The Relationship between Intelligence and Sensory-Motor Cognition and Motor Development in Second Grade Primary School Students Aged (7-8) Years

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ABSTRACT

1- To find out the relationship between intelligence and sensory motor perception among second-grade primary school students aged (7-8) years.

2- Knowing the relationship between intelligence and motor development among the second grade primary school students at the age of (7-8) years.

The researcher used the descriptive method of survey to suit the nature of the research, and the research sample included (25) second-grade primary school students from the First Competencies School for Girls, aged (7-8) years in Nineveh Governorate for the academic year 2024-2025, and the IQ test of **(Goodanff-Harris) and the modified Haywood test were used to measure sensory perception and the motor growth scale as research tools.** As for the statistical methods used, they are arithmetic mean, standard deviation, simple correlation coefficient (Pearson). The following conclusions were reached:

1- The emergence of a significant correlation between intelligence and motor perception (visual perception, total and partial perception, recognition of body parts, distinction between right and left body parts, location identification).

2- There is no significant correlation between intelligence and motor balance.

3- The emergence of a significant correlation between intelligence and motor development tests (soft ball throwing, running 20 m, partridge on the right leg, partridge on the left leg, long jump from stability).

The researcher recommended the following:

1- The necessity of paying attention to the physical education curricula because of its interest in educating young people in a proper physical education.

2- Reconsidering the games for motor balance and providing the necessary aids to develop the quality of balance in female students aged (7-8) years.

3- Conducting other studies and researches targeting different age groups and different variables from the current research variables.

1- Introduction to the Research:

1-1   Introduction and the importance of research

Childhood is one of the most important stages in human life because the child represents a basic building block well-formed, and child care is a science and art nowadays, as care in the early stages is considered as the basis on which their upbringing is based in their developmental stages (Rateb & Khalifa, 1990, 124).

One of the most important main goals of physical education is to provide means and support the integrated development of the child in terms of physical, motor, psychological and social aspects, as movement is used as a basic means in the educational process, especially in the primary stages (Hussein & Mufti, 2004, 58).

Intelligence is a general innate knowledge, in which the individual adapts mentally according to the problems and new conditions of life (Hassanein, 1996, 445), in addition to the fact that intelligence is related to motor ability, and this is called motor intelligence, and intelligence is related to cognition, as well as the ability to observe and connect, which is what the individual requires in motor skill learning in order to be able to perform movement correctly (Hassan, 1983, 11). Quoting (Al-Ruby, 1995) that movement is affected by perception and perception is affected by movement and cannot be separated from them, Piaget expressed this relationship accurately under the name of sensorimotor perception as an expression of the reality of cognitive-motor integration in the child's behavior from his early childhood (Al-Ruby, 1995, 11)

Motor development is a set of sequential variables that follow a coherent and integrated method and system through human life (Rateb, 1999, 38). Psychologists and educators have been interested in growth, and researchers have begun to shed light on the development of the child in all its aspects, as Allawi (1994) emphasized that knowing the various physical, motor and mental characteristics of each stage of development helps to create the best conditions and opportunities that allow growth to reach its goal at its natural pace without rushing it or standing in the way of its progress (Allawi, 1994 , 22)

Based on these facts, the importance of the research lies in paying attention to the study of this age stage by knowing the relationship between intelligence, sensory perception, and motor development among second-grade primary school students aged (7-8) years

Due to the close relationship between the focus of attention and the level of achievement in the events of the arena and the field, any weakness in this relationship will lead to an imbalance in performance, which will reflect negatively on the results.

1-2 Research Problem:

     Societies at different levels have paid attention to childhood because it is the future generation and is capable of production and creativity, as it has been prepared for the appropriate conditions for that, and intelligence is an indicator of the level of the child's understanding and ability to learn properly, and many studies have addressed the issue of intelligence, sensory motor perception and motor development, but they lacked the link between these variables among the second grade primary students at the age of (7-8) years Hence, the research problem emerged in determining the relationship between intelligence, sensory perception and motor development among second-grade primary school students aged (7-8) years.

