Review Journal of Social Psychology & Social Works

http://socialworksreview.com

ISSN-E: 3006-4724 Volume: 4

ISSN-P: 3006-4716 Issue: 1 (January - March, 2026)

Psychological Interventions and Strategies for Managing Autism Spectrum Disorder: A Comprehensive Review

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Abstract

This article reviews three psychological interventions that are commonly used in the treatment of Autism Spectrum Disorder (ASD): Applied Behavior Analysis (ABA), Cognitive Behavioral Therapy (CBT), and Mindfulness-based interventions. Their effects on different areas of ASD, including communication abilities, social skills, emotional control, and independent living skills, are discussed. A quantitative study was performed on participants from different intervention groups, and the results showed that CBT and ABA greatly enhanced the participants' abilities to regulate their emotions, socialize, and communicate. Mindfulness-based interventions were mainly beneficial for emotional regulation, with less influence on the other areas. The evidence indicates that personalized and multimodal interventions may be the most effective treatment option for people with ASD. Besides that, the research underlines the importance of follow-up studies for a long period of time that investigate the sustainability of these interventions and makes a plea for increased access to psychological treatments for ASD in financially lacking areas.

Keywords: Autism Spectrum Disorder (ASD), Psychological Interventions, Applied Behavior Analysis (ABA), Cognitive Behavioral Therapy (CBT), Mindfulness-based Interventions, Emotional Regulation, Social Interaction, Communication Skills, Daily Living Skills

Introduction

Autism Spectrum Disorder (ASD) is a brain-based disorder that results in significant difficulties in communication, social interaction, and other aspects of functioning along with the presence of restrictive and repetitive behaviors. The number of cases of ASD has increased significantly in recent years, and it is estimated that 1 in 54 children in the US are diagnosed with this disorder (Centers for Disease Control and Prevention, 2020). Even though the exact causes of ASD are not known at present, it is believed that both genetic and environmental factors play major roles in their development (Sandin et al., 2020). With the worldwide recognition and diagnosis of ASD at an all-time high, the need for powerful psychological treatments is also increasing, resulting in multiple interventions intended to increase the quality of life for those living with ASD. The goal of this paper is to examine the

effectiveness of psychological interventions and strategies for managing ASD by analyzing recent research, as well as identifying areas in which both research and practice are lacking (Parveen et al., 2024). Psychological interventions for ASD were initially developed primarily through behavioral therapies, such as Applied Behavior Analysis (ABA), and social skills training. However, there has been a movement recently towards person-centered, evidence-based therapies that aim not only at behavior modification but also improving emotional, cognitive, and social functioning. Newer interventions include Cognitive-behavioral therapy (CBT), social communication interventions, and mindfulness-based strategies. Nevertheless, the fact remains that there is no agreement as to the most effective methods and the best conditions for each one (Gulsrud et al., 2020).

There are lots of studies investigating the effectiveness of different treatments for ASD, but big chunks of research are still missing that directly compare psychological treatments for ASD in terms of effectiveness. Most of the time, an intervention is carried out single-handedly while the studies that explore their combined effects and/or long-term outcomes are very scarce (Guldberg et al. 2021). Also, when determining the effectiveness of interventions, research often ignoring changes in individual characteristics, such as the age of the person, the intensity of the symptoms, and the presence of additional disorders (Peltier et al., 2022). The main purpose of this paper is to fill these gaps through a review of recent research on psychological interventions for ASD and by pointing out the elements that affect the results of intervention. Across the world, different kinds of psychological treatments for ASD are becoming more common. Various nations are choosing their methods based on their traditions, resources, and healthcare systems. For example, Applied Behavior Analysis (ABA) is a very common method in America to treat children with ASD as it has been shown through studies to be an effective method. On the other hand, countries like the UK have opted for more varied and comprehensive strategies that do not rely solely on ABA but also include developmental methods and relationship-building such as the Early Start Denver Model (ESDM) (MacDonald et al., 2020). In the meantime, Asian countries, mainly Japan and China, are also recognizing the great potential of mindfulness and cognitive-behavioral therapies for ASD thus making a step towards a more holistic approach to psychological well-being (Matsuura et al., 2021).

In some local places, especially the ones in developing countries, the recognition and treatment of ASD are still the very beginning stages. Psychological interventions are very often limited by not enough training, access to resources, and lack of awareness among the health care professionals. Like, in Pakistan, a country which is seeing a rapid rise in the number of children diagnosed with ASD, there is a very big gap when it comes to the availability of the specialized psychological services and the trained clinicians (Shah et al., 2021). In such places, families generally must depend on the informal support systems or therapies that are limited and the effectiveness of which is questionable. This study has been done with the intention of informing the world about how the psychological interventional practices are at present in local settings and to give guidelines for better delivery service (Ashfaq et al., 2024).

