Learning to Play and Perform on Musical Instruments and the Socio-Behavioral Benefit to Students on the Autistic Spectrum

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An Inquiry Project Submitted to the

MAED Program for Experienced Educators
Center for Programs in Education
Antioch University Seattle

December 2010
Professor Lila Henderson

In Partial Fulfillment of the Requirements for the Degree of
Master of Arts in Education
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Abstract

Individuals with autism show impairments in social-behavioral interaction and communication with others. They are often isolated and prefer to be alone. Their inability to understand the emotions of others or to clearly communicate their own feelings is well documented. Many individuals have defined music as the language of emotion. It has the ability to convey what words cannot begin to describe. Music performance in a group brings people together as a collective, where interaction and communication with each other are necessary aspects of the experience. This project seeks to support the idea that learning an instrument and performing instrumental music can help those who are diagnosed with autism to improve their ability to communicate and interact with the world around them. Further, that music can help them understand emotion, convey their own feelings to others, and enable them in the improvement of socio-behavioral skills.
Statement of Focus

In this project, I will be investigating the following question: Does learning to play a musical instrument, as well as practicing and performing music with others improve social and behavioral skills in students who are diagnosed with one of the autism spectrum disorders (ASD)? I will also be highly interested in discovering what instruments do not cause undue agitation but are most beneficial to fostering a pleasant experience in these students. I will be focusing my study on the resources I find in written form in journals, texts, books, and on the Internet. I also will be creating a simple website which will point to the useful information I find, which I intend to add to as I continue my research beyond this thesis. This project will not be investigating savants who seemingly have an inherent musical instrumental skill with no training, as this is outside the scope of my research.
Rationale

Having come from an instrumental music background, both as a teacher and as a performer, I have a high interest in how one can utilize music in a special education setting to the best benefit. Recently, I added a special education endorsement to my teacher certificate, after spending nearly a year in study focused on the special needs population of our society. A friend of mine who has Down syndrome became my initial inspiration. I am a semi-professional French horn player, and I first met him a few years ago at a symphony rehearsal. He was playing string bass, which requires agility beyond anything I’m used to in the horn section. However, my friend has very short and deformed fingers. This supposed handicap does not slow him down in the slightest, and he is one of the finest string bass players I have ever had the pleasure of meeting. After getting to know him a bit better, I became aware that he is also proficient on guitar, keyboard, brass, woodwind, and percussion instruments of all types. I learned that he studied at Juilliard, one of the finest music schools in the country. I was awakened to the possibilities of what I might be able to inspire from my future students, no matter their particular handicap.

During this same time, as I continued my interest in special education, I became more interested than ever before in the condition of my own daughter who is an Asperger’s autistic. I noticed that she thoroughly enjoyed learning to play the clarinet and was doing well in her social interactions with others in her band class at school. I began to wonder if there might be any connection between her musical studies, working with others in band, and her sudden rise in social and behavioral skills. I wondered if there were others on the autistic spectrum that had also benefited from learning a musical instrument in a public setting, such as a band or orchestra.

Musical groups are, by my own definition and that of others, a team effort. In an orchestra, for example, a musician must be aware of a great many things. They must be in tempo with the conductor’s baton and direction. They must also be in tune with the other players in their instrumental section, and as a collective group, in tune with other sections of the orchestra. If they are string players, they must also synchronize their bowings to unify the section in both style and appearance before an audience. Musicians in an orchestra must balance and blend their volume or dynamics, and interpretive style to each other. There is constant interaction between musical sections. One must anticipate the entrances and musical note attacks of the section
leader, or if they are the section leader, convey these seemingly telepathic inferences to the section. An orchestra depends upon each member to contribute to the musical experience. I have only barely scratched the surface of all the possible ways that a musical group must work together.

Consider the usual characteristics of one diagnosed to be on the autistic spectrum.

(Kanner, 1943/1985, p. 11):

1. They have difficulty relating to others in a typical manner.
2. They prefer to be alone and isolated from the outside world.
3. They often have a lack of imagination.
4. In some cases, they have very good rote memory.
5. They can have an obsessive desire for repetition.
6. They manifest repetitive behaviors such as rocking back and forth.

The first three listed items are not considered to be beneficial social and behavioral characteristics. The last three listed items, while also characteristic traits, ironically are actually quite useful in one desiring to learn to play a musical instrument.

If my theory is valid, learning to play a musical instrument and performing with others in an instrumental group, might be very beneficial in helping the autistic student learn much needed social and behavioral skills. This paper will seek to find ways to support this theory.
Literature Review

Some children who have been diagnosed with ASD can be very severely affected in most or all “domains of functioning, while others are only mildly affected. Children with different diagnoses may share many characteristics. On the other hand, two children with the same diagnosis may be affected in markedly different ways” (Heward, W. L., 2009). All of the literary resources that were found in this study point to the use of music at varying levels of intensity and format, in ways that are beneficial to all children on the autistic spectrum.

Inherent Musical Ability

Autistic children have been known to manifest musical skills that are rare in the normal population. Often an autistic child will pick up a musical instrument very quickly. Even those autistic children without extraordinary skills in music tend to learn things related to music much more quickly in relationship to how quickly they learn other things” (Autism Ribbon, 2010). A study conducted in 2004 found that perfect pitch, which is the ability to hear an exact musical tone without an external reference, is found “at much higher rates in autistic children than in normal children” (Warner, J., 2004). Another study was conducted comparing the pitch-identifying skills of children aged between 6 and 19, half with autism and half without autism. Pitch processing is somewhat difficult for someone who is non-musically educated, because they do not know the traditional identifiers to express what they're hearing (e.g.: perfect fifth, perfect fourth, major third, minor sixth, etc.)