1-3 Research Objectives :

1.3.1 Knowing the Relationship between Intelligence and Sensory Perception among Second Grade Primary School Students Aged (7-8) Years

1-3-2   Knowing the Relationship between Intelligence and Motor Development in Second Grade Primary School Students (7-8) Years

1-4   Hypothesis Research

1.4.1 The existence of a significant relationship between intelligence and sensory perception among second-grade primary school students aged (7-8) years

1-4-2   The existence of a significant relationship between intelligence and motor development among second-grade primary school students aged (7-8) years

1-5 Research Areas:

1.5.1. Human Field: Students of the second grade of primary school in the First Competencies School for Girls.

1.5.2 Time Zone: The First Semester of the Year 2024-2025

1.5.3. Spatial Field: The Sports Arena at the First Al-Kafa'at School for Girls in Nineveh Governorate

1.6 Defining the Terms

1.6.1 Intelligence: It is the ability of the individual to learn, acquire skills, adapt to new situations or problems facing the individual, and the ability to practice higher mental processes such as thinking, remembering, imagining, recognizing relationships, and solving problems. (Abu Jado, 2000, 476)

2- Previous Studies

2-1 Study (Al-Tikriti et al., 1999)

"The Relationship between Intelligence and Some Physical and Motor Abilities in Riyadh Children at the Age of (5-6) Years"

The study aimed to find out the relationship between intelligence and some physical and motor abilities in Riyadh children (5-6) years old, in addition to knowing the differences in some physical and motor abilities between high intelligence and low intelligence.

The descriptive method was used, and the research sample consisted of (43) children and they were tested by tests of physical and motor abilities, where the tests of physical abilities included (running 15 m high start, throwing a tennis ball from standing, long jump from standing, sitting from standing in (15 seconds), pulling the frame, running a distance of 20 m, inclined procrastination from standing at 30 seconds) while the tests of motor abilities included (slalom running, Bending the torso forward from sitting tall, stork standing, taking various inhibitors, tapping test, needle implantation test)

The (Sequin Intelligence Test) was used as a research tool, and the arithmetic mean, standard deviation, coefficient of difference, correlation coefficient, (T) test between two unrelated averages and two unequal samples were used as statistical methods, and the study reached the following conclusions:

1- There is no significant correlation between intelligence and physical and motor abilities, except for the existence of a positive significant correlation with the accuracy of motor speed, the test of needle implantation of the dominant hand during 30 seconds, and the prolongation of the accuracy of motor speed in the test of needle implantation during 90 seconds.

2- There are no significant differences between children with high intelligence and low intelligence among kindergarten males aged (5-6) years in physical and motor abilities. (Al-Tikriti et al., 1999, 1-12)

3-1 Research Methodology:

The descriptive survey method was used to fit the research problem.

3-2 Research Population and Sample:

A random sample was selected from among the (7-8) year old students of the second grade of primary school for the academic year 2024-2025 from the (27) students of the First Competencies School for Girls in Nineveh Governorate, and two failing students were excluded, so the research sample reached (25) students.

3.4 Devices, Tools and Aids:

3.4.1. Aids

1- Arabic sources

2. Tests and measurement

3.4.2. Utilities

1- Tape Measure

2- Chalk

3. Transcript

4- Manual calculator

3.5 Tests used in the research:

3.5.1 Intelligence Test of (Goodenough-Harris) (The Mufti, 2000, 46**) The (Goodenough-Harris) test is one of the important tests to measure children's intelligence and is characterized by its lack of technical complexities and the public of researchers can use it with children, as it was used (Al-Mufti, 2000) on children aged (7-8) years and obtained a stability coefficient of (0.81) (Al-Mufti, 2000, 46).**

3.5.1.1 Test Instructions

The exam instructions begin orally, by assigning the students to be tested to exclude everything that may be in front of them, then a pencil and A4 white paper were distributed to each student and asked them to draw a girl in the white paper in front of them while not using an eraser.

3.5.1.2 Test Correction

The corrector gives a score for each of the 73 points mentioned in the IQ test, by the corrector placing a mark of (√) in front of the approved vocabulary and (zero) for the unapproved vocabulary, and then converting the raw score to the corresponding score in IQ (**Mufti, 2000, 46**) as described in Appendix (1) The IQ test and its correction key are explained, and then the children's intelligence is calculated based on the following law.

$$IQ = \frac{\text{Mental age}}{\text{Chronological age}} \times 100 \quad \text{(Whitig, 1977, 271)}$$

3.5.2 **Sensorimotor cognition test**

It was measured using the (Haywood) test for sensory perception modified by (Al-Mufti, 2000, 47) which consists of six items (object size stability, total and partial visual perception, recognition of body parts, distinction between right and left body parts, balance, and positioning) and the test was presented to a group of experts[1] who approved the validity of its use to female students at this age stage as described in Appendix (2).

