The Effectiveness of Applied Behavior Analysis (ABA) Strategies towards Academic Achievement, Social Interaction and Communication among ASD Students

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Abstract
The purpose of this paper is to describe the effectiveness of applied behavior analysis (ABA) strategies toward academic achievement, social interaction, and communication among students with autism spectrum disorder in Abu Dhabi, United Arab Emirates. where the research tool (questionnaire) was distributed to a random sample of 240 teachers in centers for special needs and 10 parents who applied for ABA services, some students with ASD have difficulty learning, and some have scores below normal intelligence. The main problem they have is the inability to communicate with others due to the linguistic developmental disorder that causes disruption in social relations (Al-khresheh, 2020).
According to the pilot study, special education teachers confirmed that there is a positive effect of ABA strategies on academic achievement, interaction, and social communication, provided that this strategy is used in the right way and reinforced appropriately to transfer the impact of learning to similar situations. Then I provided a guideline for teachers called A "Guideline that Sets Up Appropriate Practices and Strategies to Organize the Classroom Environment Within ABA Classes."
Keywords: ABA, Applied Behavior Analysis, Autism Spectrum Disorders, Academic Achievement, Social Interaction, Social Communication.

Introduction
For a child and family, an autism spectrum disorder is one of the most difficult developmental disabilities. This is because this type of disability is characterized by ambiguity, strange behavior patterns resulting from it, and the similarity of some of its characteristics with some of the characteristics of other disabilities (Lunsky et al., 2017).
Some of the signs of autism spectrum disorder appear in children in early childhood, such as a lack of eye contact, unresponsiveness to their name, or indifference to caregivers. Other students may grow normally during the first few months or years of life but suddenly

become introverted, aggressive, or lose language skills they have already acquired (Ozbaya et al., 2020). The signs usually appear at the age of two years. Each child with an autism spectrum disorder is likely to have a unique pattern of behavior and level of risk, ranging from low to high functioning (LeClerc & Easley, 2015).

On the other hand, to implement and train parents in ABA, there is still a need to create local training programs as well as to translate many sources so that they are suitable for use. The basic concepts in Applied Behavior Analysis (ABC) are three basic concepts
(A) Antecedent Requirements or stimuli that encourage the student to perform an action (behavior).
(B) Behavior: the responses (any action the student does).
(C) Consequences: Reinforcement or punishment, even if it is a minor or negative reaction (Meadan et al., 2016).

Applied Behavior (ABA) is considered a lifestyle and not like other therapeutic techniques, and therefore the autism spectrum disorder student must be subjected to it at an early stage and for a certain period of time to study and analyze his behavior and control and enhance the desired behaviors in order to ensure their continuity as well as control the undesirable behaviors and try to extinguish and eliminate them (Fayza, 2020).

Therefore, attempts to interfere with treatment programs by implementing training or educational methods for the skills and behaviors of these students are a means of providing a new skill, cognitive, and linguistic outcome that helps them learn alternative forms of communication and interaction. It also helps them to learn normal behavior patterns and skills. This would reduce their existing behavioral and language disorders, which would help them recover from autism spectrum disorder (Hsiao & Sorensen, 2019).

Task analysis breaks down the target behavior into small components or steps so the student can achieve it. However, while completing the steps, the teacher should reinforce each step's completion to motivate and increase the behavior. We can use a token economy when each step is completed. For instance, if the task analysis is five steps, we can reward the behavior after collecting five tokens. Therefore, combining task analysis with the token economy makes it more effective and efficient. (Crone et al., 2015).

Statement of The Problem
It is very important to adopt the views of teachers and parents and the main challenges they face when implementing the ABA strategies, as these strategies are likely to affect the academic achievement, interaction, and social communication of students with autism spectrum disorder (Unigwe et al., 2017). In addition, autism spectrum disorder affects many students around the world, and it is regarded as one of the most complex developmental disorders. Academics, as well as researchers identified shortcomings in the relevant Arab programs and studies, and the majority of those who conducted studies in the local arena ASD students, ignored following up these students, determining their behavior, and evaluating their negative and positive skills (Bellomo et al., 2020).

As a result of the increasing prevalence of autism spectrum disorder in the countries of the world during the past fifty years, with the injury of about one child out of 160 children in the world according to the report of the World Health Organization for the year 2017, which results in the families of people with autism feeling that they bear unbearable burdens and that they lack support What is needed for autism spectrum disorder care, with its accompanying communication challenges, misunderstanding of social cues, and a lack of emotional understanding that greatly affects everyone in the family, as well as focusing family

time and resources on meeting the needs of the ASD students, these pressures can have negative long-term effects on the family, its financial resources, and its social relations (Saleh, 2022).

