The Effect of Background Music

on the

Level of Independence in Students with Autism

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Abstract

The premise of this study was to investigate the effect of music being played, on the level of independence children with Autism demonstrate as they work in the classroom. The participants in the study were a group of ten students in third through fifth grades in a public school, who are all diagnosed with Autism and receiving special education services. The data was collected on a daily basis by indicating the level of prompt each student needed as they completed daily work at their desks, while listening to classical music. Over a period of one school month results showed that there was no significant difference between the level of independence of students with Autism during their designated work time, and music played in the background. Playing classical music did not have an impact on helping students with Autism work independently.

CHAPTER I

INTRODUCTION

Overview

Through the past 20 years, many educators have seen a rise in Autism within their school buildings because more students are being diagnosed with Autism or a milder form of Autism called Asperger syndrome, at a younger age (Griffin, Griffin, Christine, Albera & Gingras, 2006). Since 1% of school age children have the disorder, educators are experiencing steep learning curves to understand how to provide appropriate instruction for students with Autism, and generally better understand the disorder.

Autism is a developmental disability which affects verbal and nonverbal communication as well as social interaction which adversely affects a child's educational performance (Safran, 2008). As Safran explains, "Other characteristics often associated with autism are repetitive activities…resistance to environmental change and unusual responses to sensory experiences" (p.91). Through personal experience, the researcher has learned that people on the spectrum experience patterned and repetitive behavior, possible social impairments, and a focus of interest. Although both disorders are on the same spectrum, there are major differences between the two. Gibbons and Goins (2008) explain that people with Autism experience social and behavior impairments as well as cognitive delays, such as language and/or motor delays. On the other hand, with Asperger syndrome, Gibbons and Goins explain that, "although AS [Asperger syndrome] has some common features with autism, it does not include impaired cognitive ability or problems with language development" (p.2). Autism and Asperger syndrome are newer disorders in children today and it is crucial for educators to understand the difference between

the two in order to appropriately educate. One of the ways teachers develop programming for students on the Autism spectrum is through an Individualized Education Plan (IEP).

Many students with Autism have more severe impairments in comparison to students with Asperger syndrome. This researcher has learned that Autistic students need consistent interventions, and one of the most important skills to teach them is how to work independently. Many students with Autism can be taught grade level curriculum, with modified strategies such as hands on learning, visual cues and simplified instructions. However, there are many students who depend on their adult instructors to prompt them as they complete their daily responsibilities, even if those routines are predictable. It is important for educators to find creative ways to meet the individual and varied needs of their students with Autism.

This researcher has recognized a pattern, which is that many students on the Autism spectrum need to build their level of independence when completing mastered tasks. One way of teaching students with Autism to become more independent and become less dependent on prompts from adults, is to develop a consistent systematic instruction (Ault & Griffen, 2013). Students with significant disabilities benefit from having prompts that result in desired behavior and then fading those prompts until the behavior is demonstrated. This means that students are first taught how to complete a task correctly with the most amount of prompting, or most intrusive and then as the task is completed correctly multiple times, the adult fades the level of prompting until the student can perform the task independently.

Many researchers have concluded that the use of structured teaching in special education classrooms has proved advantageous for students with Autism. For example, a popular intervention that is used in special education classrooms is a work system developed by the Treatment and Education of Autistic and Related Communication-Handicapped Children

(TEACCH) division (Hume & Reynolds, 2010). The intervention focuses on the major areas of structured teaching including the physical structure of a student's work space. The implementation of a work space includes a visual schedule and the organization of work tasks beginning with a "start" pile and a "finished" pile. Hume and Reynolds explain that by using structured teaching and an organized work system which provides students the tools they need to work independently, students with Autism are more likely to display on task behavior.

Although students with Autism benefit from a structured and visually organized individual work space, they often require additional adjustments to sensory input. Many students with Autism have difficulty with sensory processing which often results in simple tasks becoming extremely overwhelming. Many students need additional sensory input to make up for the input they are avoiding. Murray, Baker, Murray-Slutsky, & Paris, (2009) describe these students as "sensory seekers" who "…need sensory activities that provide the needed sensory feedback and sensory input" (p.247). This means that students with Autism need adjustments to their sensory opportunities throughout the school day so they are able to demonstrate their learning in a comfortable environment.

As experience continued to build, and the pattern of sensory seeking behaviors and prompt dependency in student with Autism, continued to grow over the years, the researcher developed a theory that playing music during independent work time, might have a positive effect on students with Autism.

Statement of the Problem

The purpose of this study was to determine if incorporating music in the classroom during independent work time increased the independence of students with Autism.

