The Effect of Using Some Applied Behavior Analysis Techniques in Teaching Practical Life Skills in Mentessori Approach for Children with ASD

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Abstract

The current research aimed at identifying the effect of using some applied behavior analysis techniques (i.e. positive and negative reinforcement) in teaching practical life skills in Mentessori approach for children with Autism spectrum disorder (ASD), and identifying the continuity of the intervention effectiveness after the application and during the follow-up assessment.

To achieve this aim, the research sample consisted of (10) children with Autism spectrum disorder (ASD), with age ranges between (4-6) years old. Additionally, the following tools were utilized by the researcher: Stanford Binet Intelligence Scale – Fifth Edition (prepared and rationed by Farag, 2016), Autism Diagnostic Observation Schedule – Second Edition (ADOS-2), Practical Life Skills Scale for Children with Autism spectrum disorder (ASD) (Prepared by the researcher), and the intervention based on some applied behavior analysis techniques (positive and negative reinforcement) prepared by the researcher.

It were found statistically significant differences between mean scores of children with Autism spectrum disorder (ASD), (the experimental sample) in both pre and post measurements of the intervention application on the practical life skills scale in the direction of post measurement. Moreover, no statistically significant differences were found between mean scores of children in the experimental group in both post and follow-up measurment on the practical life skills scale.

- Key Words

Applied Behavior Analysis Techniques (Positive and Negative Reinforcement) – Practical Life Skills in Mentessori Approach – Children with Autism spectrum disorder (ASD)

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Introduction:

Autism spectrum disorder is one of the complex developmental disorders that affects children and hinders their social, linguistic, verbal and non-verbal communication, as well as their imaginative activity and mutual social interactions. As a result, it became clear how crucial to assist these children in acquiring everyday life skills so they can participate in household chores, maintain good personal hygiene, avoid dangers and develop other life skills.

Practical life skills activities using the Montessori approach work on learning to add meaning to many activities, and the areas of practical life are endless. Children learn by simulation, as they imitate everything according tolearning and understanding of the environment surrounding them, develop basic skills such as concentration and responsibility. Montessori rercommended that the training and exercises used to develop children's skills should be appropriate to their age and abilities. As such, children lose their interest in training or exercise if it is difficult beyond their ability to accomplish it, or if it is too easy for them; so they feel bored and monotonous and lose his passion and love for learning.

Applied Behavior Analysis (ABA) represents the approaches and training methods used to train skills in children with autism spectrum disorder, as it is structured in an organized, logical, and intensive manner. It is also a method based on behavioral analysis of children's habits and response to stimuli, and is a behavioral theory-based approach, where good or desired behavior is reinforced and rewarded, while undesirable behavior is neglected and ignored using appropriate behavior modification techniques. The approach was first introduced during the

second half of the twentieth century by the scientist Ivar Lovaas and is widely applied in various countries.

Therefore, there is a necessary need for an intervention that helps develop the practical life skills of children with autism spectrum disorder, so as not to negatively affect their social aspects during higher age groups. Accordingly, the current research attempts to identify the effect of using some applied behavior analysis techniques (i.e. negative reinforcement) to teach practical life skills in the Montessori approach for those with autism spectrum disorder.

Problem of Research:

The problem of the current research stemmed from the researcher's field experience, and through his observation of the children with autism spectrum disorder characteristics in many therapeutic and rehabilitation centers. It was noticed that these children show severe deficiencies in various skills, especially practical life skills, as well as through his reviewing the related Arab and foreign research and studies on children with autism spectrum disorder. Moreover, the researcher noticed that these children have clear deficiencies in many practical life skills and independence as compared to their normal peers, which always exposes them to dangers as a result of their inability to use their independent skills in daily life. They also need different means of education and training than the traditional ones, so that it increases their motivation to learn the required skills.

Moreover, according to the Montessori approach, the practical life skills which include the basic daily practical life, personal care, environmental care, and interpersonal skills, are among the most significant issues facing children with autism spectrum disorder due to their inability to accurately express their

basic needs, and their distinguishable features. Mentessori identified a set of excercises that help children with Autism spectrum disorder control movement and the adjustment with the surrounding environment. To achieve this, Mentessori used educational games as objects to attract children's attention and to increase their motivation to learn through three stages: attaching a tangible object with its meaning, distinguishing tangible objects by connecting it to a certain label, and connecting the label to children experience with the object itself. (Baggio, 2017, 49)

This was indicated by a study by Rodrinez (2020), which aimed to use Montessori activities to develop personal care, self-care, dealing with the surrounding environment, and dealing with others skills. The use of Montessori activities was proven as effective in developing different skills in children with spectrum disorders. In another study conducted by Abu Sa'ada (2021), the aim was to use Montessori activities in developing functional life skills for children with autism spectrum disorder. The results of the study revealed the effectiveness of using Montessori activities in developing life skills for children with Autism spectrum disorder. In addition, the study by Mustafa (2022) aimed to improve the attention in children with autism spectrum disorder through a program based on the Montessori approach to practical life. It was found the effectiveness of the program through Montessori activities for practical life in improving attention in children with autism spectrum disorder.

Thus, the current research identifies the effect of using some applied behavior analysis techniques (i.e. positive and negative reinforcement) to teach practical life skills in the Montessori approach for those with autism spectrum disorder.

Accordingly, the problem of research can be stated through answering the following main question:

- What is the effect of using some applied behavior analysis techniques (positive and negative reinforcement) in teaching the practical life skills in mentessori approach for those with Autism spectrum disorder, and what is the continuity of the intervention effectiveness after a period of application?

Research Objectives:

- To teach practical life skills in mentessori approach for children with Autism spectrum disorder (ASD)through the use of some applied behavior analysis techniques (positive and negative reinforcement).
- To verify the continuity of using some applied behavior analysis techniques (positive and negative reinforcement) in teaching the practical life skills in mentessori approach for those with Autism spectrum disorder.

Significance of Research:

The current research is theoretically significant in:

(1) Theoretical Significance:

The theoretical significance of the research lies in the following:

- The research provides a theoretical foundation that explains the concept of practical life in Montessori approach, and the impact of using some techniques of applied behavior analysis (i.e. positive and negative reinforcement) in teaching practical life skills to children with Autism spectrum disorder. The importance of the group addressed by the research (children with autism spectrum disorder), and hence the necessity of studying the related aspects.
- The results of the research may benefit specialists and professionals regarding the importance of teaching practical life skills in the Montessori

approach to children with autism spectrum disorder via using of some applied behavior analysis techniques (positive and negative reinforcement).

(2) Applied Significance:

1- The applied significance is evident in using some applied behavior analysis (positive and negative reinforcement) techniques in teaching practical life skills to children with autism spectrum disorder, through a set of appropriate activities and skills to the nature and characteristics of the research sample.

2- Providing, through the results of research, the necessary recommendations and suggestions for directing specialists in dealing with children with autism spectrum disorder to provide services, care; and develop suitable programs for the nature of these children.

Research Terminologies:

1- Autism spectrum disorder (ASD):

It was defined by the Diagnostic and Statistical Manual of Mental Disorders – fifth edition (2013) issued by the American Psychiatric Association as a type of compound (complex) developmental (evolutionary) disorder that appears during early childhood and results in neurological disorders in the form of issues in social interaction and social communication, play activities, responding to objects more than people, distress and boredom with changing environment, repetition of physical movements, repetition of sounds.