Autism spectrum disorder students are also characterized by poor social communication skills; where language development is slow or may not develop at all. The words are used differently from other students, where the words are linked, attention and focus are for a short period of time and include analysis in communication and verbal and non-verbal skills. The language may be completely absent and may grow but without maturity and with poor linguistic structure with repetition of speech, such as repeating the last word of the sentence that he heard, and the wrong use of pronouns (Al-Shahat, et al., 2019).

In addition, autism spectrum disorder students also show symptoms related to social interaction. They show a qualitative deficit in social interaction (eye squinting, gestures, physical postures, physical changes). The failure to establish social relationships with peers of the same chronological age, loss of desire to share interests with others, poor listening ability, and lack of mutual social and emotional behavior (Al-Saeed et al., 2019).

It is possible to provide autism spectrum disorder students with basic and daily life skills and to perform living skills. One of the ways that facilitates the self-reliance of an ASD student in performing life skills is self-management. The strategies and techniques used to ensure this category are far from attainable and are limited to a very few categories. Among these strategies used is the Applied Behavior Analysis (ABA) strategies. It is considered a way of life, not like other strategies and technologies, and therefore the student must be subjected to it at an early stage to develop some life skills for this category of autism spectrum disorder students (Boujut et al., 2016).

To support different age groups and needs, various approaches to treating ABA have been developed. The ABA (Applied Behavioral Analysis) method is a proven method for treating autism spectrum disorder. Since many students are now diagnosed at age two or three, ABA treatment can begin as early as three or four years of age, with parents supervising each session. This method is intended for long-term treatment, with most students starting at the age of four and continuing for two to three years. At the student's home, he receives a treatment for 40 hours a week (Gunadi, 2019).

Objectives of the Research
The main objective of this study is to assess the effectiveness of ABA strategies towards academic achievement, social interaction, and social communication among autism spectrum disorder students from the SEN teacher's perspective and that of their parents.

Research Question
The main problem of this study lies in the effectiveness of the Applied Behavior Analysis strategies in academic achievement and social integration, as well as social communication among ASD students, and through this question the following sub-questions come:

RQ1: How does the ABA strategies effect the progress in development of the academic achievement of ASD students?

RQ2: How does the ABA strategies effect the progress in development of social interaction among ASD students?

RQ3: How does the ABA strategies effect the progress in development of social communication among ASD students?

RQ4: How do parents see barriers of implementing ABA strategies that affect academic achievement, social interaction, and communication?

RQ5: What are the challenges of Special Needs teachers, while using ABA strategies in their classrooms for ASD students?

RQ6: What is the importance of guidelines to set up appropriate practices and strategies to organize the classroom environment within ABA classes designed for teachers?
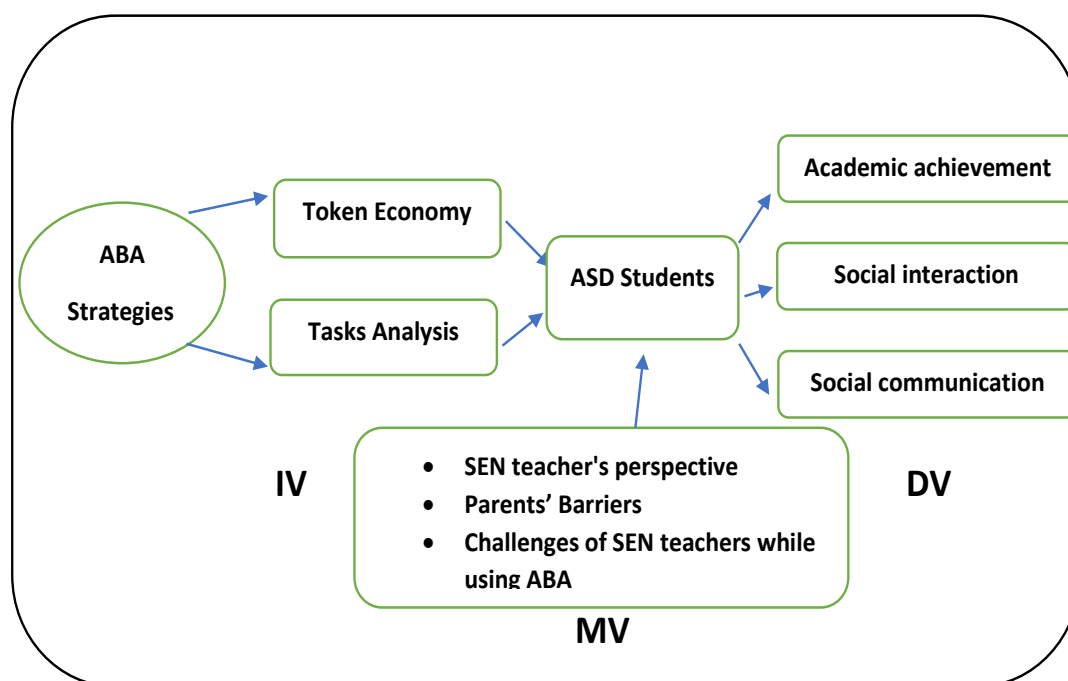
Literature Review

