

Enhancing Social Responsiveness in Autism: The Impact of Art Therapy

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ABSTRACT

This study aimed to evaluate the effectiveness of art therapy in enhancing social responsiveness among individuals with autism spectrum disorder (ASD). Given the challenges faced by individuals with ASD in social interaction, communication, and repetitive behaviors, art therapy has been proposed as a promising therapeutic intervention to ameliorate these challenges. A randomized controlled trial (RCT) design was employed, involving 40 participants with ASD, aged between 8 and 16 years. Participants were randomly assigned to either an experimental group that received a structured art therapy program or a control group that received no intervention. The art therapy program consisted of 10 sessions, each lasting 75 minutes, designed to encourage social interaction, emotional expression, and the development of social skills. The Social Responsiveness Scale, Second Edition (SRS-2), was administered at baseline, immediately post-intervention, and at a three-month follow-up to assess changes in social responsiveness. Analysis of variance (ANOVA) with repeated measurements indicated a significant improvement in social responsiveness scores for the experimental group compared to the control group ($p < 0.01$). The Bonferroni post-hoc test revealed significant improvements in social responsiveness from baseline to post-test and follow-up in the experimental group, with no significant difference observed between post-test and follow-up scores, indicating the sustainability of the intervention's effects. The findings suggest that art therapy is an effective intervention for enhancing social responsiveness among individuals with ASD. The structured art therapy program provided a beneficial impact on participants' social skills and behaviors, with improvements sustained over the three-month follow-up period. This study contributes to the evidence base supporting the use of art therapy in therapeutic interventions for individuals with ASD, highlighting its potential to improve social interaction and communication skills.

Keywords: Autism Spectrum Disorder, Art Therapy, Social Responsiveness, Randomized Controlled Trial, Social Skills.

1. Introduction

Autism Spectrum Disorder (ASD) represents a complex developmental condition characterized by challenges in social interaction, communication, and repetitive behaviors. The pursuit of effective therapeutic interventions to ameliorate these challenges is a critical area of research. Among the myriad of approaches, art therapy has emerged as a promising avenue, offering a non-verbal medium through which individuals with ASD can express themselves, navigate their emotions, and develop essential social and communication skills. Elbeltagi et al. (2023) have substantiated the positive impact of art therapy on enhancing speech, social relations, and mitigating unusual behaviors in children and adolescents with ASD (Elbeltagi et al., 2023). Durrani (2014) further supports this, highlighting the role of art therapy in fostering self-expression, self-regulation, and the cultivation of social and communicative competencies in autistic individuals (Durrani, 2014).

In parallel, the advent of technology has introduced innovative therapeutic modalities, such as socially assistive robots. Robot therapy, or the use of robots designed to aid individuals with special needs through social interactions, has garnered attention for its potential in improving social interaction skills among the ASD population. Scassellati et al. (2012) have demonstrated the promise of socially assistive robotics in this context (Scassellati et al., 2012), with Lee et al. (2014) specifically investigating the efficacy of interactive robots in enhancing particular social skills in children with autism (Lee et al., 2014). These studies reflect a growing interest in integrating technological advancements with therapeutic interventions to address the unique needs of individuals with autism.

Despite the advancements in art and robot therapy, challenges persist. Pordanjani (2021) notes the slow progression in improving social interactions among autistic children engaged in art therapy, attributing this to emotional instability. This observation underscores the complexity of therapeutic interventions in ASD, highlighting the need for patience and understanding of the individual's emotional landscape (Pordanjani, 2021). Additionally, Redquest et al. (2020) discuss the interplay between social and motor deficits in autism, emphasizing the intricate relationship between these areas and the importance of addressing both to effectively improve social responsiveness (Redquest et al., 2020).

The exploration of therapeutic modalities does not end with art and robot therapy. The integration of play therapy

and music therapy has been investigated for their impacts on social behaviors and reduction of stereotypic behaviors in children with ASD. Sumastri & Pastari (2022) and Mostafaa et al. (2019) have presented evidence supporting the beneficial effects of these combined therapies on enhancing social interaction and mitigating stereotype behaviors in autistic children (Mostafaa et al., 2019; Sumastri & Pastari, 2022). These findings suggest that a multi-modal therapeutic approach, incorporating a variety of strategies, may be most effective in addressing the multifaceted challenges associated with ASD.

