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EASTERN KENTUCKY UNIVERSITY

**The Relationship between Autism and the Multiple Intelligences Theory: Identifying Patterns in
Learning for Educational Purposes**

Honors Thesis
Submitted
In Partial Fulfillment
Of the
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Spring 2020

By
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The Relationship between Autism and the Multiple Intelligences Theory: Identifying Patterns in

Learning for Educational Purposes

Rhiannon Duvall

Dr. Julie Rutland, Department of Curriculum and Instruction

Abstract

The Multiple Intelligences theory has been used to modify lessons in the traditional classroom for years. Incorporating this intelligence theory into lesson plans, teachers address students' various learning abilities. However, this educational theory can also be used to improve students' strengths in intelligence areas they are not proficient in. This is particularly beneficial for individuals with autism with social deficits due to their developmental disorder. Autism spectrum disorder can negatively impact various cognitive elements of an individual's life, but it primarily affects an individual's social skills and interpersonal intelligence. One of the most prominent solutions to improving social skills for students with autism is including them into general classroom environments with peers who are non-disabled. Though this can prove to be a challenge in the traditional classroom, the non-traditional classroom offers more opportunities for inclusion and success. Through the use of inclusion in environments such as the music classroom, students with autism are able to develop multiple intelligences at once, including interpersonal intelligence. Orff Schulwerk is a music education method that, after significant research, has shown to address all eight areas of intelligence at once. This method can reach out to students that excel in every intelligence category as well as benefit students with autism.

Keywords: autism, multiple intelligence theory, orff schulwerk, music education, inclusion, music therapy, interpersonal intelligence, social skills

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The Relationship between Autism and the Multiple Intelligences Theory: Identifying Patterns in Learning for Educational Purposes

Autism is a developmental disorder that affects how the brain is developed, which makes it incredibly unique (Lygeraki 2019). No two cases of autism are similar, and every individual is affected differently by the disorder with some only having impacts in social behaviors while others experience extreme mental deficits (Lygeraki 2019). In fact, there are even studies showing that people with autism have completely different brain layouts from others and they are not even similar among others with autism (Applied Behavior Analysis, 2020). Though every person is different, deficiencies in social interaction and communication are incredibly common in individuals with autism as explained by the CDC in their article “What is Autism Spectrum Disorder?” (2020). Because interacting and communicating with others are such critical skills, it is important for educators to find methods of intervention that can minimize these deficiencies effectively. Developing such critical skills through activities that address multiple skills, such as music, can benefit students with autism and their various symptoms that may extend beyond social deficits.

The Multiple Intelligences theory, developed by Howard Gardner, is an educational theory that focuses on teaching students as individuals. This theory puts a strong emphasis on addressing a student’s individual needs and relating the curriculum content to their strengths. This theory centers around the concept that there are eight different areas of intelligence that are present in all individuals. Generally, an individual will only have an aptitude for one or two

intelligences meaning that they learn content best when relating it to their aptitudes (Adcock, 2014). However, there is one particular intelligence that connects to all seven other intelligences – musical intelligence. This intelligence area has the capability to reach all other areas of intelligence almost simultaneously, allowing for educational opportunities that address multiple areas of concern.

As a music education major, I hope to eventually teach in an elementary music classroom. Early intervention is incredibly beneficial for individuals with autism or any developmental disorder to prevent developmental delay or inhibition altogether. Music therapy has shown that music is a viable option for intervention with individuals of all types of disabilities, but it is particularly beneficial with children with autism. Also, inclusion is a prominent strategy for individuals with autism and one of the most common places for these students to be integrated into is the non-traditional classroom, such as a music class. Therefore, the information and the literature reviewed in this thesis will predominately be applicable to those who find themselves teaching in a similar environment. A prominent educational resource that effectively teaches multiple intelligence areas while benefitting students with autism is the Orff Schulwerk music education approach. This is a music education tool developed by Carl Orff that focuses on exploration, imitation, improvisation, and creation. This is done through the use of the voice, dance, and instruments. Orff Schulwerk has the flexibility and ability to reach students of all eight intelligence areas. Furthermore, learning through music activities such as Orff Schulwerk helps develop all eight intelligences. This creates an efficient educational resource that supports the education of all students and allows for inclusion of students with disabilities such as autism.

Multiple Intelligences Theory

The Multiple Intelligences theory was created by Dr. Howard Gardner in 1983 (Edutopia). Gardner is a professor at Harvard University who noticed limitations from the traditional Intelligence Quotient system that many psychologists used. He developed this theory stating that there were different types of intelligences an individual could have, rather than one general IQ. This theory is similar to the VARK theory, which stands for visual, auditory, reading, and kinesthetic (VARK Learn Limited, 2020). This theory is broken down into three learning styles – visual learning, auditory learning, and kinesthetic learning. These three learning styles can be simply described as “some people learn by seeing (Visual); some people learn by hearing (Auditory); some people learn by doing (Tactile/Kinesthetic)” (Sreenidhi & Chinyi Helena, 2017, p. 18). Gardner, in creating the Multiple Intelligences theory, developed a specific set of criteria that each category of intelligence must meet, while there are no criteria to define what a learning style is (Edutopia). Originally, Gardner developed seven types of intelligences: verbal/linguistic, logical-mathematical, music, visual-spatial, interpersonal, kinesthetic, and intrapersonal. He later went on to recognize naturalistic intelligence as a new category and existential as a potential category (Gardner, 2006).

Gardner explains that each category for intelligence has to display a reasonable amount of pre-determined standards to be considered a true form of intelligence (2006). One of these standards is a demonstration for biological presence. To qualify, an intelligence must be present in many different forms or societies (Gardner, 2006). For example, linguistic intelligence has many different forms such as spoken language, visual language like American Sign language, or the written word. These are all very different mediums of language that arise due to the necessities of any given society. Every intelligence category is present in all individuals, whether or not there

is an aptitude for a particular intelligence. This indicates that there is room for improvement in any intelligence area.

Verbal/Linguistic Intelligence

Verbal/linguistic intelligence has a primary focus on written and spoken word. There is a strong understanding of language and its mechanics, which helps translates to learning foreign languages. Examples of high linguistic intelligence would be people who analyze and synthesize information well. Authors, editors, and translators are all examples of professions that require high linguistic intelligence (“Multiple Intelligences Theory”, 2016). Linguistic intelligence would represent the visual, auditory, and reading learning patterns from the VARK learning theory. Linguistic intelligence, logical-mathematical intelligence, and musical intelligence all have standardized symbol systems which the other intelligences do not (Calvin-Campbell, 1998).