Autism is considered a developmental disorder that appears in the first three years of a child's life, and it has known a great spread in recent years. the ASD students also suffer from not acquiring and developing many skills, including imitation, which is considered one of the basic skills that would help the student learn. Among the remedial programs that have been concerned with developing the skill of imitation, the researcher finds the Applied Behavior Analysis strategies, which is considered one of the behavioral strategies that work on developing various skills in different fields and that teaches positive behaviors and changes or amends negative behaviors, using many methods and means to achieve this (Midoun, 2018).

Al-Ayash (2021) aimed to identify the obstacles to applying the techniques of Applied Behavior Analysis (ABA) from the point of view of autism teachers in some autism centers in the city of Damascus, and to identify the impact of some variables such as educational qualification and number of years of experience. The research sample included (100) male and female teachers, (61) female teachers, (39) teachers, the obstacles scale was used by the researcher. There are no statistically significant differences in the answers of the study sample members due to the educational qualification variable, and there are no statistically significant differences in the answers of the study sample members due to the variable of teaching experience.

Rafiee and Khanjani (2020) dealt with the Arabization of the Applied Behavior Analysis (ABA) strategies and its impact on improving the skills of a sample of children with autism spectrum disorder in the Egyptian environment. The study sample consisted of (10) children with autism ranging in age from (3-9) years, and the sample was divided into two control and

experimental groups, each group consisted of (5) children, and one of the most important results of the study was the impact of the ABA Applied Behavior Analysis strategies with feasibility and impact on improving the skills of children with autism spectrum disorder, which is suitable for the Egyptian environment after Arabization.

Bakkar and Zuraikat (2018) aimed to reveal the effectiveness of the proposed program in the development of social communication, which is to improve social interaction as well as reduce stereotyped behaviors, and the current study relied on the quasi-experimental approach, and the total study sample consists of (16) Male and female individuals, their ages range from 7 to 13 years, divided into two groups: experimental (8) and control (8). The researcher used the following tools: the autistic child scale (prepared by: Adel Abdullah, 2003), the Goddard board test to measure intelligence, and a training program to develop social skills (Prepared by: the researcher), and one of the most important results of the study is the presence of statistically significant differences between the mean scores of the experimental group members in social communication in the pre and post measurements in favor of the post measurement, and the presence of statistically significant differences between the mean scores of the experimental group and the control group in social communication In the post-measurement for the benefit of the experimental group.

Cable and Wiemer (2016) focused on the use of modern computer technology to train children with autism spectrum disorder on social communication skills. Where the study focused on providing interactive computer programs for these children, as well as providing them with specific tasks that children can accomplish, including providing them with achievement instructions, which contributes to the development of their communication and social skills, and the study concluded that the use of technology in the development of social communication skills is a modern approach and attention should be paid to this approach And conducting several empirical studies on the effect of using computer technology on developing social communication skills for children with autism disorder.

Research Limitations

This research study has the following limitations: The first limitation is tt this study is limited to Abu Dhabi government centers; the total number of centers is 15, but the researcher selected 4 centers; the second limitation is the number of teachers in these centers; there will be approximately 1785 male and female teachers working in special education centers in Abu Dhabi; in the United Arab Emirates, the researcher will select 400 teachers at random Emirates, the researcher will select 400 at random. In addition, the researcher will select 60% from the total population sample, which will be 240 teachers in the research sample. The third limitation is the number of students; there will be around 2650 students, and the last limitation is the number of parents; there will be 10 parents. It sought to ascertain the efficacy of ABA strategies in terms of academic achievement, social interaction, and communication in students with autism spectrum disorder, as perceived by teachers and parents. This study is limited to the use of applied behavior analysis techniques and methods such as token economy and task analysis.