To overcome the lack of musical training and language barriers among autistic children, researchers used a touch-screen laptop and asked participants to identify musical notes by moving the image of a boy up and down a flight of stairs that represented musical scales. The study found that although the autistic children had communication difficulties associated with the disorder, a subgroup of autistic children displayed exceptional musical abilities. In one test that required the children to identify musical intervals, four of the autistic children achieved a score of 89% compared with an average score of 30% among the others. In addition, the autistic children performed on par with the other children in tests of generalizing their knowledge about the musical tones across octaves,
despite the well-known difficulties in generalization associated with autism
(Warner, J. 2004).

What is most interesting is that of the autistic group, two were diagnosed as having intellectual impairment and none of them had any musical training. "Autistic children can be highly analytical listeners and are able to access musical details more readily than typically developing children” (Warner, J., 2004).

The Socio-Behavioral Benefits

Music is a useful way to change human behavior, using activities that include playing instruments, singing, and moving to music. The child with ASD will often be interested in the physical shape and the produced sound of a particular instrument. “In this way, the musical instrument provides an initial point of contact between the patient and the other individual by acting as an intermediary” (Oser, M., 2010). Because the use of instruments doesn’t require direct human contact, autistics find themselves in a non-threatening environment (Irawati, 2010). Children on the spectrum who work with music quite often will begin to relax, focus, and improve in ways that amaze their parents, teachers, and clinicians (AllPsychologyCareers, 2010). The following is a description of a typical day in a special education resource room where a music therapist is contracted to work with the students. Note that each student’s interests and issues are accommodated:

At the school, where all 37 full-time students are enrolled in music therapy, Belasco begins her 30- to 45-minute sessions by singing a refrain: "Hello, everybody, it's time for music today." She wheels around the group seated in a horseshoe formation, addressing each student in song as she does so. A 16-year-old, who regularly wears headphones in class because of his auditory sensitivities, responds with apparent enjoyment, as does a younger boy, who strums the autoharp with seeming pleasure as he rocks back and forth in his chair. When Belasco asks her students to shake the blue plastic maracas she has passed out, classroom assistants help. When one student seems pained by the exercise, the assistants physically settle him in his chair (Hwang, J., 2009).
According to the Individuals with Disability Act (IDEA), part of the definition of ASD includes “a developmental disability affecting verbal and nonverbal communication.” Autistics tend to speak without variation in pitch or expression, and tonal and pitch variations in speech go undetected, also causing a barrier in detecting emotions, such as happiness and sadness. However, it has been found that autistics “do process emotions through music, such as melodies and tones depicting sadness, and those signaling more upbeat, happy emotions” (AllPsychologyCareers, 2010). It would seem that the patterns of pitch, tone, and rhythm are as helpful to autistics because they tend to be regular and predictable. Further, “music therapists use singing musical games to encourage speech and vocalizations, as well as musical instruments to strengthen the use of the lips, tongues, jaws and teeth” (AllPsychologyCareers, 2010). “Playing a wind instrument almost mirrors the functioning required in order to produce speech vocalization” (Oser, M., 2010). IDEA also defines ASD as “a developmental disability affecting social interaction.” It has been found that “music performed and experienced by a group combined with regular rhythms and melodies help draw autistic children out of their tendency for self-imposed isolation” (Storr, A., 1992). When performing music in a group of two or more people, “rhythmic processes interact and sync together, which means that brain waves interact with musical sound waves, matching each other’s frequencies. Autistics entrain with the rhythms, relax and slow themselves down. This decreases acting out and problematic behavior” (AllPsychologyCareers, 2010). When used properly, with consideration for a student’s needs and mood, the use of vocal and instrumental music helps individuals with autism by “teaching social skills, encouraging communication, improving language comprehension, developing creative-self expression, lessening non-communicative speech, and reducing tendency of echolalia (instant repetition of another’s words)” (Oser, M., 2010).

It should be pointed out however, that music could have a negative effect upon an autistic. Recall or imagine spending time at a rock or jazz concert where the music becomes loud and intense. An over-responsive autistic individual may not be able to stand certain sounds (Heward, W. L., 2009), which could cause agitation leading to a partial or complete “melt-down”. “Differences that can result in positive outcomes for one can become negative for another, as autistics are extremely sensitive to sensory overload. If not used intelligently, rather than drawing a child out of their shell, it can cause the autistic to move deeper inwards” (AllPsychologyCareers, 2010).
In order to draw a student with ASD “out of their shell”, it is important to give them some control over their environment. Allow them to decide on the instrument they wish to use and how loud or softly they want to create music:

“Music therapy introduced Jaimie to various musical tones and sounds. She banged on drums when she needed LOUD and tapped on sticks or mini-xylophones when she needed more quiet tones. It also helped prepare her for the more direct interaction with Listening Therapy. She was able to tolerate the headphones and realized that she could turn up the volume of the music LOUD when she needed it or when there was music she liked and turned it back down when noises weren’t as fun for her. It also forced her to actively listen to sounds and music and not avoid or run away from it” (Laird, C. T., 2010).

