Proposed Training Program for Developing Non-Verbal Communication in Children with Autism Spectrum Disorder: A Semi-experimental Study at Al-Mann and Salwa Center in Eloued

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Abstract: The study presents a training program designed to enhance non-verbal communication skills in children with autism spectrum disorder (ASD) and evaluates its effectiveness. A sample of five children with ASD from the Al-Mann and Salwa Center for Special Needs in El Bayadh, El Oued province, participated in the study. Using a semi-experimental one-group pretest-posttest design, the Childhood Autism Rating Scale (CARS) and the Language Communication Rating Scale were administered after validation and reliability checks. After the implementation of the training program, statistical analysis using SPSS revealed significant improvements:

- Significant improvements were observed in recognition and understanding skills.
- Expression skills showed notable enhancement.
- Naming skills also demonstrated significant progress.There are statistically significant differences between the pretest and posttest results in recognition and understanding skills, favoring the posttest results.
- There are statistically significant differences between the pretest and posttest results in expression skills, favoring the posttest results.
- There are statistically significant differences between the pretest and posttest results in naming skills, favoring the posttest results.

Therefore, the study proved the effectiveness of the proposed training program in developing non-verbal communication among children with ASD.

Keywords: Autism Spectrum Disorder; Non-Verbal Communication; Training Program.

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I- Introduction :

Most countries around the world pay special attention to education in early childhood, considering the care and attention to childhood as one of the most important indicators of societal progress, without discriminating between their categories, whether typical or with special needs. The latter group has seen concerted efforts to provide schools and centers dedicated to their education, care, and integration into social life. Efforts are made to find programs that suit the type of disability, needs, and capabilities they possess. This will enable them to leverage their physical, mental, social, and professional capacities, among others. Thus, optimal care helps individuals with special needs to adapt, accept their limitations, and interact positively with society.

Autism spectrum disorder (ASD) is one of the complex developmental disorders that affect children and hinder their social and linguistic communication, as well as their imaginative activities and reciprocal social interactions. In this context, researchers have endeavored to find training, therapeutic, and rehabilitation programs aimed at helping children with ASD in various aspects. Researchers also emphasize the importance of early intervention in their care, necessitating families and specialists to follow early rehabilitation procedures with children diagnosed with ASD to enhance their skills, increase their competencies, and help them achieve the fullest potential before it's too late.

1. Problem Statement:

Autism Spectrum Disorder (ASD) stands as a perplexing category within special education, characterized by elusive causative factors. Communication disorders, encompassing both verbal and non-verbal aspects, stand prominently alongside social and behavioral interaction challenges within ASD. Diagnosis of ASD hinges upon the manifestation of these symptoms before the age of three, as per the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV); however, the DSM-5 extends this timeframe to before eight years of age. Since its identification in the mid-20th century, ongoing research has delved into detection, diagnosis, caregiving, and treatment modalities.

During childhood, individuals with ASD commonly experience setbacks in communication, social engagement, and perceptual acuity compared to their neurotypical counterparts, irrespective of varying degrees of disorder severity. Notably, Christiane (1995) highlighted that preschoolers with ASD demonstrate reduced responsiveness and attention towards adults or peers expressing emotions such as fear, frustration, or discomfort, indicating a deficit in emotional reciprocity (Nasr, 2002, p. 82).

Early communication difficulties often serve as harbingers of ASD, attributing social and behavioral challenges to underlying communication deficits. Approximately 50% of individuals

with ASD fail to develop functional speech (Al Ismail, 2011, p. 40). Hobson (1993) elaborated on the struggles of children with ASD in recognizing others' emotions or discerning emotional cues in social contexts. A study introduced a test to gauge children's ability to interpret others' emotions through facial expressions or vocal intonations, revealing substantial difficulties compared to their peers (Nasr, 2002, p. 45).

Tager (1999) highlighted that children with ASD often avoid eye contact, leading to difficulties in prompt social responsiveness, emotional exchange, and subsequent challenges in emotional expression and social integration. Strouk (2004) observed that poor eye contact and attention among children with ASD impede their comprehension of questions, verbal instructions, and social nuances, hindering their ability to connect verbal cues with gestures for social understanding. This deficiency further impairs their real-time intake and processing of external stimuli (Delshad, 2013).

Non-verbal communication, encompassing organized expressions conveying intended meanings through gestures, silence, physiology, and sensory cues, plays a vital role in interpersonal interactions (Suleiman, 2014). Studies such as Dowson (1984, 1989, 1990) highlighted that eye contact among children with ASD is often modulated by task complexity or familiarity, with diminished responsiveness to maternal smiles indicating a lack of emotional sharing and subsequent developmental and relational challenges (Nasr, 2002).