Hypothesis

The hypothesis for this study is that no significant difference will be observed, between the number of prompts needed to complete independent work and music played in the classroom, for students with Autism.

Operational Definitions

The dependent variable, the students' prompt dependence, will be recorded using a daily data sheet that focuses on 10 targeted trials and the prompt hierarchy. Every day, the students will be tracked on which type of prompt they needed to complete 10 familiar seatwork tasks. Located at the top of every data sheet, there is a description of what each level of prompt looks like to the student.

The independent variable used in this study is classical music played from the school computer, every day from 8:10 a.m. to 9:00 a.m. at a medium volume.

CHAPTER II

Introduction

This literature review discusses Autism Spectrum disorder and how students with the disorder are affected within the classroom. The first portion of the review gives an overview of Autism and the characteristics and behaviors of people with Autism Spectrum Disorder. The second portion of the review specifies strategies that are used in educational programs in order to support those students on the Autism spectrum. The third aspect of the review provides a closer look into the aspect of Autism that affects a child's sensory integration and processing.

The Autism Spectrum Disorder

Throughout the past 10 years, Autism Spectrum Disorder has become a part of the common vocabulary of special educators. The media and school institutions have familiarized the public with Autism disorders and their effects. There are common characteristics and behaviors that children with Autism Spectrum Disorder display and Autism is a spectrum, where people can have a severe form of Autism or a mild form of Autism known as Asperger Syndrome. Gibbons and Goins (2008) explain that people with Autism have a significant cognitive delay as well as display characteristics such as social impairments, repetitive and patterned behavior and an absence of language. Due to the fact that Autism is within a spectrum, people can also have a mild or more functional form of Autism called Asperger's. Gibbons and Goins continue to explain that the difference between Autism and Asperger is that they both have the same characteristics except people with Asperger Syndrome do not have cognitive or language deficits.

Some of the behaviors that are demonstrated by a person with Autism would be repetitive or focused. For example, people with Autism might rock back and forth; they might spin a wheel

on a toy car over and over again or spin around numerous times. People with Autism have a lack of communication skills, such as being unable to verbalize or only verbalize a few words which are often the cause of self-injurious behaviors or aggression towards others. Another important aspect of people on the Autism spectrum is their lack of social knowledge. As Gibbons and Goins (2008) explain, people on the Autism spectrum are unable to identify nonverbal behaviors from others, such as eye contact, body language, or other emotions. For example, a person with Autism may not understand that when their peer rolls their eyes and sighs deeply, it could indicate that he/she feels frustrated. Therefore, it is often difficult for people with Autism to develop lasting friendships. In addition to these characteristics, people also have a significant cognitive delay which often warrants special education services within the school setting. Finally, one of the biggest disadvantages of being on the Autism spectrum is the sensory issues. People with Autism have sensitivities to touch, taste, smell and sound. You will often find a person with Autism is an extremely picky eater and prefers to wear headphones to filter out noise. Gibbons and Goins explain how people on the Autism spectrum might display their sensory difficulties by walking on their toes, clumsiness and extreme sensitivity to touch. Asperger syndrome varies from severe, or classic Autism because people with Asperger's will often have repetitive behaviors like people with Autism, however the repetitive behaviors might be less noticeable. For example, people with Asperger's might tap their feet repetitively or twirl their hair which is less noticeable as people with Autism who might repeat the same phrase repeatedly. Also, a person with Asperger syndrome might not pick up on social or emotional cues that as a person who is crying may need to receive comfort. However, a person with Asperger syndrome may not have cognitive or language delays. They are able to verbalize and participate in conversation as well as keep up with grade level requirements. Within both forms

of the disorder, people with Autism will often display difficulties within the educational setting in various ways. Gibbons and Goins (2008) describe that children on the Autism spectrum will often lack eye contact, which can be interpreted by a teacher as inattention, which can lead to behavior issues. As parents and teacher begin noticing the characteristics of Autism within their child or student, active voice parents begin the identification process by contacting the family doctor or school psychologist. During the diagnosis process, a variety of personnel are required to complete different questionnaires or behavior scales, based on the characteristics of the child suspected to have Autism. As Schopler, Van Bourgondien, Wellman and Love (2010) explain in their review of the Childhood Autism Rating Scale, a variety of people who interact with the child may include psychologists, physicians, teachers, speech pathologist and other people who have experience with working with people with Autism. The CARS 2 is a standardized assessment instrument used to make a clear diagnosis of a person with Autism. There are many other instruments, similar to CARS2 used to diagnose Autism, which include input from a variety of people and observations of the person suspected to have Autism. Once the diagnosis is made, it is crucial for the network of people who interact with the autistic person to implement appropriate interventions within the educational and household setting in order to build independence and ensure a positive quality of life.