Autistics show a definite need for structure (Heward, W. L., 2009), which music contains in many forms. Melody, harmony, rhythm, phrasing and dynamics are all highly structured elements in music. Music improvisation, allowing for personal interpretation within the musical structure written or implied, “is often central for emotional expression and communication” (Music Therapy Ireland, 2010) in an autistic.

Studies and Research on the Effects of Music Interaction

Scientific research supports the idea that music has a beneficial impact on those diagnosed with ASD. Research has shown that the human mirror neuron system (MNS) in human brains is possibly abnormal in autism. Further, performing music stimulates the areas of the brain directly involved with the MNS:

*Individuals with autism show impairments in emotional tuning, social interactions and communication. These are functions that have been attributed to the putative human mirror neuron system (MNS), which contains neurons that respond to the actions of self and others. It has been proposed that a dysfunction of that system underlies some of the characteristics of autism. Here, we review behavioral and imaging studies that implicate the MNS (or a brain network with similar
functions) in sensory-motor integration and speech representation, and review data supporting the hypothesis that MNS activity could be abnormal in autism. In addition, we propose that an intervention designed to engage brain regions that overlap with the MNS may have significant clinical potential. We argue that this engagement could be achieved through forms of music making. Music making with others (e.g., playing instruments or singing) is a multi-modal activity that has been shown to engage brain regions that largely overlap with the human MNS. Furthermore, many children with autism thoroughly enjoy participating in musical activities. Such activities may enhance their ability to focus and interact with others, thereby fostering the development of communication and social skills. Thus, interventions incorporating methods of music making may offer a promising approach for facilitating expressive language in otherwise nonverbal children with autism” (Wan, C. Y., Demaine, K., Zipse, L., Norton, A., & Schlaug, G., 2010).

In another article found online, similar findings support the journal entry quoted above. Neurologists have not reached a consensus on what is different about the brain of someone with ASD, but recent studies are focusing on the MNS, “which processes both how we observe emotions in others and how we "mirror" their sadness or happiness with an empathic response” (Maloof, R., 2010). This mirroring is what makes us socially interactive. The brain of an autistic seems to manifest difficulty with mirroring. “Functional magnetic resonance imaging (fMRI) shows less activity in the mirror neuron system of people with autism” (Maloof, R., 2010). What is not easy to ascertain is why this is so. Theories suggest that the person with ASD has either a broken or improperly connected “mirror system”. It is thought that music might be the key to reconnecting this system:

_A part of the brain called the limbic system is known to be involved in processing emotion. Molnar-Szakacs and his colleague Dr. Katie Overy, co-director of the Institute for Music in Human and Social Development at the University of Edinburgh in Scotland, have speculated that this emotional hub may be linked to the mirror system, and thus involved in music perception. As they stimulate their subjects with emotional music, they'll try to trace whether both brain systems_
"activate" during an fMRI and determine how the activity and connectivity between them differs in children with ASD. With this study of the pathway between the two systems, the pieces may come into place to use music to teach kids with ASD how to improve their recognition of everyday emotional stimuli, such as facial expressions (Maloof, R., 2010).

It is possible, and current scientific thought is moving in the same direction, that music can make sense to the autistic child in ways that other environmental stimuli in their worlds do not.

When an autistic student is involved performing music there is evidence of improvement in communication, language, and socio-behavioral skills. “A meta-analysis of nine studies in 2004 found that music intervention, regardless of purpose or implementation was effective for children and adolescents with autism” (Whipple, J., 2004). A study published in the Journal of Music Therapy; found that vocal and instrumental music can help autistic children socially interact with their peers. Four preschool-age children with autism who had no interest in peer-to-peer interaction were studied near a playground. As a baseline, the students were observed for social interaction skills without any intervention. After the baseline was established, an outdoor playhouse called a “music hut”, with musical instruments included, was designed. A unique song was composed for each child. Educators and the children’s parents helped to teach each child their particular song. The teachers would then take one of the autistic children and pair him with a non-autistic peer. The two children would be encouraged to play in the “music hut.” While playing, the teacher (who also helped the peer learn how to interact with the autistic child) and children would communicate mostly by playing musical instruments and singing the autistic child's special song. As time went on, the teacher would slowly take a smaller role in the activity. By the end of the study, the students were playing with the peers independent of any help from the teachers. This study found that in all four cases, the use of music showed a profound improvement in social interaction of the four autistic boys (Kern, P., & Aldridge, D., 2006).

In 1974, research was conducted by Hollander and Juhrs using the Orff–Schulwerk approach (which will be defined further in the next section) for the purpose of increasing social, communicative, and behavioral skills in a group of thirty autism students, between the ages of four and sixteen. This approach uses instrumental music, singing, and dancing to involve
children in the experience of music and to foster the expression of self. Three times each week, the researchers used this approach along with sign language to develop language skills. In an attempt to improve behavior, rhythmic dancing motions were taught to the students in order to replace repetitive motions such as rocking back and forth. Fine motor coordination was addressed through the playing of instruments. To increase social skills, groups of four to six students performed music and danced together. “As these relationships developed and imitations increased, the children’s awareness of other maladaptive behaviors increased, and rates of these behaviors then decreased in all children” (Accordino, R., Comer, R., & Heller, W. B., 2006).

A study conducted by Alexandra Raber at Birmingham-Southern College involved twenty-two autistic children. Five music activities were used to measure oral response, physical response, attention, and eye contact. The activities that were used involved songs with and without movement, action poems, songs with full body movement, and instrument playing. Out of the five activities, “only one resulted in full participation by all 22 students, and that was instrument playing” (Funk, J., 2010).