Mohammad Qassem (2001) noted that communication deficits are salient among school-going children with ASD, manifesting in non-verbal communication struggles and deficits in joint attention, impacting their participation and social interactions. Research by Leekan et al. (2000) revealed attention deficits, limited eye contact, and restricted gestures and expressions among children with ASD, aligning with findings from Paparella (2000), Misailidi (2002), Churchill et al. (2003) (Khalifa, 2014).

Individuals with ASD often exhibit limitations in receptive and expressive language, as well as functional communication, lacking spontaneous development of imitation, gestures, and non-verbal communication modalities (Al-Dawaida, 2016). Chan et al. (2005) found varying degrees of language deficits among children with ASD, with some demonstrating clear deficits while others struggled with receptive or expressive language skills (Khalifa, 2014).

Given these challenges, studies such as Hadwien et al. (1999) underscored the importance of early training in communication skills for young children with ASD, emphasizing expressive communication and creating conducive learning environments (Delshad, 2013, p. 195). Theories and approaches to communication training for children with ASD have evolved, with Sandberg (2011) introducing the verbal behavior approach, focusing on language development as a functional aspect treated akin to behavior, utilizing diverse communication modalities including gestures and writing (Eid & Al-Bar, 2016).

Based on the above, our study addresses the communication of children with ASD through proposing a training program to develop non-verbal communication skills in children with ASD. Thus, the main research question of our study is as follows:

- **What is the effectiveness of the proposed training program in developing non-verbal communication skills in children with ASD?**

To address the study problem, we formulated the following sub-questions:

- Are there differences between pre-test and post-test results in the recognition and understanding skills of children with Autism Spectrum Disorder (ASD)?
- Are there differences between pre-test and post-test results in the expression skills of children with ASD?
- Are there differences between pre-test and post-test results in the naming skills of children with ASD?

2. Study Hypotheses:

2.1 General Hypothesis:

- The proposed training program is effective in developing non-verbal communication in children with ASD.

2.2 Specific Hypotheses:

- There are statistically significant differences between the pretest and posttest results for recognition and understanding skills in children with ASD, favoring the posttest results.
- There are statistically significant differences between the pretest and posttest results for expression skills in children with ASD, favoring the posttest results.
- There are statistically significant differences between the pretest and posttest results for naming skills in children with ASD, favoring the posttest results.

3. Study Objectives:

The current study aims to:

- Design a training program to develop certain non-verbal communication skills (recognition and understanding, expression, naming) in children with ASD.
- Test the effectiveness of the proposed training program in developing non-verbal communication to enable children with ASD to interact with their peers and society.
- Identify the differences between the pretest and posttest results for recognition and understanding skills, expression skills, and naming skills among the ASD sample.

4. Significance of the Study:

The research derives its importance from the following:

- This study enriches the theoretical frameworks related to the importance of communication and its role in improving social interaction in children with ASD.
- The specificity of the target group, children with ASD, necessitates continuous monitoring and increased attention.

- This research assists individuals interested in the ASD child category in acquiring effective methods and strategies for developing non-verbal communication.
- Providing a training program that can be applied to similar cases in specialized centers and schools.

5. Study Terms:

5.1 Autism Spectrum Disorder (ASD):

- **Conceptually**: Autism Spectrum Disorder is defined as a qualitative impairment manifested in two developmental areas: social interaction and communication, and restricted and repetitive patterns of behavior, interests, and activities, which should be apparent before the age of eight (DSM-5, 2013).
- **Operationally**: These are children diagnosed with moderate autism spectrum disorder, according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), and the Childhood Autism Rating Scale (CARS), who are enrolled at the Al-Mann and Salwa Center for Special Needs in El Bayadh, El Oued province.

5.2 Non-Verbal Communication:

- **Conceptually**: According to Eisenberg & Smith (1972), non-verbal communication refers to non-verbal behaviors such as hints, gestures, various physical movements, and facial expressions that carry meanings and indications similar to verbal symbols (Wabeli, 2005, p.23).
- **Operationally**: This refers to a set of skills used by a child to express desires and needs, encompassing several forms (recognition and understanding, expression, and naming).

  - **Recognition and Understanding**: The child's ability to recognize objects and understand their meanings, and to respond to commands using signs and physical gestures.
  - **Expression**: The child's ability to express themselves using non-verbal language (expressing their requirements, needs, feelings, and opinions).
  - **Naming**: The child's ability to name and differentiate objects, and engage in symbolic play.