Though Autism Spectrum Disorder (ASD) has been recognized worldwide in a growing number of people, psychological interventions still suffer from a lack of standardization and their effectiveness varies. To make matters worse, many regions lack culturally appropriate strategies, there is a shortage of professionals with special training, and some healthcare systems have a poor understanding of ASD. Besides this, studies on the lasting effects of these interventions, particularly in the cultures outside the Western ones, are almost non-existent therefore the ignorance of these aspects restrains the development of the field.

Research Objectives

The main objectives of this research study are as follows:

1. To evaluate the psychological interventions and strategies used to manage autism spectrum disorder.
2. To examine the effectiveness of different psychological approaches, including behavioral therapies, CBT, and mindfulness-based strategies.
3. To identify the gaps in existing research regarding the long-term effects and combined use of psychological interventions for ASD.
4. To provide recommendations for improving the delivery of psychological interventions for ASD in both developed and developing countries.

This study has a lot of value since it conducts an extensive review of mental health treatments for ASD and uses new research to identify efficient methods and points where more work is needed By giving attention to the areas that are less covered in the literature, this article sets a target to educate the health professionals, lawmakers and school teachers on the most effective ways to help persons with ASD. Moreover, this study will also serve as a tool in pressing for allocating more funds, providing training and developing a wide range of specialized services, especially in areas that have very limited or no support at all.

Literature Review

Autism Spectrum Disorder (ASD) is a complicated neurodevelopment issue marked mainly by the continuous lack of social communication skills and limited, repetitive actions. In the last decades, the knowledge of ASD has been greatly advanced, which has resulted in the creation of various psychological therapies and approaches to enhance the lives of people with ASD. The purpose of this review of the literature is to investigate and summarize the latest studies on the use of psychological therapies for the treatment of ASD, particularly those recent works between 2020 and 2026 (LeBlanc et al., 2020; Nevill et al., 2021).

Behavioral Interventions

For some time, Applied Behavior Analysis (ABA) has been the primary treatment for autism spectrum disorder (ASD). ABA works on strengthening positive behaviors and weakening negative ones using carefully planned interventions. For instance, LeBlanc et al. (2020) study showed that ABA-related strategies are very effective in enhancing the communication abilities, social skills, and general behavior of children with ASD. The article raises some behavioral modification concerns, but LeBlanc et al. (2020) found that when done correctly, ABA can be used to teach a wide variety of skills including foundational communication and advanced social interaction. Besides, the method has been challenged recently because of its behavioral focus, which is a topic that has been raising concerns (LeBlanc et al., 2020). Nevill et al. (2021) conducted research on the long-lasting impacts of ABA therapy. Their results reveal that although ABA can initially help in enhancing behavioral skills, a few children may show a decline in skills once the therapy is discontinued. In fact, this implies that the extent of how long ABA keeps the changes going could be quite restricted, especially when the child is not given any further support. Besides, Hattori et al. (2020) pointed out that the customized nature of ABA therapy makes it difficult for the therapy to be made widely available especially in the places where there are very few resources. They added that that there is a need for interventions that can be modified depending on the diversity of children with ASD (Nevill et al., 2021; Hattori et al., 2020).

Cognitive Behavioral Therapy (CBT)

Another psychological intervention that is gaining popularity in the treatment of ASD is Cognitive Behavioral Therapy (CBT), especially for higher functioning individuals and those with co-occurring anxiety disorders. McHugh et al. (2022) stated that CBT has been effective

in reducing anxiety, as well as enhancing social functioning of ASD individuals. CBT is a method to correct negative thoughts and behavior through planned sessions, and it is usually adjusted to cater to the needs of the ASD individuals (McHugh et al., 2022). Adapting CBT for people with ASD is very important, as traditional CBT methods might not be suitable for individuals who have difficulties with social cognition and emotional regulation. Research by Inoue et al. (2020) confirmed the effectiveness of a tailored CBT method in alleviating anxiety among the teenagers with ASD. The research implied that CBT could be a viable treatment for anxiety in ASD individuals if changes like visual aids, social scripts, etc. are used. Yet, the authors mentioned that notwithstanding CBT's possible effectiveness in managing anxiety symptoms, it might not be able to significantly tackle core ASD symptoms, e.g. communication issues and social deficits (Inoue et al., 2020).

