The Effects of Structured Musical Activity Sessions on the Development of a Child with Autism Spectrum Disorder: A Case Study

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Abstract

This case study sought to discover the effects of structured music activity sessions on eye contact and communication skills of Hunter; a six year old, high functioning child with autism. The research design consisted of two baseline observations in music class, six biweekly home activity sessions concurrent with three weekly music class observations, and two final music class observations. Activity sessions lasted approximately thirty minutes, and consisted of seven different activities, which were designed to increase joint attention through verbal, emotional, and social communication skills, as well as eye contact.

Sessions were video recorded, and data analysis showed that Hunter's eye contact increased from 76% in the first session to a high of 91% by the fifth activity session. Eye contact during the dedicated discussion activities increased from 21% in the first session to 46% by the sixth session. Observations and parent/teacher questionnaires revealed that he demonstrated higher levels of social functioning and both emotional and musical expression (including improvisation) following activity sessions. Hunter transferred verbal communication, facial gestures and social cues from his sessions to music classes. In his concert following the fifth session, Hunter made contextually appropriate verbal improvisations and improved singing and movement synchronisation with the music.

Keywords: autism; music; eye contact; communication; improvisation; joint attention

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Review of literature

In addition to planning and providing lessons and sessions, music teachers and therapists' jobs entail a vast knowledge of individual students and anticipated accommodations. Their skills include the incorporation of efficient modifications, which must take place when informal and formal observations and assessments deem it necessary. Because students are so diverse and music sessions must be flexible, teachers and therapists must

continue their preparation to identify, plan, and execute music activities that can be accessible and successful for different types of students.

Music activities can be extremely beneficial for people with special needs, many of whom often struggle with communication skills. Music's therapeutic qualities are utilised in the allied health profession of music therapy, where attempts are made to improve a person's physical, psychological, cognitive, and social functioning. Music therapy, as provided by a licensed music therapist, has become accepted practice for working with a variety of special needs students, and investigations on the relationship among music, communication skills, and autism have become increasingly prevalent (Aldridge, Gustorff & Neugebauer 1995; Barrow-Moore 2007; Bellini et al. 2007; Boso et al. 2007; Buday 1995; Edgerton 1994; Finnigan & Starr 2010; Havlat 2006; Holck 2004, 2011; Hoskins 1988; Kim, Wigram & Gold 2008; Lima & Castro 2012; Nelson, Anderson & Gonzales 1984; Starr & Zenker 1998; Staum 2006; Wan et al. 2010; Woodward 2004). As these studies indicate, music therapy concepts and techniques can be transferred and used in interactions by other personnel, such as researchers, teachers, and parents.

This case study sought to discover the effects of music therapy-inspired activity sessions on a child with autism spectrum disorder. As such, the article gives first insight into autism, music therapy research and techniques, followed by the participants' profile, procedure, data collection and analysis, results, and discussion.

Autism

Autism is a lifelong developmental disability, and is known as a spectrum disorder since each person diagnosed is unique with regard to the range of conditions, combinations, and challenges that they have. It is further complicated by the differentiated abilities that a person may exhibit from day to day. Therefore, it is often difficult to generalise about traits or effective therapies (Autism Spectrum Disorder Foundation 2012). What all children with autism do have in common is difficulty with verbal, emotional, and social aspects of communication (Dempsey & Foreman 2001; American Psychiatric Association 2000; Ely & Rashkin 2005; Kanner 1943; Lima & Castro 2012; Moreno & O'Neal 1991; Nelson, Anderson & Gonzales 1984; Wan et al. 2010). These attributes have been linked to the putative human mirror neuron system (MNS), which contains neurons that govern the ability to self-monitor and respond to others (Wan et al. 2010).

Social interaction is often manifested in what is termed 'joint attention', or the shared focus of attention. Vaiouli and Schertz (2012: 1044) define this as "the ability to use signals and a cluster of pre-symbolic communication actions in order to direct another's attention to interesting objects and events for the purpose of sharing them with a partner".

Persons with autism may lack joint attention and miss social cues due to an atypical 'theory of mind'. When theory of mind development is typical, it allows people to read others' minds, understand cues, and predict behaviour (Lantz 2002). Nelson, Anderson and Gonzales (1984: 116) state that children with autism exhibit "exceptional inability to relate to others; mutism or atypical language; insistence on maintaining sameness in the environment; rigidly stereotyped play with small objects, lack of imagination and playfulness". Dempsey and Foreman (2001: 104) further describe, "[d]eficits in social interaction, language, play and deficits in behavior causing self-stimulatory behavior and/or perseverance with a narrow range of routines or interests". Moreno and O'Neal (1991: para. 4) suggest that any perceived insensitivity or misbehaviour on the part of a child with autism "is the result of efforts to survive experiences which may be confusing, disorienting, or frightening".

