Science, Education and Innovations in the Context of Modern Problems
Issue 8, Vol. 8, 2025

Title of research article

Motor Creativity and Sensory-Motor Perception in Early School Years: A Correlational Analysis of Motor Fluency, Originality, and Flexibility

Ahmed BenKouider
Dr.
Institute of Physical and Sports Education, Laboratory of Sciences and Practices of Physical and Rhythmic Activities, University of Algiers 3
Algeria
E-mail: benkahmed79@gmail.com
ORCID: https://orcid.org/0009-0002-8954-8197

Kherchi Salim
Dr.
Institute of Physical and Sports Education, Laboratory of Sciences and Practices of Physical and Rhythmic Activities, University of Algiers 3
Algeria
E-mail: nazimkherchi@gmail.com
ORCID: https://orcid.org/0009-0006-4286-8651

Issue web link https://imcra-az.org/archive/375-science-education-and-innovations-in-the-context-of-modern-problems-issue-8-vol-8-2025.html

Keywords Sensory-motor perception; motor creativity; motor fluency; motor originality; flexibility; preschool children; cognitive-motor interaction.

Abstract

This study investigates the predictive role of sensory-motor perception in the development of motor creativity during early school years, emphasizing the interaction between perceptual-cognitive functions and creative motor behavior. The research explores how motor fluency, originality, and flexibility contribute to the generation of creative movement patterns, and how these abilities are linked to sensory-motor coordination—particularly static and dynamic balance, eye-hand compatibility, and body part recognition. A descriptive correlational design was employed with a sample of 62 primary school students from the Wilaya of Annaba. Two standardized instruments were used: the Dagton Test of Sensory Perception and the Weyrek Test of Motor Creativity. Data were processed statistically using the SPSS software package to examine correlations between sensory-motor variables and motor creativity dimensions. The findings revealed no significant relationship between sensory-motor perception and the subcomponents of motor creativity (fluency, flexibility, and originality). These results suggest that sensory-motor skills alone are insufficient for fostering creative movement behaviors among early learners. Instead, motor creativity in preschool and early school stages should be viewed as a multidimensional construct shaped by environmental stimulation, emotional engagement, and guided educational interventions.

Citation. BenKouider A.; Kherchi S. (2025). Motor Creativity and Sensory-Motor Perception in Early School Years: A Correlational Analysis of Motor Fluency, Originality, and Flexibility. *Science, Education and Innovations in the Context of Modern Problems*, 8(8), 1078–1104. https://doi.org/10.56334/sei/8.8.93

Received: 21.02.2025 | Accepted: 03.07.2025 | Published: 23.08.2025 (available online)

Introduction

Preparatory departments attached to educational institutions that raise children are the environment to which many children move immediately after home. and begins to influence his different habits, behavior and activities, including physical and psychological social, moral, so we have to take care of this important age, so that motor education takes its role to contribute to the process of learning and motor and psychological development and to be subject to theoretical and applied methodology in accordance with the goals and objectives of this age phase as a constructive and anchoring phase.

Perception is a kinetic process of major cognitive processes, which are the pillar of basic knowledge, and give meaning to different senses and incentives. The organs responsible for this process are the sensory and neurological system, and its integrity and degree of development affect the process of cognition (Hussein, 1990, p. 20). 92), it requires the ability to feel the place and dimension, so when children have well-rounded cognitive skills, it means that the nervous system that reflects different aspects is an indicator of it, and the preschool child is prepared for the learning process.

As there is an unlimited tendency to move and motor activity in the child during the first five years of life as a result of his/her interaction with people and objects in the environment in which the child continues to explore his/her movements and abilities And because they are characterized by the unbridled thirst for movement and play and in order to achieve greater goals than the development of motor perception capabilities, It encroaches on the cognitive act that ensures the production of new movements of speed and abundance This is what gives this privacy to motor education programs, which emphasize the need to be exposed to certain situations that are perceived as sensory triggers. helping children, encouraging them and increasing their self-confidence, helping us as educators raise the ceiling of our expectations and goals from producing a generation that can confront different life problems, to a generation that can confront the same problems through innovative, creative solutions.

The two variables relate to each other by movement, which is the only way to evaluate both. The researcher has embarked on a basic idea that the current curriculum does not provide the perfect picture of our aspirations. It helps to develop certain cognitive aspects and discourages other aspects such as motor creativity. Therefore, the idea of the current study arises from the possibility of contributing motor perception capabilities to the development of motor creativity. Is it necessary that if the capabilities of motor perception increase, the capabilities of motor creativity increase?