Autism spectrum disorder evaluation is based on two criteria:

stereotypical physical movements and social interaction. If the deficiency is only in the social interaction and not stereotypical movements, then we have

another disorder, which is social interaction disorder and not autism spectrum disorder.

2- Practical Life Skills in Mentessori Approach:

It was operationally defined by the researcher as: a set of skills, activities, and practices representing the basic daily practical life skills of children with autism spectrum disorder, including independence in food preparation, bedroom and bed arrangement, utilities organization; personal care skills, which include daily toothpaste brushing, and clothes cleaning, body cleaning, hands washing with soap and water, using disinfectants; skills of caring for the environment by preserving the surrounding environment and watering plants in house or kindergarten, and aviding any harm to the environment such as throwing waste in its undesignated place, and skills of dealing and positive interaction with others.

3- Applied Behavior Analysis (Positive and Negative Reinforcement):

It was operationally defined by the researcher as a set of practices and procedures that lead to improvement and increased positive behavior via using negative reinforcement procedures by the removal of undesired stimulus from a child (negative reinforcement), and the positive reinforcemdnt by the presentation of desired stimuli just after the targeted behavior to increase futuristic occurrances of the positive behavior.

Research Limitations:

The research is determined by the variables of its, as well as the sample, which consisted of (10) children with Autism spectrum disorder (ASD), with age ranges between (4-6) years old. The sample was matched in (age – IQ – sensory skills – Autism spectrum disorder severity) variables. Accordingly, quasi-experimental method was utilized by the researcher, with the intervention of the current research together with the tools being applied in Beity Center – Mentessori, Madinet Nasr, Cairo – Egypt from August, 2023 to November, 2023.

Theoretical Framework and Previous Studies:

First: Autism spectrum disorder (ASD):

The Concept of Autism spectrum disorder (ASD):

Autism spectrum disorder (ASD) was defined by DSM – 5 as "a disorder characterized by deficits in two basic dimensions: deficiencies in social communication and social interaction skills, the presence of repetitive stereotypical behaviors, and limited activities and interests. These symptoms begin to appear in an early developmental period, causing severe weakness in social and occupational functioning (Schaaf, 2017, 208)

Moreover, it was defined by Ali (2020, 20) as: "A developmental disability that negatively affects all aspects of growth and highlights its impact on the ability to communicate, both verbally and non-verbally, which results in a defect in the child's life, social, behavioral, and psychological skills, which leads to complete isolation of children from the surrounding society, through the preoccupation with limited and routine self-centered interests, activities, and stereotypical behaviors.

Characteristics of Children with Autism spectrum disorder (ASD):

(1) Social Characteristics:

There is a clear deficiency in this aspect through the inability of autistic children to establish relationships with the world around them, their inability to form friendships and social interactions with others, their inability to respond to the emotions, feelings and sensations of those around them, their absence of desire to communicate with them, their isolation into themselves, and their absorption in solitary activities. Moreover, children with Autism spectrum disorder tend to practice stereotypical behavior, lack of imaginative play, weakness in visual communication, and inability to translate and understand the feelings and emotions of others. (Morsi, 2017, 62)

The aforementioned characteristics appear through many emotional –social issues in children with Autism spectrum disorder, including:

(a) Deficiencies in adaptive behavior:

It is noted that autistic children have deficiencies and issues in many behavioral patterns compared to normal counterparts in same age, social and economic standard. For example, at the age of five or ten, children with autism spectrum disorder may not be able to perform tasks that a normal child whose chronological age is two years or younger can do. He/she is unable to self-feed himself, but rather needs someone to help, and cannot take off or put on clothes. (Al-Abadi, 2018, 59)

(b) Behavioral Characteristics:

The majority of children with autism spectrum disorders practice repetitive patterns of behavior, and have unusual special interests. These behaviors cannot occur in response to a specific stimulus, but rather are often non-purposeful behaviors practiced by children, that begin and end suddenly and automatically. Restricted and repetitive stereotypical behaviors are also among the most common signs and indicators of Autism spectrum disorder. Stereotypic behaviors vary widely among autistic children, and may begin differently, and may differ in terms of the length of time they last and their nature, and some may be more repetitive than others. Additionally, some of these behaviors may cause harm to child, but most of them do not, while some do not cause any harm. (Al-Khouli, 2019, 71-72)

(**c) Sensory and Perceptual characteristics**: Children with autism spectrum disorder suffer from a deficiency in sensory regulation, either in the form of increased or decreased sensitivity (than normal) to sensory stimuli. This deficiency may be a factor causing the abnormal stereotypical behaviors in which autistic children often engage. (Amer, 2015, 66)

(2) Characteristics related to Interests and Activities:

Stereotypical behavior: Children with autism spectrum disorder exhibit many stereotypical behaviors and other repetitive behaviors. Stereotypical behavior also takes the form of aggression directed at others, such as hitting or destroying property; or self-harm, such as hitting the head or forcefully biting the skin. They also make multi-tone sounds in a typical, recurring manner from time to time. (Al-Jarhi, 2016, 47)

Routine behavior: it is the insistence of children with autism spectrum disorder on a specific routine during daily life behavior, and resistance to any change that violates this routine, such as the child's insistence on eating a specific food or wearing specific clothes; and this is expressed in tantrums. Moreover, the autistic children have a great desire for connection and attachment to limited objects, abnormally and for a long time. (Badr, 2017, 325)

Second: Practical Llfe Skills in Mentessori Approach:

The Concept of Mentessori Approach:

There are many educational definitions of the Montessori approach, including: It was defined by Al-Masalha (2017, 15) as: "an integrated educational system with its own philosophy, which believes that learning becomes best in a social environment that supports and nurtures the developmental patterns specific to each child."

Moreover, Eva and Van (2021, 2104) identified it as "an approach that focuses on children self and ability to adjust with the surrounding environment rather than on the amount of information stored in subconscious mind, despite the minute details that the Montessori approach includes that we may not expected for a child to be aware of. In fact, a child understands these details and stores them in mind to benefit from them at the right time.

Practical Life Skills in Mentessori Approach:

Practical life skills are considered as a main pillars of the Montessori environment. The practical life corner of the Montessori plays as a link between home and the new environment of Montessori, by providing a number of activities that children are accustomed to seeing or practicing at home, such as preparing food. , wiping surfaces, cleaning the floor, putting on clothes, using utilities in the kitchen, and the like; and this corner contributes to the process of assuming social roles, as through it, a child applies many of roles seen around them every day and practices the process of imitating these behavioral models, so that theyfeel a sense of belonging to the group, whether in a school or family setting. (Faina, & Victoria, 2017, 119).

Significance of Practical Life Skills for Children with Autism spectrum disorder (ASD):

- **Strengthening children emotionally**: children like these activities and those who provide activities for them; and children also feel relaxed and focused.
- **Providing practical experiences for children**: children's social skills and positive attitude develop because of their love for these activities.
- **Encouraging responsibility**: practical life skills activities provide children with responsibility for self-care, environmental- care, and social relationships; thus, the development of responsibility.
- **Integrating children into physical activities**: children are exposed to physical experiences because practical life skills activities guarantee a lot of movement. Thus, children becomes involved in activity physically, mentally, and emotionally. (Faryadi, 2019, 7)
- **Adopting constructive habits in children**: skills develop the habit of awareness and constructive work through practicing and enjoying work.
- **Empowering children to appreciate independence**: practical life skills activities develop their will, as they can make smart choices, decisions, and perseverance. (Haines & Annett, 2021, 118)

The aforementioned is agreed with Munib (2016) study, which aimed to reveal the effectiveness of a proposed early intervention program using

Montessori activities in developing the cognitive and communication skills of autistic children. The study sample consisted of (20) children with autism spectrum disorder. It was found the existence of statistically significant differences between the average scores of the experimental and control groups on the cognitive skills scale after implementing the program in favor of the experimental group, and statistically significant differences between average scores of the children of the experimental group in the pre- and post-measurements on the cognitive skills scale in favor of the post-measurement.