Another journal stated with certainty, “Music-facilitated interactions and structured instrument playing are effective to improve social skills in school-age populations. Social problem solving skills in 5-year-old students are increased on a long-term basis through creative musical activities. Positive affect induced by music helps to improve social problem solving skills in middle school students” (Bryan, T., Sullivan-Burstein, K., & Mathur, S., 1998).

Research in the area of the affect of learning musical instruments on the autistic is ongoing. Currently, the Boston Conservatory of Music has begun a program to teach music lessons to students with some experience on the autistic spectrum. Lessons are taught by graduate students in the instrumental music program, aided by speech pathologists and special education teachers who consult and train the music teachers. Registration information about this program for those who can afford to send their children to the conservatory can be found online at:

http://www.bostonconservatory.edu/autism
Out west in 2009, UCLA researchers began using music to help children with ASD. They were interested in helping those on the spectrum to acquire an increased understanding of emotions, which is often very difficult for the autistic child. This emotional difficulty affects their ability to communicate with others and make friends. With the help of grants from several foundations, Istvan Molnar-Szakacs his colleagues have developed a music education program designed to help children with ASD better understand emotions and learn to recognize emotions in others. Children in a regular classroom environment are also using the Orff-Schulwerk approach described earlier. They use dance, singing, chanting of rhymes, clapping, and playing pitched and non-pitched percussion instruments to teach the fundamental building blocks of music. The program uses this form of music education to “pair emotional musical excerpts with matching displays of social emotion (e.g.: happy with happy, sad with sad, etc.) in a social, interactive setting” (Wheeler, M., 2009). Molnar-Szakacs stated that "the purpose of this work is to provide a means for awakening the potential in every child for being 'musical' — that is, to be able to understand and use music and movement as forms of expression and, through that, to develop a recognition and understanding of emotions" (Wheeler, M., 2009).

Activities that these students are participating in also have the potential to scaffold and branch into other areas of learning. The ultimate intent of this research is to understand the effect of experienced music on social and behavioral function. "Hopefully this will be a fun, engaging and cost-effective therapeutic intervention to help children with ASD recognize and understand emotions in daily life interactions," Molnar-Szakacs said. "An improved ability to recognize social emotions will allow these children to form more meaningful social relationships and hopefully greatly improve their quality of life (Wheeler, M., 2009).

Learning an Instrument & Music Performance for the Autistic

Carl Orff, a composer and music educator once said, “Tell me, I forget… Show me, I remember… Involve me, I understand.” He developed a music education model for children, which involved experiencing music though the use of modified keyboards (marimbas, xylophones, and glockenspiels) and percussion instruments. This model is still in use across the world as an effective way to teach music to elementary students. Most schools that are familiar with the model know of it as the “Orff Instruments” or “Orff-Schulwerk” approach. The Orff approach builds understanding through musical experience on all levels. These levels include
chanting, dance, singing, drama, and the playing of pitched and un-pitched instruments. By using this music education approach with autistic children, it is possible to improve speech as well as socio-behavioral skills (Smith, E., 2009). Several video demonstrations using these techniques can be found at the following link:

http://ericasmithmt.wordpress.com/category/music-therapy-tools/

If a child with autism is on the higher end of the spectrum, consideration should be given to placing that child in the school band. Stephen Shore, an Asperger autistic, wrote an autobiographical account of his experience as a child musician in his book called “Beyond the Wall”. In it, he describes the benefits he found in being part of a band and gives several recommendations for other higher functioning children on the spectrum. He points out that because of sound sensitivities, “placement in the band itself and the instrument learned are important considerations” (Shore, S., 2001). Lower pitched instruments, such as the euphonium, trombone, French horn, or tuba are good choices for students who react negatively to high frequencies, such as the oboe, flute, or piccolo. Instruments in the middle ranges, which include the clarinet, saxophone, and trumpet, might also be acceptable. Percussion instruments come in a nearly infinite number of sizes and frequencies, so care must be made to find something that will be acceptable to the individual. In fact, it is best to allow the autistic student to make his or her own instrument choice, with some guidance from the teacher. However, in some cases a high frequency instrument, such as the flute, might be the perfect choice if that is the instrument that captured their attention. Children, autistic or otherwise, are individuals with their own idiosyncrasies. Placing them in the back of the band can help to keep a student from being sonically overwhelmed. Shore states a few interesting considerations:

*The trombone may present quite a challenge, as one needs a good kinesthetic sense of where one's arm is in order to place the trombone slide in the right place for a note. Otherwise the instrument will be out of tune. However, if the child has a good ear for music, this instrument may improve coordination by requiring placement of the slide in the right position in order to play in tune. With the other brass instruments, less coordination is needed as pitches are obtained with the assistance of valves. The French horn requires much coordination of the embouchure. Percussion may be another avenue. If complex rhythms present a*
challenge then a good place to start is the Bass drum where the rhythmic patterns are simpler. The bass drum, having low and relatively simple sounds, is often easier for a person with sound sensitivities to handle. Woodwind instruments such as the clarinet, saxophone may be an option too although they tend to be located in the middle of the band and in front of the loud brass and percussion instruments. The oboe is a delicate instrument and may be difficult to play. The bassoon may prove to be unwieldy. The flute is relatively easy to learn to play and has a nice sound. It is one of my favorite instruments (Shore, S., 2001).

