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A Review of the Effectiveness of Art Therapy for Children with Autism Spectrum Disorder

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ABSTRACT

Autism spectrum disorder (ASD) is a neurological and developmental disorder which affects an individual's social skills, communication, sensitivity to stimuli, and motor skills. Art Therapy (AT) is a promising intervention for children with ASD because it has been shown to improve motor skills, improve social communication, and provide new experiences. This review examines a sample of contemporary studies on the effects of AT on children with ASD in order to synthesize and present the current state of the literature. This review identified 11 studies, two were case studies, six were controlled experiments, and three were longitudinal studies without a control. These studies provide significant and compelling evidence that AT improves motor skills and emotional processing in children with ASD and suggestive evidence that AT improves communication and mental health. Future research with more narrowly tailored controls and experimental designs will be necessary to isolate a mediating variable and better understand how and why art therapy can be used to further improve the lives of the children with ASD.

Introduction

Autism spectrum disorder (ASD) is a neurological and developmental disorder that can usually be identified within the first 2 years of life. People with ASD usually have social and communication deficits, increased sensitivity to stimuli, perform restricted and repetitive behaviors, and have difficulty relating to others. Data from Selten et al. (2015) shows that people with ASD have higher rates of depression, anxiety, sleep difficulty, and epilepsy than the general population. It is estimated that 1% of the world's population have ASD and in 2024, it is the fastest growing developmental disorder. Various forms of therapy (behavior and communication, educational, family, physical, speech, and group therapies) are often used to address the symptoms of ASD. There are also medications which can help control symptoms of ASD.

Art therapy (AT), which was first developed by Adrian Hill in 1942, is a form of psychotherapy that incorporates creative processes during treatment. People engaging in AT will generally produce and discuss their art as a means to help process emotions and communicate with therapists. AT is often used to alleviate trauma, depression, stress, anxiety, Alzheimer's, schizophrenia, and other mental disabilities. The creative process encourages communication between patients and therapists either for clarification or in a discussion. It is often used in child psychotherapy, as children are restricted by their limited vocabulary when wanting to express themselves (Kasirer et al., 2020).

AT is a promising therapy for managing the symptoms of ASD in children. AT increases motor skills which in turn improves social communication (MacDonald 2013), helps alleviate the onset of repetitive behaviors by providing new, pleasurable experiences (Leekham 2011), and encourages adaptive behaviors (Lyon & Fitzgerald, 2013). It also helps patients express emotions and ideas nonverbally with their therapists (Kasirer 2013, 2020). These studies suggest that AT might be a valuable therapy to address and alleviate the symptoms of ASD, however it is an empirical question the extent to which AT actually does so.

The Studies

In order to understand what the current literature says about the use of AT for children with ASD, 11 studies were identified. Of these 11 studies, 2 were individual case studies (Emery, 2011; Durrani, 2014), and 9 were experiments conducted to measure the effectiveness of the different impacts of AT. These studies included 6 experiments with a control group and 3 that were longitudinal studies with no control groups. All the studies focused on how AT improved motor skills, emotional regulation/processing, social communication skills, and mental health in children with ASD.

Studies that featured other learning disabilities and mental disorders were excluded in order to focus on the effects of AT on children with ASD specifically. Studies that featured participants older than 18 were also excluded. For example, one study that used AT as an intervention on adults with ASD (Harris, 2015).

The studies are divided into four main groups based on their area of inquiry. Studies tested to see if AT helped with motor skills, emotional processing, communication, and mental health. Below, we introduce the studies and present their findings with regards to each category.

Motor Skills

A number of the studies tested whether AT improved the motor skills of children with ASD. Epp (2008) examined the efficacy of AT in a group setting which included 44 children between the ages of 11 and 18. Epp (2008) had assistance from teachers and professional art therapists to conduct one hour weekly drawing AT sessions. The Social Skills Rating System (SSRS) was used to measure the impacts of AT on the children's social skills and behaviors. The SSRS consists of 3 rating forms for parents, teachers, and the child to assess behaviors of the child. Epp (2008) found that children had more motor control during later sessions when following instructions of the art therapist especially while folding paper and drawing images about oneself. The results showed an improving trend of children having better self and motor control. Facilitators also noticed that in later sessions children were able to complete physical tasks with less assistance from adults.