After the psychologists' efforts focused on discovering cognitive capabilities that qualify for motor learning only, it was found that these capabilities were not the only requirements to advance the athletic level, but that dynamic creativity was the current requirement that proved to be the key to progress, in the midst of the existing sporting conflict.

Therefore, the researcher believes that there is a need for more motor support for children, to clarify the vision of the methodological requirements of motor education in Algeria. In order to create a balanced pupil from all sides, there was an urgent need to study the relationship between motor sensory cognition and motor creativity in order to highlight the importance of these activities in the development and motor creativity and to remove them from their recreational framework to their educational framework in order to achieve higher and greater goals.

The problem of searching in:

Is there a statistical function relationship between motor sense perception and motor creativity in a preparatory child (5-6 years) in the preliminary state of Annaba?

The following sub-questions were raised:

- Are there statistically significant differences in cognitive levels of motor sensitivity attributable to sex variables and motor activity?

- Are there statistically significant differences in levels of motor creativity attributable to gender and motor activity?

Sensory- perception motor

Motor sensory perception is a concept of a complex nature. This concept is linked to two mental processes: sensation and perception, where it is defined (Yahya Attallah, 1996) as: "The ability to determine the positions and parts of the body in a vacuum and the power required for muscle contraction and control of direction and distance required during performance".

Jalal and Allawi (1982) point out that: "Motor sensory perception is a sense that gives us information on the conditions and parts of the body and the strength and direction of the contraction of its muscles during voluntary movement." (Qandil et al., 2008, pp. 24-22).

Mahjoub (2001) states: "Sensory perception precedes the requirements of the situation is therefore an interpretative process, and after interpretation it requires a motor attitude to evolve with repetition, experience and efficiency of the individual". 48).

Hussein (1990, p. 92) points out that it is the first pillar of human knowledge and gives meaning to different sensors or incentives, that the devices allocated in this process are the sensory and nervous system, and that the safety and the degree of development of the devices affect the process of perception. "

Creative motor Capabilities

It is one of the kinds of creative production in the field of movement and shows in the form of motor responses that reflect an individual's creative abilities and the individual's ability to perform movements characterized by motor fluency, motor flexibility and motor origin (Ibrahim, 1995, p. 1). 137).

Torrance (1981) defines kinetic creativity as a process in which a learner becomes sensitive to problems, and thus is the process of perceiving gaps, imbalances in information and missing elements, inconsistency between them, and then searching for glitches and indicators in the situation and in the learner's information and making assumptions about them, testing the validity of hypotheses, and linking results (Abd rasole, 2016, p. 20).

1- **Motor Fluency**: An individual's ability to perform as many motor units as possible of an exciter in a specified period of time.
2- **Motor flexibility**: An individual's ability to change and diversify into a different and appropriate class of motor behavior in a specified period of time.
3- **Motor originality**: An individual's ability to perform categories of rare motor behavior, that is, little repetition in a statistical sense among the members of the group and its suitability for excitement in a specified period of time (Ahmad, 1983, p. 20). 85).

Preschool Education

The definition of preparatory education in Algeria is contained in Official Gazette No. 35-76 of 16 April 1976. The definition reads as follows in article 19: "Preparatory education is for children who have not attained compulsory age in school" (Journal officiel de R.A.D.P ,1976, p.29).

Preparatory Section

This section accepts children aged between 05 and 06 years in different rooms with their pedagogical equipment and means. It is also the institutional place where the child is considered by the nanny as still a child rather than a pupil. It is thus a continuity of family education in preparation for the next stage of schooling, thereby acquiring the principles of reading, writing and numeracy.

METHODOLOGY

The problem of research is closely linked to its methodology. It is the problem that defines the approach. The approach refers to the method, procedures or input used in research to collect data and access findings, explanations or explanations relating to the subject matter of the research (Al-Anezi, 1999, 74).

For this reason, the researcher used the descriptive method of associative relationships, being a method of describing the subject matter of the study through a valid scientific methodology and depicting the results of the research in the form of figures to be interpreted.

Sample and Research Community

After obtaining approval to conduct the research, in order to identify the research community, the researcher selected both Annaba County 1 and Barhal County as the two largest districts in the state, in addition to serving the study's goal, especially the geographical variable, the research community is home to 1,268 pupils.