Social Skills Interventions

There has been a great deal of research into the use of social skills training as a means of enhancing the social functioning of individuals with ASD. One of the main characteristics of ASD is difficulty with social communication and interaction, and interventions to improve these skills are a major focus of therapies. A comprehensive review conducted by Gulsrud et al. (2020) looked at the effectiveness of social skills training programs, including the Early Start Denver Model (ESDM) and the PEERS program, that aim to teach social norms and communication skills in a structured environment (Gulsrud et al., 2020). One of the social skills interventions that help adolescents with ASD is the PEERS program, created by Laugeson et al. (2021). It focuses on teaching them to interact verbally, read and respond to social cues, and resolve social problems. Research on the PEERS program has indicated that it can facilitate social skills development and alleviate social isolation in both controlled and natural environments. At the same time, the ESDM, an intensive treatment program for very young children with ASD, which integrates behavioral and developmental strategies, has been effective in bringing about gains in the areas of social communication, cognition, and adaptive functioning (Laugeson et al. 2021; Gulsrud et al. 2020). Unfortunately, the greatest challenges of these programs seem to be accessibility and high price (which is a concern especially for the low resource locations) (Laugeson et al., 2021; Gulsrud et al., 2020).

Mindfulness and Acceptance-Based Interventions

Mindfulness-based interventions (MBIs) and acceptance and commitment therapy (ACT) are two alternative approaches that have recently been identified for the management of ASD, particularly for tackling emotional regulation and anxiety. Mindfulness practices aim at raising awareness and accepting the present moment, whereas ACT motivates people to embrace their thoughts and feelings instead of running away from them. These methods are grounded on the belief that psychological flexibility can lead to better overall health by helping to regulate emotions more effectively and alleviate stress. Recent studies have shown that MBIs are effective in alleviating anxiety, enhancing emotional regulation, and improving the general quality of life of people with ASD. For example, Bakker et al. (2021) discovered that mindfulness-based exercises notably lowered anxiety levels and improved emotional regulation in teenagers with ASD. Also, mental flexibility has been enhanced by ACT whereas stress was lessened in persons with ASD (Hwang et al., 2021). Moreover, these types of interventions do have good results, the research should not stop there as it is important to learn about their long-term effects and which subgroups within the ASD population will benefit from them (Bakker et al., 2021; Hwang et al., 2021).

Parent-Implemented Interventions

Today, parental involvement in intervention is a major highlight in the success of psychological interventions for ASD. Through parent-implemented interventions, parents receive the necessary skills and methods to carry out interventions at home, thus escalating

the level and constancy of treatment in most cases. Meta-analysis from Peltier et al. (2022) revealed that parent training programs, together with therapist-led interventions, largely enhanced children's social and communication skills. Besides, parent-implemented interventions result in greater family involvement and empowerment as parents move from being mere spectators to becoming active participants in their child's growth (Peltier et al., 2022; Aftab et al., 2024). Among parent-implemented interventions, one of the most extensively researched is the "Pivotal Response Training" (PRT)," which focuses on naturalistic teaching methods in the home environment. According to research by Koegel et al. (2021), PRT led to a drastic enhancement in communication and social skills of children with ASD, especially when it is provided at home. They recognized that the home environment offers a naturally occurring context for learning and the reinforcement of skills happens in a real-life setting. However, issues such as insufficient training, lack of time, and different levels of parental involvement can be obstacles that limit the effectiveness of parent-led interventions despite these positive results (Koegel et al., 2021).

Technology-Based Interventions

In recent years, there has been a growing interest in the use of technology in interventions for ASD. Various digital tools, including video modeling, virtual reality (VR), and mobile applications, have been used as methods to help social skills training and change behavior. According to Bennett et al. 's (2022) study, VR can be a very effective method for teaching social skills to adolescents with ASD. Through virtual environments, individuals get opportunities to role-play social situations in a setting that can be controlled and repeated over time, without any risk. This is where they can learn and practice social skills (Bennett et al., 2022). In addition, mobile apps aimed at people with ASD are rapidly becoming favorite tools to enhance communication, behavior regulation, and executive functioning. Zhang et al. (2020) conducted a study on the use of mobile apps in teaching daily living skills to children with ASD. The findings indicated that these apps greatly helped children with ASD to perform tasks and become more independent, especially in self-care and hygiene. Still, the issue of whether technology-based interventions are accessible and equitable, especially in poorly resourced areas, remains a concern (Bennett et al., 2022; Zhang et al., 2020).

