2020

Therapeutic Interventions that Increase Engagement for Students with Autism

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THERAPEUTIC INTERVENTIONS THAT INCREASE ENGAGEMENT FOR STUDENTS WITH AUTISM

A MASTER'S THESIS

SUBMITTED TO THE FACULTY

OF BETHEL UNIVERSITY

BY

RACHEL BERNDT

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF ARTS IN EDUCATION

APRIL 2020

BETHEL UNIVERSITY

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APPROVED

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Acknowledgements

A special thank you to the advisory staff at Bethel University, my family, and my friends for continuous encouragement and support throughout this process. I look forward to applying my new found knowledge regarding therapeutic interventions to improve the educational experience for my students with an autism spectrum disorder.

Abstract

Students with autism require unique programming to increase engagement in the classroom setting. This literature review is a collection of research-based studies involving animal assisted interventions, music therapy, art therapy, speech-language therapy, occupational therapy, and cognitive behavioral therapy. The results of these studies suggest that when provided the therapeutic interventions listed above, students with autism increase engagement in the classroom due to the expansion of language and social communication skills and the decrease of maladaptive behaviors. Given purposeful and collaborative therapeutic interventions, students learn how to problem solve, collaborate, and communicate with adults and peers. Sensory processing challenges are addressed and environmental stimuli are better tolerated. Educators should collaborate with parents and therapists to provide a well-rounded educational program that enables students to their full potential in the classroom. Meaningful learning occurs when basic needs are met and students are able to focus and communicate effectively in the classroom.

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CHAPTER I: INTRODUCTION

Educators question, assess and adjust when teaching all students in their classrooms. Students with disabilities require unique programming which includes collaboration with qualified support staff, therapists, and parents. The guiding question of, “which therapeutic interventions increase engagement for students with autism?” drives educators to seek out research-based interventions to use in the classroom setting.

The History and Due Process of Special Education

Students with disabilities have been attending school in the public setting since the Rehabilitation Act of 1973 and are entitled to receive a “free and appropriate public education” through the Individuals with Disabilities Education Act of 1990 (Torreno, 2020). The rate of children with an autism spectrum disorder has risen from 1 in 150 children in the year 2000, to currently 1 in 59 children (Centers for Disease Control, 2019). SWIFT Guide, a resource from the IDEA website, encourages inclusion for all students with disabilities, through the use of collaborative planning and support from special education staff and therapists. The opportunity improves the quality of life for students with special education needs, by promoting social interaction with peers and providing exposure to the grade level curriculum.

Autism spectrum disorder is a medical diagnosis that involves the following criteria taken from the Diagnostic and Statistical Manual of Mental Disorders (DSM-5): “deficits in social communication and interaction including social-emotional reciprocity,

nonverbal communicative behaviors, and developing relationships, along with restricted and repetitive patterns of behavior, interests, or activities including stereotyped or repetitive movements, insistence on sameness, highly restricted interests, and hyper- or hypo-reactivity to sensory input" (Autism Speaks, 2020). Students are able to qualify for special education services, without a medical diagnosis, under the autism spectrum disorder disability category, if the evaluation process proves they display significant deficits with social interaction skills, communication/language skills, and restrictive interests or repetitive movements (Minnesota Department of Education, 2019). The learner-based needs from the evaluation results drive which services a student qualifies for. The Individual Education Plan (IEP) team implements an appropriate program for the student within the school setting. A medical diagnosis opens the opportunity for outside therapy services. The most common services for autism spectrum disorder are speech-language therapy to increase communication skills and occupational therapy to increase sensory processing and tolerance. Animal assisted intervention, music, art, and cognitive behavioral therapies are also available through private practices to increase communication, social interaction skills, and sensory processing, while decreasing maladaptive behaviors.

A Therapeutic Approach

Professionals in the field of autism suggest ways to help people with autism cope with the world around them. Prizant (2015) offers a fresh perspective in his book, *Uniquely Human,* where he identifies "human behaviors and responses" (p. 5) which

appear to be a dysregulated overreaction, brought on by environmental stimuli (p. 18-19). He goes on to explain that all emotions are human, but people with autism have a challenging time regulating their emotions. Prizant (2015) encourages the professionals to seek out “clues” (p. 20) for triggers that cause dysregulation. Greene (2008) consults with families and schools to facilitate his collaborative problem solving model. He dissects social and behavioral problems while including the student in the problem solving process and coaching the adults through a supportive process to help find a “realistic and mutually satisfactory solution” (p. 52, 117) for all parties. Both work to address more than the outward evidence of an individual’s disability to mitigate “underlying causes” (Prizant, 2015, p. 18) or “lagging skills” (Greene, 2008, p. 11) that present challenges, by treating people with disabilities respectfully.

The concept of providing therapy for social and emotional needs dates back hundreds of years. For example, music therapy was used to treat war veterans in the 1800’s (American Music Therapy Association, 2020). Later, soldiers in the Air Force began working with animals on a farm in 1945 (Milligan, 2020).

Therapy programs compliment the problem-solving process by treating underlying issues that cause dysregulation. The proactive strategies teach coping skills and decrease dysregulation within the home, school, and community. By decreasing lagging skills and identifying underlying causes, people with an autism spectrum disorder are able to experience positive interactions with the people and environment at school. Given the theory that “kids do well if they can, not if they want to” (Greene,

2008, p. 10), all humans are designed to thrive and connect with the world around them, but some lack the skills to do so. Collaborative programming is successful because it presents an approach that allows the invested adults such as the teacher, therapist, and parent to focus on the child's needs and potential (Prizant, 2015, p. 166-167). Animal, art, music, speech-language, occupational, and cognitive behavioral therapy help people with autism and other disabilities connect with their surrounding environments. The Biophilic Hypothesis is the human relationship with nature and the innate drive to connect with nature (Rogers, n.d.). This example of a natural connection between humans and animals supports and helps to explain the reasoning behind animal therapy.

Given the variety of student needs within a classroom and the expectation for inclusion, educators are left wondering, "which therapeutic interventions increase engagement in the classroom, for students with autism?" The following research studies address the duration, frequency, and intensity of various interventions used to increase social communication skills, speech-language skills, and purposeful engagement for students on the autism spectrum. Collaboration between IEP team members and outside therapists provides a well-rounded and individualized program from students in the public school setting.

CHAPTER II: LITERATURE REVIEW

Literature Search Procedures

To locate the literature for this thesis, searches of ERIC, Springer Link, Research Gate, Google Scholar, EBSCO Megafile, and Education Journals were conducted for publications from 1995-2018. This list contains empirical research in peer reviewed journals that focus on autism, the characteristics of autism, and therapies that improve social communication, language, sensory processing, attention, and decrease repetitive behaviors. The key words that were used in these searches included “Empirical research” and “studies” for: “(animal, music, art, occupational, speech and language, cognitive behavior) therapy for autism,” “social communication and autism,” “autism in school,” “early intervention for autism,” “anxiety and autism” and “characteristics of autism.” The structure of this chapter is to review the literature on the various therapies in this order: animal assisted interventions, art therapy, music therapy, speech and language therapy, occupational therapy, and cognitive behavioral therapy.

Key words: Autism, autism spectrum disorder (ASD), animal assisted intervention (AAI), art therapy, music therapy, speech-language therapy, occupational therapy, cognitive behavioral therapy (CBT)

Animal Assisted Interventions

Animal assisted interventions (AAI) have been used within the private and public settings since 1945, when Pawling Air Force Base in New York, had wounded soldiers work with farm animals (Milligan, 2020). Several empirical research studies have shown

that purposeful interaction between humans and animals has proven effective for increasing engagement with social interaction and language use while decreasing anxiety and depression for individuals with an autism spectrum disorder (ASD). There are limited studies within the academic setting, and in most cases, a trained therapy animal was used. However, studies have shown that animals in general provide a "calming, non-judgmental" presence (Stevenson et al., 2015, p. 343). Therapy animals are used for people of all ages, but this paper will focus on the positive effects for school-aged students. From reading to a dog in the library, to playing catch with a dog, animals have become a social and academic buffer for students with autism because they offer a more predictable pattern of behavior that requires less effort on the student's part to read social cues (Sams, Fortney, & Willenburg, 2006). Therefore, the students are more willing to engage with an animal as compared to a teacher or peer.