5.3 Training Program:

- **Conceptually**: A set of data, guidance, information, and necessary activities to implement a series of targeted objectives (Al-Hassan & Shahab, 1990, p.220).
- **Operationally**: A set of skills and activities organized in educational sessions, aiming to develop certain non-verbal communication skills for children with autism spectrum disorder aged 6-9 years, within a specified time period.

II– Methods and Materials:

1. **Method:**

The research method refers to "the method and procedures that the researcher follows to study the problem in order to reach the truth in science" (Al-Rashidi, 2000, p.21). Given that the study's topic involves designing a training program for developing non-verbal communication in children with ASD and then testing its effectiveness by observing changes in communicative skills among

the sample, the current study relied on a semi-experimental design with one group and both pretest and posttest measures. The semi-experimental method allows the researcher to deliberately and systematically change a specific variable and observe its impact on another variable while controlling for all other variables, leading to more accurate conclusions (Saber & Khafaja, 2002, p.57).

Figure 1: The semi-experimental design with one group for the current study

Source: Prepared by the researchers

2. **Study Sample:**

The sample consisted of five children with ASD, selected purposefully, who are enrolled at the Al-Mann and Salwa Center for Special Needs under the following conditions:

- Regular attendance at the center.
- No co-occurring disabilities.
- Diagnosed with ASD according to the DSM-5 criteria.
- Diagnosed with moderate ASD according to the CARS, with scores ranging from 30 to 36.
- Obtained a low score between 0 to 40 on the Language Communication Rating Scale for Autistic Children by Souha Ahmed Amin Nasr (2001).

Table 1: Basic Study Sample

Case	Age	Autism Severity
Case 1	6	Moderate
Case 2	8	Moderate
Case 3	9	Moderate
Case 4	9	Moderate
Case 5	7	Moderate

Source: Prepared by the researchers

3. **Study Tools:**

A. Childhood Autism Rating Scale (CARS):

The Childhood Autism Rating Scale (CARS) includes 15 behavioral dimensions of the child. It is designed to diagnose children with ASD, differentiate them from other pervasive developmental disorders, and assess symptom severity. Developed at the University of North Carolina by Professor Eric Schopler in 1988 and updated in 2011, it is administered through questions to parents or clinical observation by educators.

The following table illustrates the distribution of scores on the "CARS" scale according to the three approved levels.

Table 2: CARS Autism Scale Levels

15 18 21 24 27	30 33 36 39 42	45 48 51 54 57 60
Mild Autism	**Moderate Autism**	**Severe Autism**

Source: Prepared by the researchers

The table indicates that mild autism ranges from 15 to 27 points, moderate autism from 30 to 42 points, and severe autism from 45 to 60 points.

B. Language Communication Rating Scale for Children with Autism by Souha Ahmed Amin Nasr (2001):

This scale aims to assess the language communication of children with autism. Below is a description of the scale before being presented to the experts:

- **Description of Souha Nasr's (2001) Linguistic Communication Assessment Scale before presenting it to the reviewers:**

The scale consists of 50 items distributed across five dimensions, each representing a communicative behavior: imitation, attention, understanding and recognition, expression, and naming. Each dimension covers ten situations in the mentioned order, with four choices for each situation. The teacher selects the appropriate option for each case, and upon scoring, the child receives 3 points for option A, 2 points for B, 1 point for C, and 0 points for D. The total score ranges from 0 to 150, with each dimension's total ranging from 0 to 30. A higher score indicates a lower problem in language communication and vice versa.

- **Study of the Psychometric Properties of the Language Communication Rating Scale in the Current Study:**
- **Scale Validity:**
  - **Expert Validity:**

The scale was presented to a group of experts with specialization and experience in special education, psychology, and speech therapy for their suggestions on the appropriateness of the scale for the intended measurements, clarity of its items and phrases, and scoring method, as well as to enrich the scale with their proposals and opinions.

The researchers made the suggested modifications by the experts, which included deleting some dimensions of the scale and revising certain items that had an agreement rate of (80%) among

the experts to make them clearer and more suitable for the Algerian context. Key modifications include:

- Ensuring that dimensions (understanding and recognition, expression, naming) are the most common problems children with ASD face in communicating with others.
- Modifying some phrases and sentences.
- Deleting some situations from the scale, as shown in the following table:

Table 3: Modified and Deleted Situations of the Scale

Modified Situations	
Before Modification	**After Modification**
A set of pictures	A set of cards
Removing the appropriate shape	Removing some cards
Takes pictures, looks in hand, doesn't know what to do	Observes different cards, unable to remove any picture
Places one category in its box	Places one category in its box without others
Disturbance	Annoyance
Deleted Situations	
When he wants to sleep	

Source: Prepared by the researchers

After the expert review, the researchers administered the Language Communication Rating Scale on a pilot sample of 20 children with ASD at the Al-Mann and Salwa Center for Special Needs.