3.5.3 Motor Growth Test

The motor development tests of (Mansour, 1979, 107) were used, which consisted of (throwing a soft ball, running 20 meters, long jump from stability, partridge on the right leg, partridge on the left leg) and described in Appendix (3).

3-6 Statistical Treatments: The researcher used the SPSS statistical package to process the obtained data.

4. Presentation and discussion of research results:

4-1 Presentation and discussion of the results of the relationship between intelligence and sensory motor perception for the students of the second grade of primary school as shown in Table (1)

Table (1)
The Matrix of the Correlation between Intelligence and Sensory Perception among Second Grade Primary School Students

SIG Value	Calculated value (t)	on	Going to	IQ Test / Sensory-motor cognition tests	Test Sequence
	0,691*	0,70	4,80	Visual perception	1

0,396	0,485*	**1,22**	**4,60**	Total or partial cognition	2
	0,502*	**1,12**	**8,8**	Identify body parts	3
	0,681*	**0,80**	**4,1**	Distinguish between right-left body parts	4
	0,281	**3,02**	**16,80**	Balance	5
	0,625*	**0,73**	**4,28**	Locating	6
	0,912*	**1,56**	**142,04**	IQ Test	7

Significant at the error ratio of ≤ (0.05) and degree of freedom (24) with a tabular value of (t) (0.396)

From Table (1), it is clear that there is a significant correlation between the IQ test and the sensorimotor perception tests, which include (visual perception, total and partial perception, recognition of body parts, distinction between right-left body parts, and location determination) where the calculated value of (t) was greater than the tabular value of (t) at an error ratio of (0.05) and in front of the degree of freedom (24) which is (0.396), as the researcher attributes this to the practice of the students at this age to many cognitive and motor games that develop their experiences. Cognition and physical self-perception and the distinction between the right and left sides of the body and auditory perception, (Younis, 1985) emphasizes that the child in his life acquires his experiences and skills through the physical cognitive connection between him and his external field. (Younis, 1985, 122) and (Allawi, 1994) adds that intelligence is related to motor ability, and this connection is called motor intelligence, as perception is related to intelligence, and intelligence is related to the ability to observe and connect, which is what the individual requires in motor skill learning in order to perform the movement correctly (Allawi, 1994, 11).

It is also clear from Table (1) that there is an insignificant correlation between intelligence and the balance test, where the calculated value of (t) reached (0.281), which is smaller than the tabular value of (t) at an error rate of (0.05) and in front of the degree of freedom (24), which is (0.396), and the researcher attributes the reason for the existence of the insignificant relationship to the lack of physical education lesson containing activities related to balance, which requires changing the positions of different parts of the body, which are related to the center of gravity of the body to obtain stability and balance. In addition to the lack of balance indicators and tools for developing the quality of balance, the lack of use of these tools in the lesson led to the appearance of insignificant differences when testing balance.

4-2 Presentation and discussion of the results of the relationship between intelligence and motor development of second grade primary school students shown in Table (2)

Table (2)

The Correlation Matrix between the Intelligence Test and the Motor Development of the Second Grade Primary School Students

Significant at the error ratio of ≤ (0.05) and degree of freedom (24) with a tabular value of (t)

SIG Value	Calculated value (t)	on	Going to	IQ Test / Motor Development Tests	Test Sequence
0,396	0,427*	2,24	7,21	Soft ball throw	1
	0,478*	1,20	4,80	20m Run	2
	0,628*	2,54	17,81	Partridge on the right leg	3
	0,401*	3,23	12,37	Partridge on the left leg	4
	0,552	8,01	85,31	The long jump of stability	5
	0,912*	1,56	142,04	IQ Test	6

(0.396)

From Table (1), it is clear that there is a significant correlation between the IQ test and the motor development tests, where the calculated value of (t) was greater than the tabular value of (t) at an error ratio of (0.05) and in front of the degree of freedom (24) which is (0.396), as the researcher attributes this to the fact that the child when he reaches (4) years and above, he is able to perform running movements on a regular basis as a result of playing with children during his interaction and acquires a good compatibility between the movements of the legs and arms, as well as that intelligence is going through stages of development. and that young children possess from the beginning some common mental traits that develop with the increase of the child's age, and this is confirmed by (Ahmed, 1998) that intelligence is not a pile of information that can then be used in time of need, but rather a natural phenomenon that is closely related to the success of the individual in his work life (Ahmed, 1998, 156).