Logical/Mathematical Intelligence

Logical/mathematical intelligence relates closely to math and science. People with a high level of logical intelligence have a strong understanding of problem solving and excel at mental math (“Multiple Intelligences Theory”, 2016). Like people with linguistic intelligence have a strong grasp of language and its mechanics, people with logical intelligence have an adept understanding of numbers and patterns. Examples of professions that relate to logical intelligence include accountants, engineers, and scientists. Though there are many elements of learning that individuals with autism may struggle with, there are signs that many people with ASD thrive in mathematics. In an article entitled “What Makes Some Autistic People Good at Math?” the Applied Behavioral Analysis organization (ABA) cites that, while most people with autism would not be considered savants, they often showcase above average mathematic skills (ABA, 2020). MRI studies have shown that when solving mathematical equations, people with autism had brain activity in completely different areas from a neurotypical person solving math problems.

However, every single person with autism that participated in this study had an entirely unique layout for brain activity (ABA, 2020).

Musical Intelligence

Musical intelligence relates to music. The most significant traits for musical intelligence are the ability to recognize rhythm and pitch as well as an awareness of sound and how it is used (“Multiple Intelligences Theory”, 2016). Beyond making music, people with high musical intelligence have a strong understanding of how sound can affect emotion (“Multiple Intelligences Theory”, 2016). Students with high musical intelligence may learn well by putting content into the form of a song or rhyme. Examples of professionals with high musical intelligence would be entertainers, sound engineers, and musicians. There are many individuals with autism that excel in musical intelligence (“5 Famous Musicians with Autism Spectrum Disorder”, 2020). One example of a prominent figure with autism and advanced musical intelligence is Kodi Lee, a blind musician with autism who won season 14 of America’s Got Talent (Lee, 2020). In an article entitled “5 Famous Musicians with Autism Spectrum Disorder” by the Applied Behavior Analysis organization (ABA), Wolfgang Amadeus Mozart is cited as another potential example of a musician with autism (ABA, 2020). Due to his keen ability to read, compose, and remember music (2020), there is no doubt that his musical intelligence was advanced. However, this article also stated that Mozart displayed several signs of autism such as noise sensitivity, issues with impulse control, repetitive facial expressions and motions, and frequently repeated themes in his (2020). Unfortunately, the concept of ASD was nonexistent when Mozart was alive, so there will never be a confirmation of whether or not he had the developmental disorder. Because of this connection, music therapy can be viable method of treatment or intervention for individuals with autism.

Visual-Spatial Intelligence

Visual-spatial intelligence affects an individual's understanding of images. This involves being able to interpret, imagine, and conceptualize imagery. This category of intelligence is most closely related to the traditional visual learning. In addition to interpreting and creating visual images in their head, people with high visual intelligence have an excellent level of spatial awareness. Learners with visual-spatial intelligence will often thrive through charts, mind maps, and other visual organizational strategies to categorize information. These skills lend well to professions such as city planners, visual artists, architects, and interior designers ("Multiple Intelligences Theory", 2016).

Interpersonal Intelligence

Interpersonal intelligence relates to how an individual interacts with others. Having high interpersonal skills involves being able to comprehend others' feelings based on their actions and behaviors. Gardner defines interpersonal intelligence as a category that "builds on a core capacity to notice distinctions among others—in particular, contrasts in their moods, temperaments, motivations, and intentions" (2006, pg. 20). He also cites research suggesting that the frontal lobes of the brain are what primarily control interpersonal intelligence (Gardner, 2006). Recognizing others' emotions and motivations are strong suits of this type of intelligence ("Multiple Intelligences Theory", 2016). Due to how difficult it can be to interpret other people's emotions because of a lack of predictability, many people with autism spectrum disorder struggle with interpersonal intelligence. Furthermore, due to many issues that people with autism have regarding communication such as struggling to understand verbal and non-verbal communication, indifference in interaction with others, approaching peers in inappropriate or unusual ways; it can be determined that people, particularly children, with autism are challenged in their interpersonal relationships and intelligence (Lygeraki, 2019).

Professional fields that require high levels of interpersonal skills include counselors, educators, and managers (“Multiple Intelligences Theory”, 2016). Though these specific careers involve advanced levels of interpersonal skills, every career or social interaction requires a certain aptitude for interpersonal intelligence. Lower interpersonal skills in individuals in autism can cause an inability to sustain a conversation, lack of desire to initiate social interaction, and a disinterest in imaginative play in young children (Woodard & Reet, 2010).

Intrapersonal Intelligence

In addition, there is intrapersonal intelligence. Intrapersonal intelligence is the ability to understand one’s emotions and how they relate to others around them. This could be interpreted as the opposite of interpersonal intelligence, but ideally the two types of intelligences connect to develop a well-rounded and emotionally intelligent individual. Gardner expands on the relationship between these two categories by explaining that interpersonal intelligence “allows one to understand and work with others. Intrapersonal intelligence allows one to understand and work with oneself. In the individual’s sense of self, one encounters a melding of interpersonal and intrapersonal components” (2006, pg. 23). In addition, Hobson explains how being able to understand another one’s role within themselves and with others allows for an understanding of other people’s perspectives (2004, as cited in Woodard & Reet, 2010). He explains this phenomenon simply with his statement “what is internal becomes external” (pg. 218).

In his work *In a Nutshell*, Gardner provides Virginia Woolf, a prominent and prolific writer, as an example of an individual with advanced intrapersonal intelligence (2006). Gardner believes that many people with autism have an inaptitude for intrapersonal intelligence (2006). Because of the struggles many individuals with autism have with this intelligence category, it can be important to encourage creative and artistic activities that can lend towards self-expression such as art or music.

Bodily Kinesthetic Intelligence

Bodily kinesthetic intelligence corresponds with physical activity and the body. People with high levels of bodily kinesthetic intelligence are comfortable with expressive activities such as dance or acting, and show significant amounts of dexterity, precision, and control (“Multiple Intelligences Theory”, 2016). This type of intelligence is closely related to the kinesthetic learning type from the VARK learning theory developed by Neil Fleming (VARK Learn Limited, 2020). Gross motor skills and fine motor skills both fall into this category of intelligence. Examples of professions that require high levels of kinesthetic intelligence include actors, athletes, dancers, and health care professionals (“Multiple Intelligences Theory”, 2016).