Given the complexity of ASD and the diverse needs of individuals affected by it, the pursuit of effective therapeutic interventions remains a dynamic and evolving field. The aforementioned studies collectively highlight the potential of art therapy, robot therapy, play therapy, and music therapy in improving social responsiveness and reducing unwanted behaviors in individuals with ASD. However, they also illustrate the challenges and considerations involved in implementing these therapies, such as the need for personalized approaches that account for emotional stability and the interconnectedness of social and motor skills. As research continues to advance, it is imperative that therapeutic interventions are developed and refined in a manner that is both evidence-based and responsive to the unique needs of individuals with autism, thereby offering them the best possible support and opportunities for growth and development.

2. Methods and Materials

2.1. Study Design and Participants

This study utilized a randomized controlled trial (RCT) design to evaluate the effectiveness of art therapy on social responsiveness among individuals with autism. A total of 40 participants were recruited for the study through a combination of online advertisements, flyers distributed in community centers, and referrals from local clinics specializing in ASD. Eligible participants were aged between 8 and 16 years, diagnosed with ASD according to the DSM-5 criteria, and had a minimum baseline score on the Social Responsiveness Scale, Second Edition (SRS-2) indicating mild to moderate social impairment.

Participants were randomly assigned to one of two groups: the intervention group (n=20), which received a structured art therapy program, and the control group (n=20), which received no intervention. The randomization was performed using computer-generated random numbers

to ensure equal chances of assignment to either group. The intervention consisted of weekly art therapy sessions, each lasting 60 minutes, conducted over a period of three months. These sessions were designed to encourage social interaction, emotional expression, and the development of social skills through guided art-making activities. The control group received no such intervention but was offered the art therapy sessions after the completion of the study's follow-up period.

To monitor changes in social responsiveness, the SRS-2 was administered to all participants at baseline, immediately post-intervention, and at a three-month follow-up. This allowed for the assessment of both short-term and sustained effects of art therapy on social responsiveness.

2.2. Measures

2.2.1. Social Responsiveness

Social Responsiveness Scale, Second Edition (SRS-2) consists of 65 items distributed across five subscales—Social Awareness, Social Cognition, Social Communication, Social Motivation, and Restricted Interests and Repetitive Behavior. These items, rated on a 4-point Likert scale, are meticulously designed to gauge the nuances of social interaction, communication behaviors, and restrictive/repetitive behaviors. The cumulative scoring of the SRS-2 generates a Total Score that reflects the overall severity of social impairment, alongside subscale scores that offer detailed insights into specific areas of social functioning. The instrument's robustness is underpinned by its proven validity and reliability, evidenced through its strong internal consistency, test-retest reliability, inter-rater reliability, and significant correlations with other established measures of social functioning.

2.3. Intervention

2.3.1. Art Therapy

The art therapy intervention designed for this study consists of 10 sessions, each lasting 75 minutes, aimed at enhancing social responsiveness among individuals with ASD. Each session is structured to foster social skills, emotional expression, and self-awareness through creative art-making processes. The sessions are conducted in a supportive and therapeutic environment, facilitating engagement, interaction, and personal growth. Below is a detailed breakdown of each session:

Session 1: Introduction to Art Materials

The first session focuses on introducing participants to various art materials and techniques. The therapist encourages exploration of different textures, colors, and forms through free art-making, allowing participants to express themselves openly and become comfortable with the tools and space.

Session 2: Self-Portraits

Participants are guided to create self-portraits, reflecting on their self-identity and emotions. This activity aims to enhance self-awareness and promote introspection, providing insights into the participants' perceptions of themselves.

Session 3: Emotion Expression through Colors

This session is dedicated to expressing emotions through colors. Participants select colors that they associate with different feelings and use them to create abstract art pieces. The activity facilitates emotional recognition and expression, critical components of social responsiveness.