Sams et al. (2006) measured the effectiveness of animal therapy for children with autism. In this study, 22 children received weekly animal therapy sessions with llamas and dogs, along with weekly traditional occupational therapy sessions that focused on sensory integration, language, social skills, and motor skills. All of these skills contribute to student success within a classroom setting. Given data from language use and social interaction rating forms, trained research assistants concluded that the students experienced a gain in purposeful spontaneous language and social interaction when they participated with the animals, when compared to a traditional therapy session with inanimate learning tools. These positive effects lasted after the animals

were no longer present. Through the use of animals, the students were able to experience an intrinsic motivation for using reciprocal social interaction with an animal while also receiving sensory integration therapy (Sams et al., 2006). Ninety-nine percent of occupational therapy programs address environmental stimuli by incorporating sensory integration into the therapy program (Sams et al., 2006).

Intrinsic Motivation

The intrinsic motivation provides an incentive for the students to continue participation and acquire new skills, which transfer over into a classroom setting. Teachers can and should use every opportunity and natural reinforcers as motivation to teach social skills within the context of a social situation (Koegel & Koegel, 2006).

Animals provide additional motivation because their presence reduces anxiety, allowing students to focus on the curriculum and work while in class. Animals are perceived as nonjudgmental, so the students naturally engage more often with an animal presence.

Versatility

Several studies have proven that positive effects of animal intervention and therapy are not contingent on the level of functioning of an individual with autism. All individuals experience benefits. However the range of success differs depending on the skill set of the individual. For example, Stevenson et al., (2015) incorporated animals into occupational therapy sessions and concluded that all three individuals made varying levels of progress, given their baseline abilities and displayed increased social

interaction and decreased sensory/ ritualistic behaviors while the dog was in the room. Each student had slightly varied results regarding the following areas measured: play duration, visual duration, vocal duration, expressed pleasure, play alone duration, sensory/ritual behaviors duration, negative behavior frequency.

The Role of the Adult

In most cases, the therapy session or interaction with the animal was most successful when the adult was able to fade from a directive role to a supportive/ facilitative role. This allowed the student to take ownership of the interaction, increasing the need for the student to display social communication skills with the animal (Stevenson et al., 2015). Facilitated interactions help students to work towards independence and generalization of skills. This is most important when seeking inclusion within the general education setting, as students are expected to function within the large group setting, at a similar pace to their general education counterparts.

Implications for Families

Parents and siblings long for connection with their family members on the autism spectrum. Application of therapy in the home is vital to one's ability to generalize social skills and emotional regulation outside of the school setting. Two studies indicated that parents and siblings of children with autism had an overall positive experience with animal assistance at home and in the community.

In 2014, Burgoyne et al. conducted a study in Ireland that measured parent satisfaction and opinions about child safety with environmental dangers, the public

perception of autism spectrum disorders, and levels of caregiver strain and sense of competence. Parent rating scales indicated that animal assistance was beneficial because it reduced environmental hazards and increased a positive public acceptance for children while in the community. These positive results enabled families to spend more time within their communities. Caring for the animal was recorded as the primary constraint, as it added more responsibility for the family. However, the common consensus was that the effort was worth it (Burgoyne et al., 2014).

A separate study in Australia measured five main themes including: love and companionship, perception of ownership, comfort and calming influence, ability to assist with understanding the world, and challenges. Although the study mentions canine companions, a variety of other animals were included as well, depending on the other pets in the home or on the property. Audio recorded parent interviews were used "to promote discussion about different aspects of the mothers' observations and perspectives on the nature of the child and canine companion's relationship and to discuss issues associated with the management of the child and companion animal relationship" (Harwood, Kaczmarek, & Drake, 2018).

Harwood et al. (2018) discovered that the children felt love towards the animals, missed the animals when separated, and that the animals provided a sense of companionship when the children felt lonely. Although most of the feedback was positive, negative feedback was shared primarily from mothers of younger children, as the child's behaviors impacted the ability to form a trusting relationship between the

animal and the child. Some parents reported children considering the animal to be another child in the family or at the very least, an important part of the family. Developing a loving relationship produced a sense of ownership and motivation for the child to care for the animal. Ideally, this skill would transfer to caring about the other family members at home and peers at school.

Many children with autism spectrum disorder have an aversion to or a need for sensory input. The animals were reported to have a calming effect on the children, given the increased sensory experience of petting the animal and the weighted or deep pressure to the child's lap (Burgoyne et al., 2014). Some parents reported that the animal was a positive distraction amidst a tantrum, whether the child sought out the animal or visa-versa. However, one parent reported that the child would display harmful behavior towards the animal or the child was set off by the barking (Harwood et al., 2018).

Universal concepts and cultural and social norms are often abstract for children on the autism spectrum. This study concluded that having a family pet or therapy animal in the home helped to explain the concepts of life and death to children with autism. Parents shared that one child was able to connect the death of a pet to the permanency of a grandparent's death. Children were reported to learn empathy while interacting with and caring for their pet. Self-regulation and social skills were gained as children learned how to read the animals' body language, react gently, and give personal space when needed.

Harwood et al. (2018) found that most families felt tremendous benefits from canine and other animal companions in the home. Not only was the animal a catalyst for social interaction, but a tool to teach self-regulation, directly connected to natural consequences. Out of eleven families, only one reported that they would have preferred to not have owned the pet, given the extra responsibility and their child's negative behavior towards the animals. One other perceived drawback is that it can take a while to find the right pet for the family, given the child with autism has a unique set of needs and challenges.

The two studies listed above show that approximately 80-90% of families were satisfied with the outcome of animal companions and animal therapy within the home. Indirectly, parents and siblings benefited from increased positive social interactions with the family member on the autism spectrum (Burgoyne et al., 2014; Harwood et al., 2018).

Therapy Dogs in the Classroom

In 2014, Hediger and Turner led a study within a classroom in Switzerland to determine if animals were a distraction in the classroom. 24 students who did not have an ADHD diagnosis, learning problems, were on medication, had pet allergies, a fear of dogs, or have ever owned dogs were selected. The students were not receiving other therapy services at that time. Hediger and Turner (2014) measured the human brain's response to a real animal compared to a robot animal and found that the students were more engaged, demonstrated fewer errors in their work and had higher brain activity

and increased dopamine levels with the real animal. There was very little to no impact from the robot. A questionnaire reported that 91.7% of the students preferred the real dog over the robot because of the perceived support which may have had a positive effect on attention and concentration in the classroom. The study suggests that therapy dogs are not a distraction in the classroom and that the students do not have to have a relationship with the animal to experience positive effects. However, the results were unclear whether the effect would last without the presence of a dog, if the novelty wore off, or if the activity lasted more than 15 minutes.

Documented Outcomes

Overall, the use of animal-assisted intervention, animal therapy, and animals as pets, in the home, school and community settings, are suggested to be effective in the areas of increasing positive social interactions with family members, peers, and adults. Children have experienced an increase in language, social communication, emotional regulation, and decreased repetitive behaviors (due to sensory overstimulation or anxiety) while around animals. These positive changes lead to an increased amount of time on task, connecting with others, and participating in the scheduled activity.

Art Therapy

According to Gradschools.com, graduate programs for art therapy were introduced in the United States during the 1950's, at Drexel University in Pennsylvania, and in the 1960's at New York University in New York. Counter to what one may think, the main purpose of art therapy is not to increase the artistic ability of the student, but

rather to model, teach and guide the student through the process of problem-solving while increasing flexible thinking, tolerance, and collaborative skills (Schweizer, Spreen, & Knorth, 2017). These skills are needed to increase independence in the home, school, and community settings.