Naturalistic Intelligence

Naturalistic intelligence encapsulates the ability to identify and categorize different forms of life such as plants and animals (Gardner, 2006). In addition, people with high naturalistic intelligence have an overall strength in ecological knowledge. This intelligence category was developed and accepted by Howard Gardner after the original seven. In the early stages of its development, it was believed to be an element of visual/spatial intelligence, but some of the key skills for ecologists and biologists include being able to determine different species based on their sounds or their texture (Gardner, 2006). These learners have an aptitude for categorizing and compartmentalizing information. Examples of professions that require this intelligence include biologists, ecologists, and veterinarians (“Multiple Intelligences Theory”, 2016).

Existential Intelligence

Existential intelligence relates to broad philosophical questions. It is closely related to what was previously referred to as spiritual intelligence. Gardner did not discover this category of intelligence, rather it was suggested to him by other scholars within his field. He did not find spiritual intelligence, which deals with religion and its relating emotions, to qualify as a category

of intelligence on its own. However, existential intelligence was discovered as a subcategory within spiritual intelligence. This category has a very strong correlation to philosophical questions that occur in religion, art, and media. Professions that would relate to this potential intelligence would include philosophers, politicians, and preachers or other religious leaders. Gardner did not find that this intelligence candidate met enough of his criteria to be considered an intelligence category (2006). Though some people classify this to be the ninth intelligence, Gardner does not consider it to be a part of the multiple intelligences theory. Because Gardner does not recognize it as part of his theory, it will not be expanded upon further in this paper. However, due to it being frequently referenced by other scholars and theorists, the decision was made to expand upon it in this paper for clarification.

Multiple Intelligence Theory as an Educational Theory

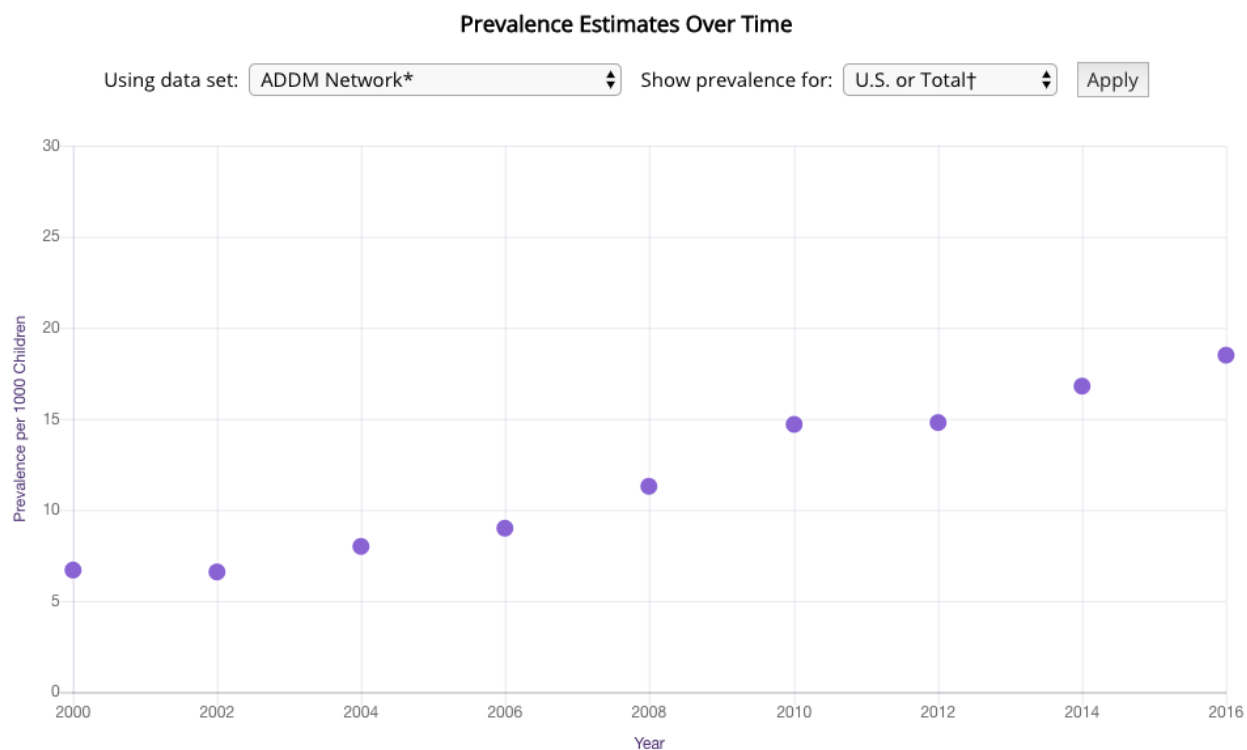
The Multiple Intelligence (MI) theory is often used in the classroom to improve the likelihood of individual student success. Teachers who have studied the MI theory extensively in their education courses often utilize and develop lesson plans that address all eight areas of intelligence (Adcock, 2014). Being aware of how all eight intelligences are prone to learning can increase a teacher's confidence as well. In a survey conducted by Phyllis Adcock, she found that "approximately 75% indicated that MI theory helped them to meet the individual needs of their students" (2014, p. 53). Additionally, reteaching content in different intelligence areas provides an opportunity to repeat information from a lesson in a new and exciting way that retains student attention (Adcock, 2014). The findings from this study found that, overall, teachers felt more confident in teaching through the MI theory because they had more confidence in their teaching and a better understanding of their students as individuals (Adcock, 2014). Increased teacher confidence can benefit students because the teacher experiences less obstacles in a learning classroom and can execute their classroom lessons more effectively. In addition, because the

teachers are working to teach to the individuals rather than simply regurgitating information to the students, there is more value in their education. When used in education, the MI theory allows for increased student success and an improved quality in the learning process (Adcock, 2014).

Autism Spectrum Disorder

Autism is a developmental disorder that can affect an individual's learning abilities or process. The official title is Autism Spectrum Disorder (ASD) because there are many different forms of autism. Some individuals with autism can be high functioning where it is barely noticeable that they have autism, while others can be low functioning where they may never be able to live independently. Many high functioning individuals were diagnosed with Asperger's syndrome, which is a part of the spectrum of autism (National Institution of Neurological Disorders and Stroke, 2020). There is no specific biological cause for the onset of ASD (Woodard & Reet, 2010). There are many genetic and environmental roles that play into the development of autism. The National Institution of Neurological Disorders and Stroke (NINDS) lists some examples of scientific factors, including premature birth and having a family history of autism. Currently, there are no defined environmental factors that relate to the cause of autism (NINDS, 2020). Though there are no specific genes connected to autism, it has been shown that "general factors for psychiatry conclude that autism is one of the most inherited disorders" (Lygeraki, 2019, p. 3). The statistics regarding the prevalence of autism in the general population are constantly changing. In a collection of studies from the CDC's Autism and Developmental Disabilities Monitoring Network (ADDM), autism continues to become more common. The chart below shows a steady increase in the presence of autism within the United States ("Data & Statistics on Autism Spectrum Disorder", 2020). These studies also showed that, in the year 2000, approximately one in every 150 children had autism. In the year 2012, approximately in one in 69

children had autism. In their most recent 2016 study, the statistic was one in 54 children. As this is a developmental disorder, there is no specific cure for ASD. There are various treatments, such as intervention and medication, that can be put into place to combat detrimental symptoms.