There is a potential for social problems from others if one finds that they are playing an instrument predominately played by the opposite gender. There is always the option to transfer to another instrument, if this becomes a problem. Because autistic students can become obsessive of any subject, it is possible that they might become interested in attempting to master all of the instruments in a band. This is not necessarily a bad thing. “Encouraging students involvement with their special interest areas can lead to positive outcomes and strengths in other areas of functioning” (Heward, W. L., 2009). In addition to the purely musical benefits, playing in an ensemble is wonderful for working on concepts such as working together with others, coordination, and a sense of accomplishment, and a whole host of other things” (Shore, S., 2001).
STATEMENT OF BIAS

I have been a musician most of my life. I studied and received a bachelor’s degree in music education from Northern Arizona University in 1988. I have taught music to students from kindergarten through high school and beyond. I am a semi-professional musician and enjoy collaborative music performance with orchestras, bands, and brass quintets as a French horn instrumentalist. I have composed and arranged music, as well as recorded my own music and the arrangements of others using computers and software to allow my ideas and talents to reach many on the Internet. I have witnessed the benefit of music to many individuals, as performers and as listeners, throughout my life. I fully believe that music speaks to the soul and conveys the emotions of its composer and performers in ways that words cannot describe with nearly as much accuracy.

My graduate work, and intended career is now focused upon special education. I have spent the last full year working on studies in special education at Antioch University Seattle, and successfully added this endorsement to my teaching degree. In addition, my three daughters all have special needs. My oldest is a dyslexic, my middle child fights ADHD, and my youngest is a diagnosed Asperger’s autistic. My wife is a speech pathologist employed by a school district and works with special education children on a daily basis. My family influences my passions and focus.

My philosophy of education is that all children will do well if they can. I believe that each student is a unique person with talents that they need to develop in order to live a full life. Students, some more than others, need help finding the necessary tools of success. The role of a teacher is to help discover those talents and assist students in developing them.

Children need an environment in which they can safely grow and mature emotionally, intellectually, physically, and socially. As their teacher, I try to help them learn how to find the answers that they seek in their growth journey. As an educator, I seek to find the best ways to model respect, acceptance, and patience towards others.
I believe that if a student is not doing well in their studies, it is not by choice. No one makes mistakes on purpose. If a child is having difficulties learning in the classroom, they are lacking a necessary skill. My role as teacher includes being a detective who can help students find what is missing, and guide them in the discovery and development of those skills.

My varied curriculum involves the interests of the children and making learning relevant not only to academics, but also to life. I design my teaching around themes, integrated units, projects, group work, individual work, and hands-on learning in order to help children become active learners.

Teaching is a lifelong learning process of discovering new philosophies and new strategies, as well as learning from parents, cultures, community, colleagues, and especially children. As a teacher, I must be a listener who is empathetic. I must garner a trust with my students. I strive to be a strategist, who can help students discover the best ways to learn. All students, regardless of lacking skills or disabilities are capable of learning. It is my privileged task to help prepare students to find their own unique path to a successful life.
METHOD

This project is a descriptive study to determine what written knowledge was available about the subject of my research. As such, the methodology for this project was the investigation of entirely text-based sources of information. Sources included professional journals, texts, books, and informational websites on the Internet. References about music come from my own experience as well as documentation in the aforementioned text sources. My criteria for salient sources of information were finding written information from multiple sources that were consistent with each other, as well as written by professionals either in science, education, or therapy. The one exception that I allowed in my research criteria was the use of autobiographical experiences in music by autistic authors.
LEARNING TO PLAY AND PERFORM ON MUSICAL INSTRUMENTS AND THE SOCIO-BEHAVIORAL BENEFIT TO STUDENTS ON THE AUTISTIC SPECTRUM

FINDINGS AND ANALYSIS

Individuals who are diagnosed with autism are still individuals. Each is a unique human being with traits that differ from all others. Although each person is different, it seems likely that all who have some form of impaired social and behavioral impairments can be helped by interaction with music. As I researched many sources, I found the most information in the area of music therapy. Nearly all sources mentioned the use of learning musical instruments and a few mentioned performing in musical groups. Without fail, every source proclaimed positive results for autistic students who interacted with music.

It is interesting to discover that those with the condition of ASD quite often excel in learning musical concepts at an easier rate than those who are not autistic. It is logically explained though. The classic joke, “How do you get to Carnegie Hall?” with the answer “Practice! Practice! Practice!” is most probably credited to E. E. Kenyon, although there is some conjecture on this point. In any case, I like this joke, from a musician’s standpoint because within it, there is ultimate truth: The only way to become a good musician is to practice a lot. Practice requires repetition, working the same melodic or rhythmic patterns over and over, and finding the most efficient and least restrictive ways of attaining the best performance. As pointed out in the beginning of this report, one of the characteristics of an autistic is an “obsessive desire for repetition and sameness. They also quite often have a very good rote memory” (Kanner, 1943/1985, p. 11). Any musician who has been required to memorize musical scales for an audition will confirm that both of the traits listed above are highly desired.

"Autistic children can be highly analytical listeners and are able to access musical details more readily than typically developing children” (Warner, J., 2004). With my experience in the classroom working with autistic students, I have often pondered what it must be like to be “trapped” in a body where so much of the world is incredibly frustrating. In my experience as a musician, I know the therapeutic power performing music can have. It will quite often center me emotionally. Playing horn in a symphony has, at times, brought me out of a state of despair and returned me to more desired feelings of joy and happiness. Part of this comes from being successful at playing the music on the stand in front of me. Since an autistic has the ability to
more readily access the details of musical analysis, they have an advantage over non-autistics. Perhaps it could be said that music is one avenue that might lead to a successful experience for the autistic. Further, it might be possible to bring someone who fights with the daily trials of ASD into the necessary emotional feeling of joy and happiness through instrumental music performance.