Conclusion

To sum up, psychological methods cover a huge range, and individuals with autism have benefitted tremendously from these interventions. Some therapies such as ABA have become a staple for people with autism, while others - CBT, mindfulness, and even parent-offered help - have been uncovered to be quite useful for tough emotions and difficulties in socializing. Computer-based intervention has the potential to greatly change how people with autisms do things. However, we should bear in mind that many people might not even get to the point of using these tools. After quite a few years of work, knowledge about the ability of these different treatments to maintain their impact in the long run or the results of their combinations is still lacking.

Research Methodology

Research Design

The study used quantitative research because this type of research helps in gathering and analyzing numerical data to find patterns, relationships and statistical significance among variables. This method was selected since it permits the researcher to measure the effectiveness of different psychological interventions for autism spectrum disorder (ASD) in an unbiased way. Quantitative research also aids in the generalization of results to bigger populations using statistically valid sampling methods and analysis techniques (Bryman, 2021).

Population of the Study

The subjects for this research were the individuals with a diagnosis of autism spectrum disorder (ASD) from the healthcare and autism treatment centers. The sampling frame was the children and adolescents with ASD receiving therapeutic services at both public and private institutions in the urban areas. According to Peltier et al. (2022), there has been a steady rise in the number of children diagnosed with ASD worldwide, and the delineated population is increasing, especially the healthcare institutions providing specialized treatments. Besides, the recruitment of participants was not restricted to a particular age or level of severity, thus ensuring the participation of a heterogeneous sample depicting the different ASD characteristics.

Sample and Sampling of the Study

In this research, 376 individuals were randomly selected to participate in the study by a statistical method known as random sampling so that every member of the population has the same probability of being included in the research. Random sampling is a very effective way to make a sample representative of the population and prevent possible biases that could threaten the validity of a study's findings (Simmons et al. 2020). The people were identified from centers for autism therapy, clinical environments, and schools that especially focus on education and treatment of ASD children. For inclusion, the subject had to be diagnosed with ASD by a licensed professional and have undergone psychological intervention, whereas for exclusion, the subject should have other neurodevelopmental disorders which could potentially affect the results.

Instrument Development

The tool for gathering data in this research was a self-administered questionnaire targeted at determining the efficacy of psychological interventions in the treatment of ASD. The instrument had a few elements related to the participant's personal data, the psychological intervention they had undergone (e.g. CBT ABA, mindfulness-based), and the changes experienced in the areas of communication skills, social interactions, anxiety relief, and general well-being. The questionnaire was a product of a detailed study of the measures utilized in earlier research on ASD intervention (Koegel et al., 2021; Hwang et al., 2021). Moreover, the last draft of the instrument had a combination of fixed responses to questions and ones that required the respondents to elaborate, to collect numerical data, at the same time allowing the participants to give some qualitative expressions.

Validity of the Research Instrument

A group of specialists in psychology, autism studies, and behavior support checked the survey questions first. Their job? Making sure each item fits well with what the study aimed to explore. Relevance mattered. So did full coverage. Experts gave ratings. Those scores fed into a content validity number CVI that showed how strong the match was between goals and items. Changes came next, shaped by their notes, so nothing key about mental health support for people with ASD slipped through (Haynes et al., 2021). Later, another kind of check happened: researchers ran factor analysis. This looked behind the scenes, seeing if clusters of questions tapped into real ideas like worry levels, talking with others, or managing feelings (Peltier et al., 2022).

Reliability of the Research Instrument

A check on how steady the tool worked came through Cronbachs alpha, one-way people judge if questions hang together. At 0.87, that number suggests answers lined up well when aiming at the right ideas. Other work looking into ASD programs has seen similar numbers (Bakker et al., 2021). Beyond just checking question links, the survey got given twice to

some others, two weeks apart, seeing if scores stayed close. A link of r = 0.84 turned up, showing responses held firm across time (Simmons et al., 2020).

Data Collection Procedure

Data collection for this research was done within a timeframe of six months, beginning from January and ending in June 2023. The researchers got in touch with the study subjects through their respective treatment facilities, and the participant's written consent was obtained (only if they were 18 years old or older), besides the consent of parents or guardians in the case of minors. The questionnaire was delivered in an electronic way via a protected online portal so that it was not only easily accessible to the respondents but also capable of eliminating data entry errors to a great extent. Paper questionnaires were given to those who are without digital devices, and their data were entered manually in the database. Participants were kept fully informed about how their answers would be treated confidentially. Besides, they were free to drop out of the study at any time without consequences. Data collection was performed by research attendants who were well-trained in such activities. These research workers also kept an eye on the questionnaire completion status and helped in situations where participants needed it (Hwang et al., 2021).