Methodology

Research design is defined as a description or plan of how the researcher decided to answer the formulated research problem (Blaikie, 2003). The main aims of this study are to investigate the effectiveness of the applied behavior analysis strategies in academic achievement, social interaction, and social communication among ASD students from the

perspective of teachers and parents. In addition, this study used a mixed-methods approach, which generally depends on the qualitative approach in the experimental investigation to answer the research questions and address the problem and quantitative data, The research sample will be randomly selected in governmental centers for people of determination inside Abu Dhabi city, and the researcher will select the sample randomly as all individuals in this study population are equal. Several teachers and parents in each center will be selected at a rate of 60% from each center; this will be 240 teachers and 10 parents
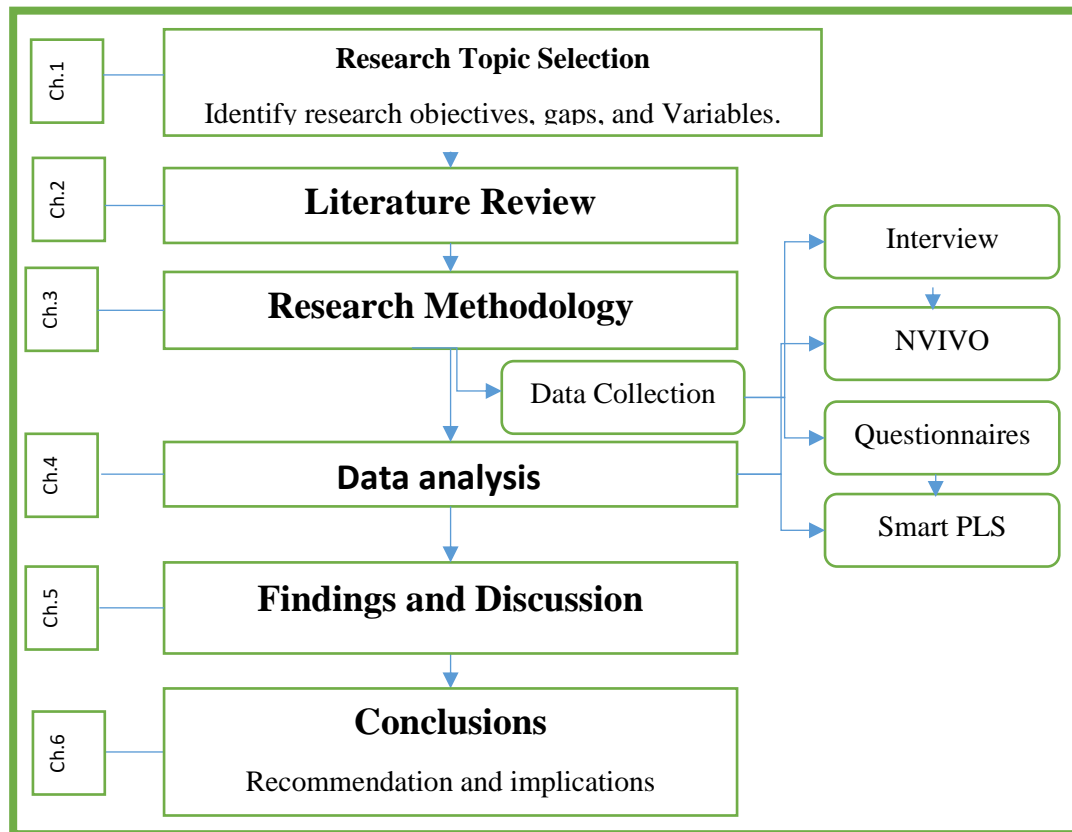

Figure 3.1
The Descriptive Research Design

The research flow (Figure 3.1) follows a research approach that starts with the description of the research subject in the first chapter, followed by a literature review before beginning to collect data through interviews. The third chapter focuses on research methodology and how research questions can be addressed, the methods of interpretation of data in this research thematic analysis are one of the qualitative methods. The data will be discussed and interpreted in accordance with the indications. This justifies the creation of a new theory to understand the research perspective.