- **Discriminative Validity:**

Also known as extreme group validity, it involves dividing the test into two parts and comparing the average scores of the top third with the bottom third, sometimes comparing 27% of the higher scorers with an equal percentage of the lower scorers. If it is found that the higher scorers perform well and the lower scorers perform poorly on the test, it indicates a high validity of the test (Al-Tabib, n.d., pp. 217-218).

In the current study, the discriminative validity of the Language Communication Rating Scale was calculated on a pilot sample of 30 children, with individuals ranked in descending order based on their scores on the scale. The significance of the difference between the averages of the two groups was calculated using the "t-test," yielding the following results:

Table 4: Calculation of Discriminative Validity of the Scale

	N	**Mean**	**SD**	**F**	**p**	**Decision**	**t**	**p**	**Decision**

High	8	14.33	6.15	0.006	0.000	Significant	-13.31	0.000	Significant
Low	8	66.50	7.36						

Source: Prepared by the researchers

The results in Table 4 indicate that the F value of 0.006 and the significance level of 0.000, which is less than 0.01, statistically indicates significant differences between the two samples, meaning they are not homogeneous. The calculated t-value of -13.31 with a significance level of 0.000, also significantly less than 0.01, indicates statistical significance.

- **Internal Consistency Validity:**

The internal consistency of the scale was calculated, yielding the following results:

Table 5: Calculation of Internal Consistency Validity for Scale Dimensions

Recognition and Understanding Dimension		
Situation Number	**Pearson Correlation Coefficient**	**Significance Level**
01	0.899	0.000
02	0.815	0.000
03	0.745	0.000
04	0.800	0.000
05	0.524	0.018
06	0.827	0.000
07	0.740	0.000
08	0.770	0.000
09	0.831	0.000
10	0.701	0.001
Expression Dimension		
Situation Number	**Pearson Correlation Coefficient**	**Significance Level**
11	0.815	0.000
12	0.792	0.000
13	0.713	0.000
14	0.686	0.001
15	0.815	0.000
16	0.686	0.001
17	0.815	0.000

18	0.792	0.000
19	0.815	0.000
Naming Dimension		
Situation Number	**Pearson Correlation Coefficient**	**Significance Level**
20	0.646	0.002
21	0.713	0.000
22	0.686	0.001
23	0.815	0.000
24	0.713	0.000
25	0.807	0.000
26	0.815	0.000
27	0.792	0.000

Source: Prepared by the researchers

The table shows that all significance levels of Pearson's correlation coefficients are below the conventional significance level of 0.01. This indicates that all dimensions and items of the scale have a high correlation with the total score, thus confirming the internal consistency of the scale. It suggests the scale is suitable for use in the current study, demonstrating its reliability and validity in measuring the intended constructs.

- **Scale Reliability:**

Table 6: Reliability using Cronbach's Alpha

Sample Size	Number of Items	Cronbach's Alpha
20	**27**	**0.971**

Source: Prepared by the researchers

The results from the table above show that the Cronbach's alpha coefficient is 0.971, indicating that the scale is reliable.

Table 7: Reliability using Split-Half Method

Correlation between Halves	Spearman-Brown	Guttman	Cronbach's Alpha for Part One	Cronbach's Alpha for Part Two
0.886	0.940	0.923	0.953	0.943

Source: Prepared by the researchers

From the table above, it is clear that the Spearman-Brown correlation between odd and even scores is 0.940, which is statistically significant at the 0.01 level, indicating that the scale is reliable.

The Guttman split-half coefficient is 0.923, also showing statistical significance, which confirms the reliability of the scale for use in this study.

C. Proposed Training Program:

Training programs play a crucial role in developing positive behaviors in children with Autism Spectrum Disorder (ASD). Clinical experiences have shown that educational and psychological training programs significantly improve the quality of life for children and their families, as highlighted by several scientific studies, including the study by Baghdadli. (Khachkhouch, 2018., p. 124).

This section will introduce the proposed training program, its importance, objectives, and all details related to its design and implementation.

➢ **Presentation of the Proposed Training Program:**

❖ **Objectives of the Program:**

The proposed training program aims to train children with ASD in essential communicative skills to improve their non-verbal linguistic behavior, thereby facilitating their ability to communicate with others, based on behavioral theory principles.

The current program's objectives are as follows:

- **General Objective:**

_ To develop non-verbal communication skills in children with ASD aged 6-9 years, utilizing the principles of behavioral theory in the program.

- **Specific Objectives:**

_ Develop certain non-verbal communication skills (recognition and understanding, expression, and naming).