Overview of Interventions Used to Accommodate Autistic Students in the Classroom

Whether it is a school psychologist or family physician, that makes the diagnosis, the educational team must work closely to provide a variety of methods and strategies to ensure the learning process is appropriate and safe. School programs will implement different behavioral and academic interventions to assist students with Autism, just as they would with the general education population. However, many Autism interventions are designed in a way that reaches

the mind of an autistic person based on the way their brain functions. One of the ways to have a successful intervention is to make sure there is consistency across all settings. Griffin, et al (2006) explain that interventions need to be consistent throughout the school day and within a highly structured environment. One type of intervention to assist with an autistic person being obsessed with sameness or routine would be a social story. A social story is a scripted story, individualized for the autistic person that would prepare him/her for changes in the school schedule. By providing a predictable environment, avoiding surprises and preparing students for schedule changes in advance, there is a smaller chance for students to display inappropriate behaviors. Another type of intervention to assist with an autistic person's oversensitivity that could cause distractions in the classroom would be to provide a work space with visual supports to help autistic students organize their space and understand what is expected of them throughout the school day. Griffin et al., explain that these visual supports provided at the student's work area, would allow them to be prepared for upcoming events throughout the school day in order to make successful transitions between locations and activities. An example of a visual support to predict upcoming events would be a picture schedule that is arranged from top to bottom on a sentence strip which has a picture of each activity of the day, such as "bathroom, work, reading, math, lunch, bathroom," etc. By providing consistent interventions in various areas of student domains, a child with Autism is much more inclined to have a successful and pleasant school experience.

Within the educational setting, one of the more problematic issues for students with Autism is transitioning between different activities. Students can have difficulty transitioning between subjects in the classroom or transitioning between physical locations in the building. One reason transitions are difficult for children on the Autism Spectrum is that they need to have

a predictable environment and if they are unaware of what they are going to complete during the next subject, they could become anxious, aggressive or shut down. Hume, Sreckovic, Snyder and Carnahan (2014), describe one type of intervention that could assist with transitioning, called priming. The priming intervention is when the student is given a preview of the upcoming subject's worksheet or activity or lesson, in order to provide a predictable environment for the next subject so the student knows what to expect during the next subject and the transition to that subject will be smooth and free of stress.

Many interventions and strategies exist for the classroom in order for students with Autism to demonstrate progress. When the intervention is used across all settings, it will be successful. One way to ensure consistency is to continuously communicate with all personnel who interact with the autistic student and update those people about the intervention to ensure that no matter where the student is during the school day, they are receiving the same interventions and strategies. Before an intervention is introduced, it is important to identify which person is responsible for which aspect of the intervention. As Hume et al. (2014) explain, it is essential to determine who will implement transition interventions throughout the day. One example would be determining who would read a morning transition social story with a student such as a teacher, peer or the parents before school.

In the educational setting, interventions that focus on behavior and transition to assist a student with Autism are crucial to making a successful educational experience. Environmental supports within the classroom can also help students with Autism. Hume and Reynolds (2010) explain how a desk should be set up with the necessary materials to support students with Autism. A work system is an organizational way to provide autistic students with visual cues about what their assigned activities are and how to complete each work task. An effective work

system at a student's desk or table, will show the student how much work they need to complete, which tasks they are required to do, how the students know that progress is being made and what their expectation is after they are completed all of their work. One example of a work system would be a plastic bin on the left side of the desk with four activities. There is a number line on the desk with Velcro numbers 1 through 4. As the student completes each task, they place the corresponding number on the line. After each task is finished, they place the completed activity into a second bin on the right side. Once all four tasks are completed, the student checks their visual schedule and moves on to the next event on their schedule.

The benefit of using work systems is that students are given the opportunity to increase their independence when working on familiar tasks. Work systems can be used throughout the student's life and can be adapted to fit individual's needs. For example, they can use a work system during their school years to complete academic activities and can generalize the work system into their vocational training in their teenage years to complete tasks at a paid work location (Hume & Reynolds, 2010). By implementing work systems within classrooms and pairing the work systems with various interventions that are used across all school settings, students with Autism are more likely to access the curriculum and participate in activities successfully and happily.

