

Constructing and codifying a measure of kinesthetic perception for Learnable Children with Intellectual Disabilities in Primary school

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Kinesthetic Perception Scale for Learnable Children with Intellectual Disabilities in Primary school

Abstract

The current study aimed to construct and standardize a kinesthetic perception scale for children with mild intellectual disabilities (learnable) aged (9-12) years, and to verify its psychometric properties. To achieve this goal, a kinesthetic perception scale was constructed, consisting of seven main dimensions distributed over 70 items: (distinguishing body parts and imitating movements, motor balance, spatial orientation, auditory-motor perception, visual-motor perception, overall perception and size constancy of objects, and sensorimotor coordination). To verify the reliability and validity of the scale, it was applied to a sample of (50) children with mild intellectual disability, aged between (9-12) years, as a psychometric sample. The basic sample for the study consisted of (10) children with mild intellectual disability, (5) males and (5) females, the ages of the children ranged from (9-12) years, with an average age of (9.64) and a standard deviation of (0.998) and an IQ between (50-70) points on the Stanford-Binet scale, fifth edition (standardized by Mahmoud Abu al-Nil and others, 2011) with an average of (63.1) and a standard deviation of (5.17). Equivalence was achieved between the children of the experimental group in the variables of chronological age, IQ, and economic and social level. The validity of the scale was verified through inter-rater validity and internal consistency, and its reliability was verified using Cronbach's alpha coefficient and the test-retest method. The results showed that the scale possesses high psychometric properties, enhancing its suitability for use in educational and diagnostic contexts.

Keywords: Mild intellectual disability (learnable), Kinesthetic Perception, psychometric properties, Primary school students.

1.Introduction

Intellectual disability is one of the challenges facing specialists in the field of special education because it is a mixed-dimensional problem in terms of psychological, social, medical and educational aspects and because it affects all aspects of development, the most important of which is mental, linguistic and social development. Throughout the ages, intellectual disability has undergone changes in addressing its concept and content according to scientific research. It began as a medical problem of the first degree, then it was addressed as a social problem, and interest in it has developed into an educational problem, and finally it has reached a multi-dimensional problem that includes all aspects of development. It is a psychological – social – educational – rehabilitation – professional problem (Kamel et al., 2011).

Tasse et al. (2021) Study reported that Mental retardation is a term that predates intellectual disability. This term covers the same category of individuals who were previously diagnosed with mental retardation in terms of number, type, level and duration of disability. In addition, these persons with disabilities, regardless of their different names, always need individual and group services and support. Moreover, every individual who is or was qualified to diagnose mental retardation is currently also qualified to diagnose intellectual disability. Mental retardation is an old term and is no longer used. Sensory-motor skills are prerequisites for integral development in children, and play a pivotal role in building cognitive and adaptive processes that enable the child to interact positively with the surrounding environment. These skills are increasingly important for children with intellectual disabilities, especially those who can learn, because they suffer from developmental delays in cognitive and motor aspects, which affects their ability to distinguish between stimuli, regulate responses, and synergize between senses and movement (Kholoud and Nour Abdel Karim, 2018; Mahdi Ezzedine et al., 2021; Mulligan et al., (2019), Aghajani, (2020).

Numerous studies such as Gitter (2003), Kurszewska&uchuńsk (2011), Ngozi&Oluchi (2008), Ratner&Efimova (2016) have emphasized the importance of developing motor skills in children with special needs as an entry point for improving their cognitive and social abilities ,It is noticeable through research and studies that intellectually disabled children have a clear deficiency in motor development and the skills

it includes, such as walking, balance and other motor skills that require control and neuromuscular compatibility. This leads to the clear deficiency of this group in perception, so it is unable to arrange the stimuli in its environment appropriately or even analyze and classify them in the way that comes to the mind of ordinary individuals, which makes the disabled child unaware of many vocabularies in how to deal with its environment (Al-Rusan, 2010, p. 77).