_ Enhance some social communication skills, focusing on group activities and communication with others.

_ Focus on positive activities that affect these children and work to deepen them within the programs offered to them.

_ Emphasize the role of rewards in reinforcing the children's behaviors.

_ Develop the child's self-awareness.

- **Theoretical Foundations for Program Development:**

The training program is designed to develop communication skills that assist children with ASD in improving their ability to communicate and express their thoughts and needs, adapting to their environment. This positively reflects on their social and cognitive levels.

Each child with ASD has unique characteristics; although they share the same diagnosis, their clinical profiles differ significantly. This variability is why it is referred to as Autism Spectrum Disorder in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). The current program employs fundamental principles used in training programs for non-verbal communication skills, including:

- Imitation or modeling.
- Repetition to consolidate the learner's behavior.
- Feedback on the child's performance, provided through comments from the trainers conducting the training.
- Reinforcement.

These principles are derived from the behavioral theory, which has proven effective in training programs for children with autism spectrum disorder, such as the Applied Behavior Analysis (ABA) program. This program's theoretical basis traces back to Skinner's conditioning theory, which relies on procedural learning and both negative and positive reinforcement. (Khachkhouch, 2018)

Therefore, our program is based on several foundations, the most important of which are:

- Human behavior is both individual and collective.
- Human behavior is learned through the process of socialization and learning.
- Human behavior is flexible and subject to modification and change.
- There are individual differences among children.
- Diversity in program activity presentation.
- Using various educational tools to prevent child boredom.
- Providing an appropriate educational environment.
- Program activities are suited to the physical and mental capacities of children with autism spectrum disorder.
- Organizing tasks and checking the tools used in the program, placing them in the appropriate location.

- **Proposed Program Content**

The program contains nineteen (19) sessions, including activities to develop non-verbal communication skills in children with autism spectrum disorder. Each group of sessions aims to achieve one of the program's partial goals related to the three targeted skills: recognition and understanding, expression, and naming. We identify the targeted skill, then define the goal of the skill, and finally break down the skill into partial skills according to the sessions, each of which includes an operational goal.

The program includes a set of skills that achieve the training objectives of the study topic:

- Sessions two to ten aim to train on recognition and understanding.
- The eleventh, thirteenth, fourteenth, and seventeenth sessions aim to train on expression.
- The twelfth, fifteenth, sixteenth, and eighteenth sessions aim to train on naming.

- **Program Activities**

The program contains activities that develop non-verbal communication skills for children with autism spectrum disorder, using movement games and sensory-motor activities.

Table 8: Sensory-Motor Skill Activities Applied to Children During the Training Program

Skill Name	Duration
Various colored ball game	35 minutes
Hand printing	35 minutes

Source: Prepared by the researchers

- **Program Evaluation**

The program is evaluated based on the following steps:

- Evaluation through the linguistic communication assessment scale prepared by Souha Ahmed Nasr (2001).
- Evaluation through the observation card of communication skills in a group of children with autism spectrum disorder, aiming to identify the changes in communication skills after the program. The evaluation is done during and after the application period by the researcher and mothers at home. (Prepared by the researchers)

Table 9: Weekly Child Communication Skills Observation Card

Observation Items	Weekly Evaluation Based on the Number of Good Responses								Total	
	Sunday		Monday		Tuesday		Wednesday		Thursday	
	W R	G R	W R	G R	W R	G R	W R	G R	W R	G R
Item 1		×								
Item 2								×		

Source: Prepared by the researchers

- " W R " indicates "Weak Response".
- "G R" indicates "Good Response".

❖ **Note**:

- The child is evaluated weekly with the observation card (in the table above), where the child's performance is rated as either weak or good.

- A mark (×) is placed on the child's responses during the week (weak or good response).
- For each item during the week, the number of good responses is counted, reflecting better communication skills.

4. Study Limitations:

The limitations of the study are as follows:

4.1 Geographical Limitations:

The study was conducted at the Al-Mann and Salwa Center for Special Needs in El Bayadh, El Oued province. This center caters to individuals with special needs (intellectual disabilities, learning difficulties, communication disorders, developmental disorders, physical disabilities). The center works with specialists to diagnose cases and develop appropriate programs, evaluating the situation before and after the program.

The center's treatment plan relies on various programs tailored to the special needs of each individual, managed by a team of administrative staff, psychologists, special education specialists, speech therapists, psychomotor therapists, and educators. The center provides a calm training environment targeted to implement the program's goals and contents, minimizing distractions that could disrupt the child's focus during individual sessions.

