments. He wrote several radio baton programs that cycled individual general midi preset pitches through all 10.5 octaves, documenting each preset's effects in low, mid, high, and full ranges. Rocco tested all 128 general midi presets this way, and identified 24 that he thought were the best in terms of vibrations produced and other effects to which the deaf population might respond. Rocco then brought the radio baton to a school for the deaf in southern New Jersey for further work on the composition. Together with Schraer-Joiner, Rocco worked with a small group of young students with severe to profound hearing losses. Several were implanted with the cochlear prosthesis and/or used a hearing aid. One child had *Atresia* of the left ear (i.e. no left ear canal, a malformation of the ossicles of the middle ear as well as malrotated inner ear structures) but normal hearing in the right ear.

Schraer-Joiner and Rocco individually tested each of the 24 presets through all octaves, taking careful note of which presets the children responded to. As Rocco played the pitch sequences, Schraer-Joiner observed their responsiveness to the pitches played. Because the children were prelingually deafened, having lost their hearing prior to the acquisition of spoken language, Schraer-Joiner observed their non-verbal responses to the pitches presented. Specific behaviors observed included alertness (ie. looking at radio baton at a specific times) facial expressions, changes in body position (i.e. moving closer to the device), and gestures such as covering ears, clapping or patting. Schraer-Joiner and Rocco were greatly encouraged by the children's reaction to the radio baton which exceeded all expectations. A profoundly deafened adult later listened to the pitch sequences in order to confirm results.

Schraer-Joiner and Rocco were able to narrow the sounds down to those they responded to best. Nine general midi presets were selected for the sound palette that Rocco would use to

compose a song for the deaf. Rocco then composed a two-page thematic sketch of several rhythmic patterns and melodic motives using traditional notation. The main goal of the *Dino Jungle Stomp* was to teach the deaf about keeping a steady beat. The one minute composition used only the nine-presets selected specifically for the deaf population to create heavy bass vibrations for a strong steady beat, along with accompanying animal-like preset sounds (dinosaurs) in the treble registers.

Rocco programmed the radio baton to use Baton 1 for creating a beat anywhere on the antenna surface, and Baton 2 for volume. This enabled the children to easily understand how to perform the piece. At this point, Rocco pursued putting the music to animation so that the students would have visual clues to assist them in keeping a steady beat. With cooperation from the Kean University film department, a silent animated film was created to align with Rocco's audio. The film was silent since the children would be playing the audio part on the radio baton as they watched the dinosaurs stomping (i.e. matching their baton motions to the beat of the dinosaurs for synchronization.)

The inaugural performance of the *Dino Jungle Stomp,* the second concert in our series, was successful. Following the performance, Rocco offered several of the students the opportunity to experience the radio baton first hand. The obvious enjoyment of the students and teachers was evident as every hand went in the air when Rocco asked for volunteers. Many students took turns trying to match the dinosaurs' movements on screen with their own audio performance on the radio baton. One little girl at the School for the Deaf emulated Rocco's performance perfectly, keeping a steady beat throughout. The performance seemed to bring her great joy as her hand was the first in the air when volunteers were requested. Also notable was the huge smile which never left this little girl's face throughout her entire experience with the radio baton. The third concert featured the animated version of the *Dino Jungle Stomp*. Rocco and Schraer-Joiner observed that the children were consistently able to synchronize to a steady beat more quickly when they had visual clues from the animated film compared to audio input alone.

Instrument Petting Zoos

Each concert concluded with an instrument "petting zoo" to provide the students who were deaf or hard-of-hearing with opportunities to play the various instruments presented. The petting zoos also offered the performers opportunities to model for the students and aid them as they played the percussion instruments. For many this was a first time experience. For example, one little girl thanked the Percussion Ensemble director stating that she had always wanted to play the drums, but until that day had never had the opportunity to do so. Following the experience, Kean music education student James exclaimed "What an experience!" "The petting zoo after the concert was quite touching. I know I walked out of there a little choked up."