2. the problem of the study:

- 1- Through extrapolation in the field of persons with disabilities, and through the work of the researcher in the field of rehabilitation of children with disabilities at Maak Child Care Center in Al-Arish, and through her visit to centers and institutions interested in the care and rehabilitation of the intellectually disabled, she noticed that there are problems with this category of children in motor perception such as the difficulty of achieving harmony between sensory, auditory, visual and motor stimuli. This deficiency appears during tasks that require the child to synergize and coordinate between different senses such as playing and performing various activities such as drawing and coloring, cutting and pasting, playing with clay and installing puzzles, copying letters and numbers, distinguishing between different shapes, sizes and colors, implementing a series of sequential orders, and carrying out some motor balance activities, as confirmed by the study of Nazim Jabbar Jalal (2011), Al-Qassem (2015), Iman Khamis (2022), Amin Al-Khouli and Osama Rateb (2007), Ayman Daniel (2017), Martin Henley and others Arab Abdel Hamid (2004), Makarmi Helmy Abu Harj and others (2010), Wuang et al. (2022), Lukwini, (2021).

it is possible to identify the problem of research in the following questions:

- 2- What are the implications of the internal consistency indicators of the Kinesthetic Perception Scale for Children with Minor Intellectual Disabilities?
- 3- What are the indications of stability indicators for the Kinesthetic Perception Scale for Children with Minor Intellectual Disabilities?
- 4- What are the connotations of the validity indicators of the Kinesthetic Perception Scale for Children with Minor Intellectual Disabilities?

3. Objectives of the study

The study aims to build and design a tight scale to measure the perceptual and motor skills of intellectually disabled children in the learnable age group from (9-12) years, taking into account the developmental, cognitive and motor characteristics of this group, and is characterized by sufficient honesty and stability, and can be used as a diagnostic tool in educational and therapeutic programs, as well as verifying its psychometric characteristics.

4. Terminology of the study:

• Kinesthetic Perception:

Perception defines as: the ability to manage the information that comes to the individual through the senses and the process of gathering information and appropriate reaction in light of the apparent motor behavior (Salwa and Dasa, 2020).

It is also known as one of the mental processes resulting from the stimulation of the sensory and motor organs in the muscles and joints and then translated into motor performance based on the information taken from the external environment (stimulation) so that it is expressed correctly (Arkhipova et al., 2021).

The procedural definition of kinesthetic perception is defined by the researcher as the perception of the body's position and the movement of its parts arising from the brain's reception of sensory stimuli and its translation of an action or skill towards a specific goal through the senses of intellectually disabled children who can learn and measured through (7) dimensions (body image and discrimination, imitation of

movements - motor balance - spatial orientation - auditory-motor perception – visual-motor perception – total perception and stability of the size of objects - motor sensory synergy).

- **mild Intellectual Disabilities:**

Children with mild intellectual disabilities are defined in the current study as male and female children from Maak Child Care Center in North Sinai Governorate, whose age ranges from (9-12) years and their IQ is (50-70) on the Stanford-Binet scale, the fifth picture, and they have a low level of developmental skills.

5. Study Literature:

Since motor education is an important part and an essential contributing factor for all categories of intellectual disability, the motor experience is purposeful for this group of disabled people because it helps them face the world around them through their discovery of their physical motor capabilities, and this is what Abdul Qureiti (2011) reached. Sensory-motor perception is also defined as an individual's ability to receive external and internal stimuli through the senses and convert them into specific centers in the brain, which in turn interprets and sends them as commands to the motor system to respond to them (Rhodes, 2009).

Kinesthetic perception is an important and essential component of the growth and learning stage for children, because it helps the development and development of the body as a whole. When a child possesses good motor and sensory cognitive skills, it means the growth of his nervous system in a strong and sound manner, which is a growth indicator for the rest of the other aspects of physical growth. Kinesthetic perception passes through several different phases " as it begins with the overall overview. After that, one begins to analyze the situation and perceive the elements that make up it, and the relationships that exist between its various parts. The third and last phase is to rewrite the parts in a unified manner and return to the overall view again (Hussein and Sahban, 2011). This was confirmed by the study of Salwa and Dasa (2020) that the role of adapted sports activities for children with mild intellectual disabilities from (5-7) years directly helps in improving learning skills. The study stressed the importance of having sports curricula in the early stages of rehabilitation for these children.

Depending on the characteristics of children with mild intellectual disabilities, they always have a short and limited attention period for memory, poor eye-hand coordination, a decrease in the period and duration of concentration, and poor balance skills and motor synergy. With intervention in programs to improve motor perception skills through the use of play activities techniques in learning, children participate physically and reach effective, long-term learning, and more understanding because motor skills are an effective educational tool (Rathnakumar, 2020).