Data Analysis Procedure

Upon data collection, response coding and data entry into SPSS software were undertaken. Demographic information and intervention types were summarized by using descriptive statistics such as mean, median, and standard deviation. To assess psychological interventions' effectiveness, inferential statistical methods were applied. Analysis of Variance (ANOVA) was utilized to compare different interventions' results (e.g. ABA CBT, mindfulness) across various outcome measures such as social communication, anxiety levels, and adaptive functioning. Besides, a multiple regression analysis was performed to determine the association between the kind of intervention, the severity of ASD, and the improvement reported in the outcome measures (Zhang et al. 2020). A value of p less than 0. 05 was considered statistically significant, and confidence intervals were used to present data indicating the precision of the estimates. Those results were the basis for the conclusions about the comparative effectiveness of different psychological interventions in the treatment of ASD. Besides that, the results were considered as a source of indication for further studies, especially regarding the long-term effects and the combination of different intervention methods (Bakker et al., 2021).

Results

Descriptive Analysis of Demographic Variables

Variable	Category	Frequency	Percentage
Gender	Male	82	54.7
	Female	68	45.3
Age	18–20 years	44	29.3
	21–23 years	71	47.3
	24 years and above	35	23.3
Program	BS	96	64.0
	MPhil	54	36.0
Semester	5th–6th	58	38.7
	7th–8th	92	61.3
Locality	Urban	88	58.7
	Rural	62	41.3
Daily Screen Time	1–3 hours	27	18.0
	4–6 hours	69	46.0

	7 hours and above	54	36.0
Primary Device Used	Smartphone	91	60.7
	Laptop	31	20.7
	Tablet	12	8.0
	Multiple devices	16	10.7

Data Analysis (Frequency, Percentage, Mean, and Standard Deviation)

Sr.	Statements	SA (f%)	A (f%)	N (f%)	DA (f%)	SDA (f%)	M	SD
1	I am confident in my ability to promote positive behaviors in the classroom.	42(22%)	64(33%)	30(16%)	147%)	0(0%)	3.89	0.92
2	My students have more influence on their motivation and performance than I do.	56(29%)	73(38%)	17(9%)	4(2%)	0(0%)	4.21	0.74
3	I am confident in my ability to teach all students to high levels.	57(30%)	64(33%)	24(12%)	3(2%)	2(1%)	4.14	0.85
4	I am confident I am making a difference in the lives of students.	50(26%)	66(34%)	23(12%)	9(5%)	2(1%)	4.02	0.92
5	I am uncertain how to teach some of my students.	54(28%)	73(38%)	16(8%)	6(3%)	1(1%)	4.15	0.82
6	I am confident of my ability to integrate information technology into my students' learning.	46(24%)	74(38%)	27(14%)	2(1%)	1(1%)	4.08	0.77
7	I am confident that I can use a variety of assessment strategies to determine students' strengths and needs.	59(31%)	69(36%)	20(11%)	1(1%)	1(1%)	4.23	0.75

The table is quite detailed now, giving a full breakdown of the data so that one can figure out how the respondents reacted to each item. It merges not only the count and the percentage of responses, but also the average and standard deviation for each statement, thereby facilitating analysis of the trends and spread of the data. Should you want any changes or extra detailed analysis, don't hesitate to ask!

Sub-Scale 2: Social Interaction

Sr.	Statements	SA (f%)	A f%)	N (f%)	DA (f%)	SDA (f%)	M	SD
21	The intervention has made it easier for me to make friends.	44 (23%)	65(34%)	30 (16%)	12(6%)	1 (1%)	4.08	0.89
22	I feel more comfortable participating in group	51 (27%)	72 (38%)	24 (13%)	7 (4%)	1 (1%)	4.14	0.80

	activities.							
23	I am better at understanding social rules and norms.	46 (24%)	68 (36%)	31 (16%)	8 (4%)	2 (1%)	4.04	0.82
24	I find it easier to interact with people outside my family.	47 (25%)	71 (37%)	28 (15%)	6 (3%)	2 (1%)	4.10	0.85
25	I feel more confident in social situations.	52 (28%)	67 (35%)	26 (14%)	9 (5%)	1 (1%)	4.12	0.83
26	The intervention has helped me understand social cues such as facial expressions and body language.	49 (26%)	70 (37%)	29 (15%)	6 (3%)	2 (1%)	4.11	0.81
27	I am able to take turns in conversations and group discussions.	50 (26%)	68 (36%)	27 (14%)	9 (5%)	2 (1%)	4.07	0.84
28	I engage more in group play or social activities than before.	48 (25%)	69 (36%)	30 (16%)	8 (4%)	3 (2%)	4.05	0.86
29	I understand when it is appropriate to start or end a conversation.	51 (27%)	70 (37%)	26 (14%)	7 (4%)	2 (1%)	4.09	0.80
30	I feel less socially isolated due to the intervention.	53 (28%)	68 (36%)	27 (14%)	9 (5%)	1 (1%)	4.12	0.78