Like other social cues, eye contact, in particular, is difficult for children with autism to understand and implement. The child is often dealing with hyperirritable attention, which causes him/her to react and understand social skills like eye contact differently than other children (Ely & Rashkin 2005).

Knowledge of autism and its inherent challenges for communication is crucial as it is the fastest growing developmental disorder in the USA. The latest large-scale data indicates that autism affects one in 110 children (Rice 2009). Recent international statistics align with the approximately 1% prevalence in the United States, with one reported South Korean estimate at 2.6% (Center for Disease Control and Prevention 2012).

Music therapy research

Halgin and Whitbourne (2003) state that a majority of researchers agree that treatment plans seem to be the most successful when working with children with autism. Boso et al. (2007) investigated the effects of a musical training program based on interactive music therapy sessions. Eight young adults with severe autism participated in 52 weekly activity sessions made up of singing, playing keyboard, and drumming. Data indicated that music therapy sessions could significantly improve the social impairments and musical skills in young adults with severe autism. Studies have described music therapy plans that were successful in

improving memory (Buday 1995), and language (Hoskins 1988; Staum 2006). Other research has shown music therapy treatments that enhanced verbal skills and eye contact (Barrow-Moore 2007; Havlat 2006, Wan et al. 2010). In a study of five children with severe autism, Havlat (2006) compared using a music therapy approach to a more traditional intervention model, like special education or behaviour management. In reviewing the communication and communicative intent of the children, she found that all of the students increased eye contact, nonverbal communication, and verbal output with the music therapy model. Barrow-Moore (2007) also compared using music during instruction to using a traditional approach without music, and found that using music enhanced speech, turn taking, and eye contact for some students.

Researchers have also found that music therapy approaches can enhance the social and emotional aspects and joint attention necessary for communication (Bellini et al. 2007; Boso et al. 2007; Finnigan & Starr 2010; Holck 2004; Holck 2011; Kim, Wigram & Gold 2008). Finnigan and Starr (2010) noted that when music was incorporated with instruction, there were fewer instances of avoidance behaviour and more social responsiveness among a preschool child with autism. Holck (2011) states that music therapy increases both verbal and nonverbal communication in children with autism, and adds that it can have a significant effect on joint attention skills in children that are ages three to six. In comparison with a control group, children experienced more and longer instances of "joy and emotional synchronicity with the music therapist, as well as spontaneously initiating engagement with the therapist" (Holck 2011: 27).

Music therapy techniques

The Autism Spectrum Disorder Foundation (2012) still maintains that Applied Behaviour Analysis (ABA) can reinforce desired social behaviours through intensive, one-on-one interaction. Among the types of intervention recommended are "interpersonal synchrony", which focuses on social development and imitation skills through communication and play. Bellini et al. (2007) describe interventions that focus on the child's turn taking, eye contact, and face-to-face engagement as a way of developing joint attention. Improvisational music therapy sessions, in particular, have proven effective in increasing communication, and social engagement in children with autism (Aldridge, Gustorff & Neugebauer 1995; Edgerton 1994; Holck 2004; Kim, Wigram & Gold 2008; Lima & Castro 2012; Staum 2006; Starr & Zenker 1998; Woodward 2004). This may be because "autistic children evidence unusual sensitivities to music. Some have perfect pitch, while many have been noted to play instruments with exceptional musicality" (Staum 2006: 2). Starr and Zenker (1998: 1) state that children with autism "respond more frequently and appropriately to music than any other auditory stimulus". Therefore, playing instruments in a structured game format may promote positive social interaction, and activities that focus attention around the facial area may help establish eye contact (Staum 2006). Edgerton (1994) and Aldridge, Gustorff and Neugebauer (1995) believe that improvisational music therapy allows musical and social skills to be generalised to other contexts within the individual's lives.

Studies using music therapy approaches suggest that call and response games, turn taking, and imitation naturally require eye contact, joint attention, and verbal communication. For instance, imitation and echo patterns on instruments require eye contact. Once established, eye contact may be transferred, over time, to eye contact in various types of communicative scenarios. For those persons with autism who also exhibit musical tendencies, the incorporation of improvisation may act as another factor that increases the joint attention necessary for communication.