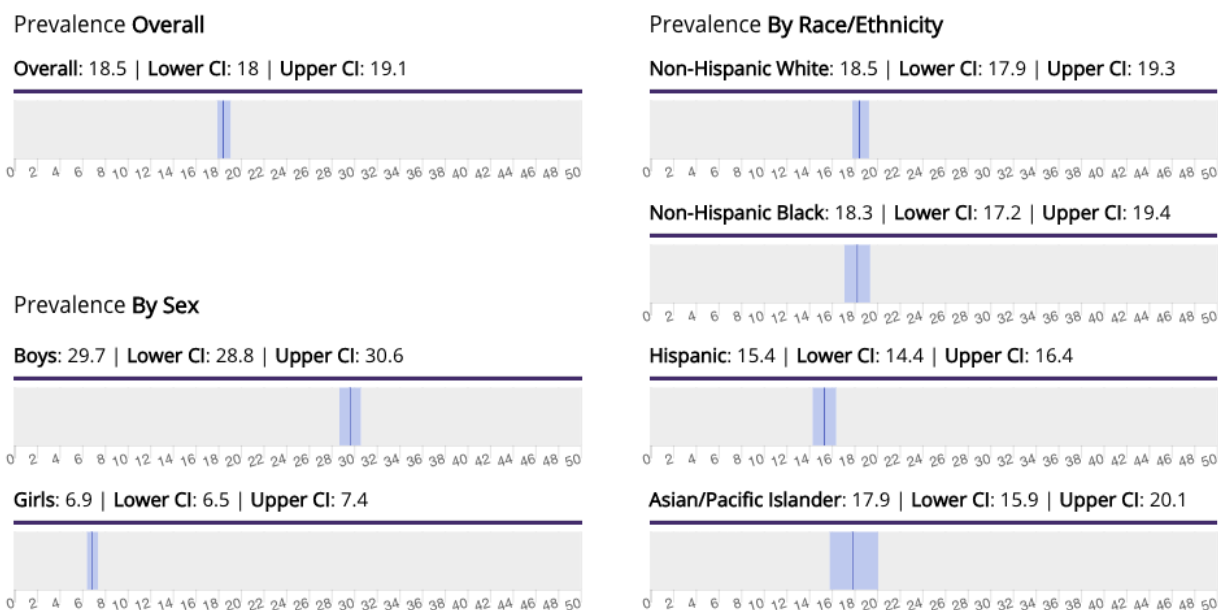


Furthermore, the various environmental factors that contribute to an autism diagnosis are spread evenly throughout different populations. The chart below, generated by the CDC in their article “Autism Data Visualization Tool”, shows that there is a relative equality of diagnoses between lower socioeconomic families and higher socioeconomic families (2020). It also shows that race and ethnicity does not appear to play much of a determining factor in the relevance of autism. However, the presence of autism diagnoses in Hispanic populations is slightly lower than other populations within the United States. The CDC cites that this gap has been steadily closing throughout the various repetitions of this study, which is redone every four years. They go on to provide an explanation as to why this could be by stating “this decrease in racial and ethnic differences may be due to more effective outreach directed toward minority communities and efforts to have all children screened for ASD” (“Autism Data Visualization Tool”, 2020, para. 9).

The only significant disparity is between male and female diagnoses. Despite the increasing rate of diagnoses, there are still no known causes for autism (Lygeraki, 2019).

MOST RECENT STUDY YEAR: 2016

ASD PREVALENCE PER 1,000 8-YEAR-OLD CHILDREN



Symptoms of Autism

There are a variety of symptoms that may be present in an individual with ASD. No two cases of autism are the same, and there are many people that do not show all signs or symptoms of autism. However, there are significant characteristics that are present in many cases of ASD. The CDC lists several potential symptoms, such as a strict adherence to routines and patterns, poor social skills, limited communication, sensory issues, and hyper focus or obsessions. Poor social skills can be defined as little to no eye contact in conversation, failure to respond when talked to or called at, and inability to sustain conversation (CDC). Many children with autism struggle to develop etiquette when playing with other children. They are often unable to grasp concepts such as sharing or taking turns and must be taught these skills by others, which makes developing peer relationships very challenging (Finnigan & Starr, 2010). Furthermore, there is often a disconnect between the mind and the physical self for people with autism. Examples of

this include inability to make eye contact with others, lack of desire for physical attention or affection, and an inability to express one's thoughts and emotions (CDC).

Many of these symptoms can cause additional disorders to arise in people with ASD. Common complications include anxiety, depression, and obsessive-compulsive disorder (NINDS, 2020). Anxiety and depression easily arise from limitations in social interactions and a level of frustration that comes from an inability to appropriately express oneself. In a study of people with ASD conducted in 2017, 25% of the participants showed signs of clinical depression and 20% reported recent suicidal thoughts and ideations. It is also estimated that up to 50% of people with ASD will experience clinical depression at some point in their lifetime (Hedley et al., 2017). This is a stark contrast to the percentage of people in the United States who experienced major depressive disorder in 2017. This percentage was 7.1% of adults in the United States experienced a depressive episode in 2017 (NIMH, 2019). Though this is only one year rather than a lifetime, this is still a large difference compared to the 25% of people with autism experiencing depression at the time of that particular study. Many people with autism have obsessive-compulsive disorder as well, which exacerbates any obsessions with routines and hyper focus issues one may have. In addition, compulsions or ticks such as hand flapping, rocking, or leg bouncing are very common that may be deferred to when stressed or overwhelmed.

Imagination and Autism

A prominent component in interaction that many people overlook is imagination. Piaget, a prominent educational theorist, connected imaginative play at a young age to cognitive development (Woodard & Reet, 2010). Imaginative play is common in infants and young children with many children pretending their toys can talk, playing with pretend phones, having tea parties, and more to entertain themselves. This imaginative play allows for children to begin to identify others and eventually see themselves through other people's perspectives. This act of

identifying with others allows for the development of basic thought in relation to oneself and to others (Woodard & Reet, 2010). Furthermore, the interpersonal actions and emotionally driven relations that spur from imaginative play “foster the shift from dyadic... self-and-object... to triadic... imagination-supported... thinking” (Woodard & Reet, 2010, p. 218).