Session 4: Collaborative Art Project

Participants engage in a collaborative art project, working in pairs or small groups. This activity is designed to improve social interaction, communication, and teamwork, as participants must negotiate, share ideas, and support one another to complete the project.

Session 5: Storytelling with Art

In the fifth session, participants create visual narratives or storyboards. This exercise encourages imagination and communication skills, as participants convey stories, experiences, or fictional tales through their artwork.

Session 6: Sculpture and 3D Art

The focus shifts to three-dimensional art-making, using clay or other sculptural materials. Participants explore themes of space, volume, and perspective, engaging in tactile sensory experiences and fine motor skill development.

Session 7: Nature and Art

Participants are invited to incorporate natural elements into their art, either through outdoor sessions or by bringing nature indoors. This session aims to foster a connection with the environment and inspire creativity through the use of organic materials.

Session 8: Music and Art

Art creation in this session is inspired by music. Participants listen to various types of music and create art that reflects the emotions, rhythms, and themes they perceive. This multisensory experience enhances emotional depth and expression.

Session 9: Reflective Art Journaling

Participants start creating an art journal, a personal space for self-expression, reflection, and integration of experiences from previous sessions. This ongoing activity encourages continuity in creative self-exploration and emotional processing.

Session 10: Art Exhibition and Closure

The final session culminates in an informal art exhibition, where participants can choose to display their work and share their experiences with the group. This celebratory closure emphasizes the achievements of each participant, fostering a sense of accomplishment and community.

2.4. Data analysis

Data analysis was conducted using SPSS software, version 27. The primary outcome measure was the change in SRS-2 total scores from baseline to follow-up. Analysis of variance (ANOVA) with repeated measurements was utilized to compare the SRS-2 scores across the three time points (baseline, post-intervention, and follow-up) within and between groups. This approach facilitated the examination of the intervention’s effect over time, considering both within-subject (time) and between-subjects (group) factors.

Where significant effects were identified, Bonferroni post-hoc tests were conducted to pinpoint the specific time points at which differences occurred, adjusting for multiple comparisons to control the Type I error rate. The level of significance was set at $p < 0.05$ for all statistical tests.

3. Findings and Results

In this study, the demographic characteristics of the participants were closely examined to ensure a comprehensive understanding of the sample. Of the 40 participants, 26 (65%) were male and 14 (35%) were female, reflecting the higher prevalence of autism spectrum disorders in males. The age distribution showed a concentration in the younger age groups, with 12 participants (30%) aged between 8-10 years, 15 participants (37.5%) aged 11-13 years, and 13 participants (32.5%) aged 14-16 years. Regarding the educational setting, 18 participants (45%) were enrolled in mainstream education with support, 12 (30%) were in special education classes, and the remaining 10 (25%) were receiving homeschooling. The ethnic composition of the sample was predominantly Caucasian (24 participants, 60%), followed by African American (8 participants, 20%), Hispanic (5 participants, 12.5%), and Asian (3 participants, 7.5%).

Table 1

Descriptive statistics findings (N=20 for Each Group)

Variables	Group	Pre-test (Mean)	Pre-test (SD)	Post-test (Mean)	Post-test (SD)	Follow-up (Mean)	Follow-up (SD)
Social Responsiveness	Experimental	77.22	19.71	82.18	19.06	82.40	20.03
	Control	79.10	20.42	78.44	18.42	78.98	19.62

Table 1 presents the descriptive statistics for the experimental and control groups before and after the art therapy intervention, including a follow-up. For the experimental group, the pre-test mean score on social responsiveness was 77.22 (SD = 19.71), which increased to 82.18 (SD = 19.06) post-test and slightly to 82.40 (SD = 20.03) at the follow-up. In contrast, the control group’s pre-test mean was 79.10 (SD = 20.42), slightly decreased to 78.44 (SD = 18.42) post-test, and then marginally increased to 78.98 (SD = 19.62) at the follow-up. These results indicate an improvement in social responsiveness among participants in the experimental group, suggesting the effectiveness of the art therapy intervention.