STUDY TOOLS

Test Wirek for Creative Motor Capabilities

This test is American in origin. Reza Mustafa Asfour translated it and drafted it for Arabic. In her 1984 study, she applied it to children who finished school in the fourth grade of primary (9-10 years). This test is suitable for different kinds of children and is based mainly on the basic movements that fit all children at all levels of motor sports (ElKafi, 2009, p. 161).

Sensory perception motor scale of dagton

From recent tests that possess most if not all elements of perception are motor, it is a high test in its scientific transactions "Dagton Test" known as the Sensory Cognitive Scale (Mahmoud, 2019, p. 264).

Scientific characteristics of study tools

Weyrek Scale for motor Creative Capabilities

-Stability

Table No 1: Persistence in calculating the Pearson coefficient between motor creativity test and return

Creativity motor	M	Standard deviation	R	Sig
Motor originality	21.27	1.98	0.81	Sig
	21.60	1.80		
Motr Fluency	1.27	1.03	0.70	Sig

	1.66	0.81		
Motor flixiblity	2.80	1.27	0.79	Sig
	3.33	1.34		
Total	25.34	3.95	0.80	Sig

Table 01 shows that all coefficients' values calculated for variables are greater than the scheduled value of 0.51 and thus we can say that the test of the capabilities of the motor creativity in question is constant, indicating the stability of the test.

-Validity Weyrek's scale of motor creativity

The researcher found a factor of validity to test motor creativity using self-honesty, which is equal to the square root of the stability factor.

Table No. 2: Calculation of validity Factor for Motor Creativity Test

Test	R pearson	Self-honesty
Motor originality	0.81	0.90
Motr Fluency	0.70	0.83
Motor flixiblity	0.79	0.88
Total	0.80	0.89

Table 02 shows a high test validity coefficient that proves that the test is valid. So the test is static and valid, it indicates the validity of its application.

Sensory perception motor scale

-Stability

Table No.3: Constant Factors for All Dimensions of the Dayton Sensory perception motor Scale

Tests	Stability factor	Sig
Physical Self	*0,91*	Sig
Area and Trends	*0,93*	Sig
Equilibrium	*0,80*	Sig
Equilibrium	*0,88*	Sig

Equilibrium	*0,82*	Sig
Rhythm and neuromuscular control	*0,91*	Sig
Piste Forward	*0,80*	Sig
Piste to the side	*0,79*	Sig
Back piste	*0,81*	Sig
Precise muscular control	*0,88*	Sig
Eye and Foot Compatibility	*0,81*	Sig
Perception of Shape	*0,80*	Sig
Perception of Shape	*0,83*	Sig
Hearing Discrimination	*0,15*	Non sig
Eye and Hand compatibility	*0,10*	Non sig

Through the table it is clear that the binding coefficient was 0.91 for the physical self, and 0.93 for the dimension of areas and trends, that the correlation coefficients for the balance dimensions were 0.88, and all transactions for all dimensions are acceptable for their obvious indication, except after the hearing distinction and the compatibility of the eye and foot, whose connectedness was greater than 0.05, and hence.

After consultation with the arbitrators, the researcher excluded them, considering that they had no significant impact on the scale as a whole.

-Validity:

after verifying arbitrators' validity and stability, we applied self-honesty in the same way as the first test.

Table No. 4: Self-validity Transactions for All Dimensions of sensory-perception motor

Tests	Stability factor R	Self-honesty (square root of stability)
Physical Self	*0,91*	*0.95*
Area and Trends	*0,93*	*0.96*
Equilibrium	*0,80*	*0.89*
Equilibrium	*0,88*	*0.93*
Equilibrium	*0,82*	*0.90*

Rhythm and neuromuscular control	*0,91*	*0.95*
Piste Forward	*0,80*	*0.89*
Piste to the side	*0,79*	*0.88*
Back piste	*0,81*	*0.9*
Precise muscular control	*0,88*	*0.93*
Eye and Foot Compatibility	*0,81*	*0.9*
Perception of Shape	*0,80*	*0.89*

Table No. (4) shows that all of the self-validity transactions were high, ranging from 0.89-0.96, which makes us honestly acknowledge the sensory-perception motor scale as a whole. Since the scale is sincere and stable, it is applicable to the basic study.

