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The impact of movement games on the development of auditory perception among children with autism.

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ABSTRACT

The study aimed to identify the effect of motor games on the development of auditory perception in children with autism, aged 7 to 9 years. The researchers used an experimental approach, with a purposive sample selected from the Al-Chorouk Association for Children with Autism in Ain Defla province. To collect data, the Heywood Sensory-Motor Perception Scale was utilized. After statistical analysis, significant differences were found between the pre-test and post-test scores of the experimental group in auditory perception (specifically in spatial localization), attributed to the proposed program, with a strong effect size.

Keywords: children with autism, motor games, auditory perception

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-Introduction:

Autism is considered a type of neurological disorder that affects a child's mental and cognitive development, negatively impacting their communication with family and peers. This presents a difficult challenge for parents, first in accepting the child and second in how to interact with them. This issue becomes evident during school age when the autistic child struggles with integration and communication with classmates. The research conducted by Kanner, published in 1943, which included a detailed description of cases of children with autism as a distinct group, is regarded as the actual beginning of modern research on these cases, even though this study only described stereotypical cases that occur in early childhood (Al-Sharbiney, 2015, p. 15).

Children with autism experience various and diverse sensory disorders, with auditory perception disorders being among the most common sensory issues for this group. Some autistic children have deficiencies in the brain's processing of auditory information from their environment, leading to confusion and incorrect responses to commands. This may result in aggressive behavior, deficits in verbal and non-verbal communication, social interaction difficulties, and challenges in attention—particularly selective and distributed attention—auditory discrimination of sounds, and auditory memory. These challenges severely hinder the child's ability to adapt to their environment due to numerous issues rooted in auditory perception deficiencies (Al-Sayed, 2023, p. 73)

It has also been established that there is no effective cure for autism; however, specialists agree on the necessity and importance of early therapeutic intervention, which relies on training programs to develop linguistic, social, and behavioural skills.

Motor and sensory games have an immense capacity to help autistic children increase their ability to interact appropriately with their surroundings. These games enhance their attention and effective communication with others, allowing them to engage in all shared activities. Consequently, this has significantly and effectively reduced behavioural disorders (Ajimi, 2019, pp. 80-81). Games remain a positive means to strengthen cognitive and perceptual growth in children and enhance their communication, especially if the game is dual, providing the child with a partner to engage with both physically and verbally. Playing is an integral part of their life, contributing to the development of all sensory, motor, and cognitive skills (Jean, 2016, p. 110).

2-Research Problem:

Autism is one of the most enigmatic developmental disabilities, partly due to the lack of precise understanding of its underlying causes, and partly due to the unique and often unusual nature of its maladaptive behavioral patterns. Autism is characterized by a set of symptoms, most notably the child's intense self-absorption and social withdrawal, coupled with a deficit in social skills, and impaired verbal and non-verbal communication that hinders constructive social interaction with those around them (Sediq, 2007, p. 08).

Numerous studies have shown that children on the autism spectrum suffer from deficits in auditory perception, which is defined as a system dedicated to processing temporally sequenced stimuli in a manner that connects the verbal symbolic system to the auditory sensory form. It is a sequential processing system, involving the ability to recognize and interpret what is heard. This serves as an important perceptual mediator for learning. Although these children do not have hearing difficulties, their challenges lie in auditory perception. They often have weak auditory discrimination, making it difficult to extract meaning from both spoken and unspoken language, which in turn affects their ability to comprehend, recognize, and communicate verbally with others (Ghalem, 2017, p. 13)

Children with autism generally struggle with auditory discrimination and have problems with auditory perception, making it difficult for them to extract concepts from both heard and unheard language. This impacts their ability to understand, recognize, and thus verbally communicate with others. (Ghalem, 2017) .