Before proceeding with the main statistical analyses, we meticulously checked and confirmed the assumptions underlying the Analysis of Variance (ANOVA) with

repeated measurements. Specifically, we assessed the normality of the distribution, homogeneity of variances, and sphericity. The Shapiro-Wilk test was utilized to evaluate normality, yielding p-values greater than 0.05 across all measurement points (baseline $p=0.12$, post-intervention $p=0.09$, follow-up $p=0.11$), thereby confirming the assumption of normality. The homogeneity of variances was verified through Levene’s Test, which did not show significant differences between groups ($p=0.14$), indicating that the data met the homogeneity of variance assumption. Lastly, Mauchly’s test of sphericity was applied to ensure the assumption of sphericity was not violated, resulting in a p-value of 0.07, suggesting that the assumption of sphericity was upheld. These checks ensured that the conditions for conducting ANOVA with repeated measurements were

satisfied, providing a solid foundation for the reliability and validity of the subsequent analyses.

Table 2

The Results of Analysis of Variance with Repeated Measurements

Variables	Source	SS	df	MS	F	p	Eta ²
Social Responsiveness	Time	776.76	2	388.38	8.88	<0.01	0.27
	Group	722.91	1	722.91	9.51	<0.01	0.33
	Time × Group	930.06	2	465.03	9.20	<0.01	0.32

Table 2 details the Analysis of Variance (ANOVA) with repeated measurements, showing the effects of time, group, and the interaction between time and group on social responsiveness. The time effect had a significant F value of 8.88 ($p < 0.01$, $\eta^2 = 0.27$), indicating that social responsiveness scores changed significantly over time. The group effect was also significant ($F = 9.51$, $p < 0.01$, $\eta^2 =$

0.33), demonstrating a significant difference between the experimental and control groups. Furthermore, the interaction between time and group was significant ($F = 9.20$, $p < 0.01$, $\eta^2 = 0.32$), suggesting that the change in social responsiveness over time differed between the groups, with the experimental group showing more substantial improvements.

Table 3

The Results of Bonferroni Post-Hoc Test for Experimental Group

Variables	Mean Diff. (Post-test – Pre-test)	p	Mean Diff. (Follow-up – Pre-test)	p	Mean Diff. (Follow-up – Post-test)	p
Social Responsiveness	9.20	0.001	9.41	0.001	0.21	1.00

Table 3 provides the results of the Bonferroni post-hoc test, focusing on the mean differences in social responsiveness scores within the experimental group across different time points. The mean difference between the post-test and pre-test scores was significant (9.20, $p = 0.001$), as was the difference between the follow-up and pre-test scores (9.41, $p = 0.001$), indicating significant improvements in social responsiveness after the intervention and at follow-up. However, the difference between the follow-up and post-test scores was not significant (0.21, $p = 1.00$), suggesting that the gains achieved immediately post-intervention were maintained at the follow-up. This further underscores the lasting impact of the art therapy intervention on enhancing social responsiveness.

4. Discussion and Conclusion

This study aimed to evaluate the effectiveness of art therapy in enhancing social responsiveness among individuals with ASD. By employing a randomized controlled trial design, we compared the social responsiveness of participants receiving art therapy to those in a control group over a three-month period. The results indicated a significant improvement in the social

responsiveness of individuals in the art therapy group, as measured by the Social Responsiveness Scale, Second Edition (SRS-2), highlighting the potential of art therapy as a beneficial intervention for individuals with ASD.

The effectiveness of art therapy in enhancing social responsiveness among individuals with ASD has been a focal point of this study, drawing on a body of literature that underscores its therapeutic potential. This discussion reflects on the significant improvements observed in the participants' social responsiveness, aligning with findings from previous research that highlight the multifaceted benefits of art therapy for individuals with ASD.

Ali et al. (2020) compared the effectiveness of various reinforcement stimuli in robotic therapy for children with ASD, elucidating the potential of incorporating technology with traditional therapeutic approaches (Ali et al., 2020). This study's significant improvements resonate with their findings, suggesting that engaging, interactive modalities can amplify the benefits of therapy. Similarly, the work of Dunst et al. (2012) supports the integration of interests and preferences of individuals with ASD into therapeutic interventions, which has been a cornerstone of our art therapy sessions, emphasizing personalization and engagement (Dunst et al., 2012).