PRESENTATION AND DESCUSION OF RESULLTS

Discussion of results in the light of the first hypothesis

Hypothesis Text: There is a statistical function relationship between sensory- perception motor and motor creativity

Table No.5 represents the matrix of correlation between sensory- perception motor and motor creativity capabilities

	sensory-perception motor	Motor Fluency	Motor flixiblity	Motor originality	Sig
sensory-perception motor	1				
Motor Fluency	0.185	1			0.143
Motor flixiblity	0.420	0.111	1		0.049
Motor originality	0.260	0.147	0.39	1	0.0141
. The correlation is significant at 0.05 (bilateral).					

From the correlation matrix table, the Pearson coefficient between preschool children's responses to Annaba State, on the Dayton scale and after motor originality in the Wirek Motor Creativity Test, it is evident that there is a weak

relationship between sensory-perception motor and motor originality. However, to determine the true impact size, the researcher applied simple linear regression metrics to see the effect of the independent variable on the affiliate and the direction of that effect, Indicates a correlation between sensory- perception motor and motor originality in motor creativity, But it does not rise to the level of significant that came in the goals of the research, This can be explained by the fact that the sample size and characteristics have affected the correlation calculation in addition to the characteristics of the two measures, and the keys to their discharge being based on quantitative data.

The Dayton scale of sensory-perception motor, did not contribute to a large part of the variability in the measurement of motor originality which we can conclude again is not related to the ability to produce simple movements such as constant balance and moving balance to the production of different kinetics.

From the linkage matrix table and the linear regression table to determine the size and direction of the effect, it is evident that there is a relationship between the dimensions of perception of motor sense and motor flexibility within motor creativity, but for the weakness of it cannot be considered significant.

The researcher explains this lack of relationship to the fact that closed and small rooms, which are adopted by the elementary as sections for all events, have a negative impact on children's motor flexibility, causing a negative effect on the capabilities of motor creativity even though the perception capabilities of motor sense are good.

In the view of Delimi, "Motor education, if well educated, contributes to the achievement of many objectives, the most important of which is the promotion of initiative, satisfaction with the level of performance and cooperation with the group, self-reliance, which reduces injury and gains motor cognitive abilities by recognizing its relationship with the place and things and its good control in the center of its weight gives it flexibility in the production of movements."

The researcher believes that after fluency is the nerve of motor creativity test being included in all tests as they evolve, as well as defined as: performing large sets of different movements in speed, finesse, ease and direction.

We could explain the lack of relationship through two factors, the small size of the sample and the lack of practice of motor education. So in the aftermath of motor fluency, there can be no doubt that the movement alone helps preschool children produce a huge amount of movements. Experiences gained through fun or automatic play contribute to filling the bag of previous experiences. s rights ", called for by the child in the event of similar motor problems.

It is our intention that the child take his or her full right to play in order to reach the saturation stage, so that he or she can properly move beyond psychological and physical distortions affecting his or her future.

Play is the only way to observe children's behavior and measure their creative developmental manifestations, especially in the early years of life. This is what Dalimi touched on (2011): in her study, which demonstrated the development of mental abilities and motor perception through motor education programs.

Discussion of results in the light of the second hypothesis

Hypothesis 2: There are statistically significant differences in perception of motor sense by sex variables and exercise of motor activity

Gender

Table No. 6 shows the differences between variables (motor perception and gender)

M	Standard deviation	DDL	T	SIG

Male	39,1351	5,62318	60	-1,173	-1,173
Females	40,7200	4,54166			

It is clear from the table of differences that there are no differences in sensorimotor perception between males and females, although there are some differences in favor of males in some dimensions of perception, because the Dayton Sensory motor Perception Scale relies mostly on memory responses, and not motor responses such as performance tests, A five-year-old child goes through the calmest and most beautiful behavioral cycle compared to most behavioral cycles that a child goes through in the various stages of his life He is distinguished by his realistic behavior, is sober in movement, and is more focused in his words and actions , He has the characteristics of an adult compared to his age.

Despite the high flexibility that females enjoy compared to males, (kamach, 2017) indicated that at this age stage, the development of muscle strength is slow, and the development is better in children undergoing training.

Practicing physical activity

Table No. (7) Represents the differences in sensory-motor perception according to the practice of motor activity.