Musical instruments are fascinating items. Each kind of instrument has unique attributes. They make different sounds, which are often challenging to attain. They have different mechanical parts, all which must work with precision in order to function properly. Some are made of shiny metal. Others are made of polished wood. They can have keys, valves, strings, slides, and most of them come apart into multiple sections. Usually, they have a case with interesting pockets and compartments. Instruments challenge the person who seeks to learn how to play them. I can think of few toys in my childhood that could have held my interest as well as a musical instrument.

The autistic, according to the readings I surveyed and my own experience and studies, are usually not very comfortable interacting with other humans. In order for a teacher or therapist to reach such a student, it is important to find some kind of mutual interest that will draw the autistic out of his or her shell. Considering the complex and fascinating workings of a musical instrument, it is possible that a mutual interest can be shared. The autistic doesn’t have to fight the anxiety they feel about interacting with another human, as “the musical instrument provides an initial point of contact between the patient and the other individual by acting as an intermediary” (Oser, M., 2010). Because the use of instruments doesn’t require direct human contact, autistics find themselves in a non-threatening environment (Irawati, 2010). Once that non-threatening environment has been established, it becomes possible to begin working with the autistic to help them discover ways to improve on lagging skills in the areas of the social and behavioral.

In the process of working on this project, I discovered something new that I hadn’t considered. Not only are students with autism able to successfully increase social and behavioral skills, they are also able to increase their abilities to communicate. Autistics tend to speak in monotone, without much conveyance of expression. It is difficult, when talking with an autistic, to detect any emotion from them (AllPsychologyCareers, 2010). Hand that same child a musical
instrument or encourage them to sing, or allow them to choose music to listen to on a portable stereo. You will find that same student can suddenly “process emotions through music, such as melodies and tones depicting sadness, and those signaling more upbeat, happy emotions” (AllPsychologyCareers, 2010). By inviting an autistic to convey their emotional state to others through music, it becomes possible to understand their current emotional state.

Keeping in mind that autistics are more comfortable with predictability and patterns, consider that music is full of these very same elements. Pitches, rhythms, and the various tones that can be produced from an instrument are complex, yet predictable patterns. If you need an example to help understand this, simply listen to anything by W. A. Mozart. You will find yourself predicting the final notes and chords of any phrase in the music.

Autistics often spend time working with speech pathologists to improve their speech patterns. It is well known in musical circles that playing musical wind instruments can help to “strengthen the use of the lips, tongues, jaws and teeth” (AllPsychologyCareers, 2010). This can be helpful to the speech pathologist. Further, “playing a wind instrument almost mirrors the functioning required in order to produce speech vocalization” (Oser, M., 2010). Although most speech pathologists don’t bring a musical instrument into therapy sessions, they will see some benefit from students (autistic or not) who are also attending band or orchestra classes.

Autistics tend to spend their time in isolation. It can be difficult to bring them out of their “shells” and get them involved with other humans. However, we also know that autistics will become fascinated with and focus upon certain areas of interest. If an autistic has found that they can convey emotion, take solace in a comfortable activity full of patterns, and become fascinated with the challenges and workings of a musical instrument, then it becomes possible to involve them in a social group full of amazing interactions. “Music performed and experienced by a group combined with regular rhythms and melodies help draw autistic children out of their tendency for self-imposed isolation” (Storr, A., 1992). The autistic musician will discover at some point, other music-makers are all around them. This provides a common ground of interest for everyone involved. Just as a musician will improve with practice, so will an autistic improve in areas of social skill with the regular interaction found in a musical group.
Individuals with ASD do well if they can have some control over a situation (Heward, W. L., 2009). It has been established that without some control over an environment, an autistic can lose control and have a “melt-down”. I have observed this behavior many times in various people with ASD with which I have been involved. In order to work in music with an autistic, it is important to at least occasionally allow them to dictate the type of music they would like to interact with. Let them convey their emotional state by determining not only type of music, but also the volume or intensity of the music. If possible to do so, perhaps with higher functioning autistics, teach them how to improvise. Improvisation is the creation of a musical line over a predictable or composed chord and rhythmic structure. A musician, or musical group, or even a recording can be used to set up this structure. Then, allow the autistic musician to sing or perform on an instrument whatever music comes to his or her mind in the moment. By encouraging this kind of musicianship, an autistic can find that they are able to emotionally express themselves. They will also have find that they are in control of their environment and hopefully minimize the possibility of a “melt-down”.

My research eventually led me to several different types of journals. Some were scientific and medical journals. Others were music education and music therapy journals. In each case, I found supportive evidence through studies that instrumental music, both learned and performed has a beneficial affect upon the autistic individual.

Scientific research has determined that the human brain processes emotions, social interaction, and communication through the putative human mirror neuron system or MNS. It has also been found that the MNS is abnormal in cases of autism. It has also been found that “Music making with others (e.g., playing instruments or singing) is a multi-modal activity that has been shown to engage brain regions that largely overlap with the human MNS” (Wan, C. Y., Demaine, K., Zipse, L., Norton, A., & Schlaug, G., 2010). I have pointed out that autistic children can benefit from working with music, either on their own or in a group. It has been found that musical interaction increases communication and social skills. Now we find that scientists are supporting the idea that music is possibly improving the abnormalities of the MNS in autistic students.