In another study conducted by Antar (2020), it was aimed to enhance attention and reduce behavioral disorders in children with autism spectrum disorder using Montessori tools. The sample consisted of (10) children, and the researcher used the experimental method, with one-group experimental design and repeated measurements (pre-test). The tools consisted of the attention scale, the behavioral disorders scale, and the program based on Montessori activities. It was found that Montessori tools helped improve attention and reduce behavioral disorders in children. And the study by Jamieson (2021), which sought to identify the Montessori method in early childhood education as a supportive environment for children with Autism spectrum disorder in Oakland. The study sample consisted of (6) children in the kindergarten stage, and was found a three main indicators a important, i.e. social competence, language and communication, individual interests and sensory effects.

Third: Applied Behavior Analysis (ABA) Techniques:

The ABA Concept:

The term applied behavior analysis (ABA) refers to a science based on the use of learning principles to improve socially important behavior. The practice focuses on assessing environmental influences on behavior, assessment-based intervention, and data-based decision making. It is also used to meet the behavioral needs of clients in multiple areas, including general and private education, organizational behavior management, gerontology, and many others. (BACB, 2018, 409)

Applied Behavior Analaysis (ABA) was defined by Casey and Carter (2016, 12) as a science in which behaviors are analyzed, and interventions are applied systematically, to improve important social behavior. Through this approach, a child can gain a clear understanding of the approaches to solving problems that lead to the best benefit, and it is described in behavioral analytical terms as providing children with the necessary skills to achieve maximum reinforcement.

Significance of Applied Behavior Analysis (ABA):

Applied behavior analysis (ABA) trains a child to perform the targeted behavior in natural settings, which helps generalize the responses in similar contexts and continue for longer periods of time; which facilitates communication and social interaction with others, and integration into society. Also, the ABA techniques are often used with children with autism spectrum disorder, so that applied behavior analysis itself is often seen as a treatment for autism spectrum disorder. There are many studies that dealt with ABA with children, especially those who received early intervention, They have achieved noticeable and significant improvement in: intelligence, mental functional performance, expressive and receptive language, academic performance, social behavior, and various adaptive behaviors. (Muhammad, 2014, 92)

Principles of ABA:

Applied behavior analysis (ABA) is based on a set of techniques that are considered as basic principles for working accordingly, they include: reinforcement, punishment, fading, sequencing, shaping, indoctrination and concealment, modeling, self-control, feedback, and generalization. The researcher suffices with presenting reinforcement as follows:

1- Reinforcement:

The behaviorism stresses that children acquire behavior based on the results that follow it, meaning that any result that leads to an increase in the repetition of the behavior is called reinforcement. Thus, reinforcement refers to giving a reward to a child after success in performing a certain behavior; and therefore reinforcement is considered an incentive that follows the behavior,

and increases the probability of it occurrence. A child tends to repeat behavior that is followed by pleasant outcomes, while they do not tend to repeat behavior that is not followed by pleasant outcomes; and the outcomes that determine the extent to which the behavior will continue are the reinforcement provided to the child. (Elliott, 2017, 1603)

Reinforcement is the procedure in which the behavior leads to positive outcomes, or removing negative ones, which results in the possibility of the behavior occurring in the following situations, and it has two forms:

A- Positive Reinforcement: It applies to behavior that brings benefit, good, or pleasure to its owner. In order for reinforcement to be called positive, it must should the rate of occurrence of the desired behavior. It has two patterns: Continuous, in which the appropriate behavior is reinforced every time it appears, and Intermittent, in which appropriate behavior is reinforced occasionally, but not continuously. If continuous reinforcement is the most effective in the stage of behavior acquisition, then intermittent reinforcement is the best in during maintaining its continuity.

B- Negative Reinforcement: It is used in the current research and is also called Avoidance Learning, and is applied to behavior that spares its owner harm, pain, or hardship, that is, avoiding the negative outcome before implementing the behavior. It includes the removal of avoidant stimulus so that increasing the possiblity of the targeted behavior in the future. (Al-Khatib, 2017, 54)

Reinforcers are classified into:

- **Primary reinforcers**: These are related to primary motivations, including positive ones (such as food and drink) and negative ones (such as extreme cold or noise).

- **Material reinforcers**: some of them are linked to primary reinforcers (such as money), or are used on their own (such as books and pens).

- **Symbolic reinforcers**: they can be converted into physical objects (such as cards and stars).

- **Activity reinforcers**: such as providing the opportunity to engage in an activity (such as trips, sports games).

- **Social reinforcers**: These increase the familiarity between a child and a person who is psychologically important to him/her (such as smiling, praise). (Schermerhorn, et al, 2018, 90)

There are a set of conditions or factors affecting reinforcement, which are:

A- Reinforcer size: reinforcers have to be presented to the learner in different amounts and shapes, to obtain the best performance.

B- Postponing the reinforcer: the longer the period of time between the response and the reinforcer, the lower the level of performance. Many experiments have indicated that the best time interval between the response and the reinforcer to obtain the best performance is half a second.

C- Repeating the reinforcement: Continuous reinforcement is more useful at the beginning of the learning process, with the aim of stabilizing the behavior, while it is preferable to use intermittent reinforcement, after stabilizing or shaping the behavior. (Abdul Rahman and El-Shenawy, 2019, 150)

Moreover, applied behavior analysis includes an emphasis on identifying appropriate and suitable reinforcers for children. So, the behavior analyst should determine the effective reinforcers for children, through several methods, including asking a child or those surrounding him/her about what he/she likes, through direct observation of children in different settings or by presenting a sample of reinforcers to a child to choose from through an interview; through which it is possible to identify what a child likes through strategies such as Preference Assessment, a procedure that includes some methods, including:

- Single Stimulus Preference Assessments.
- Paired Stimulus Preference Assessments.
- Multiple Stimulus with Replacement (MSW) Preference Assessments.

- Multiple Stimulus Without Replacement (MSWO) Preference Assessments.
- Free Operant Observations.

(Cooper, Heron, & Heward, 2020, 250)

As such, the following features of reinforcement can be extracted:

- Reinforcement means that you increase the frequency of behaviors.
- Reinforcement can be positive or negative.
- All reinforcers (positive or negative) increase the possibility of behavioral response.

(Cooper, Heron, & Heward, 2020, 250)

The following table specifies kinds and nature of reinforcement:

Table (1)

Reinforcement	
Positive	Adding something to increase behavior possibility
Negative	Removing something to increase behavior possibility

(**Source**: Cooper, Heron, & Heward, 2020, 252)

On the other hand, the current research discusses negative reinforcement that occurs by removing the undesired stimulus to increase behavior. For example, car manufacturers use negative reinforcement principles in their seat belt systems, which "beep" until you buckle your seat belt. The annoying sound stops when you perform the desired behavior, increasing the likelihood of buckling your seat belt in the future. Also, negative reinforcement is used frequently in horse training, for example, riders apply pressure — by pulling on the reins or pressing their legs — and then remove the pressure when the horse performs a desired behavior, such as turning or speeding up. So, the pressure is the negative stimulus that the horse wants to remove.