Discussion: Concert Impact

For the music education majors who performed at the schools for the deaf, the concerts reinforced the importance of music for all children regardless of background or ability. Also

reinforced was the fact that there are many ways to perceive and experience music if children are only given the chance to do so. Post Baccalaureate music education student Kenny stated “What had an impact on me was my experience working with the children after the performance. I found that the children were able to play various percussion instruments imitating rhythms and some simple drum patterns. This showed me the possibility of music in the life of someone who is not disabled, but "differently abled” than those of us who take the gift of hearing for granted.” Junior music education major Robyn said of her overall experience, “As a whole, I felt that this visit was exciting and beneficial to the students of the school because we expanded their experiences. I also feel that I’ve benefited from this experience because I’ve never worked with deaf students or an interpreter before which was a little difficult at first.”

Teacher responses revealed that they were pleased with the concert experience, overall. One teacher stated “my students were hooked from the beginning of the program.” Another commented that the story-telling portion, which included the students and required them to follow directions and participate, was excellent.” Teachers also provided us with constructive criticism including recommendations for preferred concert group size and age as well as musical story suggestions. One school principal informed Schraer-Joiner of a conversation she had with two students during the concert. One student said to her “It feels as though dinosaurs are walking across the stage!" His friend then signed "The water in my bottle is moving!" The principal told me she was excited by their observations and told them “The vibrations from the instruments are creating the movement.” She said the boys were both obviously amazed that the instruments could have such an impact on the water. The principal also told Schraer-Joiner that it was the first concert either boy had ever attended.

Student survey responses reinforced their overall enjoyment of all elements of the concert. Student comments included “I liked the vibrations and sounds;” “I liked the way they played the instruments;” and “I liked the video presentation, that was my favorite part.” Other statements included “I like to play the drums, “I want to learn about drums, and “Loved it!” Some students were not as happy about some of the concert elements and responded “too long;” “boring;” and “too loud.” This ongoing feedback helped the researcher and concert performers to make ongoing improvements to subsequent concerts.

The Radio Baton Project 2010-2012

Procedure

Ten students, ages 11-13, participated in the radio baton project. Nine of the participants had sensorineural hearing loss ranging from mild to profound. Four participants wore hearing aids, two used a cochlear implant, and three used a cochlear implant as well as a hearing aid in the contra lateral ear. One student had normal hearing but had oral and verbal Apraxia. Other classifications within the group included learning disabilities, Sensory Integration Dysfunction, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder, and mild Cerebral Palsy. Academically, the students were several grades behind and all were described as multi-sensory learners by their music teacher. Butler selected this class to participate in the project because of their love for music. To facilitate communication with the class, Butler interpreted Rocco’s spoken word into sign language, and voice-interpreted for those children

who communicated via sign language.

A majority of the participants had been involved in Butler's music class since kindergarten age, and while their hearing loss certainly affected their perception and understanding of music, the participants always maintained a positive attitude towards their music class. To increase their perception of the music, participants were encouraged to place their hands on the speakers to feel the vibrations of the sounds. Data for the radio baton project were gleaned from field notes collected by the classroom music teacher (Butler) and the visiting music teacher/performer (Rocco). Observations from independent reviewers (paraprofessionals who attended each session) were also collected, as were student reflections.

Using the Radio Baton in the Music Classroom

Improvisation Activity

The project began with improvisation to allow the students opportunities to experiment and become acclimated to the radio baton. The instrument's improvisational mode was implemented to teach the students how to hold the batons correctly as well as to familiarize them with the functions of each (i.e. *Baton 1* controlled the tempo and *Baton 2* controlled both the volume and frequencies produced). In this mode, they moved the batons randomly over the surface of the antenna board to produce a variety of sounds.

Butler and Rocco realized immediately that the students enjoyed this activity as evidenced by how quickly they learned to hold and use the batons. As a result, it became the opening activity for the remaining sessions. During one lesson, Rocco noticed that one of the students was moving the batons in a unique way. When Rocco asked why she was moving them in that manner, she looked up and happily explained that she was tracing the letters of her name to hear what it sounded like. Afterwards Rocco noted, "One of the pleasant things about research is that you learn things you never intended to."