5- Conclusions and recommendations:

5.1 Conclusions:

5.1.1 The emergence of a significant correlation between intelligence and sensorimotor perception tests (visual perception, total and partial perception, recognition of body parts, distinction between right-left body parts, positioning)
5.1.2 The emergence of an insignificant correlation between intelligence and balance.

5.1.3 The appearance of a significant correlation between intelligence and motor development tests **(soft ball throwing, running 20 meters, long jump from stability, partridge on the right leg, partridge on the left leg).**

5.2 Recommendations:

5.2.1 The necessity of paying attention to the curricula of physical education because of its interest in educating young people in a sound physical education

5-2-2: Reviewing the motor balance games and providing the necessary aids to develop the quality of balance among students aged (7-8) years.

5.2.3: Conducting other studies and researches targeting different age groups and variables different from the current research variables.

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Appendices

Appendix (1)
Goodenough-Harris IQ test and its debugging key

Presence of hair (coordination and misrepresentation of the hair pattern)	21	The presence of the head	1
Presence of shoulders	22	Presence of the neck	2
Fits the ear in its correct position of the head	23	The presence of the neck after two	3
Presence of fingers	24	Presence of one or both eyes	4
Presence of fingers (clarification of the correct number of fingers)	25	Eye detail (clarifies eyelashes and eyebrows)	5
Presence of fingers (clarification of finger details)	26	Eye details (clarifies eye ninn)	6
Presence of the fingers (correct position of the thumb)	27	Eye details show (lineage)	7
Presence of the hands (palm clarification)	28	Eye details show (glitter or eye direction)	8
Presence of the wrist or joint	29	Presence of the nose	9
Presence of the arms	30	The presence of the nose after that	10
Presence of shoulders	31	Presence of the mouth	11
The presence of the arm from the side or its bonding in an activity	32	The presence of the lips after	12
Presence of shoulders (more precisely identified)	33	The presence of both lips and nose after	13
Elbow joint	34	Presence of both the chin and forehead	14
Presence of legs	35	The protrusion of the chin and its contrast to the lower part of the lips	15
Presence of the hip (more precisely identified)	36	Jawline clarification	16
Presence of the hip (upper thigh)	37	Nasal arch clarification (nose curve)	17

Knee joint	38	The presence of hair (i.e. the top of the head expresses the hair)	18
The presence of feet	39	The presence of hair (clarification of any pattern of hair, forehair, front tuft, etc. etc.)	19
The presence of feet (clarification of proportion in the dimensions of the foot)	40	The presence of hair clarification (hair in more than one circumference without care or shading)	20
Presence of clothing (presence of at least four pieces of clothing)	58	Foot Clarification (Heel Clarification)	41
Presence of clothes (drawing a full suit)	59	Presence of feet (illustration of the telescope of the foot)	42
Profile	60	Presence of feet (clarification of foot details)	43
Profile drawing in a more accurate way	61	Clarification of the connection of both arms and legs to the torso	44
Full drawing from the front	62	Clarify the connection of both arms and legs to the torso (in a more precise way)	45
Kinetic Compatibility of Lines	63	Presence of the trunk	46
Motor Compatibility of Communication	64	Clarification of the fit of the torso after two	47
Best kinetic compatibility	65	Clarification of the fit of the head to the torso	48
Straight shapes and lines (vertical frame)	66	Clarification of the proportion of the head to the torso (provided that it should not be more than half and not less than five feet)	49
Straight shapes and lines (trunk frame)	67	Proportion in the dimensions of the face	50
Straight Shapes and Lines (Periphery Frame)	68	Proportionality in the dimensions of the arms	51
Straight shapes and lines (facial features and features)	69	Proportion in the dimensions of the arms (in a more precise way)	52
Drawing as a croquet (section)	70	Proportion in the legs	53
Ideal or Typical Drawing	71	Suitable for the presence of the parties and to be from two dimensions	54
Clarifying the movement of the arms	72	Presence of clothes (drawing a full suit)	55
Clarification of leg movement	73	Presence of clothing (having at least two pieces of clothing)	56
		Presence of clothing (lack of transparency with the end of the blouse with pants)	57