(Cooper, Heron, & Heward, 2020, 264)

Research Hypotheses:

1- There are statistically significant differences between mean scores of children in the experimental group in both pre and post measuremsnts on the practical life skills scale in favor of post measurement.
2- There are no statistically significant differences between mean scores of children in the experimental group in both post and follow-up neasurements on the practical life skills scale.

Research Methodolgy:

First: Research Method:

Quasi-experimental method with one group based on pre and post measurement design was used for the current research with the following variables:

- **The Independent Variable**: the use of some applied behavior analysis techniques (positive and negative reinforcement).
- **The dependent Variable**: practical life skills in Mentessori.
- **The Extraneous Variables**: the variables that were controlled by the researcher so that no intervention may occur with the results. These variables include: age, IQ, severity of Autism spectrum disorder (ASD), and the pre application of practical life skills in Mentessori scale. Thus, the one-group experimental design was utilized in the current research as suitable to the sample size as could be gathered by the researcher.

Second: Research Sample:

The current research sample was divided into:

A) The Exploratory Research Sample:

The exploratory research aimed to determine the suitability of the used tools to the sample of the main research; ensure the clarity of the tools' instructions, the clarity of the items in the research tools, identify difficulties that may appear during application, working to eliminate and overcome them, in addition to verify the validity and reliability of the research tools. To achieve these goals, the research tools were applied to an exploratory sample, taking into account the availability of most of the characteristics as the main sample of research. Specifically, the exploratory study sample consisted of (15)

children with autism spectrum disorder, with age ranges between 4-6 years, with an average of 68.21 months, and a standard deviation of 2.35.

The Final (Basic) Sample: The Experimental Group:

The final research sample consisted of (10) children with autism spectrum disorder, aged between (4-6) years, whom were selected to adminster the intervention according to the following bases:

Homogeneity within the experimental group:

Achieving homogeneity among the members of the experimental group in the chronological age, IQ, and Autism spectrum disorder severity according to the variables of the current research. Table (1) shows the results of the Chi Square for the differences between group members in age, IQ, and severity of autism spectrum disorder. Also, table (2) shows the results of the Chi Square score on the dimensions of the Practical Life Skills Scale according to the Montessori approach.

Homogeneity in demographic variables:

Homogeneity between the (experimental) group before implementing the intervention in chronological age and IQ. Table (1) shows the averages, the sum of the ranks, the value of (Z) and its significance for the experimental group in chronological age, IQ and the severity of autism spectrum disorder.

Table (2): Mean, Standard Deviations, Means, Sum of Ranks, Z Values and significance between Groups in Chronological Age, IQ, and Autism spectrum disorder (ASD) Severity

Dim.	Group	Mean	Stnd. Dev.	Mean Ranks	Sum of Ranks	Mann Whitney Value	Z Value	Sig.
Age	Experimental	66.40	6.80	١٠,٤٠	104.00	47.00	0.155	Insig.
IQ	Experimental	77.20	2.08	١٠,٠٠	100.00	46.00	0.397	Insig.
Autism spectrum disorder	Experimental	35.30	2.09	١٠,٠٦	100.60	45.70	0.360	Insig.

It is evident from the previous table that the value of (Z) for identifying differences between the experimental group in age and IQ is not statistically significant, which indicates no differences between the experimental group. Looking at the table, it is also evident that the (experimental) group's average scores are close in terms of chronological age, IQ, and severity of autism spectrum disorder.

Second: Homogenity in practical life skills in mentessori:

Group homogeneity in practical life skills in mentessori approach for the experimental group as clarified in Table (3).

Table (3) Significance of differences between mean scores of children on the practical life skills scale (N= 10)

Variables	Mean	Stnd. Dev.	Chi Squre	Sign.	Fredom	Significance Limit	
						0.01	0.05
Basic Daily Practical Life Skills	18.70	2.56	2.00	Insign	5	15.096	12.080
Environment Care Skills	19.80	2.89	3.20	Insign	5	15.766	14.067
Personal Care Skills	17.90	2.77	1.200	Insign	7	18.872	14.094
Dealing With Others Skills	20.30	2.94	3.20	Insign	5	15.039	11.085
Total Score	**76.70**	**4.62**	**1.200**	**Insign**	**6**	**16.782**	**13.428**

It is evident from Table (3) that no statistically significant differences were found between the children's averages in terms of the dimensions of practical life skills according to the Montessori approach and the total score, which indicates the homogeneity of these children, as the Chi square values were not statistically significant.

After applying the requirements for the sample selection, the final research sample consisted of (10) children with Autism spectrum disorder (ASD) with age ranges between 4 – 6 years old.

Third: Research Tools:

1- Stanford Binet Intelligence Scale – Fifth Edition.
2- Autism Diagnostic Observation Schedule – Second Edition (ADOS-2) (Lord, Rutter, DiLavore, & Risi, 2008).
3- Practical Life Skills in Mentessori Approach Scale for Children with Autism spectrum disorder (ASD) (Prepared by the researcher).
4- The intervention based on some applied behavior analysis techniques (positive and negative reinforcement) (prepared by the researcher).

(1) Stanford Binet Intelligence Scale – Fifth Edition (rationed and Arabized by Farag, 2016)

Psychometric properties of the scale:

This version was standardized on (4800) individuals, with age ranged between (2) to (85) years in the United States of America. The reliability coefficients were high and ranged from (0.95) to (0.98) for the composite score, between (0.90) to (0.92) for the factors, and between (0.84) to (0.89) for the subtests. Validity coefficients were also calculated with form (L-M) and the fourth form of the same scale and the Wechsler scales (i.e. Wppsl- R. Walslll. Wlat ll. And Wisclll).

The fifth edition was translated to many languages. Safwat Farag (2016) with other distinguished researchers translated and rationed the fifth edition of

Stanford Binet Intelligence Scale on a representative sample of the Egyptian society (i.e. 3600 individuals) from ages between 2-80 years old.

(2) Autism Diagnostic Observation Schedule – Second Edition (ADOS-2) (Lord, Rutter, DiLavore, & Risi, 2008)

Psychometric properties:

First: validity calculation: To calculate the validity of the scale, the researcher used the validity test, as he applied the scale to a sample of (20) children from the research community and from outside the main sample. Moreover, the CARS3 scale were administerd to the same sample, then the correlation coefficients were calculated between the sample scores on the two scales to calculate the validity of the test. The correlation coefficient reached (0.82), which is a statistically significant, indicating the validity of the scale.

Second: Reliability:

A- Reliability Calculation Using Alpha Chronbach's:

The reliability coefficients were calculated for the two dimensions of the scale added to the total measurement using alpha chronbach's, as indicated from the following table:

Table (4)

Variable	Alpha Chronbach's
Communication	0.588
Social Interaction	0.717
Total Score	0.806

From Table (4), it is evident that the sub-dimensions of the Autism spectrum disorder diagnostic observation schedule were reliable,as the reliability according to the Cronbach’s alpha method on the communication dimension was 0.588, social dimension was 0.717, and the total score was 0.806.