Music education journals discuss studies that have been conducted over the past several years that all support the benefits of musical intervention in autistic individuals. Nearly all of the
entries that I researched support the theory that “when an autistic student is involved performing music there is evidence of improvement in communication, language, and socio-behavioral skills” (Whipple, J., 2004).

A group of autistic students, when paired with non-autistics, were found to communicate much more effectively when given musical instruments to help them express themselves. Again, the use of an instrument as an intermediary helps to bring someone with ASD into a social interaction. “The use of music showed a profound improvement in social interaction of the four autistic boys” (Kern, P., & Aldridge, D., 2006).

Extensive study has been done in finding benefits from using the Orff Approach. The Orff instrument set is unique, in that the pitched instruments are modifiable. All the keyboard instruments, which are struck with soft mallets to produce tones, have removable keys or notes. When a teacher wants to work with students to create music, they usually use the prescribed pentatonic scale, which is a set of pleasing notes no matter which note is chosen. The teacher or leader simply removes all the notes from the keyboard that are not needed for a particular musical exercise. Students interact with each other in the process of creating music based on the pentatonic scale. It is nearly impossible not to have a pleasing musical result, which fosters the feeling of success and positive emotion. In the process of using Orff instruments with autistic children, it has been found that students are more readily able to express themselves, develop language skills, develop fine motor skills, become more aware of each other, and increase social and behavioral skills (Accordino, R., Comer, R., & Heller, W. B., 2006). Another study found that the most effective form of music intervention, which attains full participation from the largest amount of individuals with ASD, was playing and performing on musical instruments (Funk, J., 2010).

There are now many universities across the country that are becoming interested in furthering research on instrumental musical experience and its beneficial affects upon the autistic population. “Music-facilitated interactions and structured instrument playing are effective to improve social skills in school-age populations. Social problem solving skills in 5-year-old students are increased on a long-term basis through creative musical activities. Positive affect induced by music helps to improve social problem solving skills in middle school students” (Bryan, T., Sullivan-Burstein, K., & Mathur, S., 1998). Universities such as Boston
Conservatory and UCLA are creating programs that include working with Orff instruments and teaching music lessons privately, with the assistance of specialists in the fields of speech pathology and special education. The positive results that have been documented to date are causing these programs to expand and propagate to other universities, colleges, and conservatories across the nation.

My research led me to a few autobiographical books and “blogs” written by autistics and their parents that had enjoyed the experience of playing musical instruments and finding themselves involved in social interaction with others in the process. I was encouraged to find first hand experiences that supported the idea of instrumental music as beneficial in helping autistics to interact with their world. Research in this area is not highly accurate, but rather based on the opinions and experiences of those involved in the process. However, I believe their words to be valid.

Due to his experience, both as a student and as a music teacher, Stephen Shore had several recommendations about how to engage the autistic music enthusiast in the most effective ways in a concert band. Bands are generally comprised of brass, woodwind, and percussion instruments. Upon occasion, you will find the piano and the string bass also in a concert band. In the band, the brass family will consist voices ranging from high to low. Trumpets are the highest voices. French horns, trombones, euphoniums, and baritones are the middle ranged voices. Tubas are the low voice in the brass family. The woodwind family also has instruments that range from high to low. Piccolos are the highest voice. Flutes and oboes are also higher frequency instruments. Saxophones and clarinets are the middle ranged voices. Bassoon and bass clarinet are the low voices. Percussion instruments consist of nearly every imaginable sound frequency, some rather abrasive and others rather mild. Keeping all of the above in mind, Mr. Shore recommended that autistic students would probably gravitate to lower frequency voiced instruments (Shore, S., 2001). They would also most likely be more comfortable in the back of the band where it is less likely to have an instrument behind you playing into the back of your head and ears.

As indicated earlier in my analysis, the above considerations might not always be the best choice. Even though the flute is a higher frequency voice in the woodwind family, it might be the instrument that drew a particular autistic’s attention. Allow the autistic musician to make his
or her own choices. The music teacher can observe the results of this choice and make adjustments or suggestions as necessary.

From my own experience, I can attest to the range of difficulty in mastering the various instruments of a band. French horn, oboe, and bassoon are by far the most difficult instruments to learn, taking on average five years of daily practice to master. Only the most focused students, autistic or otherwise should be considered good candidates for these instruments. The trombone, tuba, and clarinet take on average of three years with daily practice to master. Percussion, flute, saxophone, and trumpet take an average of 2 years with daily practice to master. The above should be considered when guiding a student with ASD in their choice of musical instrument.

Social problems can become an issue if, for instance, a male student finds himself drawn to the flute as an instrument of choice. He may find that he is in a section of the band entirely populated by girls. Where some might find such an idea to be ideal, it is also quite possible that they might be teased or simply uncomfortable in a section comprised entirely of the opposite sex. For whatever reason, the flute, oboe, and clarinet sections tend to be predominately female. Trumpets, trombones, euphoniums, baritones, and tubas tend to be predominately populated by males. French horn, saxophone, bassoon, and percussion are generally an even mix of gender.