Although most studies cited in this paper used smaller sample sizes, the following research studies support that the delivery of art therapy in a one on one or small group environment can improve language, social communication and flexible problem-solving skills, while exposing the students to tactile sensory stimulation using a variety of mediums (Schweizer et al., 2017).

Small Steps Lead to Lasting Progress

Given the nature of the disability, students with autism spectrum disorder do best in smaller, controlled environments. Art therapy seeks to meet students where they are and gently push those students into their zone of proximal development (McCleod, 2019), by providing routine, structure and reasonable social and functional expectations. These expectations in some ways mimic activities found in school, in an attempt to help students generalize skills to their classrooms. Most of the studies cited show progress in skills considered to be a prerequisite to functioning in school.

In 2017, D'Amica and Lalonde produced a study which measured the effectiveness of art therapy for teaching social skills and increasing class participation for children with autism spectrum disorder. This small Canadian study involved 6 middle school students with a diagnosis of ASD, average intelligence, and good language skills.

The students participated in 75 minute sessions, for 21 weeks. Over this time period, students were given the opportunity to participate in a warm up activity which introduced them to the topic and medium used during the class, create and explore the art project, and present their project to the class. The therapists noted that as time went on, the students required less adult support to communicate. The students enjoyed giving and receiving feedback, offering assistance and commenting about each other's art pieces (D'Amico & Lalonde, 2017).

Overall, the results on the parent and student forms of the Social Skills Improvement System– Rating Scales (SSIS-RS) were not remarkable from the pre assessments to the post assessments. However, the students made notable gains on the subscales for cooperation and assertion. This is a result of the processes and routines throughout the art therapy sessions, which taught the skills necessary for presenting information and providing feedback. By the end of the study, the parents and students reported an increase in confidence, artistic skills, and tolerance to tactile sensory input. Decreased hyperactivity and inattention were also reported. The increase in attention, reciprocal communication skills, and flexible thinking transfer to the classroom, as general education standards require students to create, share out, seek feedback, and revise their work accordingly.

There were four drawbacks to the D'Amica and Lalonde study. First, there was a small sample size. Second, a control group was not used. Third, there were few remarkable outcomes noted on the post assessment. Finally, a third party, such as a

teacher, should have been used to complete the rating scale, to increase the reliability of the scores. Nevertheless, positive results were shown in areas that contribute to student functioning within a classroom setting.

Improving Evidence Based Practices

By nature, art therapy has produced qualitative results. The therapists, parents, and teachers who work with the students are able to identify growth in the areas of language development, social communication, and decreased restrictive and repetitive behaviors. However, there is a push to provide quantitative data to support that art therapy is an evidence-based practice for students on the autism spectrum.

A small study was completed in 2016, in Taiwan, by Chou, Lee, and Feng to see if a behavioral approach coupled with art therapy improved social skills for children with autism, in a group setting. The two six-year-old boys had an ASD diagnosis, basic verbal communication skills and experienced challenges with social interaction. Sessions were recorded and analyzed by graduate students who were unaware of the nature of the study and trained to take interval data on the recorded sessions.

While in session, the emphasis was placed on the art materials and adult attention, not on the maladaptive behaviors of the children. The environment mimicked a natural learning environment by having other children and adults in the room. Baseline data was taken at the beginning of every session, to measure engagement. The therapy sessions worked on one skill until mastery and then moved onto another skill. For example, speaking on topic, asking related questions, and presentation skills were

explicitly taught. A token system was used to reinforce spontaneous communication and following directions. The predictable structure encouraged participation in the warm up, main activity, and presentation time. Follow up sessions with new therapists were used to see if the boys could generalize their skills.

Although there was no control group, the results of this study indicated that all skills were maintained without reinforcers and generalized to new a new therapist. Both students showed the most growth during the presentation part of the class, from a baseline of 12% and 20%, to a maintenance level of 100% after the no reinforcement phase and with a new therapist and peers. The boys' parents and teachers completed the Verbal Behavior Analysis (VBAS) rating scale. It was noted that the teachers were impressed with the boys' ability to make eye contact after the study was completed. Both students increased their expressive language skills, interpersonal relationships, time spent with play and leisure, and coping skills (Chou et al., 2016, Figure 4).

A separate study was completed in the Netherlands, in 2017, by Sweizer, Spreen, and Knorth. This study focused on the development of the COAT model, which "used elements comparable with intervention mapping techniques" (Sweizer et al., 2017, p. 189). The COAT model includes four main categories or schemas of data: context, outcomes, art therapy materials, and therapeutic behavior of the therapist. This model helps to prove art therapy as an evidence-based practice.

Sweizer et al. (2017) understood the value in selecting art therapists who had a background in serving students on the autism spectrum and selected therapists from

schools, private practices, and day treatment clinics. Data was collected throughout the experiment, including 90 minute loosely structured interviews. Through the use of recorded interviews, those therapists were asked to consider, “What makes art therapy appropriate or inappropriate for children with ASD?” (Swiezer et al. 2017). The interviews were transcribed, reread, and coded for key words and messages. Common topics such as theory of mind, executive functioning, and central coherence (seeing the “big picture”) were noticed throughout the therapists’ opinions and experiences. The parents did not have input in this study.

During an interview, one therapist recounted a specific interaction in which a student blamed the art materials for his or her mistake. The therapist used the opportunity to explain the student’s responsibility and ownership in finding a solution *(*Sweizer, Spreen, & Knorth, 2017, p. 187). A second therapist explained how the art medium opened opportunities for the student to create and problem solve outside of a social situation because the focus was placed on the art *(*Sweizer et al., 2017, p. 187). These personal testimonies speak to the importance of art therapy for specific student profiles. The art medium acts as a third point of reference between the therapist and student. The problems are related to the art but simultaneously working on life skills.

When compared to a control group of 6 students who did not receive the art therapy, several lasting effects were noticed for some students within the home and school settings, which included increased flexible thinking, sharing experiences, focused attention, talking about personal issues, and positive changes in maladaptive behaviors.

These social communication and self-regulation skills directly correlate to one's ability to participate within a classroom setting, make friends, feel connected and learn in school.

Communication Between Settings

It is imperative that communication between home, school, and therapy staff occurs on a regular basis. The following study bridged all three settings while collecting data before and after the study.

In 2008, Epp conducted a study that involved children, ages six through twelve, who were diagnosed with high functioning autism, Asperger's Syndrome, and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS). This study aimed to use updated techniques to improve the social development in these children. Questionnaires were given to the teachers and parents to show growth at home and at school in regards to the frequency of assertive social skills increased, whereas internalizing behaviors, hyperactivity, and problem behaviors decreased.

Epp (2008) differs from the other studies because it took place at an expensive therapy program named Superkids, in an affluent area, with students who displayed lower behaviors. The parents funded the children's participation in the program and agreed to have their children participate in a program with licensed therapists who had a master's degree and professional backgrounds including art therapy, drama therapy, school counseling, and special education. Weekly one-hour sessions that included routines and expectations included cognitive behavioral therapy along with art therapy to teach positive self-talk and discuss difficult feelings (Epp, 2008, p.28). The program

included a welcome with a snack, a quick ten-minute social skills lesson, followed by a 30-minute activity, and ended with 20 minutes of unstructured free time which required students to play with a peer. Another difference when compared to other studies, is that the therapists met with the parents twice a year, and consulted with school staff and other outside therapy providers.

This study provided the opportunity for parents and teachers to complete the Social Skills Rating System (SSRS) in October and May, to track progress. The results indicated that both at home and at school the frequency of assertive social skills increased, whereas internalizing behaviors, hyperactivity, and problem behaviors decreased. Positive results on the SSRS were noted to be at a faster rate than if the children did not participate in the SuperKids program.