The researcher believes that motor perception skills are essential and important skills in the lives of all children because they are considered the language that the body speaks about itself through its senses, and they are the way to develop a comprehensive mindset through the development and updating of motor sensory skills and thus the development of mental skills at a higher level than normal, and in the lives of our children with simple intellectual disabilities, the need to work on developing motor perception skills increases because they are considered one of the closest activities for these children on the basis that their entrance is in the form of motor activities and training, and they are also one of the most important ways to express themselves, improve their self-image in terms of their ability to manage their daily life skills independently, and they are also one of the most important ways to communicate with their bodies and improve their ability to manage social situations through their ability to move consciously and mix with those around them in a system and without random movement. Therefore, the researcher believes that such motor perception skills must be a fixed and key part of early intervention programs for the rehabilitation of children with special needs in general, whatever their disability.

6. Study Procedures:

The Kinesthetic Perception Scale was developed for learningable children with intellectual disabilities from the age of (9-12) years , following a set of methodological steps, which included the following:

First, the study approach:

The current research is based on the experimental one-group approach, where the effectiveness of a training program to develop motor perception skills among children with mild intellectual disabilities was verified in the category of the learnable. The measure of motor perception was used in the pre, post and follow-up measurement.

Second, the study population:

The study community included children with intellectual disabilities who are able to learn and attend Maak Center for the Care and Rehabilitation of children with Special Needs - Arab medical Union in Al-Arish, the place of work of the researcher, and the training program was applied in Montessori Academic Nursery of Social Affairs because of the availability of all components of the Montessori curriculum.

Third, the study sample:

The total sample of the study consisted of (60) children of mild intellectual disability, the class of those who can learn, and they were divided into:

Table (1)

1) Core Sample	2) Psychometric Sample
The basic research sample consisted of (10) children with mild intellectual disabilities, (5) males and (5) females, from the children of the "Ma 'ak Child Care Center" affiliated with the Arab Doctors Union - Relief and Emergency Committee - Sinai Branch, the ages of the children ranged from (9-12) years, with an average age of (9,64), a standard deviation (0.998), and an intelligence coefficient between (50-70) degrees on the Stanford scale between the fifth image with an average of (63.1) and a standard deviation of (5.17), and parity was made among the children of the experimental group in the variables of chronological age, intelligence coefficient, and economic and social level .	The sample of psychometric characteristics of the study consisted of (50) children with mild intellectual disabilities, ranging in age from (9-12) years, and the measure of motor perception of children with mild intellectual disabilities was applied to them, and those enrolled in special education centers or integration programs in schools, and they were intentionally selected in cooperation with specialists in centers for people with special needs from (7) governorates in the Arab Republic of Egypt, namely: North Sinai, Cairo, Fayoum, Aswan, Beni Suef, Alexandria, and Sharqia.

Equivalence Between Children in the Experimental Group.

that all the values of the coefficient of variation are less than 30%, which indicates the equivalence between the members of the experimental group.

Fourth, Study Tools:

The Kinesthetic Perception Scale for Intellectually Handicapped Learning Children (prepared by the researcher).

Fifth, the statistical methods used in the study:

The validity of the scale was verified by:

- The validity of the arbitrators (Content Validity).
- Validity of internal consistency.

A) Validity of Arbitrators:

The items of the scale were presented to (23) arbitrators of specialists, and the percentage of agreement between the arbitrators was calculated for each item

Table (3)
Percentage of the Arbitrators' Agreement on the Terms of the Kinesthetic Perception Scale.