III- Results and discussion :

1. **Presentation and Analysis of Hypotheses Results:**

1.1 **General Hypothesis Results:**

The results of the general hypothesis are presented through the analysis of the subsidiary hypotheses, encompassing three dimensions of the scale.

1.2 **First Subsidiary Hypothesis Results:**

- **There are statistically significant differences between the pretest and posttest results for recognition and understanding skills in children with ASD, favoring the posttest results.**

To verify the first subsidiary hypothesis, the researcher used the Paired Samples T-test, and the results are shown in the following table:

Table 10: T-test Results for Differences in Mean Scores of the Experimental Group in Pretest and Posttest for Recognition and Understanding Skill

Measure	Group	N	Mean	Standard Deviation	Degrees of Freedom	T-value	Statistical Significance	Cohen's d

Recognition and Understanding Skill	**Experimental Pre**	5	8.20	2.683	4	7.889	0.001	6.96
	Experimental Post	5	27.20	2.775				

Source: Prepared by the researchers

The results in the table above indicate statistically significant differences at the 0.001 level between the average scores of the experimental group in the pre-test and post-test for the skill of recognition and understanding. The posttest results favored the experimental group, with a mean score of 27.20 and a standard deviation of 2.775, compared to the pre-test mean score of 8.20 and a standard deviation of 2.683. A "t" value of 7.889 was recorded, which was statistically significant at the 0.001 level.

Using the Cohen's d effect size measure, an effect size of 6.96 was obtained, which, according to Cohen (1988) and Kiess (1989), indicates a large effect size. This value also suggests that the proposed training program in developing non-verbal communication skills in children with Autism Spectrum Disorder (ASD) made a practically significant difference, not just statistically, between the pre-test and post-test applications in the experimental group in terms of acquiring the skill of recognition and understanding. Therefore, the first sub-hypothesis of the current study was confirmed.

1.3 Second Specific Hypothesis Results:

- There are statistically significant differences between the pretest and posttest results for expression skills in children with ASD, favoring the posttest results.

To verify the validity of the second partial hypothesis, the researcher employed the paired samples T-test, the results of which are presented in the following table:

Table 11: T-test Results for Differences in Mean Scores of the Experimental Group in Pretest and Posttest for Expression Skill

Measure	Group	N	Mean	Standard Deviation	Degrees of Freedom	T-value	Statistical Significance	Cohen's d
Expression Skill	**Experimental Pre**	5	15.80	1.924	4	8.913	0.001	3.98
	Experimental Post	5	25.40	1.949				

Source: Prepared by the researchers

The results in the table above indicate statistically significant differences at a significance level of (0.001) between the means of individual scores of the experimental group in pre-test and post-test expressive skill measurements. The results favored the post-test application or measurement of the experimental group, with an average of (25.40) and a standard deviation of

(1.949), compared to the pre-test with an average of (15.80) and a standard deviation of (1.924). We recorded a "T" value of (8.913), which was statistically significant at a significance level of (0.001).

Using Cohen's "d" practical significance testing method, we obtained an effect size of (3.98). This value, according to Cohen (1988) and (Kiess, 1989, p.448), indicates a large effect size. This value also suggests an indicator of the extent to which the proposed training program in non-verbal communication development for children with autism spectrum disorder has made a practical difference, not just a statistical one, between the pre-test and post-test applications for the experimental group in terms of acquiring expressive skills. Thus, the second partial hypothesis in the current study has been achieved.

1.4 **Third Specific Hypothesis Results:**

Table 12: T-test Results for Differences in Mean Scores of the Experimental Group in Pretest and Posttest for Naming Skill

Measure	Group	N	Mean	Standard Deviation	Degrees of Freedom	T-value	Statistical Significance	Cohen's d
Naming Skill	**Experimental Pre**	5	6.40	1.949	4	12.944	0.001	5.78
	Experimental Post	5	19.60	0.894				

Source: Prepared by the researchers

The results in the above table indicate statistically significant differences at a significance level of (0.001) between the means of individual scores of the experimental group in pre-test and post-test naming skill measurements. The results favored the post-test application or measurement of the experimental group, with an average of (19.60) and a standard deviation of (0.894), compared to the pre-test with an average of (6.40) and a standard deviation of (1.949). We recorded a "T" value of (12.944), which was statistically significant at a significance level of (0.001).

Using Cohen's "d" practical significance testing method, we obtained an effect size of (5.78). This value, according to Cohen (1988) and (Kiess, 1989, p.448), indicates a large effect size. This value also suggests an indicator of the extent to which the proposed training program in non-verbal communication development for children with autism spectrum disorder has made a practical difference, not just a statistical one, between the pre-test and post-test applications for the experimental group in terms of acquiring naming skills. Thus, the third partial hypothesis in the current study has been achieved.