Art Therapy and Young Children

In 2015**,** Kuo and Plavnick produced a study that measured the effectiveness of art therapy on reducing off task behavior in children. They administered antecedent art therapy in a one on one setting with a three-year-old boy who had autism. This child attended an early childhood special education class five mornings a week and daycare in the afternoons. He displayed impaired eye contact, social communication and language skills. Given how young he was, his target behaviors included leaving his seat, calling out, and looking around while in the special education classroom.

In support of Individuals with Disabilities Education Act (IDEA) in 2004, the proactive interventions took place in the classroom, reducing transition time and

increasing time with peers. Given the young age, the intervention involved choices and a variety of materials such as decorating an animal picture with beads. No other interventions were used during the course of this study.

An interesting “A-B-A-B” (Kuo & Plavnick, 2015, Figure 1) approach was taken by Kuo and Plavnick, to see if the “introduction and withdrawal of art therapy” (p. 56) had a lasting effect on the child. First, five weeks of baseline data was taken, then five weeks of therapy administered, followed by five weeks of baseline data and last, another five weeks of therapy. This allowed observational data, taken 1-2 times a day for periods of 15 minutes, to capture any lasting effects of the therapy.

The results showed that the target behaviors decreased within each five-week baseline measurement, from the initial 8-14 occurrences to 4-6 occurrences. The behaviors were near existent, ranging from one to four occurrences, during the intervention weeks. Overall, the child displayed less motor and verbal behaviors after art therapy. His off task behaviors tended to be less disruptive, in the form of averted eye gaze . This case study suggests that art therapy can be used to increase on task behaviors in your children with autism, in the classroom setting.

Reading Nonverbal Communication

Students with autism have a challenging time with social communication and identifying emotions. One aspect of nonverbal communication is reading facial expressions to help identify how another person feels. Oftentimes, cards with real life or clipart pictures are used to help teach students with autism.

Richard, More, and Joy (2015) took it one step further and conducted a study in Connecticut that measured students' ability to Build a Face (BAF) during art therapy sessions. The students with autism were randomly selected, creating a mixed gender control group and all female treatment group. One prerequisite was that all participants had the ability to understand instructions. The Diagnostic Analysis of Nonverbal Accuracy 2–Child Facial Expressions (DANVA 2-CF) measured the students' ability to recognize facial expressions. Students were also given photographs of four basic emotions, including happiness, anger, fear, and sadness. The students studied each picture and used magnetic balls and rods to build the face on an empty manikin head. The students were given individual feedback while completing the art therapy project.

The results indicated no statistically significant difference between the treatment and control groups; however, the treatment group had greater improvement than the control. Some possible factors include that students may have lost stamina during the lengthy test, there was a small sample size, and the control group had both genders whereas the test group only had female participants. One observation made, when compared to several other art therapy studies, this study appears to have lower student interest, with little to no choice or variety in the art medium.

Generalization of Skills

Students who participated in the studies completed by Chou et al. (2016) as well as Kuo and Plavnick (2015) showed the ability to generalize the skills taught after the intervention ceased. This is encouraging because ideally students would acquire new

skills within a small group setting and use the skills within a classroom setting. This encourages classroom participation and learning.

Music Therapy

Music therapy started as an intervention for war veterans in the 1800's (American Music Therapy Association, 2020) and has since grown into a professional career that targets 17 approaches, utilizing music in therapeutic ways (Eren, 2017). Given a history of over 200 years, music therapy has expanded to provided services to a wide variety of needs, one being people diagnosed with an autism spectrum disorder (Eren, 2017). Several research studies targeted the effectiveness of music therapy for young students on the autism spectrum. Overall, music therapy provides opportunities to work on foundational social and functional skills while implementing creativity and sensory integration.

Top Ranking Approaches

Eren (2017) profiled the top three of 17 music therapy approaches that were ranked most preferred and most effective for students with autism, by 477 music therapists from across the United States. Statistical data was compiled from Likert scales in regards to knowledge, effectiveness and preference. The top three therapy approaches are listed below.

Eren (2017) concluded that the most preferred therapy was a Behavioral Approach. In this case, the therapist assumes a directive role, targeting a specific behavior while structuring the environment and providing rewards and consequences to

help reach the desired outcome. Although ranked most preferred, the behavioral approach was rated third successful of the 17 approaches. The second most preferred approach was Sensory Integration Therapy, which includes ample "auditory and visual stimuli, motor planning, vestibular planning and body coordination" (Eren, 2017, p.122) while addressing organization and speech language skills. The therapist sets limits and uses behavior redirection throughout the session. Sensory Integration was rated the most effective therapy overall. The therapy ranked third most effective by therapists was Creative Music Therapy, which includes improvisational music making, with the goal being student engagement. This approach addresses several clinical problems such as "mutism, echolalia, lack of expression, and lack of creativity…" (Eren, 2017, p. 123). Creative Music Therapy was rated second most effective of the 17 approaches.

Although Eren's (2017) study was based solely on opinions, the compiled experience of trained music therapists can be used to suggest that Behavioral Approaches, Sensory Integration Therapy and Creative Music Therapy are effective when building social and emotional regulation skills for students on the autism spectrum.

Working with Nonverbal Students

Autism Speaks Inc. (2020) reported that an estimated 30% of people with autism have limited to no verbal communication skills. The following studies include students who have limited to no independent verbal communication skills. Kim, Wigram, and Gold (2008) studied the effects of improvisational music therapy compared to play

therapy when working with verbal and nonverbal children, ages three through five, to increase joint attention between the child and the therapist. When compared to play therapy with toys, the children produced higher rates of incidence for eye contact and turn taking during the adult-led portion of the music therapy sessions. Over time, the children were observed to copy the adult while displaying joint attention, given the "stability and flexibility" (Kim et al.,, 2008, p. 1764) of the music therapy.

Assessments administered before, during, and after the completed 24 sessions along with recordings and anecdotal notes show overall progress for students who participated in the study. The Pervasive Developmental Disorder Behavior Inventory-C provided parental and teacher input through rating scales. The Early Social Communication Scales measured structured play and joint attention. Recordings were used to verify therapist notes. Therapist and parent notes show that some of the nonverbal children did begin to develop initial language skills after the music therapy. Possible reasons for increased social skills in the areas of listening, visual referencing, responding and engaging include the opportunity to address rigid thinking and control issues by being flexible and creative with the music (Kim et al., 2008, p. 1764).

Music therapy is noted to have "predictable patterns" (Kim et al., 2008, p. 1759) that allows nonverbal communication to occur between the therapist and student. "Musical attunement" (Kim et al., 2008, p. 1759) helps to build a therapeutic relationship between the child and therapist. The flexible sessions move between

student led and therapist led activities which help to draw out opportunities for joint attention and in some cases, increased use of verbal language.

Wimpory, Chadwick, and Nash (1995) measured the social development between a mother and a three year old girl with autism and no verbal or gestural communication skills. The overall goal of this study was to increase engagement in regards to eye contact and "social initiations"" (Wimpory et al., 1995, p.543) through the use of very engaging tactile kinesthetic and verbal activities such as games of swinging, patting, tickling, blowing, stroking, vocalizing, action-rhymes, and singing. Sing-song language was also used to describe the actions of the adult and child. These sessions took place in the child's home. Music Interaction Therapy requires the therapist to play music that reflects the movements of the child and the partner. Over time, the music helps the child to foresee their partner's actions (Wimpory et al., 1995). An ABC design was used to collect baseline data, progress, and follow up data. Table 1 indicates that the child progressed and maintained her social skills in the areas of eye contact, initiating interactions, and symbolic play 20 months after the intervention. This study attributed music interaction therapy as the catalyst to the "fundamental and lasting changes in the child's developmental pattern" (Wimpory et al., 1995, p.549).

The Sound of Emotions

Music is known for inciting emotions (Mohana, 2018). People with autism often need to be taught theory of mind which includes shared experiences and identifying how and why other people feel. This is an essential part of nonverbal communication

and a building block for interacting with others within the school, home, and community settings (Meltzoff, 1999).