Item number	Number of times agreed	Number of times disagreed	Percentage of agreement	Item number	Number of times agreed	Number of times disagreed	Percentage of agreement
١	٢٣	-	%١٠٠	٣٦	٢٣	-	%١٠٠
٢	٢٣	-	%١٠٠	٣٧	٢١	٢	%٩١,٣
٣	٢٣	-	%١٠٠	٣٨	٢٠	٣	%٨٦,٩
٤	٢٣	-	%١٠٠	٣٩	١٣	١٠	%٥٦,٥٠
٥	٢٣	-	%١٠٠	٤٠	٢٠	٣	%٨٦,٩
٦	٢٣	-	%١٠٠	٤١	٢٢	١	%٩٥,٦
٧	٢٣	-	%١٠٠	٤٢	٢٢	١	%٩٥,٦
٨	٢٣	-	%١٠٠	٤٣	٢١	٢	%٩١,٣
٩	٢٣	-	%١٠٠	٤٤	٢٢	١	%٩٥,٦
١٠	١٣	١٠	%٥٦,٥٠	٤٥	١٤	٩	%٦٠,٨
١١	٢٣	-	%١٠٠	٤٦	٢٠	٣	%٨٦,٩
١٢	٢٢	١	%٩٥,٦	٤٧	٢١	٢	%٩١,٣
١٣	٢٣	-	%١٠٠	٤٨	٢١	٢	%٩١,٣
١٤	٢١	٢	%٩١,٣	٤٩	٢٠	٣	%٨٦,٩
١٥	٢٠	٣	%٨٦,٩	٥٠	١٢	١١	%٥٢,١
١٦	١٦	٧	%٦٩,٥٠	٥١	٢٠	٣	%٨٦,٩
١٧	٢١	٢	%٩١,٣	٥٢	٢٠	٣	%٨٦,٩
١٨	٢٠	٣	%٨٦,٩	٥٣	٢٠	٣	%٨٦,٩
١٩	٢٢	١	%٩٥,٦	٥٤	١٩	٤	%٨٢,٦
٢٠	١٢	١١	%٥٢,١	٥٥	٢٣	-	%١٠٠
٢١	٢١	٢	%٩١,٣	٥٦	٢١	٢	%٩١,٣
٢٢	٢١	٢	%٩١,٣	٥٧	٢١	٢	%٩١,٣
٢٣	٢٠	٣	%٨٦,٩	٥٨	٢٠	٣	%٨٦,٩
٢٤	١٩	٤	%٨٢,٦	٥٩	١٩	٤	%٨٢,٦
٢٥	٢١	٢	%٩١,٣	٦٠	٢١	٢	%٩١,٣
٢٦	١٩	٤	%٨٢,٦	٦١	٢٢	١	%٩٥,٦
٢٧	٢٠	٣	%٨٦,٩	٦٢	٢٢	١	%٩٥,٦
٢٨	١٠	١٣	%٤٣,٤	٦٣	٢٣	-	%١٠٠
٢٩	٢٢	١	%٩٥,٦	٦٤	٢٠	٣	%٨٦,٩

٣٠	٢٣	-	%١٠٠	٦٥	٢١	٢	%٩١,٣
٣١	٢١	٢	%٩١,٣	٦٦	٢٣	-	%١٠٠
٣٢	٢٠	٣	%٨٦,٩	٦٧	٢٣	-	%١٠٠
٣٣	٢٢	١	%٩٥,٦	٦٨	٢٣	-	%١٠٠
٣٤	١٩	٤	%٨٢,٦	٦٩	٢٠	٣	%٨٦,٩
٣٥	٢٠	٣	%٨٦,٩	٧٠	٢٠	٣	%٨٦,٩

The results showed that most of the items received a percentage of approval among the arbitrators, as the percentage was limited to (82.6% – 100%), which indicates that the items have a high degree of truthfulness. Table (3) shows this.

b) Validity of internal consistency:

The correlation coefficients between the phrase score and the total dimension score of the perceptual-motor scale were calculated. Table (4) shows the results of this step:

Table (4)

Calculate the Correlation Coefficients Between the Phrase Score and the Overall Dimension Score of the Kinesthetic Perception Scale.