Since autistic individuals can obsess over any subject of interest, it is possible that they might become more overly focused upon the instrument they have chosen. They may talk about it incessantly. “This focused attention may last for a long time and can be very difficult to break. This may impede his ability to shift attention to other people or activities, such as a parent or peer who has entered the room” (Heward, W. L., 2009). It is also possible that the autistic musician will become interested in attempting to master more than one instrument or even all of the instruments in a band. This is not necessarily a bad thing. “Encouraging students involvement with their special interest areas can lead to positive outcomes and strengths in other areas of functioning” (Heward, W. L., 2009). In addition to the purely musical benefits, playing in an ensemble is wonderful for working on concepts such as working together with others, coordination, and a sense of accomplishment, and a whole host of other things” (Shore, S., 2001).
DISCUSSION

While working on this project, I discovered that music therapists have been proclaiming the advantages of using music in working with autistics for a long time. Music educators, for the most part, are just now awakening to the possibilities in reaching out to our growing population of autistics. Special educators, who work daily with ASD children, are known to use songs and musical games to open avenues and pathways to working with them. However, in all my research, I did not find any evidence that special educators are using music instruments in their direct work with an autistic child. I feel that it’s important to begin encouraging special educators to work with music teachers in this important area. It also has become clear that there is much to be learned from the music therapists. Many of the sources that I found cautioned that it’s essential that an autistic receive music therapy from a trained and experienced musical therapist. If music and special education teachers agree that it’s time to use the resource of music in the classroom to help an autistic, then the education community should consider the consult or training from a music therapist.

Evidence clearly points to the benefits of using music, choral or instrumental, with autistic individuals. It can bring one challenged with ASD out of their shells, give them a common ground of interest with teachers, be an intermediary between themselves and uncomfortable contact with others, help them communicate emotion, encourage and improve their ability to use speech, give them much needed skill in social interaction, and improve their behavioral skills. Both scientists and educators have documented the benefits of teaching instrumental music to and encouraging performance of the same in helping an autistic in astounding ways.

Caution must be used when working with a child or adult on the spectrum. Care and consideration must be given to their individual needs. What works well with one may not work at all with another. In my research, I came across many accounts where shrill high notes or loud noises could cause a complete “melt-down” in an autistic. Constant attention to the reaction that an ASD individual has to any stimuli is important. Adjustments must be made at the first sign of
escalation in unwanted behavior. It might be necessary to adjust the volume of the music or even replace the flute, clarinet, or recorder that is in use with another entirely different sounding or differently functioning instrument.

I have come to believe that the use of music instruments with autistics is likely to become an important part of my curriculum in working with an autistic. My belief is that I must use any and all resources to reach each of my students. If an autistic is fascinated by dinosaurs, then I will make sure to have books, motivators, and prizes that can be earned which focus upon giant lizards. If they are fascinated by math, then we will use math. If they are fascinated by the drum-set in a rock and roll band, then I will teach them how to play rock beats. Any special educator I have ever met is highly motivated to reach and help the autistic student in their care. The fact that I have been a musician all of my life, and a music educator for many years, affords me the possibility of using this resource as yet another avenue into reaching into their minds and giving them all the help possible.

The most compelling aspect of this project was the realization that some of the very characteristics of an autistic, which are often seen in negative light, are the same characteristics that are encouraged in a musician who is attempting to master an instrument. Repetition, recognition of patterns, the ability to focus on accurate pitch, and the ability to predict the outcome of a musical phrase are all important elements in the daily practice and understanding of music for an instrumentalist. Evidence was found that suggests the autistic might very well excel in the practice room and the mastering of a musical instrument. That the autistic might also benefit socially and behaviorally, be able to express previously hidden emotion and understand it in others, and discover that the world is much larger than they could have imagined is encouraging and should give hope to the many who are involved in the lives of someone on the spectrum.

In order to begin the process of informing and educating others to the discoveries of this project, I will need to personally have some success in introducing instrumental music to the autistics that I work with. There will need to be personally documented evidence of the benefits as well as positive testimony from parents, teachers, and friends of improvement in the autistic.
Ultimately, there will need to be enthusiasm from those on the spectrum that I work with for the music experience that I, as their teacher, can introduce to them. If they are excited about the music and more readily communicate and work in collaboration with me to give them the tools they need to succeed in life, then that will be the greatest indication that this project has made a difference.

There are many unanswered questions that have arisen from this project. They range from wondering what kind of musical instruments are considered best practice in a special education resource room to what funding will be made available to purchase said instruments. Will there be problems with keeping instruments in good repair? Will consideration need to be made for what kind of instruments an autistic can handle without accidentally breaking a key or valve or string? What happens if a child on the spectrum becomes so interested in the xylophone, that he or she has a “melt-down” at the end of a school day when they cannot take the large keyboard home with them? Are there any legal considerations to make in regards to using music to help an autistic student without the supervision of a licensed musical therapist?

While doing research for this project, I became aware that music and special education indeed work well together. This is encouraging to me as I am both a music and special education teacher. This is also encouraging to me because I am aware that most special educators enjoy music and will be excited to bring more of it into the classroom. In the future of my career in the classroom, I fully intend to seek out other special educators who are using music in whatever form and continue to compile information. I intend to learn as much as I can in how to utilize music with my students, autistic or not. I believe that the research that I have begun and discovered from others will profoundly affect my practice as a teacher.

In an effort to share information, as I have currently compiled, and as I will continue to find over the years, I am developing a simple website that will most probably grow larger and more complex as time goes by. The reader may access the current state of this website by going here:

http://todd.macshare.com/thesis.html
REFERENCES