One of the recurring themes that literature suggests in regards to educating students with Autism is consistency. Numerous areas of literature discuss the importance of early interventions with autistic students as well as environmental supports, communication between staff members and strategies to help with interventions. Another example on how to provide consistency and encourage autistic students to generalize their skills within the home and community would be to complete homework. Carrying skills into the household is essential in building independence in

children with Autism. Hampshire, Butera and Dustin (2014) describe an 8 step list which creates a specific homework plan for students with Autism. The first step is to determine the team members of the homework plan which include the primary school personnel working with the student as well as the student's caregivers. The next step in the plan is to determine the goal of completing homework which is individualized for each student. For example, a homework plan for one student would be to complete homework accurately, whereas another student's goal might be to complete the homework independently. The third step in the homework plan is to determine the content of the homework which ties into the goal of the homework. If a student's goal is to complete the homework independently, then the content of the homework needs to be made up of a mastered skill or familiar task in which the student can complete without any adult assistance. The next step in the homework plan is developing and utilizing a checklist which is a visual support system that helps

the student understand what expectations exist when completing homework as well as a step by step list of "to dos" which serve as a self-management tool. The homework checklist is another example of a visual schedule which helps the student remains in a predictable environment. The fifth step in the homework plan is to develop and utilize the homework rules which are reviewed with the student before every homework session. The rules are to be individualized for each family. For example, if a child has trouble remaining in the designated homework work area, a rule might be that each homework task needs to be completed before leaving the area. As the student masters various skills or a behavior comes under control, that specific homework rule might be removed from the list as needed. The next step is to determine a reinforcement plan in which the student chooses a reward to work toward, prior to the homework session. For example, a student might choose to work for 15 minutes of watching television after homework is finished.

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So if the homework checklist is completed and the homework rules are followed, the student can earn their reinforcement. Next, before the team implements the plan, they need to decide if any additional training is needed. For example, if a parent feels the need for clarification on a specific step within the homework plan, he/she might meet with the special educator for some assistance or help, so that the homework plan is implemented appropriately from the start. Finally, the last step in the plan is to collect data before and during the time the homework plan is implemented in order to evaluate the student's progress with their specified goal(s) and revise the plan as needed. By developing and utilizing strategies at home, such as a homework plan, students with Autism are provided with consistency and an opportunity to generalize their skills and independence across all settings.

Finally, as interventions and strategies are implemented throughout all settings of an autistic person's life, it is important for the teachers and caregivers to be specific with how the child is prompted to complete tasks. Literature suggests that students with Autism are able to build their independence when they are taught using decreasing prompts. Ault and Griffen (2013), describe a system of least prompts which is a step by step procedure used when teaching autistic children a new task in an academic or functional setting. The basic procedure of the system is that when a new task is introduced to the child; the instructor gives a verbal direction and waits for a response. If there is no response, or if the response is incorrect, the instructor gives the least intrusive prompt such as a verbal prompt to "try again" and waits for the response. The instructor repeats the sequence until the child performs the task correctly. When the task is completed correctly, at any time during the sequence, the instructor provides the child with a visible reinforcement and records the type of prompt that was necessary for completion. The system of least prompts is repeated until the autistic child has mastered the task and can do so

independently. The goal of the system is for students to complete tasks independently and not become dependent on adult prompts. As the autistic child is rewarded earlier and more frequently, when given a direction, the child is motivated and able to complete tasks independently. By using this prompt hierarchy of least intrusive to most intrusive prompts across all settings, the child is able to perform consistently and not become dependent in specific areas. For example, a child might be able to unpack his/her belongings independently in the school locker, but might need constant prompts to unpack at home in the garage because he/she is dependent on the caregiver providing prompts to complete that task. Therefore, if all persons who interact with the autistic student are on the same page with how the student is prompted, the level of independence should increase and remain consistent in all areas.

The Sensitive Side of Autism

Along with the need for consistent behavior and prompting strategies for students with Autism, various authors indicate the need to understand the sensory deficits of a person with Autism. Students with Autism are affected by various sensations throughout the school day that can negatively affect their level of independence. Murray, et al. (2009), explain how the behavior of autistic children is actually a way to communicate their needs at the moment. One aspect of the Autism Spectrum Disorder is difficulty processing sensory information such as touch, sound, and movement. Students with Autism will often have difficulty sensory processing as well as seeking ways for more sensory input. For students with Autism who are seeking more sensory input, one strategy to use in the classroom during written language practice would be to use a weighted or vibrating pencil or writing in an inclined board or the use of sandpaper under written work. This strategy gives the autistic student sensory integration and feedback while

participating in school work. According to Murray et al., another strategy to use in the classroom

with students who are under responders, or lower functioning students with Autism who do not

engage with others and often seem in their own world, would be a multisensory approach to

academics. For example, a student with complex sensory needs will be unlikely to respond to an

academic task because the task is not meaningful. Students with autism need to have

opportunities to explore different sensory approaches to their academic activities in order for

them to retain the information. For example, if the teacher is giving a reading lesson about an

informational text about United States leaders, the student should be able to touch an American

flag, listen to the National Anthem, taste a common American food, and watch a short video clip

about the United States. If the story mentions leaders such as Abraham Lincoln, the student

would benefit from touching fur to represent the beard on Abraham Lincoln's face and touch a

cherry blossom to represent Washington DC. Therefore, it is crucial to provide students with

Autism sensory feedback within the school setting in order to make the content meaningful,

memorable and motivating for the autistic student to participate and attend to the activity.