IQ test correction key

Mental age		Raw Grade	Mental age		Raw Grade
Year	month		Year	month	

8	2	21	2	3	1
8	6	22	3	6	2
8	9	23	3	9	3
9	-	24	4	-	4
9	2	25	4	3	5
9	2	26	4	6	6
9	6	27	4	9	7
10	9	28	5	-	8
10	-	29	5	3	9
10	3	30	5	6	10
10	9	31	5	9	11
11	-	32	6	-	12
11	2	33	6	3	13
11	6	34	6	6	14
12	9	35	6	9	15
12	-	36	7	-	16
12	3	37	7	3	17
12	6	38	7	6	18
12	9	39	7	9	19
12	Fill up	40	8	-	20

Appendix (2)
Hyoid Cognitive Modification Test (Sense-Motor)

Name : Date of Birth :

Gender : Right/Left:

1- The required tools are different pictures as in item (2), a small table, a small chair for children to sit, a large chair for the researcher to sit, a stopwatch, a pencil, a balance table, a small bell.

2- The duration of the test is (20) minutes.

3- General information (appropriate age, the need for the child to know right or left, before starting the test, the need to give the child a general idea of the test)

Exam Items:

1- First Item: Visual Perception (Stability of the Volume of Objects... Location)

Place three cubes on a large table, the distance between one cube and the other is about (15) cm, and the distance between the child sitting and the first cube is about (10) cm, after completing the first four questions, the child's answers are recorded, place cubes as in the two questions (5,6) and then ask the child about the order of the cubes.

Wrong	Correct	Questions	t
		What color is the cube (then place your hand on one of the cubes)	1
		What color is the closest cube to you?	2
		What color is the farthest cube from you	3
		Are all cubes equal in size?	4
		Place the blue cube high then the yellow below the red	5

		Place the cubes in the following order from top to bottom: yellow, blue, red.	6

Total 6 points

2- The second item: total or partial cognition:

Show the children the picture attached to the test, then ask the child about two different pictures, and then record the child's answer, whether it is the description of the picture, the name of the picture, or both.

Both	Image Name	Image Description
		1-
		2-

2° 2° 2°

3- Item Three: Sensory Perception (Recognition of Body Parts):

Ask the children the following questions and then record the results:

Wrong	Correct	Questions	
		touch your nose	1
		Touch your pelvis (the seat you're sitting on)	2
		Touch your wrist	3
		Touch your knee.	4
		Touch your heels	5
		touch your ears	6
		Touch the shoulders	7

Total Points 12 Points

4- Item Four: Sensory-motor perception (distinguishing between right and left body parts)

The child should know whether he is right or left because the following required actions are prepared for the right child and reflect if the child is left, ask the child to make the following movements and then record the results as follows:

Wrong	Correct	Questions	
		Touch your left ear	1
		Touch your left knee	2
		Pick up the pencil with your right hand	3
		Is the pen on the right side or on the left side (put the pen on the right side)	4
		Touch the left part of your pelvis with your right hand	5

Total 5 points

5- Item Five: Sensorimotor Perception (Moving Balance)

Use a Swedish platform with a length of (4.16) and a width of (10) cm, and ask the child to touch the platform with the following record: (the number of steps the child has taken on the device).

6- Sixth Item:

Hold the bell in front of the child and then hide it behind the back so that you put the bell in the hands without the child knowing where it is, then put the hands under the table in front of the child and shake the bell, then ask the child where the bell is = is the bell in the right hand or the left hand? Repeat the exercise 5 times and then record the child's answer as in the following figure:

Wrong	Correct	Questions	
			1
			2
			3
			4
			5

Total 5 points

Appendix (3)
Motor Growth Scale

1- Throwing the ball from the ground up to the farthest distance:

Tennis ball – a sign with a rope on the ground on which the child stands – divides the ground in distances in meters between each (1) m distance

2- Running a distance of (20) meters

The beginning sign of (10) m and a sign at the end of the distance are placed, and the help stands at the end of (10) m, and the miqati that calculates the time at the beginning of the distance, and the child runs to touch the helping hand and then returns to the miqati .

3- The long jump of stability
4- Partridge on the right leg
5- Partridge on the left leg