However, the development of a child with autism often shows an interruption in imaginative play and activities –this affects their social, linguistic, and even cognitive skills (Woodard & Reet, 2010). Woodard and Van Reet state that “autism occurs in infants who are pre-disposed to a physical object focus... [showing] an understanding of self and others as objects only” (2010, p. 223). They also define a person with autism as an individual who is “deficient in imitation... turn-taking... sharing experiences and emotions... or pretend play” (2010, p. 219). This deficiency in imagination skills can make understanding others and their emotions incredibly challenging for individuals with autism (Lygeraki, 2019). Furthermore, due to their inefficiency in relating to others, children with autism often do not learn well through collaboration and struggle to effectively use language as a communication tool with others (Woodard & Reet, 2010). However, Woodard and Reet call for more activities that promote thinking of people as humans rather than objects for children with autism as a form for intervention (2010). They also recommend implementing activities and practices that rehearse and enforce triadic, or imaginative, thinking for people with autism (2010). Additionally, music therapy can be used to encourage interest in creative play and aid in the development of interpersonal skills (Lygeraki, 2019). Activities that help develop these interpersonal relationships as well as an understanding of the self could potentially be incredibly beneficial for individuals with autism.

Although many children with autism do not often initiate pretend play, it is not impossible for them to participate in such activities. One particular study discovered that children with high-functioning autism were able to participate in activities that emulated imaginative play, but only

through encouragement or pressure (Woodard & Reet, 2010). This shows that the lack of imaginative play in young stages of development can severely impact an individual's interpersonal and intrapersonal intelligence. These two areas of intelligence are both critical in any given career or social situation. Therefore, it is important to find educational opportunities to develop these skills.

Intervention

Intervention is the utilization of various tools that can aid in improving autism symptoms. The National Institute of Child Health and Human Development (NICHD) explains that "early diagnosis and interventions for autism are more likely to have major long-term positive effects on symptoms and later skills" (2017, para. 1). The NICHD also lists examples of activities in various intervention programs such as family training, speech therapy, physical therapy, and nutrition services (2017). Behavioral and educational intervention can be beneficial and successful for individuals with autism, but it is more effective the earlier it begins (NINDS, 2020). Another example of an intervention tool is a Social Story. Social Stories were developed by Carol Gray in 1990, a long-time special education teacher of individuals with autism (Gray, n.d.), used to teach individuals with autism various social skills through stories. Carol Gray explains in her presentation "What are Social Stories™?" that, to be considered a Social Story, the author must meet different guidelines and characteristics including a topic relevant to the audience, illustrations, and personalized text ("Carol Gray: What are Social Stories™?", 2011). Though social stories are not usually set to music, there have been several studies applying the text of social stories to melodies for children with autism to sing along. These studies each showed that the children displayed inappropriate social behaviors less frequently than they did before the studies began (Finnigan & Starr, 2010).

Music Therapy and Autism

Music therapy is a tool for intervention for people with autism that is growing in popularity (Finnigan & Starr, 2010). Emily Finnigan and Elizabeth Starr define music therapy as “an established healthcare profession that uses music to address physical, emotional, cognitive, and social needs of individuals of all ages” (2010, p. 322). One of the primary challenges that individuals with autism face are social limitations. A frequent characteristic in many children with autism is a lack of desire to initiate conversation, unless there is a desire or end goal in mind, such as obtaining a snack or assistance in some other form (Finnigan & Starr, 2010). There are many cognitive benefits to music therapy for children with autism, but another significant benefit is that it is a source of fun for these children (Finnigan & Starr, 2010). Allowing a source of creativity and fun that involves collaborating with others like music does can be an excellent opportunity to develop social skills. If many individuals with autism only initiate social interaction with a desire in mind and music therapy introduces an interest in music, this creates a new desire for interacting with others.

In several case studies, it has shown to be very effective for individuals with autism (Lygeraki, 2019). In one particular case study conducted by Agapi Lygeraki (2019), a child with autism attended music therapy sessions in his schooling every day for a month. After four weeks, this child showed improved behaviors in tolerating physical contact, expressing sad feelings, waiting patiently, and responding to non-verbal cues from others (smiling, waving, etc.) (Lygeraki, 2019). Furthermore, an additional case study observing five boys with autism found that music therapy benefited their interpersonal skills – so much so that three of the five boys were able to attend kindergarten with their peers (Finnigan & Starr, 2010).

In another example, a young girl with autism participated in a study with music therapy and non-music therapy for a month (Finnigan & Starr, 2010). Within this study, the following

social behaviors were tracked during the music activities and the non-music activities: eye contact, imitation, turn-taking, pushing toys away, and moving away from the activity (Finnigan & Starr, 2010). The data collected regarding her imitative behaviors is particularly telling of the effects of music therapy. As seen below, the young girl was significantly more imitative during music activities than non-music activities. Another interesting observation is that her participation in the non-music activities was improved on the days that she participated in musical intervention activities. In the follow-up at the end of the study, her participation is significantly lower which could be due to the fact that there were no music activities that day (Finnigan & Starr, 2010). One could gather from this that, by keeping music as a frequent tool in an individual with autism's life, their overall social behaviors could be improved.

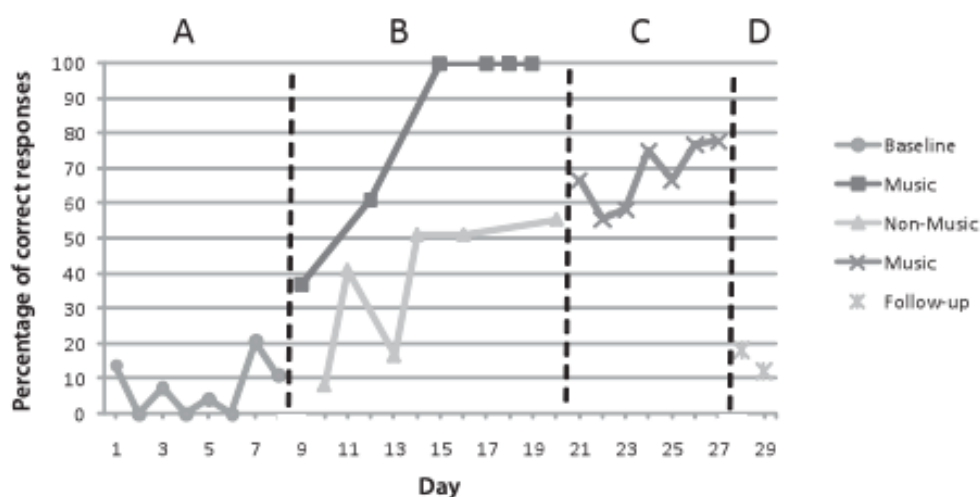


Figure 2 Percentage of correct responses for imitation

Inclusion

Inclusion is the educational practice of incorporating students with various disabilities, such as autism, into the general education classroom as explained by the Special Education Guide (2020). This allows for students to follow the same curriculum as their neurotypical peers, as well as increases opportunities for social interaction and collaboration. The increased social interactions are a significant benefit from practicing inclusion. In one study focusing on social