Adaptation of the Study Instrument (questionnaire)
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Adopted Instrument

Name	Items before validity	Items after validation	Ref
A- The effect of ABA strategies on academic achievement	18	15	Fahmy & Ahmed. (2022).
B- The effect of ABA strategies on social interaction	16	12	Jawan & Mahmoud (2020).
C- The effect of ABA strategies on social communication	16	12	Sayed et al (2015)
D- The Interview Question	6	6	Researcher + BHUPTANI (2017).

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Adopted Instrument

Name	Items before validity	Items after validation	Ref
RO5- Challenges that teachers face while using ABA strategies	13	13	Maageny & Alghamdy (2020)

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Correlation coefficients between each item" The effect of ABA strategies on social communication" and domain

No.	item	Pearson Correlation
1	Token reinforcement supports the use of rewards to increase student participation in structured play.	.746**
2	The token reinforcement strategy increases language use and spontaneous speech initiation as spoken languages for ASD students.	.651**
3	The strategy of token reinforcement supports a reference to what is desired, such as referring to a favorite game.	.701**
4	The token reinforcement strategy increases the verbal and nonverbal skills of ASD students.	.715**
5	The token reinforcement strategy reduces apparent weaknesses in imitation skills such as building a tower.	.582**
6	A strategy of "token reinforcement" supports the use of language, such as greeting others, for ASD students.	.715**
7	The task analysis strategy increases the follow-up of simple and complex instructions by analyzing ASD students.	.582**
8	Through the fragmentation of simple and complex tasks, the task analysis strategy contributes to increased attention and focus.	.552**
9	The task analysis strategy increases eye contact and maintenance, provided it is reinforced for ASD students.	0.257**
10	The task analysis strategy contributes to gradual language development if it is used with the reinforcement strategy to improve the level of reading and writing.	.647**
11	The token reinforcement strategy reduces stereotypical and repetitive language, such as echoed sounds and words.	.368**
12	The task analysis strategy leverages functional communication, such as the technique of requesting a specific object to complement a specific activity.	.507**

* Correlation is significant at level (α ≤ 0.05)
** Correlation is significant at level (α ≤ 0.01)

Table 3.12 shows the correlation coefficient for each item of the " Challenges that teachers face while using ABA strategies " and the total of the domain. The p-values (Sig.) are less than 0.01, so the correlation coefficients of this domain are significant at a = 0.01, so it can be said that the items of this domain are consistent and valid to measure what it was set for.

The validity of the study tools was verified by
Content validity is ensured by presenting the study tools in their original form to 11 highly qualified and experienced experts from special needs centers and associations in Jordan, the UAE, and Egypt, as well as specialists in ABA services and autism spectrum disorders, measurement, and evaluation, to ensure the validity of the content and correct the formulation of the tool's items when necessary. The connection of the items and how they

relate to the measurement target, the wording's accuracy, and any other remarks were all put to the experts for their input. The criteria for approving the items were adopted with 80% of the experts' agreement.

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The result of reliability (Cronbach Alpha)

No	Domain	Cronbach Alpha	reliability Test R. test	Item No
1	The effect of ABA strategies on academic achievement	0.869	0.891	15
2	The effect of ABA strategies on social interaction	0.937	0.918	12
3	The effect of ABA strategies on social communication	0.825	0.707	12
	Challenges that teachers face while using ABA strategies	0.845	0.869	13

Contributions of the Study

This study contributes to its findings in helping specialists and those dealing with ASD students face their own problems, and it may be a database that develops a culture of dealing with them and plans training and treatment guidance strategies s for them. This study benefits associations and institutions interested in ASD students, as well as those in charge and specialists in the field of mental health, by opening horizons for building a strategy based on the ABA approach and the skills based on it. It also opens the prospects for conducting more studies related to the study category ASD students and the approaches to their treatment

Findings

All students with ASD benefit from the specific ABA strategies, but the first category of mild autism spectrum disorder benefits the most, according to the parents' responses in the pilot study (semi-formal interview).All the main questions and sub question for Interview were formulated clearly in order to answer the objectives of the study and identify the barriers that parents face during the implementation of ABA strategies, Some of the barriers identified in the interviews were: Cost of treatment, fear of allowing student to be with therapist, discomfort in accepting the need for therapy, finding the right place from the perspective of location and quality of service, lack of service. According to the teachers in the pilot study, they reported that the items of the questionnaire to measure the challenges facing teachers while using ABA strategies clear and covering all components and dimensions of the current study. In general, the pilot study provided us with confirmation that the study's sample size is appropriate. Due to the three-point Likert scale and short questionnaire, as stated by the instructors, the teachers responded to the questionnaire at a high rate. One of the difficulties that surfaced was that the pilot study's professors required frequent prompting and encouragement to complete the questionnaire.