Through our review of previous studies and research in this field, as well as the first and second preliminary studies conducted and our interaction with some sports supervisors for children with autism, we observed a significant lack of studies focused on the impact of programs on developing auditory perception in children with autism. From this standpoint, the researchers believe there is an urgent need for programs that stimulate the senses and abilities of this group of children. Consequently, the researchers aimed to design a proposed recreational sports program using motor games to enhance auditory perception in children with autism. The significance of the current study lies in its focus on children with autism spectrum disorder (ASD), a subject of great interest to educators and researchers due to its impact on the child's life. This study is fundamentally connected to an essential area: sensory-motor perceptual ability, specifically auditory perception, which children use to acquire knowledge and information from the environment they

interact with. The researcher hopes that the study's findings will confirm the effectiveness of the proposed recreational sports program using motor games in developing auditory perception in children with autism.

The research problem of the current study is encapsulated in the following general question:

What is the effect of the proposed program using motor games on developing auditory perception in children with autism?

General Hypothesis:

The proposed program using motor games impacts the development of auditory perception in children with autism.

3-Importance of the Study

-The importance of the current study arises from its fundamental connection to the crucial topic of auditory perception in children with autism spectrum disorder.

-The study gains importance by addressing the growing population of children with autism in society.

-To draw the attention of caregivers and educators of children with autism to the importance of using motor game programs to develop auditory perception in children with autism.

-The current study, through its theoretical framework and results, may pave the way for future research that explores other variables.

4- Objectives of the Study

-In light of the research problem, the study aims to identify the effect of the proposed program using motor games in developing auditory perception in children with autism.

. 5- Definition of Terms in the Study

5- 1Children with Autism :

Autism is one of the pervasive developmental disorders resulting from a central nervous system dysfunction that causes brain damage (cerebral dysfunction), leading to deficits in social interaction, verbal and non-verbal communication, and an inability to imagine, typically appearing within the first three years of a child's life (Kamel & Farouk, 2011, p. 30)

Operational Definition:

Children with autism spectrum disorder (ASD), displaying one, two, or three symptoms at a mild level

5-2. Motor Games:

Motor games involve physical movement from the child, requiring them to move or perform the activity for a certain amount of time, which may vary in duration depending on the nature of the game. These movements vary in speed and number per game and may include transferring the child from one place to another or having them move in place, such as rotating their body in a certain position or moving specific body parts like hands, legs, or head. These games develop the child's motor abilities to fulfill their general functions. Motor play emerges as one of the earliest activities in children, as they start moving their hands, head, and kicking with their legs while still in the cradle, with movements increasing and becoming more organized as they grow (Al-Houry & Al-Jarou, 2021, p. 72).

Operational Definition:

Motor games are defined as a set of small physical games, including exercises designed to develop auditory perception.

5-3 Auditory Perception

According to the American Psychological Association (2005), auditory perception is the brain's process of organizing and interpreting auditory information received through the outer ear. Sound waves are transmitted to the middle ear, causing the eardrum and small bones to vibrate, and then to the inner ear, creating vibrations inside the cochlea. The cells work to filter the sound using a series of electromechanical mechanisms, converting mechanical impulses into neural stimuli that travel through the auditory pathway to the auditory cortex in the brain for processing.

Operational Definition:

Auditory perception is measured as the overall score the child (examinee) achieves on sensory-motor perceptual ability items, according to the adapted Haywood scale for sensory-motor perceptual abilities in children aged 5-7, specifically in item 5: auditory perception (location identification).

6-Theoretical Framework and Previous Studies:

6-1 Children with Autism Spectrum Disorder:

Autism is characterized by a wide range of behaviors, forming a spectrum that spans from mild to severe cases, affecting all aspects of a child's daily life. The core difficulty lies in establishing relationships with others. Autism diagnosis typically includes three main elements, and affected children may exhibit one or more of the following traits (Terrell & Passenger, 2013, p. 49)

- Difficulties using language for communication, either with parents or other children. For instance, there might be a noticeable delay in speech development, or speech may be limited to repeating words with minimal understanding.

- Difficulty forming relationships, as evidenced by a lack of awareness of others, avoidance of eye contact, or unwillingness to sustain it.

- Challenges in pretend play and imagination, with a strong preference for solitary and often repetitive activities.