success in children with autism, results determined that a larger class size was beneficial at recess because the students interacted with others more frequently (Locke et al., 2016). Since special education classrooms are typically much smaller than the general classroom, without inclusion students with autism would not be able to interact with as many students. Furthermore, this research suggests that children with autism began to decrease their social networks around age eight which can cause additional challenges for them later on (Locke, et al., 2016). Without intervening and introducing students to these pivotal social interactions, their interpersonal intelligence could be negatively impacted. However, their findings also indicated that a smaller class size was more beneficial for academic success (Locke et al., 2016). One reason that this could have occurred could be the lack of individualized attention for all students as a teacher becomes more spread out with more students.

Educational Resources for Individuals with Autism

It is also shown that individuals with autism have a high success rate at processing pitch (Coast Music Therapy, 2020) as well as interpreting the intended emotion from a piece of music. These elements, combined with the many correlations between music and communication, facilitate learning for individuals with autism (Lygeraki, 2019). With many individuals with autism struggling with communication disorders or inabilities, music is a viable educational resource to help develop communication skills. The music and movement involved in music therapy allows the development of non-verbal communication (Lygeraki, 2019). Lygeraki also goes on to assert the importance of music intervention with the statement “research has shown that music for autism is important as it develops many areas and, above all, gives the patient the opportunity to express themselves through melody” (2019, p. 11).

With early intervention being the most effective for individuals with autism, incorporating effective techniques into various elementary school environments would prove to be beneficial

for students with autism. In addition, it has been shown that frequently rehearsing activities that help develop interpersonal skills is effective for children with autism (Woodard & Reet, 2010). One of the most effective ways for children with autism to practice or rehearse activities that develop interpersonal skills is for them to be included with their peers. Due to frequent class meetings and being surrounded by peers, the elementary school music classroom becomes a viable educational environment for individuals with autism that addresses these critical components of inclusion and intervention. Orff Schulwerk is a music education method that has the ability to address several different intelligence areas during various music activities.

Orff Schulwerk

Carl Orff

Carl Orff was a German composer born in 1895 (“Carl Orff & Gunild Keetman”, n.d.). Under Nazi control, most modern music was attacked or censored which negatively impacted Orff’s compositional career (Burkholder et al., 2019). However, he was one of the few composers to create a lasting piece during the Nazi regime. This piece was *Carmina Burana*, which is his best-known work. Beyond composition, Carl Orff is more well-known for his lasting impact in music education. He developed a method of music education which he called Orff Schulwerk, commonly referred to as Orff. This method was developed from 1924-1936. Orff Schulwerk frequently uses voice, non-pitched percussion, body percussion, and pitched percussion to create songs based off of different stories or educational elements (Colwell et al., 2013). This educational method is incredibly prominent in the world of music education, often found in the elementary school music classroom. Through the American Orff Schulwerk Association (AOSA), there are opportunities to take courses and become Orff certified. This method of learning is widely used in education settings as well as other group learning settings for children (Burkholder et al., 2019).

However, this method was not developed by Carl Orff alone. Orff had assistance from a female composer and performer named Gunild Keetman (“Carl Orff & Gunild Keetman”, n.d.). She worked alongside Orff for several years until she eventually assisted in developing the Orff Institute in 1961 (“Carl Orff & Gunild Keetman”, n.d.). Though Orff “frequently said that the Shulwerk could not have come into being without Keetman’s essential contributions,” her name has been excluded from the educational approach’s moniker (“Carl Orff & Gunild Keetman”, n.d., para. 6). The Orff Shulwerk music education model is divided into three different tools for education: the voice, movement, and instruments.

Voice

The voice is typically the first tool used in the Orff process. The voice is one of the first expression tools that humans have that is developed in infancy. It comes from within the body and is one of the only forms of expression that does not have any physical limitations. In some elements such as pitch matching and creating melodies, there is not a language barrier either. The melodies and scales used in the Orff method are based of pitches that young children can easily imitate and comprehend (Calvin-Campbell, 1998). Typically, this translates to the pentatonic scale. This scale is comprised of five notes with no half step intervals. Bobby McFerrin demonstrates this five-note scale in a short presentation at the World Science Festival (2009). In his demonstration, he shows that the audience naturally picks up on the pentatonic scale with minimal instruction. It is an incredibly accessible scale because of the lack of extreme dissonance (Estrella, 2018). In addition, it is a scale that has existed for at least 50,000 years with archaeologists finding bone flutes that were tuned to the pentatonic scale (Estrella, 2018). The consonance of this scale makes it incredibly easy for young children to imitate and is therefore the basis to almost all melodies involved in the Orff model.

Many songs used in this model begin with chanted rhymes that are based off of common nursery rhymes (Calvin-Campbell, 1998). It is also common for storybooks to be used for the words of any Orff based activity (Colwell et al., 2013). To make Orff activities more beneficial for individuals with autism, a social story could be used for the lyrics to a song activity. These chants then turn into defined rhythms, and then melodies are added. The melodies are typically taught to the children using the echo technique, where the teacher models the melody and the students sing it back (Calvin-Campbell, 1998). Once the children have mastered the given melody and rhythms, the next logical step is to layer movements to create a dance.

Movement

Movement is a critical tool in the Orff model that is used in dance and in playing the instruments. The movement portion of an Orff activity will often begin with the teacher encouraging the students to explore different movements that pertain to the activity at hand. This could be finding movements that relate to a certain mood, activity, or to the words in a particular nursery rhyme. By allowing the children to explore, they are developing their imaginations and critically thinking about the topic at hand. In addition, dancing is very imitative in nature. After the exploration stage, teachers will often move into the imitative stage. The teacher will model specific movements that relate to the activity and allow the students to imitate them. This helps the students develop a vocabulary of movements that relate to the topic. By developing this vocabulary, students are able to begin making connections between emotions and music and dance. Examples of this include slow movement to slow songs, fast movement to fast songs, motions that may imitate or reflect happiness or sadness, etc. Other examples include more physical connections such as motions that animals may make or motions that symbolize other activities such as reading, sleeping, etc. Movement is significantly more

collaborative in nature as the students participate in this element together and often imitate one other.