The students also enjoyed learning about dynamics and being able to control the dynamics while they improvised. Butler and Rocco observed similar interest during activities that featured the concepts of tempo and pitch/frequencies (high/low). The improvisation mode also proved to be useful for the introduction of musical timbre. During such timbre activities, the students improvised in pairs, with each holding a baton. As the students performed, another student was tasked with changing the sound coming from the synthesizer by incrementing or decrementing the preset button.

Animusic Activity: Accompanying Musical Animations

The success of *Dino Jungle Stomp* led Rocco to contact *Animusic*, a recognized leader in state-of-the-art musical animation. *Animusic* was intrigued by Rocco's proposed project and generously donated both of their production DVDs. Butler and Rocco implemented the videos in order to help students progress in their ability to maintain a steady beat.

The students viewed the videos and were asked to select the four that they wanted to accompany using the radio baton. According to Rocco, the students were not shy about indicating their preferences and feelings when selecting their favorite tracks from the *Animusic* videos. Two from the first DVD entitled *Animusic* were selected ("Aquaharp" and "Harmonic Voltage") while the remaining two were selected from the second DVD entitled *Animusic 2* ("Pogo Sticks" and "Fiber Bundles"). It should be noted that some of the *Animusic* videos had very clear images of a steady beat while others did not. For example, some had music with tempo changes or ritardandos that interrupted the steadiness of the beat. Of the four videos selected by the students, only "Fiber Bundles" could not be programmed to teach steady beat. As a result, Butler and Rocco decided that the students would accompany the video using the radio baton's improvisation mode (i.e. interacting with the video by changing presets, frequency, dynamics, and timbres.)

For the three *Animusic* videos that did contain steady beat visuals, Rocco composed a supplemental percussive track in rhythmic notation, similar to a traditional bass line. All music notation for the videos were proprietary so Rocco listened to the music to determine the correct pitches and to identify each harmonic change. He then programmed the radio baton to create the supplemental percussive track. This enabled the students to play the radio baton synchronously as they watched the *Animusic* video.

The students informed Butler and Rocco that they were able to perceive changes in pitch, dynamics, and timbre as they moved the batons. Rocco noted how excited the students' were to report what they were able to perceive. Students' continued enjoyment of playing the radio baton to accompany the selected tracks was observed during the remaining sessions. One student who made an emotional connection to two of the tracks remarked that they made him feel sad.

Overall, the striking visual element of the videos was highly motivating for the students as evidenced by their excitement and enthusiasm in the selection process as well as by the emotional connections made by one student. Furthermore, when the beat and rhythms were easy to see, the students with severe or profound hearing losses were better able to move to the beat. In later sessions, observers noted students' overall improved abilities to maintain a steady beat.

The paraprofessionals who worked with the students during each radio baton project session remarked on the students' level of engagement and apparent motivation which they attributed to the pleasing visuals and sounds in the videos and music tracks. One paraprofessional observed that the student with a profound hearing loss responded physically by moving in time to the music when watching the video. Overall, the paraprofessionals noted the positive reactions of the students to this part of the radio baton project. One paraprofessional commented that the students seemed better able to fully experience and enjoy the music as a result of the combined efforts of the radio baton and the *Animusic* videos.

Grand American Tapestry Activity: Learning About American Music

Rocco composed *Tapestry* [1](2007) researching over 250 American folk songs for

[1] Tapestry was preceded by Rocco's Grand American Rhapsody both of which were written for the inventor of the radio Baton, Max Matthews.

incorporation into the piece. He then organized them into three historically related periods: pre-civil war, civil war, and post civil war. A total of sixteen song quotes were included in the first movement of *Tapestry*, all from the pre-civil war era. As a result of this, Rocco thought *Tapestry* might have educational applications for teaching the deaf about melody. Butler agreed, and indicated that the thematic material of the American folk songs comprising *Tapestry* also allowed for cross curricular connections to subjects such as history.