While there are some commonalities among children with autism, their musical and communicative abilities vary; therefore, this research was designed as a case study to examine the results of structured musical activity sessions on the development of a six year old, high-functioning child with autism. Researchers sought to discover if music activity sessions, inspired by music therapy approaches, could create a higher level of social functioning with regard to eye contact and communication.

Hunter's profile

This case study examined 'Hunter', a six year old, high-functioning child with autism. Like many other children with autism, Hunter's mind cannot filter out the less important elements of life. As he sits in classes and other environments, he cannot relegate to the background the murmur of other muted conversations, the hum of the air-conditioning unit, and numerous other sights, smells, sounds, textures, and even tastes that fill our world. Every sensation, sound, smell, touch, taste, and sight commands an equal part of his attention.

He creates order through an obsession mechanism common to children with autism. Hunter's individual obsession is with numbers, and he frequently watches clocks and other devices that organise time. When listening to a CD, Hunter will not remember the name of the song, but he will

remember the track number, how many verses there were, and the exact length of the song in minutes and seconds. Since the age of three he has been able to add triple digit numbers in his head, and has been deeply attached to his calculator.

Hunter sometimes experiences problems responding to questions, especially unfamiliar ones. When confronted with new language, he can exhibit patterns of echolalia, repeating whatever was said to him. He also misunderstands pronouns. Because most questions addressed to Hunter began with "you" (i.e. *Do you want to play ball?*), he has misunderstood the word "you" to always mean him. Hunter does not automatically maintain eye contact or even look in the general direction of someone who is speaking to him or to whom he is speaking. Eye contact and communication through focused joint attention are his main challenges.

Procedure

This case study was granted approval by an Institutional Review Board of a university, and Hunter's parents gave written permission for his research participation. Much of Hunter's information was obtained through an initial interview with his parents and surveys given to his parents and music teacher. These interviews and surveys, along with Hunter's Individualised Education Plan (IEP), served to provide information about his current social skills and needed areas of improvement. Consistency among all of this information provided data triangulation. Both researchers collaborated to design Hunter's case study, which began with two weekly baseline observations. This was followed with biweekly music activity sessions happening concurrently with weekly observations in weeks three, four, and five. There were also two final observations ocurring in the sixth and ninth weeks of the plan (Table 1). Although not part of the original design, a class concert, given after Hunter's fifth activity session, was used for additional observation.

All observations were made during Hunters' public school music classes, which lasted 40 minutes each. All activity sessions were done in Hunter's home and lasted approximately 30 minutes. Because the design was centred on joint

Week	Time	Event	Focus during activity sessions
Week 1	40 minutes	music classroom observation	record baseline behaviour
Week 2	40 minutes	music classroom observation	record baseline behaviour
Week 3	30 minutes	music activity session #1	social skill development
	40 minutes	music classroom observation	record notes on behaviour
	30 minutes	music activity session #2	social skill development
Week 4	30 minutes	music activity session #3	social skill development
	40 minutes	one classroom observation	record notes on behaviour
	30 minutes	music activity session #4	social skill development
Week 5	30 minutes	music activity session #5	social skill development
	40 minutes	one classroom observation	record notes on behaviour
	30 minutes	music class concert	record notes on behaviour
Week 6	40 minutes	one classroom observation	record notes on behaviour
Week 9	40 minutes	music classroom observation	record notes on behaviour

Table 1: Chronological research design

attention and social skill development, the researchers determined that only one investigator should carry out these classroom observations and music activity sessions. The activity sessions, however, were video recorded so that both researchers could watch and take notes, as well as record data.

The first set of observations occurred once a week for two consecutive weeks, and established a baseline for social and musical behaviour. During this time, there was no direct contact with Hunter. From there, an 'activity analysis' was created, detailing the component parts of the session and the time spent on each. The activity sessions included

two sessions over the following three weeks, resulting in a total of six sessions.

Each activity session was thirty minutes long, and consisted of seven total activities involving verbal communication, eye contact and emotional expression. The breakdown of time, as well as the focus of each activity, can be seen in Table 2 below. Inspired by Bellini et al. (2007) and Staum (2006), the investigators incorporated activities that promoted interaction and use of communication through instrument play. 'Eye contact' activities required Hunter to focus visually on the researcher or on an object. These activities usually started with tasks that involved Hunter focusing on objects

farther away from his body, then slowly moved to direct person-to-person eye contact. Eye contact on body and face, as recommended by Staum (2006), was the eventual goal of every session. The individual eye contact activities changed in duration every session, but maintained a total duration of ten minutes in each session.