Huili et al. (2023) also found that AT improves motor skills in children with ASD. They conducted a study on 26 children with ASD between the ages of 7 and 12. They split the 26 students randomly into a picture book group and a somatosensory interactive game group (which is a type of art therapy in which children can access digital puzzles and art programs) and recorded the difference between the two forms of AT using Childhood Autism Rating Scale (CARS) and Autism Behavioral Checklist (ABC). CARS along with CARS-2 is a diagnostic assessment that rates individuals on 15 areas from normal to severe to diagnose autism. The 15 evaluations include relationship to people, emotional response, adaptation to change, verbal communication, activity level, and object use. Autism Behavioral Checklist (ABC) lists common non-adaptive behaviors of children with ASD. The interactive game group showed significantly better body control, balance, sports skills, coordination and endurance than the group which read picture books. Both groups showed an increase in activity level and better social interaction scores on the CARS and ABC post-test.

Finally, Koo and Thomas (2019) included a total of 18 children with ASD between the ages of 4 and 12. Pre-tests and post-tests were performed after sketching AT sessions. The experimental group saw a significantly greater improvement in their CARS results compared to the control group. Koo and Thomas (2019) observed noticeable improvements in motor skills from their CARS test results post experiment. This improvement was also observed in their art. Children who saw an improvement in their post-test CARS results were able to include more details in their drawing.

Emotional Processing

Three studies in the sample examined whether AT improved emotional processing in children with ASD (Prasitwut et al., 2024; Richard et al., 2015; Huili et al., 2023). Prasitwut and their colleagues (2024) included 23 children with ASD between the ages of 7 and 16 to evaluate the effectiveness of weaving therapy after 3 months. They split the 23 students into 2 groups. One group immediately received weaving therapy for 3 months, while the second group did not participate during this period of time. After 3 months, the roles were reversed and the waitlisted group received AT. The differences between the 2 groups were compared using the CARS-2 to measure emotional response, relationship to people, and level of both verbal and nonverbal communication. Emotional processing is then evaluated based on these areas as they reflect how an individual experiences emotions and how they express the emotion verbally or behaviorally with other people (Prasitwut et al., 2024). There was no significant pre and post-test difference for the control group. The experimental group, on the other hand, had a significant improvement in emotional response scores as measured by CARS-2. Specifically, children who underwent AT had an improvement in emotional response and level of verbal and nonverbal communication.

Another study, Richard et al. (2015) included 20 secondary school students between the ages 8 and 14. 10 students with ASD were put in the experimental group and 10 students with ASD were in a control group and did not do any activities. The experimental group did a form of AT involving a “build-a-face” activity to try and help children with ASD learn facial expressions. Richard et al. (2015) used DANVA-2CF (Diagnostic Analysis of Nonverbal Accuracy) to note subjects' changes. This test presents 24 photos of people making expressions modeling a specific emotion and test subjects are asked to identify which emotion matches the photo. Richard et al. (2015) noticed only slight improvements between control and experimental group. Of the 10 participants in the experimental group, 7 showed improvements while only 4 of the 10 participants in the control group showed improvements. The “mean amount of change between the pretest and post-test DANVA 2-CF scores for the treatment group was 1.50 (SD D 2.80). For the control group, the mean change in DANVA 2-CF score was 0.44 (SD D 2.13)” (Richard et al., 2015). Although the treatment group improved more than the control group by almost half a standard deviation, there was no statistically significant difference in the amount of change across the two groups. There were no significant differences on which emotions were easier to be identified after the Build A Face activity performed by the treatment group.

Finally, Huili et al. (2023), who compared the effects of 2 forms of AT (reading picture books and playing interactive art games) with children with ASD, observed that the picture book group of 13 children showed significantly better emotional response compared to the pretest.

Communication

A total of 7 studies, 2 case studies and 5 experiments, examined the effectiveness of AT for improving the social communication skills of children with ASD. The 2 case studies both focused on a single individual with ASD and observed their improvements throughout the course of AT. Emery (2011) provided a case study of AT as an intervention for autism based on her experience with a 6 year old boy. During weekly individual therapy sessions that lasted one hour, she explored different mediums such as playdough, crayons, and tracing with the boy. This whole process continued for 7 months during which the boy started exhibiting more willingness to participate in the activities provided each time. A similar case study was recorded by Durrani (2014) on a 12 year old boy during their weekly 30 minute sessions that lasted one year. The goal of the study was to evaluate whether AT can facilitate attachment and social functioning. The therapists started by demonstrating how to use different art mediums such as crayons and paint in front of the boy. As sessions continued, the amount of paint provided along with the color was changed each time to provide new stimulatory factors. Both case studies lacked any quantitative results and were based on the author’s own observations throughout the experiment.

In terms of results, the 2 case studies arrived at similar conclusions that AT helped to improve eye contact, speech, and a willingness to converse. Durrani (2014) also observed that the boy started showing the art he made to his parents and discussing his choice of colors. Both Emery (2011) and Durrani (2014) believed that the AT session encouraged the boy's communication through creativity.