Symptoms of autism, first recognized in 1943, include (Mustafa, 2008, pp. 11-12).

- Inability to form relationships with others, showing greater interest in objects or inanimate things than people.

- Delay in language acquisition.

- Lack of use of spoken language for meaningful communication after acquiring it, as autistic children may struggle to use words in coherent conversations.

- Delayed echolalia, meaning they repeat words or phrases heard previously.

- Reversed pronoun usage; for example, when asked, "Do you want something?" the child may respond with "You want this" instead of "I want this".

- Repetitive, stereotyped play, showing limited play range and a preference for repeating the same activity, with an inability to engage in imaginative play typically seen in children from around 18 months.

- A strong tendency to maintain routines and resist changes in their daily lives or surroundings.

-Excellent rote memory, with many autistic children capable of performing remarkable memory-based feats without understanding, such as recalling facts or data.

-Normal physical appearance

6-2 Auditory Perception:

(Mahmoud, 2017) cites (Stefanatos & Wasserstein, 2011) in defining auditory perception as a system specialized in processing temporally patterned stimuli organized sequentially, in a way that connects the verbal symbolic system with auditory sensory forms; it is thus a sequential processing system. Auditory perception can also be defined as the ability to recognize and interpret what is heard, serving as an essential cognitive medium for learning. These children do not have hearing difficulties per se; rather, the challenge lies in auditory perception. Auditory perception skills include:

-Phoneme perception.

-Auditory discrimination.

-Auditory memory.

-Auditory sequencing or serial ordering.

-Auditory blending or synthesis.

Children with autism generally show weak auditory discrimination and also have issues with auditory perception. Consequently, they are often unable to derive meanings from both non-verbal and verbal auditory language. This affects their ability to understand, identify, and therefore engage in linguistic communication with others. (Ghalem, 2017).

6-3 Motor Games:

Motor games are activities that bring joy and happiness to children, allowing them to engage in high-energy movements as these games incorporate physical stories from the child's real-life context and are of an educational nature (Qasim, 1998, p. 96). Through play, a child with autism can learn various skills, including imagination, language and vocabulary, mutual interaction and relationship building, diversity in play methods, and most importantly, enjoyment and fun. Numerous studies have highlighted the importance of different types of play in enhancing linguistic and social skills in children with autism, in addition to improving effective communication. Motor and sensory games have also shown a tremendous ability to help children with autism enhance their interaction with their surroundings. Furthermore, their

The impact of movement games on the development of auditory perception among children with autism.

Miliani Mourad, Ben hadj tahar Abdelkader, Djekma ramdan

attention span and ability to communicate with others in meaningful ways improved, allowing them to engage in shared activities. This positively and effectively reduced behavioral issues.

When a child with autism is given the freedom to choose the game they desire, it contributes to their self-confidence and increases their interactions and experiences with others. It is preferred that games designed for children with autism include tangible, visual, and auditory stimuli that are spontaneous. Play is not limited to motor games alone; imaginary play is equally important, as it relies on the child's ability to imagine, visualize, role-play, and take on different characters. Benefits of play for autistic children (Ajimi, 2019, pp. 80-81) include:

- Play greatly aids autistic children in acquiring social skills and competencies, such as proper use of motor abilities, self-reliance, and concentration.
- Through play, children learn a variety of skills, including appropriate behavior, task completion, imagination, role-taking, relationship building, imitation, language, diverse play methods, and mutual interaction.
- Selecting games suited to autistic children should be based on behaviors that the autistic child displays, as choosing beneficial and appropriate games has the most significant effect on guiding desired behaviors.
- Additionally, the use of storytelling and proverbs with siblings of autistic children is highly effective in helping them understand their sibling's feelings. Time should be given to the siblings to ask questions, share their thoughts, and express their emotions.

Objectives of Motor Games:

- Development of large muscles.
- Provide social interaction between the child and peers.
- Bring enjoyment and entertainment.
- Contribute to acquiring social values such as cooperation, assistance, sharing, taking turns, and patience.
- Promote language development in children.