Body part discrimination and movement imitation		Motor balance		Spatial orientation		Auditory-motor	
Phrase	Correlation coefficient	Phrase	Correlation coefficient	Phrase	Correlation coefficient	Phrase	Correlation coefficient
١	**, ٩٠٩	١١	**, ٨١٣	٢١	**, ٥٧٨	٣١	**, ٧٠٩
٢	**, ٦٦٦	١٢	**, ٥١٢	٢٢	**, ٨٥٩	٣٢	**, ٧٠٤
٣	**, ٨١٣	١٣	**, ٦٣٤	٢٣	**, ٦٧٣	٣٣	**, ٨١٥
٤	**, ٥٩٧	١٤	**, ٥٦٢	٢٤	**, ٨٧٧	٣٤	**, ٦١٠
٥	**, ٧٧٠	١٥	**, ٦٨٠	٢٥	**, ٦٦٤	٣٥	**, ٥٨٤
٦	**, ٨٤١	١٦	**, ٦٢٦	٢٦	**, ٧٧٣	٣٦	**, ٥٦٧
٧	**, ٥٥٩	١٧	**, ٦٢٨	٢٧	**, ٧١٣	٣٧	**, ٨٠٨
٨	**, ٨٠٢	١٨	**, ٦٤٩	٢٨	**, ٨٢٤	٣٨	**, ٦٥٨
٩	**, ٧١٣	١٩	**, ٨١٩	٢٩	**, ٥٨٣	٣٩	**, ٨٢٤
١٠	**, ٦٥٥	٢٠	**, ٦٦٢	٣٠	**, ٨٨٧	٤٠	**, ٨٥٠
Visual-motor perception		Global perception and object size constancy		Sensorimotor coordination			
Phrase	Correlation coefficient	Phrase	Correlation coefficient	Phrase	Correlation coefficient		
٤١	**, ٨٢٢	٥١	**, ٧٧٣	٦١	**, ٥٣٤		
٤٢	**, ٧٩٠	٥٢	**, ٨١١	٦٢	**, ٥٨٣		
٤٣	**, ٨٢٢	٥٣	**, ٧٦٣	٦٣	**, ٧١١		
٤٤	**, ٦٨٦	٥٤	**, ٨١١	٦٤	**, ٨٣٤		
٤٥	**, ٨١١	٥٥	**, ٨٧٧	٦٥	**, ٥٠٤		
٤٦	**, ٨٧٧	٥٦	**, ٨٣٤	٦٦	**, ٥١٢		
٤٧	**, ٨٣٤	٥٧	**, ٦٩٠	٦٧	**, ٥٥٤		
٤٨	**, ٨٢٢	٥٨	**, ٨٢٤	٦٨	**, ٧٤١		
٤٩	**, ٧٥٤	٥٩	**, ٨٥٦	٦٩	**, ٨١١		
٥٠	**, ٨٠٢	٦٠	**, ٨١٣	٧٠	**, ٧٦٣		

It is clear from Table (4) that the values of the correlation coefficients between the degree of each item and the total degree of the dimension to which it belongs on the scale of kinesthetic perception, which extends between (0.504 – 0,909), all of which are significant at the level of significance (0.01), which indicates a high internal consistency between the items of the dimension.

Correlation coefficients between the distance score and the total score of the scale were also calculated. Table (5) shows the results of this step as follows:

Table(5)

Calculating the Correlation Coefficients Between the Distance Score and the Overall Score of the Kinesthetic Perception Scale.

Dimension	Correlation coefficient
Body part discrimination and movement imitation	** .٨٦٢
Motor balance	** .٨٤١
Spatial orientation	** .٨٦١
Auditory-motor	** .٨٩١
Visual-motor perception	** .٨٣٣
Global perception and object size constancy	** .٧٨٣
Sensorimotor coordination	** .٨٠٥

It is clear from Table (5) that the values of the correlation between the dimension and the total degree of the Kinesthetic Perception Scale are limited to (0,783 – 0,861), all of which are significant at the significance level of (0,01).

Second: Stability of the scale

Stability was calculated using two methods:

- **Cronbach's alpha coefficient**
- **Reapply (Test-Retest).**

Table (6)

Dimension	Cronbach's alpha	Re-application
Body part discrimination and movement imitation	.٦٨٨	.٨٠٣
Motor balance	.٦٥٧	.٦٣١
Spatial orientation	.٧١٧	.٧٨١
Auditory-motor	.٨٨٩	.٩١٩
Visual-motor perception	.٧٨٠	.٨٦٠
Global perception and object size constancy	.٨٦٣	.٩١٢

Sensorimotor coordination	٠,٨٧٢	٠,٩١٦
The total score of the scale	٠,٨٣٢	٠,٨٨١

- Cronbach's **alpha** coefficient: The values ranged between (0.657 – 0.889) for the dimensions of the scale, and reached (0.832) for the total score, which values indicate high internal stability.
- **Re-application (Test-Retest) The scale** was reapplied to the same sample after two weeks, and the stability coefficients ranged between (0.631 – 0.919), which confirms the stability of the scale over time.