A- Reliability Calculation Using Test-Retest Method:

To calculate the reliability of the scale, the test-retest method was applied to a sample of (20) children from the research community and from outside the main sample. The correlation coefficient between the first and second applications of the scale reached (0.93), which is statistically significant indicating the reliability of the scale.

(3) Practical Life Skills in Mentessori Approach Scale (Prepared by the researcher):

The scale was prepared using the following steps:

First: The researcher reviewed the available theoretical frameworks, literature, Arabic and foreign research and references, some opinions related to the subject of the research, and a set of scales and tests that dealt with practical life skills of children with autism spectrum disorder, in order to identify the methods and tools used in measuring life skills.

The process follows the Montessori approach and benefits from it in formulating phrases that fit each dimension.

The researcher took into account the nature of the research sample and the difficulties faced by the researcher, as well as those responsible for caring for children with autism spectrum disorder. The researcher attempted to make the scale simple and truly reflect the true capabilities of this group.

Moreover, the number of statements, the length of the scale, and the accuracy items should be appropriate to the nature of the sample. The researcher was also keen in formulating the statements in their initial form to be easy, clear, and short; that they do not carry more than one meaning, measure what they were designed to without ambiguity, and that the response to be useful and short.

The Psychometric Properties Of The Scale:

First: Validity: several methods were used to ensure the validity of practical life skills using the Montessori approach, as follows:

- Validity of the external test:

The correlation coefficient was calculated between practical life skills using the Montessori approach and the life skills scale prepared by (Salwa Zayed, 2018). The correlation coefficients reached 0.774, confirming the validity of the scale and its suitability for use in the current research.

Factorial Validity of Statements:

The factorial validity between the score of each statement and the total score of the dimension to which this statement belongs was analyzed by the researcher.

It was found that all factorial validity between each item score and the scale score to which it belongs are statistically significant at the level of (0.01), indicating the consistency of the internal structure of the practical life skills in the mentessori approach scale. Then the researcher found the correlation coefficient between the individuals' scores on the total score of the dimension and the total score of the scale. The following is a presentation of the internal correlation coefficients of the scale dimensions with the total score and the results, as shown in Table (5)

Internal Correlations between the practical life skills in mentessori approach scale, score of each dimensions and the total score of the scale (N=30)

Dimensions	Basic Daily Practical Life Skills	Environment Care Skills	Personal Care Skills	Dealing with Others Skills
Basic Daily Practical Life Skills	_	-	-	-
Environment Care Skills	**0.527	-	-	-
Personal Care Skills	**0.580	**0.685	-	-
Dealing with Others Skills	**0.627	**0.692	**0.765	-
The Total Scale	**0.679	**0.735	**0.783	**0.764

According to the previous table, all correlation coefficients between the scores of the items and the total score of the scale to which they belong are

statistically significant at (0.01) level, indicating the consistency of the internal structure of the practical life skills scale.

Reliability: The reliability of practical life skills in mentessori approach was calculated using the following methods:

(a) **Cronbach's alpha equation**: This was done on a sample of (30) of the subjects, because the scale is on a triple scale, and therefore this type of equation is suitable for calculating reliability, and the results were as summarized in Table (6).

Reliability Coefficients Using Alpha (N=30)

Dimensions	Alpha Chronbach's
Basic Daily Practical Life Skills	0.746
Environment Care Skills	0.785
Personal Care Skills	0.734
Dealing with Others Skills	0.783
The Total Score	**0.864**

(a) **Test-Retest method**: The researcher calculated the correlation coefficients of the two measurements within an interval of two weeks on the exploratory study sample, and the correlation coefficients were as shown in Table (7).

Reliability Coefficients Using Test-Retest Method (N=30)

Dimension	Alpha Chronbach's
Basic Daily Practical Life Skills	0.758
Environment Care Skills	0.772
Personal Care Skills	0.764
Dealing with Others Skills	0.753
The Total Score	**0.788**

(4) The intervention based on some applied behavior analysis techniques (Positive and Negative Reinforcement) in Mentessori Approach for children with Autism spectrum disorder (ASD) (prepared by the researcher)

A planned and organized intervention eas prepared based on the use of some applied behavior analysis techniques (positive and negative reinforcement) to teach practical life skills in the Montessori approach for children with autism spectrum disorder according to a set of specific and organized steps based on theories that took into account the education of children with autism spectrum disorder.

Significance of Intervention:

The intervention contributes to teaching practical life skills in Mentessori approach for children with Autism spectrum disorder (ASD) including basic life practical skills, environment care skills, personal care skills, and dealing with others skills.

General planning of the intervention:

The general planning process for the intervention includes defining general and procedural objectives, and their practical content, such as the strategies and methods used in its implementation, determining the time span, the number of activities, and the location of the implementation, and then evaluating the intervention as a whole.

Procedural and behavioral objectives: At the end of implementing the intervention, children with autism spectrum disorder can:

- Prepare his/her own food, arrange bedroom and bed, and organize utilities.
- Prepare and pour juices, use tweezers and spoons to transfer grains and beads, open the lids of cans and bottles, use various locks in training on opening and closing, cutting, shearing, folding clothes, and using various threads and needles.
- Use the toothpaste brush daily.
- Take care of clothes and body cleanliness, washe hands with soap and water, use disinfectants, use the activity room cleanliness tools located in the practical life corner, to clean the activity room after working in the other corners.

- Maintain the surrounding environment and pay attention to watering the plants in house or kindergarten, cooperate with peers in cleaning the activity room or the kindergarten playground or the center without distress or objection.
- Clean floors, use wiping and polishing tools for surfaces and glass, and dust tools, take care for indoor plants and small pets inside the Montessori activity room, such as (birds - ornamental fish - cats).
- Exchange games with peers, and follow the correct steps in cleaning room or the kindergarten playground correctly.
- Keep away from harmful objects to the environment, such as throwing waste in places other than those designated for it.
- Positively interact with others and peers.
- Respond to instructions, and acquire normal behavior and order.
- Train on sensory-motor coordination through a number of exercises, such as buttoning and unbuttoning.
- Directly distinguish correct and incorrect behavior, distinguish male and female clothing, cooperate with family members in performing housework, and expresses some of the work that the mother does inside the house.
- Gain educational experiences that help children learn the skills of dealing and interacting with others, learning linguistic and motor skills, ways to express feelings and emotions, and learn the importance of moral values.
- Answer some questions related to children's activities at home, infers things by describing them, compares similar things, participate in playing with his peers, and cooperate with others.

Intervention Procedures Using some Applied Behavior Analysis Techniques (Positive and Negative Reinforcement):

The program springs from applied behavior analysis. Applied behavior analysis (ABA) is one of the most influential methods in developing children

skills. It is also considered one of the approaches that have contributed most to the development of practical daily life skills in children with autism spectrum disorder. ABA consitsts of a set of procedures that address significant behaviors by modifying, changing, or deleting them according to the principles of behavioral theory; where good or desired behavior is reinforced and rewarded, while undesirable behavior is neglected and ignored using the techniques of applied behavior analysis (positive and negative reinforcement), which can be achieved by identifying and observing the target behavior, identifying the processes or variables that precede it, the results of behavior, and thus the possibility of controlling the antecedents of the behavior through reinforcement as well as its results. In the current research, the focus was on negative reinforcement.