Although modifying instruction and providing sensory feedback is important for students

with Autism, educators also suggests the ways in which sensory needs can be supported through

music and other multimedia supports. Radley, Jenson, Hood, Clark and Nicholas (2014) explain

an additional benefit to using multimedia supports for students with Autism which is to include

non-disabled peers within the strategy to increase opportunities for socialization. Most children

with Autism have difficulty socializing and communicating with their peers so it is necessary to

teach social skills, rather than expect autistic children to understand social cues through

experience. By understanding their sensory and social needs, instructors can implement social

skills training through the use of music, and during "play" or "free time" periods throughout the

school day. One program, the Superheroes Social Skills, gives the instructor an opportunity to identify the weaknesses in the areas of socialization and follow a lesson sequence to teach those skills through music and turn taking with the student's peers. If a student is unable to express their wants or needs, by participating in the turn taking game Go Fish their Superheroes Social Skills lesson sequence might be a 4 step program to understand how to: Decide what you want or need, wait for a pause, give a signal, wait for the person to respond. Another example would be if an autistic student had difficulty getting ready for a lesson, the program follows a sequence to teach the targeted skills of joining the group, sitting nicely and looking at the teacher, through a game of musical chairs. Instructors can use musical games and turn taking opportunities to allow students with Autism to increase their socialization while meeting their sensory needs.

An additional accommodation that needs to be made in order to assist with sensory processing is to adapt the materials that students work with on a daily basis. As Abramo (2012) explains, music education is an essential part of a child's development, even if a child has a disability. Students with Autism or other disabilities continue to need access to all aspects of education, and it is up to the educator to make those accommodations in order to meet those needs. Abramo discusses how students with Autism or other disabilities might need modified instruments to be used in music class in order to access the music education and perform with others. Another example is that a student might need to wear headphones during music class to filter out the over stimulating noises so that the student can participate using both hands on the instrument, as opposed to covering their ears. Students with cognitive, sensory or physical disabilities have a right and access to education and can do so with various accommodations put in place by all educators who interact with those students. Specifically, students with Autism can

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participate successfully in educational activities, especially those activities that are motivating such as music, as long as their physical and sensory needs are met.

Another example of how sensory needs can be met within the educational setting is through the use of Picture Communication Symbols (PCS), which are labeled picture cards that are available for students to express their wants and needs (DeEtoile, 2014). One of the ways music teachers can use PCS in their classrooms is by providing the symbols for students to refer to as they make requests to use an instrument, helping students understand new information, and giving them a visual cue for a list of expected behaviors, identifying feelings and various musical concepts. A student with Autism who is nonverbal may pick up a PCS for "quiet" when requesting the volume to be reduced. A student with Autism who is verbal may just need the PCS for "sit", "nice hands", "nice feet" and "quiet mouth" posted on the board for visual cues for expected behaviors. Regardless of the student's need for PCS, it is crucial for students with Autism to have a means of communication in order to express their sensory needs. By communicating through pictures such as PCS, students with Autism are less likely to display interfering behaviors within the educational setting and more likely to initiate conversation or make a request which also serves as a functional life skill.

Conclusion

Autism Spectrum Disorder is a common disorder that affects many students in today's world. The literature discussed, provides explanations of common characteristics a person with Autism may display. The literature demonstrated how a student is commonly diagnosed with Autism and provides a broad explanation of the identification process. Students with Autism need early intervention within their home and school settings to gain and maintain independence.

The interventions and strategies provided within the literature, demonstrate effective ways to implement and monitor programs to assist students with Autism within the domains of academics, behavior and sensory processing.

CHAPTER III

METHODS

This study was conducted to determine the effect of music on the level of prompt dependence in students with Autism.

Design

The study used a quasi-experimental design which measured the number of prompts students with Autism needed to complete their work tasks as music played. The study used a pre-posttest design using data collected from the students' performance during their independent work time. The data measured the number of prompts each student needed to complete their work. The dependent variable was the number of prompt each student with Autism needed to complete their assignments. The independent variable was playing music in the classroom while the students worked. The intervention was implemented for 6 school weeks which was 29 school days.