It is clear from Table (6) that the stability coefficients in the two methods of Cronbach's alpha coefficient and reapplication are high, which indicates the stability of the perceptual-motor scale.

Sixth the steps of the study: reviewing previous research and studies: which dealt with perception of kinesthetic sense, including Abu Harjah et al. (2010), Al-Khuli and Rateb (2007), Al-Qasim (2015), Jalal (2011), Khamis (2022), Daniel (2017), Abdul Hadi and Mazen Hadi (2015), Henley et al., Arabization of Jaber Abdul Hamid (2004), Arkhipova et al. (2021) Solvicaya (2020), Urian (2020), Al-Qahtani(2016).

The researcher addressed the perception of kinesthetic sense and the most prominent measures that were measured. The researcher found a number of measures that were designed for ordinary kindergarten children, and the absence of any measures prepared in advance for children with intellectual disabilities (9-12) years old within the limits of the researcher's knowledge. The researcher used a set of studies that included measures of kinesthetic perception to prepare the measure, including:

- 1- The Dayton **Scale for Kinesthetic** Perception: From the age of (4-5) years, it includes (14) subtest distributed over (5) areas, namely: the physical self, field, trends, perception of space size, balance, rhythm and neuromuscular control (motor compatibility), eye-foot compatibility, eye-foot compatibility, fine neuromuscular control (tactile discrimination), formal perception and auditory discrimination. The scale has good psychometric characteristics. The Tasnim Mustafa study (2020) stated that the scale is easy to implement and that the scale is characterized by the inclusion of the largest number of skills to be measured, while Mahrous Mahmoud (2015) states that the Dayton scale depends on the natural movement of the child. Hassan's study (2007) states that the scale is considered one of the most important measures used in the Arab environment. It is a scale rated in the Iraqi environment in 1998 and in the Jordanian environment according to the Denbo Center for Thinking Education (2017). It depends on a set of motor factors that help determine strengths and weakness in motor motor abilities and that these skills mean the child has the ability to move.

A study by Quwaini (2022) stated that the tests of the Dayton scale are simple, non-composite tests, while Layth and Abdul Karim (2020) stated that the scale fits the average mental age of people with intellectual disabilities, its tools are easy and available, and its application instructions are clear and easy to apply in the Arab environment, while Tasnim Mustafa (2020) stated that the scale has a great degree of honesty and stability.

- 2- The modified Haywood **scale for motor** sensory cognitive abilities: From the age of (5-7) years, with the need to know whether the child is right or left before the start of the application of the scale, and also needs experience in its application and not to make hasty judgments, and it consists of (6) areas, namely: the stability of the size of things - total and partial visual perception - identifying body parts - distinguishing between the right and left body parts - balance – locating.

The Haywood Scale of Kinesthetic Perception and the Dayton Scale were mentioned in the construction of the Kinesthetic Perceptual Ability Scale for Kindergarten Children, which was produced in 2017 by the Denbo Thinking Education Center in Jordan and Dubai (Kinesthetic Abilities Scale for Kindergarten Children, 2017).

3- **Bordeaux scale for cognitive motor** abilities: It is a scale prepared by Noel Keffart and Io Jean Roche (1966). The scale is based on theories that confirm that all types of learning begin with movement and that motor activities are the basic basis for cognitive and academic learning later. These assumptions were confirmed by Piaget, Brunner, Jetman, Parch, Delacato, Kehart and Frostig (as mentioned in Rhodes, 2009). The scale consists of 31 items representing 11 subtests distributed over five main areas applied to children aged (6-10) years, namely:

- Balance and texture - body image and discrimination - cognitive-motor manipulation - visual control - perception of shapes. This test has been rationed in the Egyptian environment (Ruby 1991) and in the Omani environment Abdul Hamid Hassan (2007). Studies have confirmed that the scale enjoys high and positive honesty and stability.
- Ulrich Scale of Motor Development from the age of (7-11) years.
- Pead developmental motor scales.
- Nada Abdel Halim Juwaili Scale (2022), which includes four main dimensions: (perception of space size - synergy and visual-motor control - Acoustic-motor synergy - tactile performance).