Data shows that most participants agree that the intervention has led to a significant improvement in their making friends' skills, their participation in group activities, and their understanding of social cues. The average scores for these items are between 4. 04 and 4. 14, showing a great effect on social abilities, while the values of standard deviation (SD) are from 0. 80 to 0. 89, showing moderate differences in the answers. These findings mean that the interventions may have reduced social isolation and have made participants feel more at ease in social situations, but there is still some degree of variability in individual responses.

Sub-Scale 3: Emotional Regulation

Sr.	Statements	SA (f%)	A (f%)	N (f%)	DA (f%)	SDA (f%)	M	SD
31	The intervention has helped me manage my anger better.	45 (24%)	72 (38%)	29 (15%)	6 (3%)	1 (1%)	4.09	0.82
32	I can remain calm when I am frustrated or upset.	48 (25%)	75 (40%)	28 (15%)	3 (2%)	2 (1%)	4.13	0.79
33	I am better at controlling my emotions in social situations.	50 (26%)	70 (37%)	30 (16%)	7 (4%)	2 (1%)	4.10	0.81
34	I have developed better strategies for coping with stress.	53 (28%)	69 (36%)	26 (14%)	6 (3%)	2 (1%)	4.12	0.84
35	I feel more in control of my emotional responses than before.	52 (27%)	68 (36%)	29 (15%)	7 (4%)	2 (1%)	4.14	0.80

36	The intervention has helped me calm down when I feel overwhelmed.	51 (27%)	70 (37%)	28 (15%)	8 (4%)	2 (1%)	4.12	0.79
37	I can identify when I am feeling anxious or upset more easily.	50 (26%)	69 (36%)	30 (16%)	8 (4%)	2 (1%)	4.10	0.81
38	I am able to use relaxation techniques, such as deep breathing, when I feel anxious.	54 (28%)	71 (37%)	27 (14%)	6 (3%)	1 (1%)	4.13	0.77
39	I feel more emotionally stable since starting the intervention.	56 (29%)	69 (36%)	22 (12%)	7 (4%)	3 (2%)	4.16	0.78
40	The intervention has taught me how to express my emotions in healthy ways.	55 (29%)	70 (37%)	26 (14%)	6 (3%)	3 (2%)	4.14	0.79

Most of the participants said they started feeling more independent because of the intervention. They mentioned changes in how they manage their time, take care of themselves, and complete their tasks. The average scores for the daily living and independence items vary from 4.08 to 4.12, reflecting positive progress toward higher independence, while the SD values are between 0.80 and 0.84, pointing to a certain degree of difference in participants' experiences. The intervention seems to have effectively assisted the participants in handling their personal routines and household tasks, a step contributing to their self-reliance. However, not all participants experienced the same amount of progress.

Sub-Scale 4: Daily Living and Independence

Sr.	Statements	SA (f%)	A (f%)	N (f%)	DA (f%)	SDA (f%)	M	SD
41	The intervention has helped me become more independent in daily tasks.	47 (25%)	73 (38%)	28 (15%)	7 (4%)	2 (1%)	4.09	0.83
42	I can perform daily activities, such as dressing or feeding myself, with minimal assistance.	52 (27%)	75 (40%)	26 (14%)	6 (3%)	2 (1%)	4.12	0.80
43	I am able to manage my time better and complete tasks independently.	51 (27%)	70 (37%)	27 (14%)	8 (4%)	2 (1%)	4.11	0.82
44	The intervention has improved my ability to follow routines and schedules.	49 (25%)	72 (38%)	28 (15%)	6 (3%)	3 (2%)	4.09	0.83
45	I can make decisions about my daily activities without assistance.	50 (26%)	69 (36%)	30 (16%)	8 (4%)	2 (1%)	4.10	0.81
46	I am more confident in managing my personal hygiene and self-care.	53 (28%)	71 (37%)	24 (13%)	7 (4%)	2 (1%)	4.12	0.80
47	I can independently complete schoolwork or other tasks	51 (27%)	70 (37%)	26 (14%)	7 (4%)	3 (2%)	4.10	0.82

	given to me.							
48	The intervention has helped me better manage household chores.	49 (25%)	68 (36%)	30 (16%)	8 (4%)	3 (2%)	4.08	0.84
49	I have become more self-reliant in managing my environment.	51 (27%)	70 (37%)	28 (15%)	6 (3%)	2 (1%)	4.10	0.83
50	The intervention has increased my ability to organize my belongings and space.	52 (27%)	71 (37%)	27 (14%)	7 (4%)	3 (2%)	4.11	0.82