Participants

The participants in this study were a convenience sample from an intermediate grade level special education class of ten students. All of the students had an Individualized Education Plan (IEP) and all had the diagnosis of Autism. Four of the students were African American; five of the students were White/Caucasian and one was another race. Four of the students were in third grade, four of the students were in fourth grade and two of the students were in fifth grade. For communication, eight of the students could verbally request their wants and needs, while two used an IPAD or Picture Communication Exchange System (PECS). All of the students had a goal or objective on their IEP regarding the ability to build independence and decrease the amount of adult support needed to complete familiar or routine tasks.

Instrument

The instrument that was used in the study was a table that indicated ten trials, or opportunities for students to initiate and complete their familiar tasks at their desk. The table also included the prompt hierarchy. The hierarchy included independent opportunities, verbal prompts, gesture prompts and full physical prompts. The prompt hierarchy was listed from the least physical prompting from an adult (independent), to the most physical prompting (full physical). The table described a key to clarify how each prompt is demonstrated.

The instrument was used to collect data on every school day while the students completed work tasks at their desk. Student data on IEP goals and objectives throughout the school year were collected (See Appendix A).

The researcher tracked data on a student while they work with music playing, the researcher might have written in the comments section about how that student had arrived at school late that day or was recovering from a fever. Therefore, when the researcher reviewed the results, those types of factors were taken into consideration.

Procedure

The students arrived in their classroom between 7:40 a.m. and 8:05 a.m. The school day began at 8:10 and at that time, all 10 students were required to check their daily schedules and sit at their desks. Once the students were seated, the teacher in the classroom began to play classical music through the classroom speakers using a basic music player from the computer. The teacher and three para educators were assigned two or three students to supervise while the students worked. The teacher and para educators monitored their assigned students and recorded data throughout the student work time. The data was completed when the student either finished his/her work or work time was finished at 9:00 a.m. and the students moved on to the next

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activity. At 9:00 a.m., the music was turned off and the students participated in the rest of their school day. The next morning, the same routine occurred, except the staff members monitored a different set of students so that they did not observe the same students every day. Student data was collected for six weeks prior to the intervention. The intervention was introduced and student data was collected for five consecutive weeks. The data table also included a "comments" section to allow the instructor to record anecdotal data. This data was important because the researcher noted any behavioral or physiological changes to each specific student.
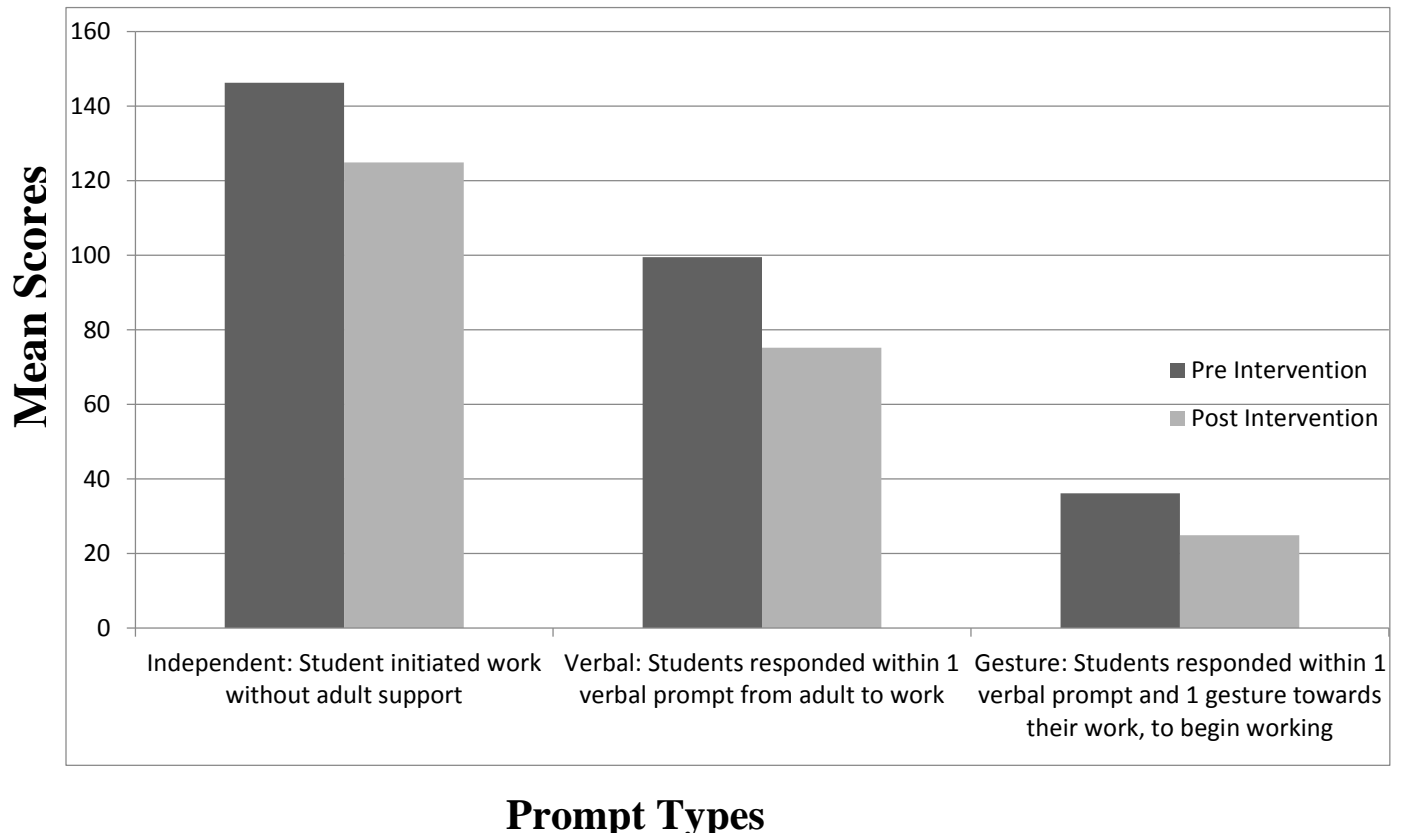
CHAPTER IV