In preparation for the introduction of the *Tapestry*, Butler focused on the patriotic songs woven into the piece. This also provided her with the opportunity to reinforce students' understanding of United States history. The songs Butler emphasized in her preliminary lessons included the "Star Spangled Banner" and "America."

Tapestry lessons began with a focus on the "Star Spangled Banner." In order to determine if the students had previous experience or exposure to the melody, Butler first played it on the keyboard. One student responded by asking "Is that the flag song?" To help them understand the history of the song, Butler showed the captioned video "The Star-Spangled Banner" obtained through the Described and Captioned Media Program (DCMP.) After watching the story and listening to the verses, students began learning to sign the song. They also watched signed (American Sign Language or ASL) performances of the song on YouTube. During each *Tapestry* lesson, the students signed and/or sang "The Star Spangled Banner." To further reinforce the melody, Butler also periodically played the song on the keyboard without lyrics.

"America" was introduced later and in a manner similar to that of the "Star Spangled Banner" though when Butler introduced the song on the keyboard at first, none of the students were able to identify it. Students also learned to sign and/or sing the America while also continuing to review the "Star Spangled Banner." In subsequent weeks, students were not able to identify either song individually nor were they able to distinguish between the two. Additional approaches implemented to help the students identify the differences between the two included projecting both songs onto the whiteboard and providing visual cues to the participants. Butler indicated that this approach seemed to help as one student indicated that she was able to perceive that there were differences between the two songs.

The fact that the students were unable to recognize "America" and the "Star Spangled Banner" when presented in their entirety but separately from *Tapestry*, did not negatively impact their enjoyment of the performance of *Tapestry*. On the contrary, Butler observed that the participants were obviously moved by it. One student said, "It felt like a prayer" and was moved to tears.

Although they didn't realize that portions of the "Star Spangled Banner" and "America" were present, they gleaned enjoyment from listening and watching the live performance on the radio baton. Some students expressed amazement that Rocco had created the composition, and others seemed intrigued by how he conducted *Tapestry* with the radio baton. According to Butler, participants' inability to recognize and distinguish between "America" and the "Star Spangled Banner" may be due to several factors such as the nature and degree of hearing loss, limited experience and exposure to the songs, as well as issues with the teaching schedule.

The degree of hearing loss does affect pitch discrimination, the detection of sound, as well as melodic recognition. The amount of exposure time the students had to the songs must also be considered. Unlike hearing children who may learn songs without even realizing it, through television, radio, and other media, students with a hearing loss typically do not have full access to these audio sources. While their hearing peers might recognize these tunes from sporting events, patriotic assemblies and the like, the time constraints of an hour long music class per week was not enough for these students to learn to recognize the songs. Changes in the school calendar (e.g. snow days, special assemblies, field trips, etc.) occurring within the time frame of the project may have also been a factor as there was a lack of continuity necessary for growth in this skill. Therefore, the likelihood of success might have improved particularly for participants who potentially could perceive the differences, had they had more time for repeated listening of both "The Star Spangled Banner" and "America." One potential solution to this would be to involve the classroom teacher. Cross curricular connections would allow for a greater study of the time period and subsequently greater exposure to the songs. The researchers intend to continue their *Tapestry* research implementing a schedule that will allow for more time and the continuity necessary in order to develop new strategies and approaches for teaching melody to children with hearing loss.

Practical Applications for Music Teachers

Many of the music activities presented within this paper can be replicated by involving local ensembles and the materials teachers use in their general music classrooms. Considering the components of the concert series for the deaf, music teachers can invite local percussion ensembles or high school groups to perform for their general music students. Orff and percussion activities can also be performed within the general music classroom in small groups so that students can rotate and serve as both performers and audience members. This approach will allow them to both enjoy and experience the performance. Music teachers can also do rhythmic call and response activities in the general music classroom. This can be done by creating a dialogue with two hand-drums. In instances where instrument playing is not possible, music teachers can substitute a movement activity (spinning, rocking, clapping, patchen, jumping). In either case, students and teachers can alternate serving as the musical leader.