One Turkish case study monitored the effectiveness of teaching nonverbal facial expressions through music therapy. Eren (2018) recorded one child's journey through the process of learning the emotion of sadness. Over the course of twelve weeks, observational and recorded data revealed that the five-year-old boy was able to move from humming a song about feeling sad, to signing some of the lyrics, drawing a sad face, and mimicking a sad face. A basic reinforcement system was used to increase participation and expected behavior throughout the study. His mother reported that he was able to generalize this skill to other emotional situations and noted increased communication between her and her son. This study is encouraging because the music therapist used basic materials that can be easily access by others.

Outcomes

The research completed by Eren (2017, 2018); Kim et al., (2008); Wimpory et al., (1995) suggests that music therapy is a viable treatment for children on the autism spectrum because it teaches basic social communication skills, which increases student engagement in the classroom.

Speech and Language Therapy

The Division of Speech and Hearing Sciences, through the University Library of North Carolina reported that speech and language therapy has been used to treat language delays and disorders since the 1940's and 1950's and encompasses speech

production, along with receptive and expressive language, which includes pragmatic or social language. When addressing the needs of students with autism, spontaneous language, social interaction with peers, and training for the other staff members tends to be the focus; grammatical structures and speech errors are secondary (Clark, 2016).

Social Communication Disorders

Social communication refers to the semantic and pragmatic aspects of language. Students with autism have a hard time processing spoken language and deciphering the meaning behind verbal and nonverbal communication, within the context of varying social situations.

Prosody

In 2016, Kuschke, Vinck, and Geertsema found that providing direct instruction regarding prosody, the element that addresses duration, intensity, pitch, emphasis, stress, rhythm, and intonation, is critical for helping students with autism communicate effectively with others because people with autism tend to have an increased ability to recognize pitch but show a limited ability to process the spoken words. A speech and language pathologist in South Africa, studied prosody with three elementary aged students with autism. Seven skills including following a simple direction, commenting on a picture, categorizing, requesting, describing/ sequencing, role playing to teach the function of objects, and using songs to redirect the students' attention back to the task were addressed over the course of six treatments that were spread across 3 weeks.

Although this study had a small sample size and no control group, the analyzed recordings propose that direct instruction with an emphasis on prosody increases students' ability to perform the tasks listed above. Unfortunately, the therapy sessions were followed by a two-week break from school, so the students did not have an opportunity to apply these skills within the classroom and regressed in several areas over the break. Given an Autism Index probe, pragmatic skills was the one area that students demonstrated a level maintained progress. Students with autism appear to gain social communication skills when the speech and language pathologist emphasizes prosody throughout a traditional language therapy session (Kuschke et al., 2016).

Communication and Social Anxiety

The Anxiety and Depression Association of America reported in 2018, that "40% of young people with an autism spectrum disorder also have clinically elevated levels of anxiety or at least one anxiety disorder." Although anxiety is not one of the criteria for autism spectrum disorder, it is prevalent among the autism community. Therefore, clinicians and school staff address the issue with clients and students.

In 2017, Rodas, Eisenhower, and Blanchar completed a longitudinal study that measured anxiety tied to structural and pragmatic language ability with students on the autism spectrum. Since this study focused on the correlation, there was no intervention with pre and post data. The Weschler Preschool and Primary Scales of Intelligence, the Autism Diagnostic Interview- Revised and the ADOS were used to confirm autism and

measure IQ, along with parent rating scales and assessments to measure language skills for 159 children with autism, ages four through seven.

In general, Rodas et al., (2017) found that students who had higher receptive language skills had higher levels of anxiety because they comprehend the negative information communicated to them and students who had higher pragmatic (social) communication skills had lower levels of anxiety. An emphasis was placed on the importance of teaching pragmatic skills as an early intervention for children identified as having an autism spectrum disorder, at the early childhood level. This supports the early childhood model for speech-language instruction, within the school system. When compared to other supporting research mentioned, this study identifies the link between social communication difficulties in preschool aged students and externalizing behaviors and anxiety in older students. (Rodas et al., 2017, p. 3485-3486).

Communication Systems

Speech-language services target social communication for students with autism because deciphering social interactions is challenging. Therapists vary approaches depending on students' language abilities. Students who are considered nonverbal are taught to use communication systems, ranging from low technology such as picture symbols and CORE boards, to higher levels of technological communication systems with voice output (Biggs, Carter, Bumble, Barnes, & Mazure, 2018).

Video Self-modeling for Teaching New Skills

Students with autism often have a difficult time receiving information auditorily and also generalizing skills from one setting to another. One way to reduce, if not eliminate the language piece of learning is to use video modeling, or better yet, video self-modeling. This requires someone to record and capture the student demonstrating desired skills. The footage is edited to give the illusion that the student is capable of independently completing a task. Of course, this is not the case, as the prompting and maladaptive behaviors have been edited out. This technique has been successful for teaching students how to use a picture exchange communication system, called PECS.

Jemma, Hand, and Dowrick (2013) completed a small study with three participants (2 children and 1 adult) who experienced limited to no success with using PECS independently. After viewing their personal videos on a daily basis over the course of 1-4 weeks, the participants went from zero to 80-100% success with the specific phase of PECS being taught. They were able to generalize the skill with a second adult and maintain the skill during the post-intervention phase of data collection. At one point, one of the participants left for one month. It was reported that with a brief intervention phase, he quickly recovered his skills.

Video self-modeling is a technique that can be generalized to other skills and routines that students are expected to use throughout the school day. It removes the adult prompt and language altogether and leaves only the visual demonstration of the skill. This technique was reported to have a positive effect on staff that worked with the

participants, as the staff were better able to visual the participant completing the task and therefore encourage the student, with a positive outlook (Jemma, et al., 2013).

This technique could be used for students who have a history of regression without recoupment of skill over an extended break in instruction. For example, the student could view the video of himself or herself on a daily basis, to help him or her practice that skill over the break.

The Benefits of Utilizing the Natural Setting

In 2018, Biggs et al. conducted a study that considered the benefits to providing speech-language therapy, using nondisabled peers, within a natural learning environment. They hypothesized that using a peer network would increase peer interactions and the use of a voice output system, but would not increase a student's use of PECS. (Biggs et al., 2018). Four elementary students, three of which had an autism spectrum disorder, were selected because they demonstrated limited nonverbal communication and had access to augmentative and alternative communication systems in the school setting. All four students were receiving special education services and demonstrated significant cognitive impairments. While gathering baseline data at lunch and recess, observations revealed that the nonverbal students rarely interacted with their nondisabled peers and only two of the four students accessed their device. It was also noted that the para educators did not facilitate social interactions between students. This study provided opportunities for the staff and students to increase their engagement and productivity. After 4 months of extensive systematic training, the

educational staff carefully selected “peer network members” (Biggs et al., 2018, p. 72) who received 4-5 training sessions, where they practiced a series of prompts and strategies to engage the students, using the communication devices. Throughout the intervention cycle, all four students were noted to have made significant increases in the frequency of non-prompted interactions. After that, the students showed a small dip in generalization of those skills. However, all students were observed to be with their peer network member and maintained an increase in skills when compared to the preintervention data. The students and teachers reported this as a positive experience and wanted to continue with the “meaningful and socially significant” (Biggs et al., 2018, p. 81) communication. By assigning peer models as social coaches, the students increased engagement and social initiation. The paraprofessionals felt supported and began working closely with the students during lunch and recess. The peer network members also gained new communication skills, to work with their classmates who required communication devices (Biggs et al., 2018).

Outcomes

Speech and language pathologists support the social communication needs of children with autism, while also considering the specific language and articulation needs for individual students. The pathologists consult with school staff and parents, to best serve students within the classroom, home and community settings.