2. **Discussion and Interpretation of Study Results:**

2.1 General Hypothesis Discussion:

The general hypothesis posits that the proposed training program is effective in developing non-verbal communication skills in children with autism spectrum disorder. The results previously presented demonstrate significant differences between the pre-test and post-test results on the

linguistic communication assessment scale, indicating that the proposed training program has brought about positive changes in developing non-verbal communication skills in children with autism spectrum disorder.

This finding aligns with several studies, including the study by Mohamed Ahmed Ali (2008) titled "Effectiveness of a Training Program in Developing Non-verbal Communication Skills (eye contact, gesture communication, head nods, and facial expressions)" and Bushra Essam Awijan's (2012) study "Effectiveness of a Training Program in Developing Non-verbal Communication Skills in Autistic Children."

These studies, along with Delshad Ali's (2013) research, which highlighted the efficacy of training programs in developing non-verbal behaviors in autistic children, and Siddiq's (2006) study, which showed the effectiveness of communication programs based on behavior modification strategies in developing both verbal and non-verbal communication skills and their positive impact on other performance aspects of autistic children, and Buffington's (1998) study, which demonstrated the effectiveness of the training program in helping children acquire targeted communication skills, especially gestures and signs, support the effectiveness of such programs.

The idea behind the proposed training program stems from the fact that approximately 30% of children with autism spectrum disorder are delayed in acquiring speech abilities, and some may never speak at all. Therefore, the question arises whether it is better to let these children live unable to express their basic needs or to teach them an acceptable method of communication that others can understand, thereby enabling them to lead happier lives through at least some level of communication with those around them.

The success of the program in the current study is attributed to the skills included in the program being relatively easy and appropriate for their level and characteristics. The experimental application of the program on children, the behavior modification techniques used, the commitment to attending training sessions, and the individual training for some sessions, along with reviewing previous activities at the start of each session, played an effective role in the program's success.

Potter & Whittaker (2001) note that communication with autistic children, initially using speech, is often difficult to understand, leading to the provision of a clear and simple communication system as an essential element for developing their communication skills. Additionally, the motivation of children for the social aspects of communication (praise, rewards, shared attention, and interaction) is weak compared to material influences, such as obtaining desired objects (Kechk, 2007, p. 201).

Rashad Mousa (2002) observed that autistic children perform worst in tasks requiring abstract and symbolic thinking, which are typically associated with their linguistic deficits, but perform better in tasks requiring visual skills, like in tests of communication designs and arranging disparate objects, a finding corroborated by the current study.

Therefore, it can be said that the training programs provided offer children significant opportunities for communication and interaction with others, positively affecting their

developmental gains. The program presented in this study has contributed to increased interaction, thereby enhancing the communication skills of children with autism spectrum disorder.

Throughout the program sessions, there was consistent engagement with the family, involving them in the child's training through homework, which helped alleviate the psychological burdens faced by families having a child with autism spectrum disorder, and their helplessness in dealing with and training the child.

2.2 Discussion of the Study Results for the First Specific Hypothesis:

Through the presentation and analysis of results in the first specific hypothesis, which stated "There are statistically significant differences between the pre-test and post-test results for the recognition and understanding skill in the study sample, favoring the post-test results," it was confirmed using the T-test for differences between means that there are statistically significant differences between the pre-test and post-test results for the recognition and understanding skill, favoring the post-test.

This finding is consistent with studies by Souha Nasr (2001), Ben Lagha Souhaila Zulikha (2015), Rym Malek Fadil (2015), Ola Kamal Abou Hasaballah (2015), and Al-Hassani (2005), which all noted the effectiveness of the training program in developing the recognition and understanding skill.

In the current study, this result is attributed to the variety in presenting the program's activities and using programs tailored to the needs and characteristics of children with autism spectrum disorder.

Kamal Morsi (1999) indicated that the period from eight months to three years is crucial for the cognitive, emotional, and social development of both typical and atypical children. It is essential to focus on this period to prevent delays in intellectual growth and behavioral deviations, which could adversely affect their future life stages. Autism spectrum disorder impacts their ability to communicate and interact effectively with peers and society, especially when compared to their age-matched peers.