The current research intervention is based on the use of some applied behavior analysis techniques (i.e. negative reinforcement) to teach practical life skills to children with autism spectrum disorder based on a set of basic principles, as follow:

The intervention includes educational activities and excercises aimed at developing practical life skills that can be taught to children with autism spectrum disorder through the use of some applied behavior analysis techniques (positive and negative reinforcement) with children, with the stimulus presence through training on practical life skills, and children acquire the behavior based on the results which leads to an increase in the repetition of behavior (i.e. the reinforcement). The researcher used the reinforcement technique by giving a reward to children after their success in performing a certain behavior. Thus, reinforcement is considered an incentive that follows the behavior and increases the possibility of its occurrence. A child tends to repeat a behavior that is followed by pleasant results, while avoid to repeat the behavior not followed by pleasant results. Therefore, the results are the determinant of the extent to which the behavior will continue, it is the reinforcement provided to children. Reinforcement is the procedure in which the occurrence of behavior leads to positive results, or the elimination of

negative ones; which results in the possibility of the behavior occurring in the following situations, and it has two forms:

A - Positive Reinforcement: The researcher determined that the use of positive reinforcement depends on a child's ability to increase the rate of occurrence of the desired behavior as required by the researcher.

B - Negative Reinforcement: It is also called Avoidance Learning, and applies to behavior that causes harm, pain, or hardship for a child, that is, avoiding the negative result before implementing the behavior.

The researcher also identified a set of conditions or factors affecting the intervention based on some applied behavior analysis techniques (i.e. reinforcement), which are as follow:

A- Reinforcer size: The researcher was keen to provide reinforcements to the child in different amounts and shapes, to obtain the best performance.

B- Postponing the reinforcer: The researcher was keen to provide the reinforcer to children immediately after performing the required behavior and mastering the skill without delay.

C- Repeating the reinforcer: The researcher used intermittent reinforcement after stabilizing or shaping the behavior.

Applied behavior analysis also includes an emphasis on identifying appropriate and suitable reinforcers for children. It has also been emphasized, in current research intervention using applied behavior analysis, the necessity of using negative reinforcement, which includes withdrawing an aversive stimulus, and positive reinforcement, which includes providing a positive reinforcer, which results in an increase in behavior.

Additionally, the researcher used the preferences assessment methodology among the sample individuals, which included the following:

- Single Stimulus Preference Assessments.
- Paired Stimulus Preference Assessments.
- Multiple Stimulus with Replacement (MSW) Preference Assessments.
- Multiple Stimulus Without Replacement (MSWO) preference assessments.

Through the previous, the researcher concluded the preferences of the sample individuals, which were used in the reinforcement intervention after testing them in the reinforcement evaluation procedures, which is the second stage after evaluating the preferences.

In the current research, the evaluation of reinforcers was added to determine the effectiveness of the preferred stimuli that had previously concluded using the preferences assessment, in order to use what would reinforce the practical life skills and behaviors targeted in Montessori approach in the current research through some procedures, including:

- Concurrent Schedule Reinforcer Assessment (C).
- In-the-Moment Reinforcer Analysis (I).
- Multiple Schedule Reinforcer Assessment (M).
- Progressive Ratio Reinforcer Assessment (P).

Moreover, the researcher used various procedures, including continuous reinforcement at the beginning of training to create great motivation to acquire the skill, and intermittent reinforcement to ensure the retention of the acquired skills.

Procedural fidelity

The current intervention procedures were carried out by the researcher through the use of self-observation, and the observers agreement on the accuracy of the intervention used in some techniques of applied behavior analysis (positive and negative reinforcement) to teach practical life skills to children with autism spectrum disorder.

1- The Use of Self-observation: through the behavior evaluation form that was applied by the researcher at the end of each session or training activity to determine the extent of child's mastery of the required skill or to identify deficiencies in implementing the skill to confirm its development through the next session of the intervention.

2- Interobserver Agreement (IOA): This procedure was done by following up with children's teacher or the specialist in the center who cares, educates

and trains children; so that the second observer takes notes or records the extent of children's performance in implementing the skill, as compared to children's scores on pre-application of the practical life skills scale.

The researcher also used some IOA procedures, including:

Total Count IOA

It is a method that includes concluding the percentage of approval of the total number of responses through a mathematical equation: is smallest/largest x 100%.

Exact Count-per-Interval IOA:

It is one of the most important and accurate methods in IOA, and includes reaching a consensus through the number of periods with 100% IOA agreement/ Total number of periods x 100%

Table (8)

Number of Intervention Sessions (48 sessions), Topics, Procedural Objectives, Techniques and Time of Session (35 Min.) and Total Application Time (3 months from the intervention application start-up)

Skill	Number of Sessions	Procedural Objectives	Strategies	Session Time
Daily Basic Practical Life Skills	15	- A child can prepare food independently. - A child arranges bedroom and bed; and organizes tools. - A child can pour juices. - A child uses tweezers and spoons to transfer grains and beads. - A child can open the lids of cans and bottles. - A child uses various locks to open and close. - A child practices cutting. - A child learns how to fold clothes.	Modelling – Reinforcement - Role Playing - Homework	35 Min.

		- A child uses various threads and needles. - A child can use the toothpaste brush daily.		
Environment Care Skills	11	-A child uses special cleaning tools such as floor cleansers, wiping and polishing tools for surfaces and glass, and dusting tools. - A child is trained to use tools for caring for indoor plants. - A child treats with pets inside the Montessori activity room with a kind of familiarity and interest, such as (birds - ornamental fish - cats).	Modelling – Reinforcement - Role Playing - Homework	35 Min.
Personal Cre Skills	11	- A child is self- reliance in taking care of personal hygiene. - A child is trained to increase self-confidence through training sessions on dressing skills. - A child uses hair and dental care tools, and uses toothbrushes. - A child is trained on personal care skills and self-reliance in bathing, using and cleaning the toilet. - A child is trained to develop small muscles and fine motor skills. - A child learns sensory-motor coordination through a number of exercises, such as buttoning and unbuttoning. - A child can tie and undo the laces until he gets accustomed to the	Modelling – Reinforcement - Role Playing - Homework	35 Min.

		operations in his daily life. It consists of (9) wooden frames. Each frame has a piece of fabric equipped with buttons, loops, laces, and zippers, which the child can practice them. - A child can wear clothes without the help of adults, which make them independent and self-reliance.		
Dealing with Others Skills	10	-A child gains many educational experiences that help learn the skills of dealing and interacting with others. - A child is trained to increase linguistic vocabulary and linguistic and motor skills. - A child can express feelings and emotions. - A child recognizes moral values, such as honesty, trustworthiness, respect and appreciation for others. - A child is able to show interactive behavior that leads to mutual influence between him/her and peers. - A child is trained to develop social behavior through positive interaction with peers.	Modelling – Reinforcement - Role Playing - Homework	35 Min.
Final Session	1	-Thanking children, distributing some symbolic gifts to them, and thanking the mothers for their keenness to have their children participate in the intervention. - Providing a copy of the intervention to mothers and teachers to benefit	Reinforcement - Play	35 Min.

		from it with their children.		