Activity order	Focus during activity sessions	Focus duration (in minutes) per music activity session					
		1st session	2nd session	3rd session	4th session	5th session	6th session
Instrument echo	Eye contact on instrument	4mins	3mins	3mins	2mins	2mins	1min
Verbal questioning	Communication/emotions	5mins	5mins	5mins	5mins	5mins	5mins
Mirrored clapping	Eye contact on hands	3mins	3mins	3mins	2mins	2mins	2mins
Reading story	Communication/emotions	10mins	10mins	10mins	10mins	10mins	10mins
Body mirroring	Eye contact on body	2mins	2mins	2mins	3mins	3mins	3mins
Music listening	Communication/emotions	5mins	5mins	5mins	5mins	5mins	5mins
Facial mirroring	Eye contact on/around face	1min	2mins	2mins	3mins	3mins	4mins

Table 2: Hunter's music activity analysis for each session

The individual communication activities maintained consistent time frames across sessions and comprised twenty total minutes for each session. Overall, the three communication activities in each session were mapped out to start with closed questions like, *"where is the boy?"* and moved toward more abstract questioning like *"what is the boy feeling?"* in an effort to gauge Hunter's interpretation of emotions. The last communication activity, as well as the eye contact activities all used music in ways similar to other research (Barrow-Moore 2007; Buday 1995; Havlat 2006; Wan, et al. 2010).

Specifically, the first activity of every session was an eye contact activity on an Orff xylophone. The objective was for Hunter to focus his attention and eyes on the keyboard. After the researcher played a pattern, Hunter was supposed to echo back the same pattern. This is an authentic activity that commonly takes place in the music classroom, with teachers demonstrating patterns on a board, with manipulatives, or on an instrument, while students visually follow and echo back.

The second activity of each session was questioning which focused on "I/You" questions in light of his past difficulties with this concept. Also, Hunter's IEP suggested one area of improvement might be his ability to respond to questions appropriately, especially regarding his feelings. During this five-minute portion of the activity session, Hunter was asked questions pertaining to his life in general or the happenings of his day.

The third activity was another eye contact activity. An ongoing, yet gradually changing steady beat would be clapped to Hunter. He was asked to join in clapping the beat, which required continuous visual attention to the researcher's motions. Occasionally, the researcher would stop short of clapping to gauge his focus of attention. This is another authentic activity that teachers might employ as they work on steady beat and its kinaesthetic feel in the body.

The fourth activity was story reading. The focus of this activity was answering questions about the story or pictures in the chosen book. The same book was read in each of two consecutive sessions. During the first reading of each book, the questions that were posed were factual, and answers could easily be derived from the book. The questions after the second reading focused more on emotion and feeling. These answers necessitated details extrapolated from interpretation of the books' words or illustrations.

The fifth activity was another eye contact segment, with an objective of focusing Hunter's eye contact on another person. The researcher used various parts of the body to perform a gradually changing steady beat. Hunter was supposed to mirror not only the pace of this steady beat, but also mirror the location of the tapping. This type of activity is most often seen in body percussion activities, where students must visually focus on the teacher to either simultaneously mirror or echo the movements.

Activity six, the third and last communication activity of each session, involved listening to a piece of music and following a listening map of the piece. Following the selection, the researcher asked Hunter questions about the music, again ranging from more factual questions to more subjective questions to gauge emotion.

Activity seven, the last eye contact activity, was the only activity that required direct eye contact between Hunter and the researcher. This game focused on areas around the eyes, as opposed to the body, and included steady beat gestures to the ears, nose, mouth, and head for Hunter to mimic.

Following the three weeks and six activity sessions described above, two post observations were scheduled. These occurred one week and four weeks after the last tandem activity and observation week. Follow-up observations served to determine whether any observed benefits persisted, improved, or declined after the cessation of activity sessions. Like the baseline and concurrent observations, the post observations took place in the group atmosphere of Hunter's public school music class.

Data collection and analysis

Hunter's interactions in music class before, during, and after the activity sessions were transcribed chronologically in journals by one of the researchers. Data triangulation was again achieved in the form of parental and teacher surveys taken after the series of musical activity session sessions.

It was also decided that quantitative data could support qualitative observations and findings. All activity session sessions were recorded using iMovie 6.0.3 on a MacBook laptop computer, and were converted to QuickTime files for data analysis. These videos were uploaded to Scribe 4.0.6 data analysis software, and the percentage of time spent in focused eye contact over the span of activity session sessions was calculated. Categories of 'eye contact' and 'no eye contact' were used.