	M	Standard deviation	DDL	T	SIG
Practitioner	41,5294	4,04842	60	1,646	,105
Non- practicing	39,1111	5,51124			

Through a table of differences in sensory-motor perception according to the practice of motor activity, which shows that there are no differences in perception according to the practice variable, because the number of practitioners in the current study sample is small, amounting to 26 children, as the researcher noticed that there are differences, but they do not reach the level of significance statistically.

It is not possible to deny that sensory-motor perception does not develop through the practice of motor activity Most studies, such as: (Yaqoubi, 2012, Al-Diwan, 2009, McCarthy) on music and motor education for pre-school children, showed the development of thought, perception, and motor skills the shift from playing primary music to creative performance in music and movement.

Which (Abdel Wahed, 2016) study was able to prove through the presence of statistically significant differences between students who practiced motor education in the preparatory education stage and those who did not practice these activities in psychological and social harmony, in this regard Boumsjed's (2005) study concluded: The proposed program in psycho-motor education It has had a positive impact on sensory-motor cognitive abilities, unlike the general program approved by the Ministry as a preparatory education curriculum. All of this puts us around a painful truth whose question we asked: What is the benefit of preparatory education if it does not positively affect greater abilities of sensory-motor perception.

Discuss the results in light of the third hypothesis

Hypothesis text 3: There are statistically significant differences in motor creativity according to gender and the practice of motor activity

Gender

Table No. *8* shows the differences between variables (motor creativity and gender)

	M	Standard deviation	DDL	T	SIG
Male	164,1081	10,77751	60	,110	,913
Females	163,8400	6,91424			

Through the table, it was found that are no statistically significant differences between the sexes in motor creativity as we said previously, the small sample size and the different characteristics of the study measures are what affected the results of the differences.

his finding is consistent with a study (Cleland, 1994), which examined a differential mobility test expressing motor fluency and motor flexibility for boys and girls aged 4, 6, and 8 years, Gender differences were not significantly associated in this sample He interpreted it to mean that when it came to the ability to perform most basic movement skills, significant differences were found when one gender received more experience practicing a particular skill.

This superiority is the result of more exposure and experience in a specific skill, such as throwing, for example. Since the gender variable is a social variable that is not significantly related to the ability of the differentiated movement to produce movements that express the motor creativity of young children, neither boys nor girls may have more experience than the other in producing differentiated movement responses.

Therefore, the motor creativity test is closely linked to the practice of motor activity, which explains the second part of the hypothesis.

Practicing physical activity

Table No. (9) represents the differences in creativity motor according to the practice of motor activity

	M	Standard deviation	DDL	T	SIG
Practitioner	164,1081	7,92845	60	,060	,913
Non- practicing	163,8400	9,91316			

Through the table, the results found that there were no significant differences, meaning that the relationship was affected by the size of the sample of practitioners, estimated at 26 children.

However, the role of practicing motor education in motor creativity cannot be denied, as the current study was consistent with the study of (Al-Diwan, 2009, Yaqoubi, 2012, Ababsa 2018), who proved that motor education programs and indirect methods had a positive impact on levels of motor creativity.

The role of play was clearly demonstrated through the stages of the study carried out by the researcher, the child in his development, as (Peqini, E- Misja, B. 2024) sees it "begins to form creative habits that grow through play, he believes that play is pure drama, whether individual or group, realistic or imaginative play, or play that involves an acting element".

The study of the relationship between sensory motor perception and motor creativity, which was evaluated through the children's varying movement ability, was the focus of this study, motor creativity was defined as a combination of perceptions in new and modern movement patterns that can be either a solution to a previous problem or to express an idea or emotion, through movement, which alone can increase motor creativity Being the basis of expression and representation, it is the language in which children communicate with each other.

Conclusion

This study was presented in order to know the relationship between sensory-motor perception and motor creativity among pre-school children in Annaba state primary schools, in order to evaluate preparatory education curricula, measure the levels of the two variables on the aforementioned sample, and extract the overlap of intermediate variables such as gender and practice.

The study sample consisted of (62) boys and girls, students of the preparatory departments attached to primary schools in the state of Annaba.

The sample was chosen randomly after more than (100) forms for the Dayton scale were distributed. However, after applying the Wirek test for motor creativity, and after withdrawing the values The anomalous sample reached (62) boys and girls with certain characteristics according to the nature of the study.

In order to reach the objectives of the study, the researcher used the Dayton Sensory-Motor Perception Scale, in which the researcher relied on all dimensions of the Sensory-Motor Perception Scale except auditory discrimination and eye-hand compatibility after consulting arbitrators from higher education professors specializing in educational activity, psychology, and sociology, and the Wirek Motor Creativity Test, which We relied on motor fluency, motor flexibility, and motor originality, which are all dimensions common to the various motor creativity tests.