Occupational Therapy

Occupational therapy addresses sensory integration needs to help students process information, as a "prerequisite for the development of higher cognitive processes" (Thompson, 2011, p. 202) and productively engage in the school environment. Sams et al., (2006) found that nearly all occupational therapy programs tie in sensory integration to help students tolerate stimulation within the environment. Occupational therapy can be provided within a private, clinical or school setting. The studies shared utilize all of these settings. Some children are nonverbal and easily set off by stimuli in a controlled home environment. Expand their world to a school setting and consider how their sensory systems takes in more information than they are able to process and cope with. Therefore, Children either seek out or reject sensory stimuli. There are four patterns of dysfunction: low registration, sensation seeking, sensory sensitivity, and sensation avoiding (Baker, Lane, Angley, & Young, 2007). Occupational therapists assist children with processing information and self-regulation strategies through direct or indirect/consultative services.

Linking Sensory Processing to Autism

A study completed in 2007, by Baker et al. looked at the relationship between sensory processing and behaviors for young students with autism. These 22 early childhood students had an autism diagnosis and were either on a waiting list, currently participating in, or had completed the Early Intervention Research Program at Flinders University, in Australia. As a way to measure the frequency and severity of sensory

processing issues, the parents were asked to complete the Short Sensory Profile, which consisted of 38 questions in the form of a Likert Scale. The parents also completed a Developmental Behaviour Checklist (DBC-P), which measured the behavioral and emotional problems observed. All but one parent completed the Vineland in person, at the research center, to measure the adaptive functioning regarding communication, daily living, motor skills, and socialization skills for their child. The results showed that 82% exhibited sensory difficulty and patterns that were found between the children's sensory processing and the social, emotional, and behavioral functioning.

Overall, many children's scores showed a relationship between higher scores on the Vineland (maladaptive behavior domain) scores and Developmental Behaviors Checklist, with lower scores on the Sensory Profile. Every child with autism has a slightly different profile and therefore, results showed varied needs for each child. Most children showed the need for seeking sensory input and difficulty filtering auditory stimulation. These children may appear inattentive, distracted, and busy due to the amount of stimulation within a school environment (Baker et al., 2007).

Sensory Processing in the School Environment

Another study, completed by Thompson, in 2011, measured the effectiveness of multi-sensory interventions for increased sustained focus, decreased self- injurious behaviors, and increased happiness and engagement for students with autism. 50 students, ten having an autism diagnosis, attending preschool through the twelfth grade, in a public school system, participated in this study. Over the course of five

months, the four researchers completed 60 minute observations for all 50 students. First, 20 minutes of baseline data was gathered in the classroom. Next, the student attended a multi-sensory room for 20 minutes, as the intervention. Last, the student returned to his or her classroom for 20 minutes of post-intervention data. Interval data was taken to measure facial expressions, body language and vocalizations. This information was then compared to carefully defined categories mentioned above, to see if the opportunity for sensory input made a difference in how the students were able to process information as well as organize and regulate their bodies in the classroom afterward.

Thompson found that students increased focus in the multi-sensory room, and maintained a higher level of focus in the post data in class, when compared to the baseline data. Self-injurious behaviors significantly decreased in the multi-sensory room and continued to decrease during the post intervention in class. Student engagement rose significantly in the multi-sensory room and dropped when the student returned to class; however the level of engagement was still higher in the post intervention phase, when compared to baseline. An overall improvement in the “quality of life” (Thompson, 2011, p. 213) was recorded for the students who participated in sensory integration programs.

Similarly, a study within a rural school system accessed the BrainWorks program for movement breaks throughout the school day. Wild (2018) led the research study to see if classrooms that participated in proactive, preplanned movement breaks had more

student engagement when compared to classrooms that did not provide movement breaks. Students were grouped from preschool through second grade and third through sixth grade. There were 22 students and several teachers in the intervention group and 24 students with various teachers in the control group. The Sensory Processing Measure and the Behavioral Assessment System for Children were used to establish baseline data. The participating teachers received training regarding information about sensory input, data collection, the BrainWorks program, and the importance of consistency throughout the study.

The results of Wild's study showed that teachers who provided consistent and proactive movement breaks, using the Brainworks program with efficacy, yielded a higher level of student alertness and awareness of individual calming tools. The teachers who committed to providing the BrainWorks program but chose to use movement breaks in a reactive, nonscheduled manner did not see the same level of student engagement or increase in self-awareness. This occurred in part because the older students see several teachers throughout the day and it can be harder to provide a movement break schedule when a student travels from class to class, versus younger students who see stay with one primary teacher throughout the day.

Because students who seek sensory input are often considered off task, time should be spent on teaching self-regulation skills, not just providing movement breaks, to increase student learning in the classroom (Wild, 2018, p. 749). Wild's study suggests the future emphasis be placed on teachers guiding students to have a self-awareness

and ability to self-regulate, to positively effect learning. Programs like BrainWorks are available to the general public through online resources.

Auditory Processing

In 1999, Brown conducted an at-home study that focused on auditory processing for a brother, age five, and sister, age three, both with autism. The purpose of this study was to measure the effectiveness of auditory integration therapy on sensory modulation and language. Although this study used a very small sample size, there is ample research throughout the study that confirms this to be a successful practice for several profiles. These children spent the majority of their time at home, with their parents. The baseline data showed that the boy had very limited language, displayed tantrums and was hard to calm. His mother took him for long car rides because the movement was soothing for him. The girl had no language skills, did not vocalize, and showed little to no engagement with others and was observed to flick her hands and watch television. She only accepted her mother and showed symptoms of physical illness from loud trucks and construction noises (Brown, 1999, p. 16).

Brown led the family through Auditory Integration Training to see if the children's language and ability to process sensory information would improve. The children needed to adjust to the new 20-day routine, which involved listening to carefully selected music with "full audio spectral content," (Brown, 1999, p. 15) using a special device, for a 30 minute morning and an afternoon session, which were scheduled four hours apart. Half way through the study, the sound was decreased in

one ear of the headphones. At first, the boy was observed to cry at the sound of a female voice, but eventually calmed down. Half way through the training, he became clumsy which was attributed to his vestibular system "reorganizing" (Brown, 1999, p. 16) itself. In the beginning, the girl cried with the expectation to use the headphones. However, once listening to the music, she did cuddle with her mom, was observed to laugh, and stopped grinding her teeth. At one point while listening to the music, she pulled her mom's hair and bit, which was attributed to excess energy only when listening to the music. During the study, she also developed a tolerance to loud noises.

The quick results of this study were incredibly positive and long lasting for both children. Throughout the intervention and during the post intervention data checks at three and six months, they experienced growth with language development, balance and movement, social and emotional maturity, praxis and sequencing, and eye control. For example, the boy went from using one word to label an item, to using full sentences with inflection and correcting his own speech errors. He no longer has tantrums requiring a car ride to calm down or aggressive behaviors towards his sister. The boy's eye contact has improved and his wandering eye has reduced by half. Given his natural motor abilities, he remained in the average range for gross motor movements throughout the study. The girl went from no vocalizations, to melodically vocalizing to communicate. She runs while looking ahead and is able to catch herself during a misstep. The girl is more affectionate to her family, gives specific eye contact, and accepts physical touch from her father. She developed a chewing reflex and eats with

her family. The girl is able to tolerate crowds of people and most loud noises without having a physical reaction. Auditory integration therapy provides the opportunity for children with autism to learn how to tolerate auditory stimulation through the "reduction of hearing sensitivities and distortions" (Brown, 1999, p. 13), gain speech and language development, increase eye contact and social communication, and experience improved flexible thinking, listening and attention to task.

Outcomes

Sensory processing impacts student learning in the classroom, home and community environments. The more sensory stimuli, the harder it can be for a person with autism to process the information. Scheduled sensory breaks can be beneficial and increase engagement and meaningful learning for students on the autism spectrum.

Cognitive Behavioral Therapy

As defined by the Oxford Dictionary, cognitive therapy addresses and challenges "negative thought patterns about the self and the world…to treat mood disorders such as depression" and has been used throughout the psychotherapy community since the 1960s and 1970s (Micallef-Trigona, 2018). Given the comorbidity of autism and social anxiety, social worries, and depression, three recent studies measured the effectiveness of cognitive behavioral therapy for people with autism and autistic characteristics.