'Eye contact' was operationally defined as any situation in which Hunter focused his eyes on the researcher during communication or on an object as directed by the researcher. 'No eye contact' was defined as times when Hunter should have been focused on a person or object, but did not give eye contact.

In order to obtain inter-observer reliability, a second researcher watched and categorised around 20% of the activity session videos using SCRIBE software. Overall reliability (MD = 28.3 seconds with a range of 0 to 49 seconds) was achieved among all categories. The total reliability observation time for these files was 35 minutes and 26 seconds, which equated to 2126 seconds. With a total of 85 seconds of observer difference, less than 3% of this time was inconsistent.

Results

Data on eye contact were gathered from the video recordings of all activity sessions, and were described in both times and percentages of 'eye contact' and 'no eye contact'. As seen below in Table 3, the structured activity sessions showed a slight increase in eye contact from 76%, to 77%, to 79% in the first three sessions. The number then dipped back down to 77% in session four. An increase to 91% occurred in the fifth session before dipping in session six to 79%. There was a substantial decrease in eye contact again in the sixth session, where the levels returned to those of session three at 79%.

Most of the eye contact activity sessions, by their very nature, required Hunter to maintain constant eye contact with an object, a part of the body, or the facial area in close proximity to the eyes. During discussion activities, Hunter did not necessarily have to focus on an object to complete the tasks; however, it was hoped that his experiences in the other activities would encourage more eye contact in strictly verbal situations. Therefore, the videos were analysed specifically for eye contact during these discussion times (Table 4).

Sessions	Percentage eye contact	Percentage no eye contact	Total time eye contact	Total time no eye contact	Total time
Session 1	76%	24%	23:39	07:16	30:55
Session 2	77%	23%	26:09	07:51	34:00
Session 3	79%	21%	23:29	06:17	29:46
Session 4	77%	23%	23:35	07:13	30:48
Session 5	91%	9%	28:11	02:51	31:02
Session 6	79%	21%	24:30	06:21	30:51

Table 3: Percentage and time of eye contact during music activity sessions

Sessions	Percentage eye contact	Percentage no eye contact	Total time eye contact	Total time no eye contact	Total time
Session 1	21%	79%	00:29	01:49	02:18
Session 2	21%	79%	00:59	03:46	04:45
Session 3	32%	68%	01:30	03:13	04:43
Session 4	27%	73%	00:57	02:33	03:30
Session 5	44%	56%	01:29	01:55	03:24
Session 6	46%	54%	01:19	01:33	02:52

Table 4: Percentage and time of eye contact during communication activities

When only these data were considered, there was again an increase in percentage of eye contact from session one to session three Also, there was a lull from session three to session four, and a sharper increase from session four to session five. Unlike the overall eye contact from all sessions, there was no decrease in percentage from session five to session six. Overall, as seen in Figure 1 below,

Hunter seems to have shown continued increase in eye contact during discussions, even when eye contact was not necessary for participation. Although these numbers are comparatively much lower than overall eye contact percentages, they do show improvement during activities that did not require eye contact for completion of the tasks.
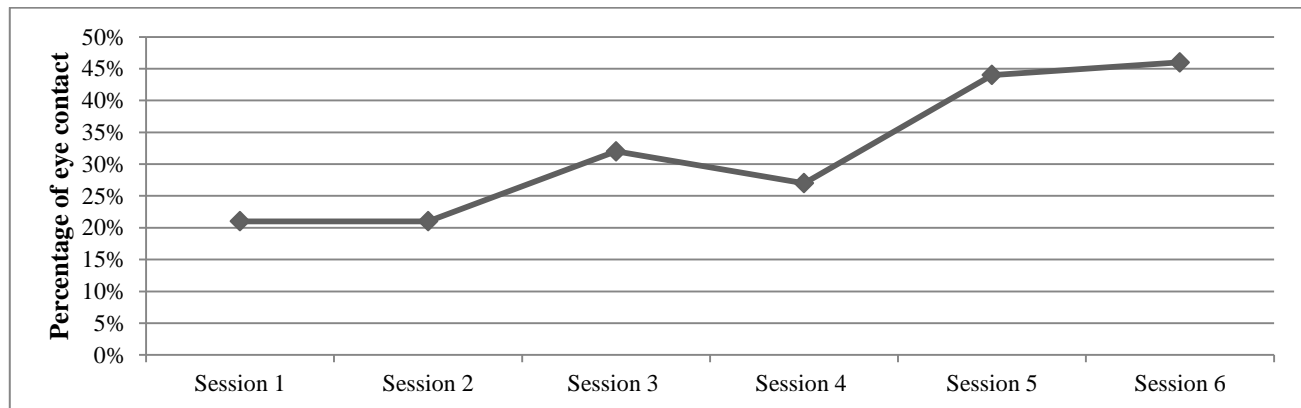