Fourth: Steps of Research:

The research was conducted according to the following steps:

- Reviewing the theoretical framework and previous studies, and determining the basic hypotheses for research and methods for collecting appropriate data for these hypotheses. The researcher reviewed the tools and previous studies at the Arab and foreign levels on practical life skills using the Montessori approach. Based on this review, the researcher built a measure of practical life skills for children with autism spectrum disorder.
- Building the intervention based on some techniques of applied behavior analysis (positive and negative reinforcement) according to theoretical framework and previous studies, and reviewing a number of programs that were designed for this category of children.
- The psychometric properties of the tools were calculated in terms of validity and reliability on the exploratory research sample, which is similar to the basic research sample.
- After ensuring the psychometric properties of the tools, the validity and suitability of the program to achieve its goals, the application was carried out on the experimental group.
- Appropriate statistical methods were used to test the research hypotheses.
- The results were presented according to the research hypotheses, and were interpreted in light of the theoretical framework and previous studies.

Fifth: Statistical Methodology:

Statistical methods were used to calculate psychometric properties and prepare research tools, in addition to using them to prove the validity or invalidity of the research hypotheses, and to find the stability and validity of the measures and the research results using the SPSS statistical package

programs used in the social sciences. The most important of these statistical methods used are:

- Wilcox on Signed Ranks Test, to calculate the difference between the average ranks of pairs of related scores.
- Averages and standard deviations.
- Correlation coefficients.
- Cronbach's alpha reliability coefficient.

Results and Discussion:

Results and Discussion of the first hypothesis:

The first hypothesis states that: "There are statistically significant differences between the mean scores of children in the experimental group in pre- and post-measurements on the practical life skills at the Montessori approach scale in the direction of the post-measurement." To verify this hypothesis, the Wilcoxon test was used to reveal the significance and direction of the differences between the mean scores of the pre- and post-measurements of the experimental group on the practical life skills at the Montessori approach scale. The Z value was calculated to determine the differences between the pre- and post-measurements of the dimensions by applying the practical life skills in the Montessori approach scale, which the experimental group was trained on during the intervention sessions. The following table shows the results of this.

Table (9) for Z value to identify the differences between pre and post measurements for the practical life skills in Mentessori approach scale and the total score using Wilcoxon formula

Dimensions	Ranks	N.	Rank Average	Rank Sum	Z Value	Sig.
Daily Basic Practical Life Skills	Positive Ranks	10	5.50	55.00	- 2.820	Sig. at 0.01 level
	Negative Ranks	0	00.00	00.00		
	Equality	0				
	Sum	10				
Environment Care Skills	Positive Ranks	10	5.50	55.00	-2.827	Sig. at 0.01 level
	Negative Ranks	0	00.00	00.00		
	Equality	0				
	Sum	10				
Self-Care Skills	Positive Ranks	10	5.50	55.00	−2.831	Sig. at 0.01 level
	Negative Ranks	0	00.00	00.00		
	Equality	0				
	Sum	10				
Dealing with Others Skills	Positive Ranks	10	5.50	55.00	−-2.831	Sig. at 0.01 level
	Negative Ranks	0	00.00	00.00		
	Equality	0				
	Sum	10				
Total Score	**Positive Ranks**	**10**	**5.50**	**55.00**	**−2.812**	**Sig. at 0.01 level**
	Negative Ranks	**0**	**00.00**	**0.00**		
	Equality	**0**				
	Sum	**10**				

It is evident, from the previous table, that the (Z) values to determine the differences between the pre- and post-measurements of the dimensions are (-2.820, -2.827, -2.831, 2.831 - 2.812) respectively, which are significant values at the level (0.01), indicating that the presence of differences between the pre and post measurements were in favor of the post measurement, as the average positive ranks were greater than the average negative ones, and an indication of the effectiveness of the intervention in teaching practical life skills using the Montessori approach to children with autism spectrum disorder in the experimental sample.

To determine the amount of improvement in the dimensions of the Practical Life Skills Scale using the Montessori approach, the arithmetic mean and standard deviation were calculated for the pre- and post-measurements of the experimental group, and the effect size was calculated using the equation provided by Field (2018, 520), in which the effect size is calculated from the following equation:

$$r = \frac{Z}{\sqrt{N}}$$

As Z represents the calculated Z and N means the sample size

Table (10) Arithmetic mean and standard deviation for the practical life skills in mentessori approach scale and the total score of the experimental group in both pre and post measurements

Dimension	Pre		Post		Effect Size
	Mean	Standard Deviation	Mean	Standard Deviation	
Daily Basic Practical Life Skills	17.70	1.10	25.80	1.19	0.90
Environment Care Skills	16.80	0.96	26.30	1.19	0.90
Personal Care Skills	17.90	0.87	26.50	0.82	0.90
Dealing with Others Skills	16.30	0.92	22.70	0.73	0.90
Total Score	**68.70**	2.64	101.30	2.90	0.90

According to the previous table, the arithmetic mean of the post-measurement is higher than the pre-measurement in the four dimensions, indicating that practical life skills using the Montessori approach are taught to children of the experimental group. It is an indicator of the effectiveness of using an intervention based on the use of some applied behavior analysis techniques (positive and negative reinforcement).

Discussion and Interpretaion of the the first hypothesis results:

The results of the first hypothesis indicate that there are statistically significant differences between the mean scores of children with autism

spectrum disorder (i.e. the experimental research sample) in the pre- and post-application on the scale (i.e. practical life skills using the Montessori approach scale) used in the current research, in favor of the post-application, and thus the first hypothesis is verified. It is also clear from the above that the first hypothesis was fulfilled, as the value of (z) indicative of the differences between the average ranks of the scores of children with autism spectrum disorder (the experimental sample) in the pre- and post-application on the practical life skills in Montessori approach scale was in the direction of the post-measurement, which indicates the effectiveness of using some techniques based on applied behavior analysis used in the current research.

The results of the first hypothesis also indicated that the applied behavior analysis techniques (positive and negative reinforcement) were effective to the extent that they led to an increase in the averages of all scores, and this is an indication of the increase and improvement that occurred for children with autism spectrum disorder after the application of the intervention. The researcher attributes this result to a group of reasons, including the techniques used in the intervention, such as: reinforcement, punishment, modeling, home activity, role playing, and these techniques allow the child with autism spectrum disorder to teach practical life skills using the Montessori approach through the training corner on basic daily practical life skills. Moreover, children learned environment care skills through training on the use of cleaning tools, tools for caring for indoor plants and small pets in the classroom, and personal care skills, which contributed to developing self-reliance and self-confidence in children. The provision of opportunities for meetings between peers in the Montessori approach within the activity room enables them to demonstrate their behavior in an interactive framework that leads to mutual influence among them, and to the rapid development of their social behavior.

The researcher attributed this result to the nature and quality of applied behavior analysis techniques (i.e. positove and negative reinforcement); as they include a set of exercises, activities, and exercises that are appropriate to the

abilities of children with autism spectrum disorder. The result of this hypothesis also supports the effectiveness of using some applied behavior analysis techniques (positive and negative reinforcement) in achieving the research goals and developing life skills in Montessori approach for children with autism spectrum disorder.

These results can be explained by the set of techniques included in the intervention, which contributed to its effectiveness in achieving its goals. To implement the intervention, the current research relied on behavior modification techniques, especially positive and negative reinforcement, and punishment, which led to teaching practical life skills using the Montessori approach. This was evident in the children's performance, which was reflected in the result of the current research with a difference in favor of the post-measurement. This means that the techniques of positive and negative reinforcement were effective to the extent that they led to high rates of improvement between the pre- and post-measurements on the practical life skills in Montessori approach scale.