Petting zoos can also be accomplished when the local percussion ensembles or high school groups perform. Exploration of various instruments can and should also be part of the general music classroom routine – preferably using those instruments that promote vibration. Musical stories provide many opportunities for creating, performing, listening, and evaluating. They also promote opportunities for multidisciplinary involvement such as collaborating with classroom teachers on literature being studied in other subject areas. This approach can bring about a greater appreciation of stories or poems while also providing students with opportunities for a creative retelling by identifying key words and concepts and enhancing them with vocal and/or instrumental sounds.

Considering the activities included in the radio baton project, two versions of the *Dino Jungle Stomp* videos are available online at http://bobrocco.com/music_for_deaf_children. The first is a silent one-minute version while the second is a 25 second demo with sound. In either instance, a child can keep a steady beat with a variety of instruments particularly those that

transmit strong vibrations such as hand drums that the children can hold or larger bongo or conga drums that students can stand close to while they play. Bass drums would also work in this capacity. The music teacher might also pick a simple song to play on the piano along with the silent video as the students place their hands on the piano.

The *Animusic* videos are commercially available in retail stores or online at http://www.animusic.com/. Some are even available on YouTube. Instead of conducting the score using a radio baton, students can conduct (or use some other bodily movement) in synchronization with the video or along with the music teacher who might keep a steady beat on a drum or other percussive instrument to synchronize with the steady beat of the videos.

A video of *Tapestry* is under development and will be available online at http://bobrocco.com/music_for_deaf_children. Rocco has also prepared program notes, included at the end of this paper, to aid in the development of cross curricular connections to US History. For many US States, *Tapestry* ties in with the Social Studies curriculum of the upper elementary grades or middle school.

The two projects described herein had a great impact upon all who participated. They both reinforced the importance of music for all children regardless of background and ability as well as the significance of a multimodal approach to music education. Children have the potential to develop their musical skills and to create and express themselves musically if they are provided with the opportunities that meet their individual needs.

Tapestry Program Notes

1. Oh! Susanna: Stephen Foster wrote the original lyrics in 1847. During the California gold rush it was set to new lyrics and became known as the '49ers theme song'. The tune was based on a Scottish marching song whose melody could be easily carried on the chanter of the bagpipes. Though it appears first in the Tapestry, it was the last to be written of all of the songs in this pre-civil war period.

2. Yankee Doodle: A British Army surgeon named Dr. Richard Schuckburg was reportedly credited with writing the tune in the early 1750s during the French and Indian war. Some scholars believe it is a variant of the nursery rhyme Lucy Locket. The song gained much popularity with the colonials who created their own versions and lyrics, many of which made fun of themselves and even their own officers, including General George Washington. It is believed that when Cornwallis surrendered at Yorktown, the Americans played Yankee Doodle, and the song remains a standard in the American folk tradition to this day.

3. Free America: The lyrics were written by one of the original minutemen, Dr. Joseph Warren, the man who sent Paul Revere to Lexington to warn John Hancock that the British were coming. He set the words to the English song "British Grenadiers" whose exact origin is unknown, though it is believed the original verse could not predate 1678 since that is when the regiment was created. Some sources place the original tune as far back as the Elizabethan era, but the current words and music were found on a British Grenadiers 18th century manuscript.

4. Yankee Whalermen: This tune was based on the old Naval song called "Spanish Ladies." According to the Oxford book of Sea Songs the earliest known reference is from 1796, and the tune was a capstan shanty (sung while raising the anchor as the capstan was turned). The tune was sung in the Movie Jaws by the character who played the captain of the fishing boat.