Figure 1: Percentage of eye contact during communication activities. This figure shows the percentage of time that Hunter was engaged in eye contact for communication activities across each of the six sessions.

There were also many observations that were notable. In baseline observations, Hunter's engagement in music class was difficult to measure, as he was often listening, but not maintaining eye contact or establishing joint attention with anyone. When called upon, he usually knew numeric or musical answers to any questions regarding the lesson at hand. He once recalled the rhythm of a whole song, singing it on rhythmic syllables, weeks after it was introduced for the first and only time. It was noted, however, that Hunter was frequently a beat or two behind the other children when he clearly knew the words, tune, and/or motions independently. Hunter's music teacher also noted this in the first questionnaire.

Throughout the sessions, Hunter showed increased ability to stay on topic, and his verbal interaction became more of a true exchange of conversation. He even began to initiate communication. During the first intervention sessions, Hunter's responses to music were often numerically based. He often stated that the song made him feel happy because it lasted for a certain amount of time. Hunter also claimed that any song with a listening map was *"happy"*. During activity session one he was asked why the song *Rocky Mountain* sounded happy. Hunter replied, *"Because it has three verses"*. He was, however, able to correctly label emotional context within the song. In response to whether *"hang your head and cry"* was happy or sad, Hunter replied, *"That's sad"*. At the end of one session, he was told, *"You did so good today"*. Hunter simply mimicked, *"so*

good today". His echolalia was still present in instances where he was unsure of appropriate responses; however, the echolalia did improve throughout sessions, and this was one area in which he was receiving therapy at school.

By the fourth activity session, Hunter had begun to connect the emotions of music and stories to his own feelings. After reading the book, *How are you Peeling?*, the rese archer asked which orange he felt like. Hunter hit the page happily and stated, *"this one is feeling sad, but this one is feeling like me"*, indicating happy. At the end of that fourth session, the researcher inquired, *"Who do you love Hunter?"* He spoke thoughtfully, *"I love my mom and my dad, and my [sister] too"*. The researcher probed, "*Do you have friends Hunter?"* He readily gave two names. *"How do you know they are your friends?"* replied the investigator, and he meaningfully declared, *"Because they both play with me at recess"*. In surveys following the activity sessions, both Hunter's mother and father rated his ability to classify and recognise emotions as one to two points higher on a five-point scale than before the activity sessions.

Another area of perceived improvement during the structured activity sessions was Hunter's increase in creativity and the use of musical means for expression. As early as the first intervention, he was experimenting with volume, which was a concept not yet modelled. During the second intervention, he played the edges of the keys and the base of the xylophone, experimenting with timbre. He also explored adding vocal sounds.

Sometimes the sounds were seemingly random words (mailman, fe, fi, fo, fum, etc.) and sometimes they were letters (A, B, C, etc.). During his own improvisations, he also added glissandos, body percussion (hitting his shoe and clapping) and patting the floor.

In questionnaires completed after the activity sessions, Hunter's parents also noted areas of tremendous musical expression and a higher level of musical functioning than before the activity sessions began. Both of Hunter's parents had earlier remarked on his constant humming, but after the activity sessions they noticed that Hunter had begun to compose his own songs, all with recognisable melodies and rhythms. His mother stated that since the sessions Hunter had created twenty-six songs, and was using music as a creative outlet.

Final observations in the music classroom revealed Hunter's was transferring eye contact and communication skills to different settings. During the third week of concurrent observations and activity sessions, Hunter approached his music teacher and made a laughing face that was used in mirroring activities. She made eye contact with him, and he continued to mirror her expressions. Hunter also engaged the researcher with gestures and facial expressions in his classroom music observations. In the first post observation, he also attempted to communicate verbally. At one point, after yelling out, *"Hello, Ms. K."*, his teacher had to give a *"shushing"* gesture. He then wiggled his nose, remembering past session activities of facial mirroring. When the researcher wiggled back in response, he grinned. Although he began to exhibit and vocalise much more in class, Hunter's numerical fixation still remained a primary way to organise thoughts and responses.