RESULTS

Before the intervention, the special education students obtained a mean score of 146.30 in the area of "independent"(independently initiated and/or completed a specific work task at their desk, without any prompts from their instructors). After the intervention began and music was playing during independent work time, the students decreased in their level of independence to 124.90. Although the mean scores during the post intervention decreased, the difference was not significant, t (9) = 1.26, p=.24.

Before the intervention, the students obtained a mean score of 99.50 for verbal prompts (students did not initiate and/or complete a specific task independently, but responded within one verbal prompt). After the intervention, the mean number of verbal prompts decreased to 75.20. Although the mean scores for verbal prompts decreased during the post intervention, the difference was not statistically significant, t (9) = 1.77, p=.11.

Before the intervention, the students obtained a mean score of 36.20 for gesture prompts. This means that the students did not initiate and/or complete a specific task independently and did not respond within one verbal prompt. The students needed one gesture prompt to respond which was demonstrated by the instructor giving a verbal prompt first and when there was no response, the instructor physically gestured toward the work task that needed to be completed. After the intervention began, the students decreased their need for gesture prompts, which was evident by the mean score of 24.90. The difference between the pre and post interventions showed a decrease in the gesture prompts however, the difference was not significant, t(9) = 1.14, p=.28.

Figure 1:

Pre/Post Intervention Data – Music and Autism Study

CHAPTER V

DISCUSSION

The hypothesis for the study about the effect of music on the productivity of students with Autism was that no significant difference would be observed between the number of prompts needed to complete independent work and the use of music played in the classroom, for students with Autism. The study determined that the original null hypothesis was supported. According to the data that was gathered, no significant difference was observed.

Implications of Results

The results of the study showed that there was no significant effect on music in a special education classroom of students with Autism. The music did not have an impact on the students as they completed their independent work. The music did not show a significant impact on the level of prompts students needed to maintain or improve their independence. The study helps an educator understand what type of multisensory strategies may or may not impact students with Autism. As a result of this study, the population of students who participated in the intervention did not demonstrate any major change in their behavior or productivity. The null hypothesis was supported.

Theoretical Consequences

The results of this study support the theory that students with Autism need a highly structured and predictable environment, in order to increase their independence (Griffin et al., 2006). The participants in this study were in a classroom with the visual supports which the literature suggested using, such as a picture schedule and a systematic work space. In addition to the environmental supports, the students continued to be taught with the system of least prompts, also as the literature suggests (Ault & Griffen, 2013). The staff in the classroom remained

consistent and implemented the strategy of using the least to most prompting as the students completed their tasks. The results of the study showed how students maintained a level of independence, given an environment that supports their sensory needs. Although the results showed that there was no major significance between before and after the intervention, there was no regression in their skills.