Characteristics of Motor Games:

- All children in motor game situations strive to achieve a single goal.
- Motor games are characterized by positive interdependence among children.

-Motor games encourage children to exert their maximum effort alongside peers in the group.

-During motor games, children practice many positive social skills within the group.

-Each child perceives other children in the motor game group as extensions of themselves, providing support and encouragement (Khafaf, 2015, p. 182)

6-4 Previous Studies:

-Study One: (Jassim & Frih, 2020)

aimed to assess the effectiveness of the Makaton method in improving some sensory and perceptual skills in children with autism. The researchers used an experimental method with a control and an experimental group. The study sample consisted of 10 children with autism, randomly selected. Key findings indicated statistically significant differences between the mean ranks (pre- and post-test) for auditory perception skills in the experimental group, favoring the post-test application.

-Study Two: (Al-Bahnasawi & Others, 2020)

aimed to examine the effect of an early intervention program on sensory adaptation in reducing emotional tension among autistic children. The researchers used a quasi-experimental method with two groups (experimental and control) of children with autism. The study sample also consisted of 10 children with autism, selected randomly. Key findings showed that early intervention helps reduce sensory and perceptual disturbances in children with autism, as assessed by the modified *Sensory Profile* list, with subdimensions such as auditory perceptual processing, sensitivity, and tactile responses.

6-5 Commentary on Previous Studies:

The objectives of the previous studies differ from the current study in terms of focus. While Jasim & Farih (2020) aimed to develop sensory-motor perceptual abilities across various levels of autism, Al-Bahnasawi et al. (2020) aligned with the current study's objective of enhancing auditory perception. In terms of methodology, both previous studies used an experimental design with two equal groups (one experimental and one control), whereas the current study employs a single-group experimental design with pre- and post-test measurements. The study sample in the current research was purposefully selected, consisting of five children with moderate autism spectrum disorder, unlike Jasim & Farih (2020) and Al-Bahnasawi et al. (2020), which relied on

The impact of movement games on the development of auditory perception among children with autism.

Miliani Mourad, Ben hadj tahar Abdelkader, Djekma ramdan

random sampling. In terms of tools, Al-Bahnasawi et al. (2020) used the Goddard Autism Intelligence Scale and the Gilliam Autism Rating Scale, while Jasim & Farih (2020) designed their own measurement tool. In the current study, the modified *Haywood Scale* for sensory-motor perceptual abilities was used for children aged 5-7 years, consisting of six items, with item number 05 selected for focus.

7-Method and Materials:

7.1 Study Methodology:

The experimental approach was chosen as it is appropriate for the nature of this study. A one-group experimental design was employed using pre- and post-test measurements. This design aimed to examine the effect of the proposed recreational sports program, using motor games, on enhancing auditory perception in children with autism.

7-2 Study Population:

The study population included all children with autism enrolled in special education classes in Ain Defla province during the 2022/2023 academic year, according to the Directorate of Social Activity. This population, comprising 286 students, is officially registered in centers and associations under the Directorate's supervision.

7-3 Study Sample:

A purposive sample was selected from the original population, specifically from the *Shorouq Association for Children with Autism*. The sample consisted of five male children with mild autism, aged between 7 and 9 years.

7-4 Sample Characteristics:

The following table presents the characteristics of the study sample:

Table 1: Sample Homogeneity in Terms of Age, Height, Weight, and Autism Severity

Variables	Mean	Standard Déviation	Coefficient of Variation
Age	10	1.22	12.2
Height	1.44	0.15	10.41
Weight	32.22	1.27	3.94
Autism Severity	28.2	5.29	18.75

The impact of movement games on the development of auditory perception among children with autism.

Miliani Mourad, Ben hadj tahar Abdelkader, Djekma ramdan

From Table 1, we observe that the coefficient of variation values for the sample's age, height, weight, and autism severity were 12.2%, 10.41%, 3.94%, and 18.75%, respectively, all of which are below 30%, this indicates that the members of the sample are homogeneous in these variables

7-5 Study Tools:

The tools used in the study were:

-Haywood Scale for Cognitive (Sensory-Motor) Abilities for children aged (5-7) years .