Discussion

The overall increase in eye contact from the first to last sessions seems to indicate, similar to the recommendations of Staum (2006), that such exercises can increase a person's comfort with eye contact. The one slight decrease in overall eye contact from session three to session four may have been the result of underestimating Hunter's abilities. While he had been able to play back simple rhythms during earlier sessions, Hunter failed to echo simple rhythms in session four. When more complicated rhythms were played for him, Hunter echoed back perfectly, revealing that the errors may have been purposeful. This also seemed to indicate his desire to become the "leader" of echoing games. This cue to incorporate improvisation may have led to the increase in eye contact in the fifth session, and is reminiscent of

research that indicates various types of increased communication with improvisation activities (Aldridge, Gustorff & Neugebauer 1995; Edgerton 1994; Holck 2004; Kim, Wigram & Gold 2008; Lima & Castro 2012; Staum 2006; Starr & Zenker 1998; Woodward 2004).

In the baseline observations, it had been noted that Hunter was frequently a beat or two behind the other children. It was finally established that he continued to echo activities and motions, just as the class had done when they were first being taught. The teacher had not directly stated that the students should stop echoing and start singing with her, so Hunter had missed the social cue to synchronise his performance with the teacher and classmates. Through activity session work, he was able to understand the social and verbal cues to know when to cease echoing in the music classroom. As Bellini et al. (2007) stated, interventions that focus on eye contact can develop joint attention. Perhaps the individualised sessions can enhance the timing and social cues that accompany this joint attention.

Throughout activity sessions, Hunter demonstrated an increased ability to initiate conversation and hold a conversation. The perceived increase in joint attention through verbal and social communication was also noted in some emotional contexts. Perhaps he was able to transfer the turn taking and cues from musical activities to verbal communication contexts. Research (Aldridge, Gustorff & Neugebauer 1995; Edgerton 1994; Holck 2004; Kim, Wigram & Gold 2008; Lima & Castro 2012; Starr & Zenker 1998; Staum 2006; Woodward 2004) has shown that improvisational music therapy might allow skills to be generalised to other contexts within the individuals' lives.

Hunter also experimented with using facial and gestural communication to engage his teacher and the researcher in post observation music classes. This was yet another successful way to communicate through nonverbal communication and joint attention as described in previous articles (Bellini et al. 2007; Holck 2004; Vaiouli & Schertz 2012). The attention and eye contact directed toward him seemed to be very comforting in the activity sessions, and he was able to transfer this to a less intimate setting.

It cannot be claimed that the success Hunter experienced during these months was fully a result of music activity sessions. There were many other variables, which posed threats to the quantitative or observed results. For instance, it could be that Hunter's natural maturation was a factor in the perceived growth of communication or music expression. Results did, however, reveal Hunter's increased ability to hold eye contact for longer periods of time. He made more attempts to initiate

conversation both within and outside the activity sessions, and he found creative ways to communicate nonverbally.

For Hunter, improvements in eye contact, communication, and even the increased understanding of music timing and creativity came together during performance at his class Christmas recital. This came after the fifth activity session with Hunter. Not only did he sing the songs with the other children and perform most of the choreography in time, but he also was creatively involved. He made several very clever comments about the performance that were clearly addressed to the audience. The comments he made were completely unplanned on the part of the teacher. During a four-measure prelude Hunter announced, *"Hey, everybody, this song has only two words. They are 'sing' and 'noel'"*. He then proceeded to sing and motion the entire song of correctly.

He also seemed to achieve a greater understanding of emotional and social communication skills during that time. Certainly, Hunter's mother noted his improvements too, in a way that surpasses the importance of any other quantitative or qualitative findings of this individual case study:

> "I didn't have high expectations for Hunter at his class's Christmas music program. The last time I had seen him sing with a group was the previous summer. He sometimes sang along, but usually half a measure behind everyone else, especially with hand motions. And a lot of the time he was disconnected, flapping his hands, sitting down, and not at all in the performance mode...
>
> What I saw at [the concert] was unlike anything I'd ever seen from him before. He stood on the far right, in front (making me extra nervous). Many of his classmates wore reindeer antlers, and one tall girl had a blinking red nose; we'd put Hunter in a Santa hat. The CD player, on whose digital display he typically fixates in any situation where it's present, was far away; I thought he'd be craning his neck to see it or even running over to check it. But instead he stood relatively still (without wandering away or sitting down), and enthusiastically belted out the songs. He was much closer to singing right along on the beat with his classmates – so close that only someone who knew he was an imitator and not an instigator would see the delay. And as the program went on, he stayed on task. The hand motions were sometimes accompanied by a little flapping, but the hand motions were there – and close to on time. His sister sat rapt beside me, singing along. I began to relax as the program went on, realising that something was different this time. Toward the end, the class sang *'Rudolf the Red Nosed Reindeer,'* and as the song began, I could see Hunter gathering himself excitely. *'... Had a very shiny nose,'* the class sang. In the brief beat before the next line, Hunter jumped one step out in front of the line, pointed emphatically toward the girl in the back row, and yelled, *'Like Macy!'* The crowd broke up. I was astounded. Hunter was not only involved with the song, but he had made a connection – and had expressed it within the song. He had a huge grin on his face as he continued singing, barely able to contain his excitement.
>
> When the song referred to "other reindeer", he did it again, jumping out and jabbing his finger at his classmates wearing antlers: *'Like Jaren!'* The contrast from his summer program couldn't have been more marked. Hunter was focused and engaged, and he stayed that way for at least twenty minutes. He participated and was noticeably happy about doing well. His outbursts during 'Rudolf' weren't what I expected at all – they were context-appropriate and even demonstrated contextual understanding. The crowd of parents laughed because it was cute, but nobody there understood how wonderful it was except for us" (Hunter's mother, personal communication, 4th January 2008).

This research, combined with the positive results of various other studies (Barrow-Moore 2007; Buday 1995; Havlat 2006; Holck 2004, 2011; Hoskins 1988; Kim, Wigram & Gold 2008; Staum 2006; Wan et al. 2010) suggests that individualised music activity sessions may be a highly effective way to improve the quality of communication for some children with autism. It can be argued that the use of visual focus with musical instruments, body movement, and facial expressions is a viable way to establish eye contact and hold attention. It is possible that highly interactive musical play contributed to areas of growth in joint attention and communication as indicated in previous studies (Aldridge, Gustorff & Neugebauer 1995; Edgerton 1994; Holck 2004; Kim, Wigram & Gold 2008; Lima & Castro 2012; Staum 2006; Woodward 2004).

Individual activity sessions can also discover and isolate individual challenges, such as Hunter's lack of social cues in echoing and not echoing music. While music therapists can design and provide advanced music therapy treatment for a variety of special needs, it is often the teachers, caregivers, and parents that need techniques for interacting with children with autism. In the case of Hunter, it seems that engaging him in mirroring seemed to hold him to joint attention and provide a vehicle for increased eye contact. Perhaps other persons with autism would respond similarly if they are directed to a point of visual focus or asked to simultaneously mirror movement. Music teachers in particular might note that mirroring and focusing visual attention are techniques that may help the child with autism, as well as benefit many other students. Of course, the classroom atmosphere of

multiple students is much different than the activity session with individual connection. Teachers or other helpers may need to facilitate this visual focus through proximity or direct statements. Classmates may even be used in peer activities, serving as a mirror and point of close visual focus for a student with autism. Teachers should also be mindful that when using echo techniques, there should be clear instructions and direct cues for when echoing is desired and when it should cease, as children with autism may not pick up on these social cues. This finding with Hunter may apply to similar situations with other children, and is reminiscent of the research by Lantz (2002) and Nelson, Anderson and Gonzales (1984).

Further study in combining music activities and children with autism are needed. Such research could continue to isolate and improve individual eye contact on a case by case basis since it is a skill needed for increased social functioning. As Staum (2006) stated, it seems that activities involving instruments and facial focus can indeed establish a basis for social interaction and eye contact for persons with autism. Studies might also attempt to include a larger population of participants, and include children from diverse backgrounds and cultures. More studies on music's relationship to joint attention and communication skills are also needed, and one area of focus may be improvisation as a vehicle to enhance these areas.

This case study was limited to one on one sessions made specifically to meet the needs of one child with autism. Adjustments would inevitably need to be made to extend the study to other subjects. In future studies, this basic approach could be replicated, although, the components of the activity sessions would have to be individualised for other subjects. This limitation will always be an inherent part of music therapy or activity approaches for children with autism; however, knowing that many of the techniques used in research can be easily transferred to authentic situations in music and discussion is empowering. When parents and teachers are more aware of autism, its symptoms, and the special needs of individuals with autism, they can better understand the person, and incorporate techniques for maintaining joint attention, eye contact, and various other social skills.

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