The results of this study do not however, support the theory that many students with Autism need to have advance preparation for changes in the environment (Hume et al., 2014). Also, the study does not support the theory that students with Autism are extremely sensitive to sound and this sensitivity could cause changes in their behavior. The participants in this study, did not show any major changes in their independence during their seat work time, as classical music was played. According to theory, it is common for students with Autism to be affected by sensory changes such as auditory input (DeEtoile, 2014). However, the result of this study showed that this group of students was not greatly affected by the sensory change and the music did not have an effect on their level of independence.

Threats to the Validity

The most influential threat to validity in this study was differential selection which was the convenience sample. The participants of the study were students in grades third through fifth, all of which were diagnosed with Autism. This particular group had previous knowledge of the classroom routine and had developed the ability to complete at least portions of their tasks independently. The selection was made for convenience since the population was made up of the researcher's students. Also, the sample consisted of students with the same disorder who are enrolled in the same elementary classroom and follow the same routines.

Using a convenience sample in a research study makes it difficult to generalize the results to varying populations. For example, if the study was conducted in the primary grades in a different school using students with Autism, the results may vary. If the students were chosen randomly from different ages and classrooms in the county, the results would increase generalization. However, for the purpose of this study, the convenience sample was sufficient due to the fact that the research was aiming to find whether or not music had a significant impact on the independence of students with Autism.

Connections to Literature

During the preparation for this study, the researcher did not find numerous studies directly relating music to increased independence during work time for students with Autism. However, literature does exist relating music to increased social skills for students with Autism. For example, Radley et al. (2014) study found an increase in social skills through the use of musical games in order to prepare students with Autism for activities such as a whole group lesson. The authors described a program, the Superheroes Social Skills, which allowed the teacher to identify the students' weaknesses in the area of socialization. The teacher then followed a lesson sequence utilizing music and turn taking, to improve those weak areas. The study found that the children with Autism who participated in the musical lessons, demonstrated an increase of social interactions within a group of their same age non-disabled peers.

The main difference between the current study and the previous literature, is that the current study did not show significant statistical growth. Furthermore, the previous study (Radley et al, 2014) used music as a strategy for social skills where students were required to tune in and utilize the music to their assistance. The current study however, used music in a different fashion

which included a classical form as a calming strategy to help students with Autism focus on their independent work and decrease their dependence on adults.

Implications for Future Research

A suggestion for future studies would be for the researcher to utilize different strategies in order to generalize the study. For example, the researcher could use a random sampling of students in Anne Arundel County who are diagnosed with Autism, but of different ages and at different schools. That way, the study would be generalized to the population and not be limited to one set of students in one classroom who were already used to the classroom routines. However, the research does inform the educator that those students were greatly affected by music in the classroom. This information is helpful for the teachers for the following school year to understand and plan accordingly.

Another change that can be made in future studies is the type of music playing the classroom as the students work. In this study, the students listened to calm, classical music as they completed work at their desks. Instead, the teacher could play lyrical music, or music with words, to see if the change in music has a different result. The revision to the music could vary from the current result of the study by showing a significant statistical difference between the pre and post intervention.

Finally, future researchers could utilize different timing to implement the study. For example, the study would begin during the first week of school when the students return after the summer break. The researcher would track the student's prompt dependency during their seat work for the first quarter of school. Next, the researcher could implement classical music for the second quarter and continue to track the data. The researcher could analyze the results and complete the third quarter with lyrical music and track the data in the same way as the previous

quarters. By the fourth quarter, the researcher would have a better idea about which type, if any, music resulted in significant changes in the statistical data. Also, by completing the study for a longer amount of time and differentiating the music types, the researcher would be able to definitively explain any changes in the students' levels of independence.

Conclusion

The researcher observed that on days where there were changes in the school routine, such as two hour late arrivals due to snow, students were more likely to depend on prompting from adults. Due to the timing of the study, the post intervention was conducted during the winter months, where the county experienced more snow days and snow delays. So there were more instances of daily schedule changes during the post intervention compared to the pre intervention. Therefore, it is reasonable to assume that the students became more dependent on prompting of adults due to the difficulties students with Autism have with changes in routine, instead of as a result of the music.

Appendix A

		Score: I→ Student answers correctly independently
		V→ Student answers correctly after 1 verbal prompts such as, "Try again"
		G→ Student answers correctly when you gesture in the area of the correct answer
		FP→ Staff places their hand over the student's and guides it towards the correct answer

Date	Staff:	Trial	I	V	G	FP	Date	STAFF:	Trial:	I	V	G	FP
COMMENTS:		1					COMMENTS:		1				
		2							2				
		3							3				
		4							4				
		5							5				
		6							6				
		7							7				
		8							8				
		9							9				
		10							10				
Total									Total				

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