These observations were backed up empirically by the experiments in our sample. Koo & Thomas (2019) observed that children paid more attention to their surroundings and asked more questions after the AT sessions. They saw a similar situation to the 2 case studies in which students engaged more with the facilitators and parents about their art work during later sessions.

Jalambadani (2020) included 40 students, between the ages of 6 and 12, who were split into a control group and an experimental group with 20 students in each. The control group did not participate in any AT sessions whereas the experimental group did for 3 months. The study does not specify what form of AT the experimental group underwent. Their experiment lasted for 12 weeks with 12 AT sessions. At the end of each session, a follow-up questionnaire was offered to the parents about the child's behavior after AT. Jalambadani (2020) inquired about how AT can improve autistic children's social interactions. They concluded that after 12 AT sessions, most subjects showed more adaptive behaviors as well as willingness to share their feelings and have social interactions. However no specific measurements from the questionnaire were provided in the report.

Epp (2008) included 44 primary and secondary school students between the ages of 6 and 18. The main goal was to measure improvements in social skills, reductions of problem behaviors, hyperactivity, and internalizing behaviors after drawing AT sessions. There was no control group. Problem behaviors in ASD usually include tantrums, non-compliance, self-injurious behaviors, and aggression. Epp (2008) found that AT significantly improved communication skills in children. She also found a significant decrease in internalizing behaviors and hyperactivity, as measured by the SSRS.

Wang (2020) included 8 children between the ages of 5 and 8. 4 children with ASD underwent painting AT sessions with pre and post-tests and had a control group of similarly aged children that did not have autism perform the same sessions and tests. The experiment lasted 8 months with weekly 45 minute sessions. During this time, Wang (2020) used the ABC to measure improvements between the groups. The results showed significant improvements for children with ASD. She concluded that AT "enhanced and activated neuropsychological performance in the perceptual, linguistic, cognitive, emotional and motor parts of the brain." During the session, children often needed to communicate with teachers and parents, and it was observed that painting was used to communicate what they could not express. Wang (2020) noted statistically significant improvement in language, communication, and overall behavioral abilities.

D'amico and Lalonde (2017) examined 6 children with ASD between the ages of 10 and 12. The children were put in group AT sessions with 2 art therapists and met weekly for 75 minutes. The experiment lasted 21 weeks. Children were asked to make faces of themselves through drawing, masks, and paper making. Pretest and post-test were offered and Social Skills Improvement System - Rating Scale (SSIS-RS), a modified version of the SSRS, was used. SSIS-RS offers analysis of social skills, problem behaviors, and academic competence. They found statistically significant improvements in both the student and parent form of SSIS-RS post-test. The results demonstrated a trend towards improving social communication skills matched by the observation that children were independently initiating conversations with peers towards the end of the study.

Mental Health

Four studies examined the efficacy of AT for improving the mental health of children with ASD. Emery (2011) and Durrani (2014) agreed that AT provides children with ASD pleasure and curiosity. Both studies noted that the subject had more endurance and concentration after several AT sessions. The parents believed that the AT session reduced the boy's stress levels, self stimulatory behaviors and increased his self regulation.

Prasitwut et al. (2024) found that subjects' levels of fear, nervousness, and object use improved over the course of the 3 month weaving AT.

Schweizer et al. (2020) included 12 children between the ages of 8 and 12 to evaluate the different methods of AT and their impacts. They had all subjects perform the same experiments and recorded trends and observations without a control group. Schweizer et al. (2020) made a qualitative observation that AT seemed to improve a child's self confidence. This stemmed from a boy who believed that he was not able to build a birdhouse but later succeeded with the therapist's help. This encouraged him to communicate his difficulties in school about bullying and discrimination with the therapist and his parents.

D'amico and Lalonde (2017), who performed group AT sessions with 6 children with ASD, recorded statistically significant reduction of inattention and hyperactivity. After completing their art, children demonstrated a shift in their self image, gaining more confidence. This inspired more interest in children about future art activities, reducing the time of inattention (D'amico & Lalonde, 2017). There were also significant results supporting a reduction in problem behaviors. D'amico and Lalonde (2017) observed that since children were able to use AT to express emotions they could not otherwise say verbally, art helped to contain outbursts and problem behaviors.