Linking Social Anxiety to Autism

A study conducted in 2014, by Liew, Thevaraja, Hong, and Magiati reports high levels of anxiety among people with autism. Therefore, the study considered a correlation

between specific autistic traits (in the general public) and social anxiety, worry, obsessive-compulsive, and depression like traits. The National University of Singapore surveyed 252 students attending the university, using 18 self-assessments measuring the traits listed above as well as social problem-solving skills, impulsivity, and sensory processing.

The results of the study propose that it is beneficial to include a social skills component into the cognitive behavioral intervention. An importance is placed on social problem-solving, verses acquiring general social skills because learning to manage specific social challenges can reduce anxiety and depression symptoms (Liew et al. 2014, p. 869). Although the limitations of this study include one-time self-rating scales with no follow up, the study determined the results as valid when linking autistic traits to social anxiety, worry, obsessive-compulsive and depression like traits because the traits often stem from a history of being bullied, having fewer meaningful relationships, and sensory processing challenges. This information can be applied within the school setting, when intervening with students who appear to have similar traits, needs, and past experiences.

Reducing Anxiety Across Settings

Luxford, Hadwin, and Kovshoff (2016) used a total of six parent, teacher, and student rating scales to measure the level of student functioning related to social communication, anxiety, and attention, for 35 students, ages 11-14, within the English school setting. The study focused on Tony Attwood's Exploring Feelings CBT program during six 90-minute sessions with a consistent researcher. A home and school connection was emphasized by assigned homework after each session. A teaching

assistant helped students to generalize new skills by reinforcing the strategies taught in the therapy session, throughout the school day. Both the home and classroom connections were suggested to be an integral part of anxiety reduction. The pre, post and follow up assessments indicate that when compared to the control group (students who were on a waiting list) the intervention group demonstrated decreased anxiety, social worry, and increased attention. The study also suggests that the students' anxiety was tied to the inference of threat and emotional response time for those students. Although the students showed an increased ability to resist distraction, this study did not find a decreased bias to inferred threats.

In a 2017 study, Duifhuis, den Boer, Doornboos, Osterling, and Klip measured the effect of pivotal response treatment for children with autism spectrum disorders. It was predicted that given therapy within a natural environment and motivation to communicate, the children would increase their communication skills and decrease parental stress levels. Twenty-four patients, ages three through eight, received therapy through the outpatient clinics of the Child and Adolescent Psychiatry Center in the Eastern part of the Netherlands. Over the course of six months, 11 children participated in pivotal response therapy. Parents and teachers completed the Social Responsiveness Scale and parents completed the Child Behavior Checklist, Nijmegen Parental Stress Index as a baseline measurement and progress monitoring tool at three months into the program, and after the completion of the six-month program. A nonverbal IQ test and ADOS were used as well.

The parents were an integral part of the study and child's communication program (Duifhuis et al. 2017). Recoded sessions were shared with the parents for the purpose of sharing feedback and setting goals. The parents were also trained in the pivotal response treatment and participated in home therapy twice a week, for 75-minute session.

Given the results of the study (Duifhuis et al. 2017) the children who received the pivotal response treatment showed decreased autistic characteristics regarding communication skills, when compared to a control group who received typical treatment. However, the results on the initial ADOS were significantly higher for the children receiving the pivotal response treatment. One limitation noted was that the typical treatment varied, so the results should be cautiously interpreted. Unfortunately there were unremarkable positive results regarding parent stress levels and differences in behavioral rating scales for either group.

Respite for Caregivers

The American Association for Retired Persons (AARP, 2020) suggests that caregivers (in this case, parents and older siblings) often feel side effects such as depression, anxiety, and stress symptoms when caring for a loved one who has special needs. This worry and anxiety leads to thinking about the worst case scenario and limits the quality of life. Accessing therapy programs allows the caregiver some relief and the informed council of a professional therapist who guides positive programming in the school, home, and community (Duihuis et al. 2017; Luxford et al., 2016).

Outcomes

The results of recent studies suggest that under the care of a trained professional and research-based curriculum, children with autism can learn to identify their triggers for anxiety and manage their emotions. Keeping in mind that they learn best and demonstrate generalization of skills, while being taught in a natural environment.

CHAPTER III: DISCUSSION AND SUMMARY

Summary of Literature

Students on the autism spectrum require additional services to increase engagement in the classroom. Targeted therapies are used to improve language and social communication, expand restrictive interests, and decrease repetitive movements. Students with autism spectrum disorders benefit from a collaborative and therapeutic teaching model. The research found within the private, clinical, and school environments can be generalized and provided within the educational setting. Studies regarding animal assisted intervention and therapy, music therapy, art therapy, speech and language therapy, occupational therapy, and cognitive behavioral therapy suggest that programs designed to meet the unique needs of learners with autism increase engagement and decrease time spent demonstrating maladaptive behaviors.

Animal assisted intervention and therapy have been used to increase language and social interaction skills, and address sensory processing issues for children (Burgoyne et al., 2014; Harwood et al., 2018; Hediger & Turner, 2014; Koegel &Koegel 2006; Sams et al., 2006; Stevenson et al., 2015). Children increased their language skills by learning basic commands, socializing with peers about the animal, and having family discussions about relationships and universal concepts such as natural consequences and death (Harwood et al., 2018; Stevenson et al. 2015). Increased motivation to engage was observed because the children and students wanted to interact with the animal that appeared nonjudgmental and approachable (Koegel & Koegel, 2006). This provided

an opportunity to practice self-regulation skills, social skills, and overcome sensory processing difficulties related to texture. (Burgoyne et al., 2014; Harwood et al., 2018; Koegel &Koegel, 2006; Sams et al., 2006). Animal therapy provides a versatile array of services for children on the autism spectrum (Stevenson et al.,2015).

Art therapy primarily focuses on self-regulation, problem solving, and communication skills instead of the artistic ability of the child (Chou et al., 2016; D'Amico & Lalonde, 2017; Epp, 2008; Kuo & Plavnick, 2015; Richard et al., 2015; Schweizer et al., 2017). However, the art medium can be used as a third point of reference when communicating with the child (Schweizer et al.,2017). These skills transfer into the classroom because the art therapy students are exposed to basic classroom routines and structures (Chou et al.,2016; Epp, 2008) while they work on following directions, communicating their needs and presenting their projects. Therefore, cooperation skills improve over time (D'Amico, & Lalonde, 2017). While social communication skills improve, hyperactivity and internalizing behaviors decrease (Epp, 2008). Art therapy also addresses sensory processing needs by accessing a variety of mediums (Schweizer et al., 2017). Art therapy can be delivered as an inclusive intervention in the classroom (Kuo, & Plavnick, 2015), school setting (Richard et al., 2015), or in a private setting (Chou et al., 2016; D'Amico, & Lalonde, 2017; Epp, 2008; Schweizer et al., 2017). Students demonstrate increased participation in class, when they are able to communicate and cooperate with their peers.

Music therapy provides a fun and creative way to practice social, emotional, functional, and language skills (Eren, 2017; Kim et al., 2008). Therapists prefer taking a behavioral approach with a structured environment, a sensory integration approach that targets motor planning and speech language skills, and a creative music therapy approach which enhances personal expression (Eren, 2017) when providing music therapy to their clients. Improvisational therapy provides an opportunity for eye contact, joint attention and flexible thinking (Kim, Wigram, & Gold, 2008). Music therapy can be provided one on one, in the home, (Wimpory et al., 1995), or in a small group setting, at a therapy center (Eren, 2018; Kim et al., 2008). Music therapy increases social communication, which positively effects a student's participation in the classroom setting.