Instruments

Another form of the Orff Schulwerk educational model incorporates instruments. There are pitched and unpitched instruments involved in this process. The unpitched instruments are often more easily accessible to students in the beginning. There are fewer rules involved so it is a much more creative process for the children. There is a lot of improvisation with unpitched instruments and the students do not always have to follow a specific ostinato like they would with pitched instruments. Examples of unpitched instruments would be hand drums, drums that use sticks, shakers, tambourines, and more. Students may be asked to imitate specific rhythms from the teacher to start the activity, but they will often then be allowed to develop their own ideas and rhythms to use. A prominent Orff activity for unpitched instruments is a drum circle (Moore, 2011). Drum circles are useful in elementary education settings or for students with disabilities because of the ease of accessibility. Moore expands on this accessibility by explaining that prior experience is not an obstacle because “someone who has never played an instrument in his/her life can pick up a shaker and participate in a drumming experience” (2011, para. 14). This allows for a large group to collaborate and make music together as well as gives opportunities for individual students to practice their creative and improvisation skills.

The pitched instruments are often used for more advanced Orff activities because pitch adds a newer, more challenging layer for creating music. These instruments are typically pitched to pentatonic scales to allow for students to easily re-create melodies that they are capable of singing (Calvin-Campbell, 1998). Examples of this include special Orff keyboards that are in many different octaves but only have notes within the pentatonic scale. In addition, collaborative

songs that are used in Orff activities are typically based in ostinatos (Calvin-Campbell, 1998). An ostinato is a repeated melody, rhythm or musical phrase (Editors of Encyclopaedia Britannica, 2013). By using repeated material, the songs are not too complicated for young students to follow along the form.

Beyond the tools that are used in Orff education, there are four areas that are implemented into each activity: exploration, imitation, improvisation, and creation (Calvin-Campbell, 1998). They typically appear in that order, but this is not necessary. However, improvisation and creation cannot occur before imitation. Through these four areas, the content of a particular lesson is analyzed and covered in different forms and then introduced into a collaborative setting.

Exploration

The exploration stage is very prominent within the three tools of Orff. In the exploration stage of an Orff activity, children are given a mood or topic by the teacher and encouraged to find as many sounds and motions they can make that they feel relates to that subject (Calvin-Campbell, 1998). This is guided and encouraged by the teacher while conducted in a large group setting. The teacher's encouragement helps students develop their creative and explorative process. This area of Orff activities is critical because this is where students will often begin to develop connections between emotions and music and develop their creative vocabulary for Orff activities. An example of a topic to explore may be the different ways an elephant makes music. For voice, students could potentially emulate the trumpeting sounds an elephant makes with its trunk. For movement, children may begin by imitating the heavy footsteps of such a large instrument or waving their arms in front of their face to imitate their trunks. In instruments, they

may create slow, deep-pitched timbres to re-create the sounds of heavy footsteps or fast, high-pitched rhythms to further imitate the trumpeting sounds.

For individuals with autism, due to the limitations in imaginative play and thinking, the exploration period of an Orff activity could seem ineffective. However, in a study regarding four boys with autism and encouraging interaction with their peers, the children with autism showed a high level of interest in exploring musical sounds (Finnigan & Starr, 2010). At a childcare program that the four boys attended, an outdoor music area was set up as a method of intervention in the playground that all of the children shared. All four boys showed a level of interest with the instruments and, with teachers present, showed increased levels of peer interaction and meaningful play with others (Finnigan & Star, 2010).

Imitation

This step may occur before or after exploration. In this area, the teacher models different methods of sound and movement that can be creating that pertain to the topic at hand (Calvin-Campbell, 1998). These different actions or sounds are taught through the echo technique, similarly to melodies taught for voice and instruments. In some ways, this is similar to the exploration area because it allows children to establish a vocabulary of sounds and movements to use in the more imaginative components of the exercise. Sometimes it may be beneficial to switch back and forth between exploration and imitation. Allowing the students to develop a vocabulary or establishing specific vocabulary elements for the students is incredibly beneficial for students with autism. Having a set of resources to use for the more imaginative stages can help avoid blockages that may come from any imagination deficiencies that students with autism often deal with as a symptom of autism.

Improvisation

The improvisation area is where students are encouraged to create music without limitations of structure or rules. This involves improvising melodies, movements, and rhythms that relate to the task at hand without structure (Calvin-Campbell, 1998). A common example of improvisation would be having a student or multiple students featured as soloists in a drum or dance circle. Here, they can create dances, rhythms, or songs that they feel relate to the mood or activity on the spot. Due to the nature of improvisation, there is not time to stop, think, and rehearse before acting. Improvisation encourages children to explore the relationship between music and emotion. The act of tying something concrete, such as music, to something more abstract, such as emotions, connects two different intelligences from Gardner's multiple intelligences theory. Particularly, it builds a relationship between musical intelligences and the personal intelligences. With musical intelligence being a stronger area of intelligence for many individuals with autism, this is an excellent educational opportunity to develop the personal intelligences by promoting groupwork and connecting emotions to more tangible activities. Even if students with autism are struggling to improvise on their own, they are able to witness other students doing so and develop an understanding of their emotional processes.

Creation

Finally, there is the creation area. In this stage, children work individually or in small groups to create a song or dance that pertains to the task at hand. There is minimal teacher obstruction in this stage, so the students work solely with each other (Calvin-Campbell, 1998). This allows for more creativity and freedom to develop their work. By working in groups, the students are able to develop their interpersonal intelligence in a fun and collaborative environment. In addition, there are no wrong answers in this creative process, so it allows for less frustration in

communication from those with social limitations such as students with autism. If a particular Orff activity is repeated within a music classroom, the end result is never the same two times in a row because the children will develop a new creation each time (Calvin-Campbell, 1998).

Implications

Through focusing on musical intelligence, Orff helps children develop other areas of intelligence indirectly. With an emphasis in collaboration and improvisation, Orff helps children with autism build these critical skills in which they may experience deficiencies. Though children with autism often show socially avoidant behaviors, it has been shown that music therapy is most beneficial when connected to a particular interest from the child's life (Finnigan & Starr, 2010). An example of this comes from a case study of a young boy with autism going through music therapy. He originally did not show interest in playing keyboard with his therapist until his therapist began to play one of the boy's favorite songs from *Winnie the Pooh*, after which the boy began to play and make eye contact with his therapist (Finnigan & Starr, 2010). With this observation in mind, identifying a child's particular interests and applying it in an Orff Shulwerk lesson could prove beneficial and increase their participation within the activity and with their peers.