The modified Haywood scale for sensory-motor cognitive abilities for children aged (5-7) years was used, consisting of six items, and item number 05 was selected: **(De Bono , 2017, p. 13)**

Table 2: Shows the degree of item five from the Haywood scale

Number	Scale Items	Degree
1	Auditory Perception	0-2

7-6 Statistical Methods:

To ensure the normality of the data distribution, the "Shapiro-Wilk" test was used, along with the "Wilcoxon" test and the corresponding effect size test, using the Statistical Package for Social Sciences (SPSS), version 22.

8- Presentation and Analysis of Partial Hypothesis Results:

Table 3: Shows the significance of the differences between the pre-test and post-test measurements for auditory perception in the experimental group

Measurement	Rank Distribution	Mean Rank	Sum Rank	Z Value	Significance Value	Significance	Effect Size
Auditory Perception	Négative Ranks	00	00	-2.04	0.04	(*)	0.91
	Positive Ranks	2	6				
(*) Significant at the 0.05 level							
0.5: Large effect size≤0.1 < 0.3: Small effect size, 0.3 < 0.5: Medium effect size,							

The results in Table 3 show that the significance value for the auditory perception variable was 0.04, which is less than the significance level of 0.05. This indicates statistically significant differences between the pre-test and post-test measurements for the experimental group in the auditory perception

variable. The effect size was estimated at 0.91, indicating a strong effect of the independent variable on the dependent variable.

- Discussion of Study Hypothesis Results:

The hypothesis states: There are differences between the pre-test and post-test measurements for the experimental group in auditory perception (location identification) in favor of the post-test measurement.

The results from Table 3 show statistically significant differences between the pre-test and post-test measurements for the experimental group in auditory perception (location identification) for children with Autism Spectrum Disorder. The effect size of the independent variable (motor games) on the dependent variable (auditory perception) was strong.

The researcher attributes this significant improvement to the effectiveness of the proposed program, which included games that stimulate the auditory sense in the children of the experimental group. Various auditory stimuli were used, such as the ringing of a phone, bell, and other sounds produced by the educator. Additionally, the activities were conducted in a dedicated hall for practice, which positively influenced the proper implementation of the program contents and also helped reduce attention distraction among the children.

Sensory experiences acquired by children through auditory and visual perception are essential for cognitive thinking and development. Therefore, using auditory and visual materials is crucial in enhancing a child's motivation for learning and cognitive development, especially since the early years are when fundamental concepts and ideas form in a child (Raslan, 2010, p. 23).

For auditory perception to occur, three key elements must be present: the auditory stimulus (sound), the auditory system that receives the auditory signals from the environment, and the auditory centers in the brain that process and perceive these sounds (Kahla, 2012, p. 72).

"Galagio" emphasizes that sensory-motor theorists assert that motor activity is essential for the development of cognitive abilities, and deficiencies in sensory-motor development are responsible for many learning difficulties in children (Amin & Osama, 1982, p. 35).

The results of the current study align with those of Jassim and Farih (2020), who found statistically significant differences between the pre-test and post-test rank averages for auditory perception skills in children of the experimental group, favoring the post-test application.

- Conclusion:

It was concluded that there are statistically significant differences at the 0.05 level for the experimental group in auditory perception (location identification), favoring the post-test, with a strong effect size. Therefore, the general hypothesis was confirmed. This is attributed to the impact of the proposed program that utilized motor games.

- Recommendations:

Based on the conclusions reached, we recommend the following:

- Conduct similar studies for children with Autism Spectrum Disorder using other programs.
- Rely on a variety of measures and tests that assess sensory-motor cognitive abilities in children with Autism Spectrum Disorder.
- It is essential to conduct health screenings for children to identify areas of weakness, such as auditory and visual impairments.

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The impact of movement games on the development of auditory perception among children with autism.

Miliani Mourad, Ben hadj tahar Abdelkader, Djekma ramdan

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