Discussion

Limitations

While all of the results showed benefits of AT for children with ASD, there was a range in the quality of studies, and there exist some limitations which bear on how much can be inferred from the data. For example, Jalambadani (2020) used the Stanford-Binet Intelligence Scale to select subjects with an IQ of 50-70. Autistic children's average IQ is usually around or above 85. Thus Jalambadani' (2020) experiments were targeting ASD children with significantly lower IQ than the average children with ASD (National Institute of Mental Health, 2022). Along with this, many studies did not specifically explain what type of AT was conducted in terms of mediums and how sessions were led. This includes Wang (2020) where parents were responsible for leading their child through each session which could impact the results as the study did not consider the parent's impact on the children when later analyzing the results. This lack of specificity makes it harder for us to understand which types of AT are more or less effective and why.

A common limitation that most studies addressed in their discussion was having a small sample size. This includes Wang (2020) with a sample size of 8 children, D'amico and Lalonde (2017) with a sample of 6 children with ASD, Koo and Thomas (2019) with a sample size of 9 children, and Schweizer et al. (2020) with 12 children included in their study. Along with this is the drop out of subjects that experiments excluded. Epp (2008) had exclusions from their studies that led to a smaller sample size in the end. Most of these dropouts are caused by parent refusal or medical issues that prevented a child from participating in the experiment. This could create a selection effect where the children that stayed in the AT sessions were the ones who saw the greatest improvement from AT whereas the children who dropped out saw less impact. It also prevents the accuracy of the result if the sample size is too small to the point where it doesn't represent the general population.

There is also little research done on how different AT mediums differ. Many studies experiment with multi medium art such as Emery (2011), Durrani (2014), and Schweizer et al. (2020) but there lacks research on how each medium differs. The closest study is by She and their colleagues (2023) who had a group of children engage with art video games and the other engage with picture books and stickers. They found that the video game had a greater improvement in motor skills and the picture book group had a great improvement in social skills. Most discussion of this topic comes from interviews with art therapists or therapists who specialize in children with ASD. Such interviews were performed by Schweier et al. (2017), Lith et al. (2017), and Regev

et al. (2013). Regev et al. (2013) summarized that using mediums which can be modeled such as sand, dough, and clay made it easier to engage with younger children. The other 2 interviews also mentioned sketching or painting with a variety of colors that are slowly introduced as a common method of AT. This seemed to match how most experiments used coloring and sketching during AT sessions; however, Prasitwut et al. (2024) used weaving therapy and Richard et al. (2015) used arrangement of paper to build a face.

Although some studies had post-test follow ups, none of the experiments had long term observations to assess whether the benefits of AT are sustainable over the years. The longest time of follow up testing ended 3 months after the experiment was done by Prasitwut et al. (2024). Other than this, Epp (2008), Richard et al. (2015), Koo and Thomas (2019), Schweizer et al. (2020), and Wang (2020) all included a post-test immediately after the experimental period was complete with no additional follow-ups. Additional observations would be needed to accurately determine the long term impact of AT on children with ASD.

Lastly, most studies focused on children age 7-12 with some going from 12-18, and even fewer focusing on children 5-7. There is no research done on children with ASD younger than 5. Children with ASD can be reliably diagnosed around 2 years old. There is a 3 years gap from 2-5 where the impact of AT is not yet tested. While AT sessions might be hard to facilitate on younger children, since the important aspects are that the children are engaging in a new experience, it would still be worth it for younger children to perform AT and review its impacts.

Overview

For children with ASD, AT seems to effectively improve their social skills and reduce repetitive behaviors. AT was also shown to improve quality of life in children with ASD specifically by reducing stress and anxiety. This further encourages creativity, more adaptive behavioral patterns, the will to interact and converse with others as well as a sense of self. There are a few reasons why AT might have this positive impact. AT is a nonverbal psychotherapy that engages emotionally, socially, physically, and creatively with children with ASD. It offers new tactile and motor experiences which sometimes helps to consolidate ideas better in people with ASD (Wang, 2020). These experiences can also lead to new behaviors, decreasing the repetitive behaviors characteristic of the population (Schweizer et al., 2020). Based on Schweizer et al. (2020), children can explore their emotional perception through preferences and new actions during art therapy since it offers a safe and low stress environment for the processing of experiences. Greater self esteem is also an effect of AT, especially in activities where the children were required to make something based on themselves. These activities correlate with a more complete self perception and many children report a feeling of success after the AT sessions. Wang (2020) also believes that AT requires the children to engage with facilitators verbally while still offering a nonverbal aspect to the task. This improves their communication and adaptation to new environments as they need to structure their behavior based on the mediums provided.