This result is consistent with the results of many studies, including Amy (2018), Chisnall (2019), Little, et al (2018), Debs and Brown (2019), Solange (2020), Eva and Van (2020), Haines and Annett (2021), which aimed to use training interventions to develop life skills for children with autism spectrum disorder, and Mustafa's (2021) study, which aimed to identify the effectiveness of a program to develop some practical life skills and independence for children on the autism spectrum disorder and its relationship to social interaction.

Results and Discussion of The Second Hypothesis:

The second hypothesis states that "there are no statistically significant differences between the average scores of the children in the experimental group on the practical life skills in mentessori approach scale in the post and follow-up measurements." To verify this hypothesis, the Wilcoxon test was used and the value of (Z) was calculated to find differences between the average scores of the children of the experimental group's scores in the post-

and follow-up measurements of the dimensions by applying the Practical Life Skills in mentessori approach Scale, which the children of the experimental group were trained on during the intervention sessions, after a month. The following table shows this.

Table (11)
Z value to identify the differences betyween the post and follow-up measurements of the practical life skills in mentessori approach scale and the total score using Wilcoxon Formula

Dimensions	Ranks	N.	Rank Average	Rank Sum	Z Value	Sig.
Daily Basic Practical Life Skills	Positive Rank	1	1.00	1.00	-1.000	Insig.
	Negative Ranks	0	0.00	0.00		
	Equality	9				
	Sum	10				
Environment Care Skills	Positive Rank	1	1.00	1.00	-1.000	Insig.
	Negative Ranks	0	0.00	0.00		
	Equality	9				
	Sum	10				
Personal Care Skills	Positive Rank	1	1.00	1.00	-1.000	Insig.
	Negative Ranks	0	0.00	0.00		
	Equality	9				
	Sum	10				
Dealing with Others Skills	Positive Rank	1	1.00	1.00	-1.000	Insig.
	Negative Ranks	0	0.00	0.00		
	Equality	9				
	Sum	10				
Total Score	**Positive Ranks**	**4**	**2.50**	**2.50**	-1.000	**Insig**.
	Negative Ranks	**0**	**0.00**	**0.00**		
	Equality	**6**				
	Sum	**10**				

It is evident, from the previous table, that the Z values for determining the differences between the post and follow-up measurements of the dimensions are values that are not statistically significant, indicating no differences between the post and follow-up measures, as the average positive ranks were close to the average negative ranks. This indicates the persistence of the learning effect of the intervention used to develop practical life skills using the Montessori approach among the children of the experimental sample. To state the amount of difference in the dimensions of the Practical Life Skills in Montessori approach scale, the arithmetic mean and standard deviation were calculated for the post and follow-up measurements for the experimental group, and the following table shows this.

Table (12) Arithmetic mean and standard deviation for the practical life skills in mentessori approach scale and the total score of the experimental group in post and follow-up measurements

Dimension	Post		Follow-up	
	Mean	Standard Deviation	Mean	Standard Deviation
Daily Basic Practical Life Skills	25.80	1.19	25.90	1.05
Environment Care Skills	26.30	1.19	26.40	1.05
Personal Care Skills	26.50	0.82	26.50	0.69
Dealing with Others Skills	22.70	0.73	22.80	0.66
Total Score	101.30	2.90	101.60	2.63

It is evident, from the previous table, that the arithmetic mean of the post-measurement is close to the arithmetic mean of the follow-up measurement in the dimensions, which indicates the persistence of the effect of training on teaching practical life skills using the Montessori approach to the experimental group, and this is an indication of the effectiveness of the training within the intervention sessions in teaching practical life skills to children with autism spectrum disorder in the experimental group.

The Second Hypothesis Results Discussion and Interpretation:

From Table (13), it is clear that there were no statistically significant differences between the average scores of children with autism spectrum disorder, the experimental research sample, in the post and follow-up application after a month of implementing the intervention using the practical life skills in Montessori approach scale for children with autism spectrum disorder, which agreed and verified the validity of this hypothesis.

Therefore, the results of this second hypothesis may confirm that the effect of the intervention based on the use of some applied behavior analysis techniques is continuous and was not temporary, but rather its effectiveness continued even after a period of time had passed since the implementation. This can be attributed to the progress that children with autism spectrum disorder achieved within the intervention sessions. The activities that were presented to the children in the sessions were largely appropriate to their

abilities, and their impact continued beyond application. This is also due to the use of the techniques (i.e. positive and negative reinforcement) that helped children master the skills or experiences that they were about to learn, as well as the use of different reinforcement methods.

This was confirmed by the results of Ali (2017), Mahmoud (2019), and Knott et al (2020) studies, which emphasized the acquisition of daily life skills, and are considered a real indicator for measuring the level of development in children with autism spectrum disorder. It was also found that the daily practical life skills are acquired and needs to be practiced until the autistic child achieves the ability to perform them. Through it, children moved from an introverted state to a shared group state. The results of the research resulted in no statistically significant differences between the average scores of children with autism spectrum disorder in the experimental research sample in the post and follow-up application after a month.

The results of the second hypothesis also showed that there were no statistically significant differences between the post and follow-up measurements in each of the dimensions of the daily practical life skills scale (basic daily life skills, environmental care skills, personal care skills, and interpersonal skills), indicating that the intervention achieved improvement for children with autism spectrum disorder, and this improvement continued after a period of the application.

This can be attributed to the progress the children achieved within the intervention sessions, which led to the continued impact of the intervention after a period of time of implementation, and also the reinforcement the children received that made them desire to continue and progress; as they found support from the researcher and from his family at home. In addition, children felt that their abilities had improved among the peer group. The intervention also helped educate parents about the importance of the intervention and the importance of acquiring and developing daily practical life skills for their children, which supported the child’s position, through participation between

the parents and the child in performing household activities, and the parents' observation of their child's progress.

The result of the current research also agreed with the results of Al-Qahtani (2016), Barsoum (2018), Baggio (2017), Eugenia and Athanasios (2017), Ratner and Efimova (2018), Faryadi (2019), Solange (2020), Rodrignez (2020), and Jamieson (2021) who all confirmed that the intervention remains effective during the follow-up period in developing life skills for children with autism spectrum disorder. They also indicated that the effectiveness of programs that rely on applied behavior analysis techniques in developing many skills and experiences, including life and job skills (self-care, participation and communication skills with others, social behavior skills, living skills and independence), and the impact of these programs appears to extend even after they end.

Therefore, it is evident that the result of the second hypothesis was verified, and that despite the end of the application of the intervention, its effectiveness extended and continued even after a period of one month, which led to no statistically significant differences between the average scores of the children in the experimental group in the post and follow-up measurements, indicateing the continued impact and effectiveness of the intervention, which included the use of some techniques of applied behavior analysis (positive and negative reinforcement) in teaching practical life skills to children with autism spectrum disorder.

Second: Recommendations:

1- The use of some techniques of applied behavior analysis with other categories of children with disabilities to identify its effectiveness with each category.
2- The use of positive and negative reinforcement techniques to develop social communication skills in children with autism spectrum disorder.
3- Educating families who have an autistic child about the importance of applied behavior analysis and its impact on them in helping autistic children improve their skills and integrate into educational institutions.

4- Training teachers and specialists on the forms and methods of applying applied behavior analysis with autistic people.
5- Providing trained educational personnel who are proficient in using the applied behavior analysis to deal with children with autism spectrum disorder.

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