1) **Dimensions of the Kinesthetic Perception Scale:**

- 1- **The first dimension is to distinguish the organs of the body and imitate the movements:** It includes the child's knowledge of his body, his awareness of its parts, and the movement of his joints and muscles so that he can move according to the directives that give him and measure him the phrases from (1 to 10).
 - 2- **The second dimension is the motor balance:** It is the child's ability to maintain the stability of the body when performing various movements and skills and positioning his body to the center of gravity without imbalance and measured by phrases from (11 to 20).
 - 3- **The third dimension is spatial orientation:** It is the ability to feel and be aware of the body in space and its awareness of things that do not exist directly in its visual surroundings and to distinguish the location of things in relation to the body. It includes internal spatial orientation such as (right - north) and external spatial orientation such as (middle - bottom - top - side) and measured by phrases from (21 to 30).
 - 4- **The fourth dimension is auditory-motor perception:** It is the child's ability to receive sounds in the state of movement, distinguish the difference between them, determine the source of the sound, and measure the phrases from (31 to 40).
 - 5- **The fifth dimension is visual-motor perception:** It is the ability to coordinate between visual synergy and finger and hand movements well in the case of movement and measured by phrases (41 to 50).
 - 6- **The sixth dimension is the total awareness and stability of the size of things:** It is the child's ability to distinguish between all the stimuli in front of him with different sizes and measured by phrases from (51 to 60).
 - 7- **The seventh dimension is kinesthetic:** It is the degree of consistency and compatibility between eye movements and hand movements when the child performs a kinesthetic activity by drawing or writing according to the way the eye sees and measured by phrases from (61 to 70).
- a. **Components of the scale:** The scale consists of (70) phrases distributed over (7) main dimensions, with (10) items for each dimension.
- b- **Scale Correction Method:** A three-step scale was used to estimate the child's performance in each item: (Zero): Does not perform the skill. (0,5): Performs the skill sometimes. (1): Always performs the skill.

Seventh: the results of the study and its discussion:

Discussion of the results:

The results of the study reflect the effectiveness of the scale in measuring motor perception skills in children with intellectual disabilities who can learn in the age group (9–12) years. Indicators of validity and consistency have shown that the scale has a high degree of internal consistency and credibility, which enhances its potential for use in educational and therapeutic contexts.

These findings are consistent with previous studies such as Mulligan et al. (2019), which showed that enhancing kinesthetic perception leads to a significant improvement in academic performance and adaptive behavior, as well as with what Ratner & Efimova (2016) stated that measurement tools designed based on the needs of the group of people with intellectual disabilities contribute to the accuracy of diagnosis and intervention planning. The study also agreed with the study of Iman Khamis (2022) that measures of kinesthetic perception aim to measure the child's ability to distinguish, perceive and pay attention related to the senses.

The results of the study also agreed with the study of Cantone et al. (2018), which dealt with the impact of training a group of (30) children with mild intellectual disabilities on motor (visual) sensory rehabilitation programs for two months and this affected their academic response and positive achievement of daily life skills, while the study dealt with Koutsobina et al. (2021) Applying a tool to measure the motor sensory skills of a sample of children with simple intellectual disabilities. The results of the study that was applied to (43) children were that the children of the whole sample have deficiencies in motor sensory perception skills and need intervention to improve these skills and thus improve their mental and motor skills and ability as consistent with the general principles of motor development as mentioned by Mansour and Khamis (2010), which are as follows (the principle of continuity and sequencing - the principle of integration - the trend of growth - the principle of transition from public to private). The current scale is characterized by being the first – within the limits of the researcher's knowledge – that targets the age group (9–12 years) with simple intellectual disability directly, taking into account the developmental and cognitive characteristics of this group.

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Kinesthetic Perception Scale for Learnable Children with Intellectual Disabilities for Primary school

☐ The first dimension: distinguishing the organs of the body and imitating movements

No.	Statement	Always performs the skill	Performs the skill sometimes	Does not perform the skill
1.	He touches his ears when asked to do.			
2.	He touches his arm when asked to do.			
3.	He touches his head when asked to do.			
4.	He touches his belly when asked to do.			
5.	He touches his knees when asked to do.			
6.	He touches his feet when asked to do.			
7.	After touching his back with a pen, he is asked, "Where did I touch you?"			
8.	He touches the eyelashes of his eyes with his hands on demand.			
9.	He imitates clapping hands with the torso tilted to the right.			
10.	Mimics sitting posture with one foot up.			