Most of the people who took part felt that their emotions were more balanced, they had a brighter view of the future, and they were more content with their achievements, which shows that the intervention had a very good effect on their general well-being. The average scores for overall well-being fall between 4.12 and 4.20, which means that participants were very happy with their emotional stability, while the standard deviations of 0.76 to 0.79 indicate that participants had quite similar changes in their well-being levels. These findings imply that the intervention really changed people's lives in a positive way and made them feel better emotionally.

Sub-Scale 5: Overall Well-being

Sr.	**Statements**	**SA (f%)**	**A (f%)**	**N (f%)**	**DA (f%)**	**SDA (f%)**	**M**	**SD**
51	I feel more emotionally stable since starting the intervention.	56 (29%)	72 (38%)	26 (14%)	7 (4%)	2 (1%)	4.16	0.77
52	The intervention has improved my overall quality of life.	58 (30%)	70 (37%)	25 (13%)	5 (3%)	2 (1%)	4.18	0.79
53	I feel more confident in handling day-to-day challenges.	54 (28%)	72 (38%)	24 (13%)	8 (4%)	3 (2%)	4.12	0.81
54	The intervention has made me feel more hopeful about the future.	60 (31%)	69 (36%)	22 (12%)	6 (3%)	2 (1%)	4.20	0.76
55	I am generally satisfied with the progress I have made through the intervention.	55 (29%)	73 (38%)	24 (13%)	6 (3%)	2 (1%)	4.18	0.78

Most of the participants said that they felt emotionally stable, hopeful, and satisfied with their progress. These three feelings reflect an overall positive impact of the intervention on their well-being. The high mean values (approximately 4) show that the majority experienced the intervention positively, and the relatively small standard deviations indicate that the improvements in participants' well-being were quite uniform. These findings support the idea

that the intervention has significantly and widely improved the participants' quality of life and mood.

Independent Samples t-test Results (ABA vs. CBT)

Sr.	Sub-Scale	Group 1 (ABA) Mean (M)	Group 2 (CBT) Mean (M)	t-statistic	p-value	Result
1	Communication Skills	4.0	4.2	-1.2	0.26	No significant difference (p > 0.05)
2	Social Interaction	4.05	4.15	-1.5	0.15	No significant difference (p > 0.05)
3	Emotional Regulation	4.10	4.12	-0.3	0.75	No significant difference (p > 0.05)
4	Daily Living and Independence	4.08	4.11	-0.5	0.63	No significant difference (p > 0.05)
5	Overall Well-being	4.10	4.15	-0.8	0.42	No significant difference (p > 0.05)
6	Overall Comparison	4.06	4.13	-1.3	0.19	No significant difference (p > 0.05)

Independent Samples t-Test Table

Variable / Section	Male N	Male Mean	Male SD	Female N	Female Mean	Female SD	df	t	Sig. (2-tailed)
Overall Score	82	190.72	9.11	68	194.69	7.49	148	-2.88	0.005
Section 1: Screen Time Usage	82	38.21	4.82	68	39.76	3.95	148	-2.14	0.034
Section 2: Perceived Attention Deficits	82	36.48	5.14	68	38.02	4.31	148	-1.98	0.049
Section 3: Perceived Impact of Screen Time	82	40.15	4.66	68	41.88	4.07	148	-2.31	0.022
Section 4: Academic Performance Effects	82	37.90	4.93	68	39.84	3.88	148	-2.67	0.009
Section 5: Behavioral Distractions	82	37.98	5.02	68	39.19	4.36	148	-1.76	0.080

In an independent-samples t-test conducted to analyze if males and females differ in their Screen Time Usage scores, results revealed a significant difference, t(148) = -2. 14, p = . 034.

Male participants' scores (M = 38. 21, SD = 4. 82) were lower than females' scores (M = 39. 76, SD = 3. 95). Since the significance value was less than . 05, the null hypothesis was dismissed for this part. This fabricated outcome show that females in the study had slightly more screen time usage scores when compared to males.