Another benefit of Orff Shulwerk is its flexibility. Music is an excellent opportunity for interdisciplinary study, and Orff lessons can be easily adapted to focus on a number of core content subjects. One of the benefits of incorporating core content into Orff activities is that it helps students relate or synthesize music from different classes and further understand their connections (An et al., 2014). This can be particularly useful for students who may have a disdain for core subjects like math or English but enjoy non-traditional classroom activities. Furthermore, with the music classroom being a non-traditional environment, inclusion is much

more viable and allows for students who may not be successful in a traditional classroom – such as students with pervasive developmental issues like ASD – to learn core content alongside their peers and develop steadier relationships. Additionally, music is a repetitive educational process that calls for certain activities to be repeated (Hodges, 2019). In a traditional lecture style classroom, this could become tedious and discouraging to young students; however, music can keep students engaged for longer (Hodges, 2019).

Bodily-Kinesthetic Intelligence

The development of bodily-kinesthetic intelligence and activities is critical to one's success in life. To live independently, one must have steady control of their gross motor skills, fine motor skills, and ability to balance (Pektas & Akyol, 2018). Pektas and Akyol explain in their study that, with intervention there is a primary goal to aid in an individual's development so that they may eventually become independent (2018). The results from their study showed that children with various developmental disabilities, including autism improved in various physical activities with music present as a motivator (2018). Two groups were subjected to the same amount of physical activities over the course of 20 weeks and one group listened to music during their activities while the other group did not. Their results showed that the group with music improved significantly more than the other group as well as displayed fewer visual signs of discomfort and pain (Pektas & Akyol, 2018). With Orff activities, music is present as a motivator to engage in physical activities which could show improvement in overall skill as well as likelihood to participate.

In the dance activities of Orff, children are utilizing the physical space around them to emulate different behaviors and moods. This dance allows not only for an outlet of self-

expression but improves motor skills and kinesthetic intelligence. Also, when playing instruments children have an opportunity to develop their hand-eye coordination.

Interpersonal Intelligence

Though music can be an individual experience, it is often very collaborative in nature. Meanwhile, Orff Schulwerk is entirely collaborative and focused on group activities. In a study conducted in southern India, children with varying degrees of ASD went through three months of music therapy that was rooted in the Orff Schulwerk process (Bharathi, Venugopal, & Vellingiri, 2019). The results of this study showed that children with ASD who went through active Orff Schulwerk-based music therapy showed improvements in understanding other people's perspectives, responding to others, and maintaining interactions with others (Bharathi, Venugopal, & Vellingiri, 2019).

Intrapersonal Intelligence

Music is an opportunity to express oneself. Through connecting musical elements to different moods and behaviors, Orff Schulwerk is ingraining various options for self-expression into students. This is particularly helpful for students with autism as Woodard and Reet noted in their study that rehearsing imaginative activities helps people with autism emulate and understand them (2010). Furthermore, Orff Schulwerk is often used in music therapy environments (Lygeraki, 2019). In a study conducted in 2013, Orff Schulwerk was found to be one of the most effective music therapy methods in reducing anxiety in young hospital patients (Colwell et. Al, 2013). Intrapersonal intelligence allows for an individual to be able to communicate within themselves and properly address their emotions. Through using music and Orff activities to develop intrapersonal skills, students with autism may be more equipped to

handle the many mental illnesses such as anxiety or depression that frequently develop as a complication of ASD.

Visual-Spatial Intelligence

Orff Shulwerk is effective for individuals who learn through visual-spatial intelligence because the dance and instrument playing is incredibly visual. Students are able to watch each other to absorb the content and follow along with the activity. Furthermore, the act of dancing helps develop the student's spatial awareness. In dance, it is important to be aware of an individual's surroundings so that no one gets knocked into or hit (Small, 2017).

Logical-Mathematical Intelligence

An important component of learning any subject is an individual's level of confidence in a particular subject. Mathematics can be very frustrating for students to learn and can cause anxiety and negative attitudes by even as early as kindergarten (An et. Al, 2014). However, music and Orff activities have been shown to reduce anxiety as well as express and process their emotions.

Linguistic Intelligence

Studies that have shown connections between musical intelligence and linguistic intelligence. In a study conducted by Northwestern University in Illinois, students were asked to perform a task relating to music and then a separate one relating to language. This study found that students who performed well on the music task succeeded in the language task as well (Jaslow, 2013). This is likely due to the fact that both of these skills depend on auditory processing (Jaslow, 2013). With that in mind, developing musical ability could benefit linguistic intelligence as well. Additional research has shown that music and language develop in the same

portions of the brain (Hodges, 2019). With this in mind, engaging in an overall activity that captures a student's attention for longer and allows for more repetition is an excellent opportunity to reinforce neural pathways that aid in the development of language acquisition (Hodges, 2019). Furthermore, though rhythm and pitch are typically referred to as musical elements only, they are vital in language as well. Identifying pitch can help an individual delineate between another person's intention behind their words and understanding rhythm allows for one to follow another person's vocal cadences as well. Studying these skills in an environment where they are directly involved can help students - particularly students with ASD that often have issues with communication – develop the more nuanced indirect elements of rhythm and pitch in language and speech.

Naturalistic Intelligence

Individuals with high naturalistic intelligence learn efficiently through patterns and categories (“Naturalist Intelligence”, n.d.). The frequent use of ostinatos, pentatonic scales, and patterns could easily translate to this type of intelligence. This would allow those with naturalist learning preferences to understand fundamental musical elements as rhythms often develop in patterns, melodies are often based on sequences, and songs always have a specific form to them.

Conclusion

The multiple intelligence theory is valuable for both teachers and students in developing confidence and addressing areas of concern. Furthermore, music is one of the few activities that can aid in the development of all eight areas of intelligence. With the opportunity to incorporate content from core classes while training interpersonal relationships and address different potential learning styles, Orff Schulwerk becomes an extremely inclusive educational method.

Using an educational strategy that is accessible to all types of learning as well as students with autism is critical in ensuring all students' success in the classroom. Furthermore, Orff Schulwerk is often utilized in music therapy environments to improve cognitive and emotional skills. With all of this in mind, Orff Schulwerk becomes an incredibly reliable educational resource for individuals with autism.

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