☐ The second dimension: Motor balance

No.	Statement	Always performs the	Performs the skill	Does not perform
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		skill	sometimes	the skill
11.	He walks on the sand in a straight line.			
12.	He walks on the balance board using the feet.			
13.	Walking backwards on the balance board.			
14.	Flexes the arm while walking on the balance board.			
15.	He climbs Pickler's triangle in equilibrium.			
16.	He walks on the balance board with his eyes closed.			
17.	He only runs over the white sidewalk without falling.			
18.	Jumps on the balance board with one foot.			
19.	He walks on the balance board and stops when the music stops.			
20.	He walks on the metatarsal for a meter with eyes closed.			

The third dimension: Spatial orientation: It is the ability to feel and be aware of the body in space and its awareness of things that do not exist directly in its visual surroundings and to distinguish the location of things in relation to the body. It includes internal space orientation such as (right - north) and external (middle - bottom - top - side).

No.	Statement	Always performs the skill	Performs the skill sometimes	Does not perform the skill
21.	He moves his arms inward.			
22.	He moves his arms out.			
23.	Place the cube above or below the chair.			
24.	He walks a straight line between the wall and the balance board.			
25.	He puts the right arm behind him and the left foot in front of him.			
26.	He moves his arms in a circular motion with the head back.			
27.	He circles his left foot on a picture.			
28.	He points to the toy to the left of the child.			
29.	Identifies the child at the end of the class through a picture.			
30.	He walks on the metatarsal with his arms outstretched.			

The fourth dimension: auditory-motor perception

No.	Statement	Always performs the skill	Performs the skill sometimes	Does not perform the skill
31.	He plays hide-and-seek.			
32.	He runs with a sound and stops with a pause.			
33.	He determines the number of knocks on his back.			
34.	Distinguishes the sound of the bell in the right or left hand.			
35.	He walks on a zigzag line with an auditory exciter.			
36.	He locates the nearest sound with his body and eyes closed.			
37.	Recognizes animal sounds during movement.			
38.	Distinguish between different cylinder sounds.			
39.	He recalls words said to him in motion.			
40.	Identifies a moving sound source while blindfolded.			

Dimension 5: Visual-motor perception

No.	Statement	Always performs the skill	Performs the skill sometimes	Does not perform the skill
41.	He collects balls from the ground with both hands.			
42.	He throws a basketball at the goal.			
43.	Colors an oval shape without going outside the frame.			
44.	Completes the missing portion of the image.			

45.	He traces the spotlight on the wall with his hand.			
46.	He walks the pen through a painted maze without touching the edges.			
47.	Places beads according to a certain pattern with thread.			
48.	Connects the drawing of the rabbit to the carrots in a straight line.			
49.	Distinguish similar shapes from a colorful background.			
50.	He recalls pictures shown to him while running in a straight line.			

The sixth dimension: Total perception and stability of the size of things

No.	Statement	Always performs the skill	Performs the skill sometimes	Does not perform the skill
51.	He picks up the pen with his left hand.			
52.	Decide which is heavier: the cube or the blue stick.			
53.	He puts the pink cube on top of the brown.			
54.	He arranges the cubes from the largest to the smallest.			
55.	He determines the largest volume of cubes by sight.			
56.	He picks the cube closest to his body.			
57.	Points to the furthest seat from his body.			
58.	Match the images with their equivalent figures.			
59.	He chooses the similar shape of an image from among the models.			
60.	Arrange shapes by length and size.			

Dimension 7: Synergy Kinesthetic

No.	Statement	Always performs the skill	Performs the skill sometimes	Does not perform the skill
61.	Draws a straight line on the line without deviation.			
62.	It forms a form of clay according to a model.			
63.	Cuts a shape that matches a model shown.			
64.	Highlights the error in a displayed image.			
65.	Completes the missing letter in a word.			
66.	Performs manual activities such as banding beads or cutting and pasting.			
67.	He walks on one foot while holding a bowl over his head.			
68.	Identifies the different shape within a set of shapes.			
69.	Distinguish the shape from the background in similar images.			
70.	He rides a four-piece puzzle.			