Speech and language therapy provides the opportunity for children and students with autism to receive targeted interventions for social communication, which includes deciphering verbal and nonverbal language (Kuschke et al., 2016; Rodas et al., 2017). Connections have been made between a student's receptive language skills and comorbid diagnoses such as anxiety and depression (Rodas et al., 2017) because students with higher receptive language skills have the ability to pick up on the negativity within a conversation, so additional therapy may be needed to target secondary diagnoses. Teaching prosody in isolation helps children and students to understand how inflection, tone, etc. change the meaning of spoken language (Kuschke et al., 2016) which is essential for communicating with peers and teachers in the

classroom. Communication systems and video self-modeling are used to help organize information and model desired communicative behaviors for children (Biggs et al., 2018; Jemma et al.,2013). Practicing communication skills within a natural setting helps children and students with autism to generalize newfound skills and engage with adults and peers (Biggs et al., 2018) which reduces frustration and disengagement in the classroom setting.

Occupational therapy addresses sensory processing needs for children with autism to encourage positive social interactions with the environment and people around them (Baker et al., 2007; Thompson, 2011). By targeting specific sensory needs, occupational therapists are able to improve a child's social and emotional functioning at home (Brown, 1999) and at school (Thompson, 2011). Scheduled sensory breaks paired are often provided in the school setting, for students who either need a quiet break or specific sensory input to help organize their body for learning (Wild, 2018). Specific therapies, like auditory integration therapy are available to increase a child's tolerance for specific auditory stimulation and language skills (Brown, 1999). Sensory integration is a successful intervention for children who have sensory processing needs (Baker et al., 2007; Brown, 1999; Thompson, 2011; Wild, 2018). Increased tolerance to sensory stimuli increases student engagement in class.

Cognitive behavioral therapy is used to treat comorbid mood disorders like social anxiety for children with autism spectrum disorders (Liew et al., 2014; Luxford et al., 2016). A focus is placed on problem solving, which can be applied to the school setting

(Liew et al., 2014). A strong home and school connection supports greater success in regards to students assessing social situations, managing their emotions, and solving problems, which equates to increased attention, learning, and engagement in the classroom. School staff can and should be a support to help bridge the two settings (Luxford et al., 2016). The same results are shown when therapists share specific feedback and provide training for parents to use in the home setting (Duifhuis et al., 2016).

One could make the case that that animal, art and music therapy are about multitasking and efficiency because the students are working on several skills at once. These therapies open doors for the use of language, sensory tolerance, and social communication. The skills mentioned are necessary for students to survive and thrive within a school setting.

In several cases, therapies can be combined to maximize time and resources. For example, Epp's case study addressed social skills through the combination of art therapy and cognitive behavioral therapy. Also, Sams et al., (2006) addressed language needs and social skills through occupational therapists who also addressed the need for sensory integration by working with animals. It is wise to combine services and capitalize on resources when considering programming for a student within the school setting.

Students with documented disabilities often experience a slower rate of progress when compared to their nondisabled peers. However, this progress is to be celebrated

and used as data to inform future programming. As noted within the results from the art therapy studies (Chou et al., 2016; D'Amico, & Lalonda, 2017; Epp, 2008; Kuo, & Plavnick, 2015; Richard et al., 2015; Schweizer et al., 2017), students made progress within a number of important sub strands on the rating scales. This progress helps to improve the students' experience in the classroom, interaction with their peers, and exposure to the grade level curriculum.

Limitations of the Research

The original search parameters have been limited to address the specific research question, "Which therapeutic interventions increase engagement for students with autism?" Initial searches targeting educational journals produced several articles with information but only a limited amount of empirical research studies that occurred within a classroom setting and were completed in the United States. The search was broadened to include studies that took place outside of the classroom setting and were conducted in other countries. Several therapy studies did not include participants with autism. The search was narrowed to include key words such as "autism, school, engagement, music, art, animal, occupational, speech-language, and cognitive behavioral therapy." Due to the lack of empirical research studies in the classroom setting, the guiding research question was broadened to general engagement for students with autism verses only in the classroom. This produced a wide range of studies that can be generalized to the classroom setting.

Given the nature of these less documented therapeutic approaches, many of the studies completed for animal, art, music, speech-language, occupational and cognitive behavioral therapy used small sample sizes. There are drawbacks to smaller sample sizes. Sciencing.com noted that smaller sample sizes can produce bias and are may represent a small sample of the targeted population. However, several studies opened the door to new information, creative problem solving and encouraged the continued research with larger sample sizes.

Implications for Future Research

There are three recommendations for future research. First, several studies suggested using larger sample sizes when targeting children with autism. Most of the studies included less than 10 participants. The opportunity to conduct empirical research increases as therapies become widely used and accepted. Broadening participants to include a variety of demographics such as gender, ethnicity, geographic location, and socioeconomic status will increase the reliability of the studies. Second, an increase in quantitative baseline, mid-intervention and post-intervention data should be gathered, to measure specific progress, verses using only parent and teacher rating scales. Specifically coded interval data, reviewed by multiple highly trained individuals increases the validity of the results. Last, more studies should be conducted within the inclusive classroom setting, as this will account for the environmental factors that affect focus, attention, communication, and sensory needs. The studies could measure student

engagement within the large group and small group settings in the general education and special education classrooms.

Implications for Professional Application

The research included in this Literature Review applies to educators who serve students with autism, communication disorders, and sensory processing disorders. The research provides professional educators with evidence of strategies and therapies that improve engagement for children with autism, within the private and educational settings.

First, educators should collaborate with related service providers and parents. Consulting with speech and language pathologists can improve social communication and language skills by utilizing tools that increase interactions with peers and teachers. Occupational therapists can provide sensory integration strategies to help students tolerate stimulation within a classroom environment. This allows students to increase their ability to focus on learning within a classroom. Educators should collaborate with parents, to provide a strong home to school connection. Outside therapy providers should be a part of the collaborative Individual Education Program (IEP) team, as consistency increases the chance for generalization of new language, social communication, and functional skills.

Second, educators should collaborate with parents, to provide a strong home to school connection. Communication tools, such as voice output systems and CORE boards should be transferred between settings to increase communication. Sensory

related strategies will help students to focus at home, complete work, and tolerate family members. Sharing information about the student's current level of performance and research-based strategies helps to increase the student's quality of life in the home, school, and community.

Third, educators should implement best practice strategies to improve language and social communication while decreasing maladaptive behaviors that are interpreted as off task or harmful when in a classroom setting. Best practice strategies include using visuals and systems provided by the speech and language pathologist. This may look like a PECS sentence strip, a CORE board, voice output system, or modeling desired language skills. Visual schedules and "First, Then" prompts increase student engagement because the visual expectation and routine reduces anxiety for students with autism. Visual prompts paired with sensory integration and/or sensory breaks increase time on task for students with autism. The purposeful sensory input helps to organize the student's body for learning. Accessing outside therapy providers for art, music, and animal assistance supports basic communication and collaboration skills needed for the classroom. Students work through frustrations and increase joint attention and social communication skills. Including nondisabled peers helps to bridge social communication, as all students may benefit from art, music, and animal therapy.

Some of the research addressed in chapter II identifies prerequisite skills needed to receive a therapeutic intervention. For example, students who have basic verbal communication skills might do better with art therapy because much of the problem

solving and presentation skills require and practice dialogue (Schweizer et al., 2017). Another example addresses the need for supervision and training with animal assisted interventions. This provides a safe environment for the animal and a systematic process for the child (Hediger & Turner, 2014).

In conclusion, educators should collaborate with related service providers, outside therapists, and parents to create well rounded, developmentally appropriate programming for students with autism. Research-based strategies should be implemented throughout a students' day, to increase engagement within the classroom setting.

Conclusion

Animal, art, music, speech-language, occupational, and cognitive behavioral therapies are research-based interventions, used to increase engagement for students with autism. Consistent, purposeful programming and collaboration between the students' parents, therapists, and educators increase the students' language and social communication skills, and decrease maladaptive behaviors in the home, school, and community settings. Therapy improves the quality of life for students with autism spectrum disorder.

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