Future Recommendations

Despite the results of our current study, which confirmed the results of previous studies on the effect of applied behavior analysis strategies on students with autism spectrum

disorder and the presence of positive effects on academic achievement, social interaction, and communication, the researcher recommends more research, which can include other strategies for ABA. It has also become necessary to have laws and regulations that support the rights of students. With an autism spectrum disorder to obtain ABA services, get more benefit in the classroom, and train those around the student on them.

References

Al-Ayash, M. A. (2021). Obstacles to applying the techniques of Applied Behavior Analysis (ABA) from the viewpoint of teachers of autism. Damascus University Journal of Educational and Psychological Sciences, 37(4).

Al-khresheh, M. (2020). A comparative study of language development in monolingual and bilingual children with autism spectrum disorders. Int. J. Engl. Ling, 10(6), 104-117.

Al-Saeed, Sh., Al-Badrawi, A., and Al-Husseini, H. M. S. (2017). Autism in children. The Scientific Journal of the College of Early Childhood Education, 4(2), 381 - 410.

Bakkar, H., & Zuraikat, I. (2018) The effectiveness of a play-based training program in developing children's cognitive skills People with autism spectrum disorder. Studies Educational Sciences, 45(4), 7.

Bellomo, T. R., Prasad, S., Munzer, T., & Laventhal, N. (2020). The impact of the COVID-19 pandemic on children with autism spectrum disorders. Journal of Pediatric Rehabilitation Medicine, 13(3), 349-354.

Boujut, E., Dean, A., Grouselle, A., & Cappe, E. (2016). Comparative study of teachers in regular schools and teachers in specialized schools in France, working with students with an autism spectrum disorder: Stress, social support, coping strategies and burnout. Journal of autism and developmental disorders, 46(9), 2874-2889.

Cable, A., & Wiemer, H. (2016). Social skills intervention: Children with autism spectrum disorder. Clinical review. Cinahl Information Systems.

Crone, D. A., Hawken, L. S., & Horner, R. H. (2015). Building positive behavior support systems in schools: Functional behavioral assessment. Guilford Publications.

Hsiao, Y. J., & Sorensen Petersen, S. (2019). Evidence-based practices provided in teacher education and in-service training programs for special education teachers of students with autism spectrum disorders. Teacher Education and Special Education, 42(3), 193-208

Gunadi, T. (2019). The effect of Applied Behavior Analysis (ABA) verbal behavior to the ability of language development in early age children with autistic spectrum disorder. Jurnal Sosial Humaniora Terapan, 1(2).

LeClerc, S., & Easley, D. (2015). Pharmacological therapies for autism spectrum disorder: a review. Pharmacy and Therapeutics, 40(6), 389.

Lunsky, Y., P Hastings, R., Weiss, J. A., M Palucka, A., Hutton, S., & White, K. (2017). Comparative effects of mindfulness and support and information group interventions for parents of adults with autism spectrum disorder and other developmental disabilities. Journal of Autism and Developmental Disorders, 47(6), 1769-1779.

Meadan, H., Ayvazo, S., & Ostrosky, M. M. (2016). The ABCs of challenging behavior: Understanding basic concepts. Young Exceptional Children, 19(1), 3-15.

Midoun, M. (2018). The effectiveness of a training program based on applied behavior analysis in modifying some behavioral problems among children with autism spectrum disorder (Doctoral dissertation, University of Algiers 2 Abu al-Qasim Saadallah).

Rafiee, S., & Khanjani, Z. (2020). The effectiveness of applied behavior analysis therapy on eye contact enhancement, stereotypical behaviors and reduction of behavioral problems in children with autism spectrum. Revista Gestão & Tecnologia.

Saleh, A. A. M. (2022). Autism: its causes and family effects. Andalusia Journal of Humanities and Social Sciences, 57, 177-195.

Unigwe, S., Buckley, C., Crane, L., Kenny, L., Remington, A., & Pellicano, E. (2017). GPs' confidence in caring for their patients on the autism spectrum: an online self-report study. British Journal of General Practice, 67(659), e445-e452.