5. Amazing Grace: Widely considered to be the most popular hymn in the English language, it appeared as early as 1829 in the "Baptist Songster" by R. Winchell. The words were written around 1772 by John Newton. The original tune is believed to be Scottish or Irish in origin. The hymn was very popular during the Civil War, with both sides. It was frequently sung by the Cherokee in lieu of giving their dead a full burial while on the 'trail of tears' (the forced relocation of the five civilized tribes from the southern United States to the West) and has sometimes been called the Cherokee National Anthem.

6. Star Spangled Banner: The melody was first published around 1780 as "To Anacreon in Heaven" and is believed to be from the British composer John Stafford Smith. The words were penned by Ralph Tomlinson. Both men were members of the Anacreontic Club of London, a wealthy group of men, and this was their theme song. The melody became popular in America, especially around the time of the War of 1812, and several Americans wrote patriotic lyrics to the tune, including Francis Scott Key, a lawyer, who while aboard an American ship witnessed the bombardment of Fort McHenry. When the bombardment was over he saw the flag was still there and wrote a poem, 'The Defense of Fort McHenry". The words were then set to the tune "To Anacreon in Heaven" and published in 1815, with the new name of 'The Star Spangled Banner'. The song was adopted first by both the Army and Navy as the National Anthem, and in 1931 by an Act of Congress became the official National Anthem.

7. The Girl I Left Behind Me: This tune has quite a history of folklore associated with it, the actual origins being placed at various periods/places by different sources. It is possible the original tune dates back to the Elizabethan era. It became known in America around 1650 as a traditional fife tune, imported from England as "Britain Camp'. It was especially popular during the Revolutionary War period.

8. Billy Boy: The earliest printed version of the tune was "Lord Ronald, my Son" printed in 1787, and is thought to have been based on an Italian ballad of the 1600s. The tune as we know it today probably originated in the 1800s from England and was called 'Willie Lad' and 'Charming William'.

9. Long Long Ago: Written in 1833 by Thomas Haynes Bayly, this song became widely known and was the most popular song in America in 1843.

10. Over the River and Through the Woods: Originally published in 1844, this was written by Lydia Maria Child, one of the earliest American women to make a living from her writing. It relates her childhood memories of visiting her grandmother's house and remains popular today, especially around Thanksgiving.

[11.] America: This tune is also known as 'God save the King' and is based on an English air. The words we know today were written by Samuel Francis Smith on July 4th, 1832, and the tune remains one of the most popular patriotic songs in America.

[12.] Arkansas Traveler: This tune has been credited by some to Colonel Sandford C. Faulkner, a prominent figure in Arkansas, who in 1840 came upon a mountain fiddler while traveling in Pope County, Arkansas. The song was printed in New York circa 1850 and became part of a hit play of the period. A later reprint in "The Arkansas Traveler's Songster" credited Mose Case as both author and composer.

[13.] Buffalo Gals: Scholars have suggested various originations, from Germany to England, for this tune which became popular in pre-civil war minstrel shows throughout the United States. It was published in America in 1844 with the title 'Lubly Fan,' written by John Hodges. The name in the title changed to reflect the location of the performances. In other words, Buffalo referred to the city, not the animal.

[14.] Turkey in the Straw: Very popular during Andrew Jackson's presidency, this tune traces its origins to an Irish ballad called "The Old Rose Tree'. In America, it was popular as a fiddle tune and one of the earliest American minstrel songs. It was published along with words in 1834 as 'Old Zip Coon'.

[15.] Polly Wolly Doodle: Daniel Decatur Emmett and the Virginia Minstrels played this tune in the 1840s. The exact origins of the song are unknown, though it has been thought to be a song sung in the south by slaves. It has remained a popular traditional children's song.

[16.] Marine's Hymn: This tune derives from a song in Jacques Offenbach's comic opera "Genevieve de Brabant", called "Two men in the Army." The lyrics were composed by a Marine circa 1847 while stationed in Mexico, and were originally sung to a traditional Spanish folk song. After the debut of Offenbach's opera at the Metropolitan Opera House in 1868, marines began singing the lyrics to 'Two men in the Army'. The Unites States Marine Corps made the song their theme in 1920.

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