In the case studies by Emery (2011) and Durrani (2014) especially, it can be most clearly observed that the children showed emotional openness with therapists and parents after AT sessions. The 6 year old and 12 year old boys both showed excitement and pleasure while talking about the art they've created and also during the therapy session. In addition to emotional openness, children with ASD also seemed to gain better emotional recognition and processing. Richard et al. (2015) and Schweizer et al. (2020) both noticed a significant improvement in how children expressed themselves and identified the specific emotions they felt. Durrani (2014) noted that AT sessions also seemed to improve attention span. Epp (2008) supports this when she observes an increase in the duration of concentration in the experimental group.

Data from Koo and Thomas (2019) along with Epp (2008) also suggest that AT helps with the children's body control especially in motor skills. While Huili et al. (2023) noticed a null effect in the emotional response between their picture book group and video game group, they did also observe a significant improvement in the hand eye coordination of the game group. In fact most of the studies reported positive change after

AT sessions with some studies reporting null results due to the size of the sample group being too small to accurately represent the overall population such as Wang (2020) and Schweizer et al. (2020).

The findings from our sample suggest that AT can improve the symptoms of children with ASD along four discrete dimensions: motor skills, emotional processing, social skills, and mental health.

Two of the four effects, motor skills and emotional processing, have a clear and distinct causal link with the data presented in the studies. In the case of motor skills, Huili et al. (2023) had one group perform AT through video games and observed better CARS scores for body use and coordination. As AT requires hands manipulation of an art medium, motor skills will be expected to improve after a long period of AT sessions as seen in the experiment performed by Prasitwut et al. (2024). Similarly, an improvement in processing of emotions is also observed through the AT sessions that train for emotional recognition performed by Richard et al. (2015). After building a paper face with sticker features to match the prompted emotion given by the therapist, 7 out of the 10 children in the experimental group had an improvement in identifying the emotion of a person in a photograph. This is to be expected as the activity specifically trains the participants to recognize characteristics of certain emotions.

While communication skills and mental health were areas that saw improvements in studies, the data do not establish as clear a causal link with AT. Wang (2020) mentioned that AT functioned as an activity that encouraged communication in a no pressure environment. It allowed children to understand instructions, ask for clarifications, and show their work. However, it is not clear as to whether the creative process is what encourages this behavior or if the main causal mechanism is that it is a new topic that allows communication to be fostered through curiosity. One way to test the causal link could be to have a group read a picture book or story and the other perform AT. Then engage in conversations to see if social skills are impacted by the creative aspect of AT.

Similarly, a reduction in stress and anxiety was also a main impact of AT sessions. This was measured through the repetitive behaviors that children with ASD would perform. The introduction of AT allowed for new behaviors and more adaptive behaviors which decreased repetitive behaviors in children (Epp, 2008). As with the effect on communications, it is not clear whether this reduction in repetitive behaviors is causally related to the creative elements of AT. The case study Emery (2011) observed that the 6 year old boy gained more confidence and grew less anxious as more sessions went on. The reduction of stress could have been because the children were growing accustomed to the AT sessions and the therapists performing them instead of actually having a causal link with AT. For the two aforementioned effects, knowing the exact mechanism will require further research that has more tailored experimental designs.

Conclusion

ASD is a fast growing neurological disorder that requires more research specifically in possible treatments and effective interventions. Children with ASD can have communication deficits, repetitive behaviors, and be more prone to other mental disorders. AT is a combination of creative processes and psychotherapy. MacDonald et al. (2013), Kasirer et al. (2020), and Leekam et al. (2011) argue that AT is a promising intervention for children with ASD because it improves creativity and motor skills. It offers opportunities for more social communication and trains for more adaptive behaviors in children with ASD which limits their repetitive behaviors.

This review examined 11 studies, of which 2 were case studies and 9 were experiments. Of the experimental studies, 6 included controls in their method designs with Jalambadani (2020), Prasitwut et al. (2024), Wang (2020), Richard et al. (2015), Huili et al. (2023), and Koo & Thomas (2019). The 11 studies, taken as a whole, examined four main areas of effect: motor skills, emotional processing, communication skills, and mental health. All four of these areas of affect had a positive relationship with AT. Motor skills and emotional processing showed a direct causal link to AT. In the case of communication and mental health, the causal link is not as clear.

Future research can improve upon the existing body of literature by featuring larger sample sizes, comparing multiple mediums, and including longer term follow ups. Furthermore, future research can make better use of controls. A control group of neurotypical children can help show if AT is uniquely helpful for children with ASD and a control group of children with ASD who did not perform the experiment will address whether AT actually helps the children. As most current research focuses on children between 5-18, children with ASD between the ages of 2-5 should also be an area of focus for AT. Future research into the effectiveness of different types of AT will help generate valuable interventions to improve the lives of those with ASD.

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