Shaver (2007) pointed out that some children with autism spectrum disorder have difficulty understanding non-verbal communication, including conventional gestures. This difficulty affects their ability to grasp the precise information conveyed by communication partners, which in turn affects their literal understanding of meaning. (Dawaida, 2016, p.92)

Barbera (2007) noted that children with autism spectrum disorder lack listening skills when diagnosed because this skill is either significantly delayed or, in some cases, regresses after the first year of life, leading to the child not responding when called by name or when asked to follow simple instructions or point to objects. (Dawaida, 2016, p.88)

Some believe that alternative and augmented communication methods act as Scaffolding to develop linguistic communication methods and enhance cognitive skills. The results of the study by Corina & Remington (2002), aimed at teaching children with autism spectrum disorder the skill of

recognizing and identifying pictures of objects using the training strategy through discrete trials, showed more effectiveness in acquiring receptive language skills (recognition and identification of pictures of objects) using a conditioned stimulus associated with a reinforcer.

2.3 Discussion of the Study Results for the Second Specific Hypothesis:

The analysis of the results for the second specific hypothesis, "There are statistically significant differences between the pre-test and post-test results for the expression skill in the study sample, favoring the post-test results," confirmed using the T-test for differences between means that there are statistically significant differences in favor of the post-test results for the expression skill.

These results can be explained by the use of play and sensory-motor activities, which help children with autism spectrum disorder develop communication skills and encourage them to initiate spontaneous communication due to their understanding of the importance of the communication process.

This is consistent with the studies of Souha Nasr (2001) and Rym Malek Fadil (2015), which highlighted the use of play in training programs, establishing a friendly and familiar relationship with the researcher that allowed children to express themselves easily. Sedik's (2007) study confirmed the importance of expressing needs using gestures indicating desired objects.

Before the program, these children did not show this skill and would lead by holding the teacher's hand to what they wanted, confirming Roberl's (1993) observation that 65% of children with autism spectrum disorder aged 3-5 years display "hand-leading" behavior due to linguistic deficits. The experimental group of children started using gestural communication for indicating desires, aligning with Carr & Kemp’s (1989) findings that increased use of gestural communication decreased hand-leading behavior (Ben Sidik, 2005, p.24).

Patricia Howlin (1998) highlighted that communication among children with them encompasses problems in expressing emotions and mental states, leading to behaviors indicating frustration during emotional arousal or anger, such as throwing objects. This emphasizes the need for them to learn to express their needs for assistance through words, phrases, gestures, or simple pictures, effectively modifying their communication behaviors.

Therefore, it is crucial not only to train children with autism spectrum disorder in verbal expressions but also to encourage them to use alternative communication methods to express their desires, make suitable choices, and respond appropriately to others (Kechk, 2007, p.210).

2.4 Discussion of the Study Results for the Third Specific Hypothesis:

The third specific hypothesis stated, "There are statistically significant differences between the pre-test and post-test results for the naming skill in the study sample, favoring the post-test results." The T-test confirmed statistically significant differences favoring the post-test results for the naming skill.

These findings are in line with the studies of Heather, et al. (2012) and Tina, et al. (2010), which aimed to determine the effectiveness of teaching request and naming strategies to children with autism, showing improved communicative skills in these children.

The success of the program is attributed to meaningful and relevant methods used in the lives of these children, improving communicative skills like responding to their name, pointing to colors and shapes upon hearing their names, and using hand signals and body gestures among other communication skills.

Behavior modification techniques (reinforcement, modeling, repetition, prompting) used in the program significantly impacted learning new behaviors. Setting a predefined stimulus and response as a behavioral goal based on the child's abilities, progressing towards the activity's overall goal, played a crucial role in the training program's success.

Adel Abdullah Mohamed (2004) emphasized the necessity of training children with autism spectrum disorder in communication methods to enable them to interact, integrate with others, and alleviate feelings of isolation and loneliness (Kechk, 2007, p.208).

IV- Conclusion:

The findings from our research indicate that there are statistically significant differences between the pre-test and post-test results in the areas of recognition and understanding, expression, and naming skills, with the post-test results showing favorable outcomes in each case. Consequently, we have substantiated the primary hypothesis that the proposed training program effectively enhances non-verbal communication among children diagnosed with autism spectrum disorder.

These results underscore the positive influence of targeted training and rehabilitation programs in ameliorating the disruptive behaviors observed in these children. Notably, such interventions are vital in improving their communicative and linguistic abilities, which are essential for their future linguistic development and overall quality of life.

Based on the foregoing, the following recommendations are presented:

- ✓ Train children with autism in non-verbal communication from an early age to develop preliminary linguistic skills.
- ✓ Rely on behavior modification techniques when implementing communication programs with children with autism spectrum disorder.
- ✓ Continuously evaluate the child’s performance in the program, identifying strengths to reinforce and weaknesses to improve.
- ✓ Conduct studies and develop guidance programs for parents on managing children with autism and the importance of early intervention for their children.
- ✓ Train families of children with autism spectrum disorder in communication skills to improve their interaction with their children.

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