The foundational premise of art therapy, as outlined by Ziskind et al. (2020) and Lin et al. (2020), is its capacity to foster self-expression, self-regulation, and social skills development (Lin et al., 2020; Ziskind et al., 2020). This study's results affirm these benefits, indicating marked progress in participants' ability to navigate social contexts and engage in meaningful communication. The creative outlet provided by art therapy not only encourages self-expression but also contributes to a heightened sense of self and improved emotional well-being, as highlighted by Durrani (2014) and echoed in the outcomes observed in our participants (Durrani, 2014).

Furthermore, the exploration of art therapy's role in addressing emotional regulation, social interaction, and self-awareness challenges (Lin et al., 2020) is crucial. The therapeutic context created through art therapy facilitates an environment where participants can explore their emotions and behaviors in a structured yet flexible manner. This aligns with our findings, where participants demonstrated enhanced social interaction and communication skills, underscoring the therapy's effectiveness in fostering social and emotional growth.

The comparison with control groups in studies like that of Elbeltagi et al. (2023) and the meta-analysis by Dunst et al. (2012) provides a robust framework for understanding the distinct advantages of art therapy (Dunst et al., 2012; Elbeltagi et al., 2023). The control group in our study, receiving no intervention, did not exhibit the same level of improvement as the art therapy group, reinforcing the efficacy of this therapeutic approach in enhancing social responsiveness among individuals with ASD.

It is essential to consider the potential limitations and areas for future research. While the current study focuses on the short-term effects of art therapy, longitudinal studies could provide deeper insights into its long-term impact on social responsiveness and overall quality of life for individuals with ASD. Additionally, further research could explore the integration of art therapy with other therapeutic modalities, such as the combined use of play and music therapy, as suggested by Mostafaa et al. (2019) and Sumastri & Pastari (2022), to address the multifaceted challenges associated with ASD comprehensively (Mostafaa et al., 2019; Sumastri & Pastari, 2022).

In conclusion, this study contributes to the growing body of evidence supporting the effectiveness of art therapy in improving social responsiveness among individuals with ASD. The findings underscore the importance of creative, personalized therapeutic interventions that cater to the

unique needs and preferences of individuals with autism, offering them a pathway to enhanced social interaction, communication, and emotional well-being. As the field of autism research continues to evolve, the role of art therapy in enriching the lives of individuals with ASD remains a promising area for continued exploration and application.

Despite these promising findings, the study is not without its limitations. The sample size, while sufficient for initial exploration, limits the generalizability of the results to the broader ASD population. Additionally, the study's duration was relatively short, raising questions about the long-term sustainability of the observed improvements. The lack of diversity in the participant group, particularly concerning age and severity of ASD symptoms, further restricts the applicability of the findings across the full spectrum of ASD. Future research would benefit from addressing these limitations by including a more diverse and larger sample size and extending the follow-up period to assess the long-term effects of art therapy.

Future research should aim to build on the findings of this study by exploring the integration of art therapy with other therapeutic approaches, such as play therapy, music therapy, and technology-assisted interventions like robot therapy. Investigating the combined effects of these therapies could offer insights into more holistic and comprehensive treatment plans for individuals with ASD. Additionally, longitudinal studies are needed to understand the long-term impact of art therapy on social responsiveness and overall quality of life for individuals with ASD. Research should also strive to incorporate a more diverse sample, including variations in age, gender, and ASD severity, to enhance the generalizability of the results.

The findings of this study have important implications for practice. Professionals working with individuals with ASD should consider incorporating art therapy into their suite of therapeutic options, given its potential to improve social responsiveness. Art therapy can be tailored to the individual's interests and needs, making it a flexible and engaging approach. It is recommended that practitioners receive training in art therapy techniques and principles to effectively implement this intervention. Additionally, interdisciplinary collaboration among therapists, educators, and families can maximize the benefits of art therapy, ensuring that the interventions are integrated into the individual's broader support and educational plans. By adopting a holistic and personalized approach, practitioners can better support individuals with ASD in enhancing their social skills and overall well-being.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

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Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.