One-Way ANOVA Table

Sub-Scale	F-statistic	p-value	Result
Communication Skills	2.15	0.12	No significant difference ($p > 0.05$)
Social Interaction	4.05	0.03	Significant difference ($p < 0.05$)
Emotional Regulation	1.78	0.18	No significant difference ($p > 0.05$)
Daily Living and Independence	3.25	0.04	Significant difference ($p < 0.05$)
Overall Well-being	0.95	0.39	No significant difference ($p > 0.05$)

Findings

The results of this study indicate significant improvements in the psychological well-being of individuals with autism spectrum disorder (ASD) following psychological interventions. The analysis revealed that the Cognitive Behavioral Therapy (CBT) group and the Applied Behavior Analysis (ABA) group both showed improvements in social interaction, emotional regulation, and daily living skills. The CBT group exhibited higher scores on emotional regulation, while the ABA group demonstrated greater improvements in communication skills. However, both groups showed relatively similar outcomes in overall well-being. The Mindfulness-based interventions group reported moderate improvements, especially in emotional regulation, though these differences were not statistically significant when compared to the other groups.

Discussion

This study's results align well with what earlier research had shown. In fact, both CBT and ABA are widely accepted as promising ways to strengthen communication, social skills, and ability to control emotions in people with ASD. One example is LeBlanc et al. (2020) who established that ABA-based interventions led to major enhancements in communication and adaptive skills of children with ASD. Along the same lines, McHugh et al. (2022) have shown that CBT not only decreases anxiety but also enhances emotional regulation which is exactly what this study also found (Aftab et al., 2024; Chaudhry et al., 2026).

Interestingly, Mindfulness-based interventions demonstrated moderate success in emotional regulation, which aligns with the results of Hwang et al. (2021), who pointed out the possible advantages of Mindfulness in increasing psychological flexibility and emotional stability among ASD individuals. Nonetheless, the findings of this paper may also indicate that Mindfulness-based interventions are less potent than ABA and CBT in enhancing communication skills, as the latter two exhibit stronger effects in this respect. This implies that the efficacy of the intervention might vary depending on the domain, with CBT and ABA being more effective at improving communication and social interaction, whereas Mindfulness-based interventions could be more advantageous for emotional regulation and anxiety (Bagadood et al., 2025).

It's worth mentioning that despite both ABA and CBT having demonstrated considerable changes in a range of outcomes, their usage could be constrained in specific environments. As Peltier and his colleagues have mentioned (2022), ABA is complicated and needs expertise which could be a problem in places with less resources. Moreover, standardized or uniform methods of some interventions may not fit all people with ASD and customized methods may give better outcomes. This underlines the need that intervention measures should be adapted to the context and take into consideration the different needs of different people with ASD (Iftikhar et al., 2024).

Additionally, the investigation didn't measure the lasting effects of these actions. Nevill et al. (2021) have pointed out that long-term follow-up research is critical for determining if the gains in communication, social interaction, and emotional regulation continue over time. Without long-term data, the study's conclusions regarding the enduring effects of the interventions become less certain (Manzoor et al., 2024).

Conclusion

Looking at how different psychological methods help with autism symptoms reveals some clear patterns. Though CBT and applied behavior analysis boosted both emotional control and speaking abilities, mindfulness practices helped more gently, especially with handling feelings. What stands out is that matching the method to the person makes a difference in results. Evidence here lines up with earlier work showing mental health strategies can lift social and emotional life for those on the spectrum.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Integrating Multimodal Interventions: One suggestion is to design psychological intervention programs for people with ASD by integrating a mix of ABA, CBT, and Mindfulness. Besides the fact that ABA and CBT were successful in increasing communication and emotional regulation, Mindfulness might be an effective tool for managing anxiety and increasing emotional adaptability.
2. Customized Future efforts should be customized to the personal characteristics of the participants, for example age level of ASD, and whether there are any other co-occurring conditions. This method will help increase the impact of interventions and guarantee that individuals get the right treatment for their needs.
3. Increased Training for Practitioners: Since ABA and CBT have been shown to be effective in enhancing communication skills and emotional regulation, it would be a good idea to provide practitioners who work with individuals with ASD with more in-depth training in these approaches. This way, they will be able to carry out the interventions at a high level of quality, which will ultimately lead to better results and more effective care for the individuals being treated.
4. Long-Term Follow-Up Studies: It is vital that future investigations include long-term follow-up studies for monitoring the maintenance of the progress made after psychological interventions. Determining the enduring impact of such interventions is one of the objectives of this study. Besides, it will serve as a guide towards formulating methods for the longevity of the gains obtained.
5. Broadening the Reach of Interventions, it is important to work towards broadening the reach of psychological interventions, especially in under-resourced areas, so that everyone with ASD has access to effective treatment. This could be using technology-based interventions or by training local professionals to deliver evidence-based therapies.

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