We reached the results of the measurements, analyzed them, and discussed them, The latter indicated that there is no statistical relationship between sensorimotor perception and motor fluency, It also indicated that there is a relationship between sensorimotor perception and motor flexibility, and between it and motor originality, due to its weakness the researcher was certain that there is no relationship between sensorimotor perception and motor creativity Although their levels were high in the study sample, they also indicated that there were no statistically significant differences in both sensory-motor perception and motor creativity according to the variables of gender and the practice of motor activity.

From the above, we conclude that the curriculum adopted in the preparatory sections in primary school does not give an appropriate picture of our ambition, especially in its aspect related to motor education, which contributes to widening the gap between theory and practice, and the lack of saturation of children in the motor aspect may lead to psychological and physical deformities in later stages.

Therefore, it is wrong to adopt an educational curriculum that contains two classes for motor education, on the contrary, a general program for motor education that contains educational classes must be used because the child needs movement play and playfulness are a reliable basis for developing both motor perception and motor creativity.

The pre-school stage is an important stage in the formation and building of the child's personality with all its characteristics, especially the cheerful and creative personality, during it, abilities, energies, and many cognitive and thinking processes are formed that develop their creative sense. Creativity appears through their spontaneous actions during fun. It generally contributes to the healthy development of children. It gives clear signals about children's feelings, which in turn allows teachers and parents to understand, express and predict them in the future.

In our arduous journey, which extended from the crystallization of the problem until the results were produced, all results were considered good.

We adopted the theories of Kephart, Gilford, and (Mcbride, 1992) for creativity and critical thinking, and we used previous studies to make the results of this study available for new studies as a previous study, and thus the series of scientific research continues.

From all of this, we believe that if we adopt the redevelopment of the content of an approach curriculum that relies on motor education as its basis, and deal with this category more responsibly, and adopt more critical and analytical studies for this category, while developing a database that contains all the information in each academic year, because Freud considered it A sensitive stage that has a significant impact on the following stages.

The subjects in this study appear to enjoy the challenges involved in solving movement problems and using motor creativity strategies, which warrants further studies and replication of these findings.

In conclusion, motor creativity ability appears to be a very clear measure of young children's ability to generate alternative movement responses to basic movement tasks its sensitivity to physical education content and teaching methods indicates that if we want children to be able to employ motor creativity and critical thinking skills, we must teach them how to do so.

Methodology

This research utilized a descriptive correlational methodology, aiming to analyze the relationship between sensory-motor perception and motor creativity among early school-aged children. The sample consisted of 62 students (ages 6–8) enrolled in primary schools in the Wilaya of Annaba, Algeria. Two standardized instruments were administered: (1) Dagton Sensory Perception Test, used to assess coordination, balance, and sensory integration, and (2) Weyrek Motor Creativity Test, which measures creative motor expression through indicators such as fluency, originality, and flexibility. Each participant completed both assessments under supervised conditions. The collected data were analyzed using the SPSS (Statistical Package for the Social Sciences) to determine the correlation coefficients between sensory-motor perception variables and the components of motor creativity. The level of statistical significance was set at $p < 0.05$. This methodological framework was designed to ensure the reliability and validity of results and to facilitate a comprehensive understanding of the cognitive-motor processes involved in creative movement among young learners.

Ethical Considerations

The study complied with the ethical standards of the University of Algiers 3 and adhered to the Declaration of Helsinki for research involving human participants. Informed consent was obtained from the parents or legal guardians of all participating children. No invasive or harmful procedures were conducted. Participants' data were anonymized and used exclusively for academic purposes. The study ensured the principles of confidentiality, voluntariness, and child protection throughout the research process.

Acknowledgements

The authors express their gratitude to the Institute of Physical and Sports Education at the University of Algiers 3, as well as to the Laboratory of Sciences and Practices of Physical and Rhythmic Activities for their academic and logistical support. Appreciation is also extended to the school administrators, teachers, and parents in the Wilaya of Annaba for their cooperation and contribution to the successful completion of this research.

Funding

This research was not supported by any external funding. It was conducted with the institutional and material support of the University of Algiers 3 within the framework of academic research in motor and sports education sciences.

Conflict of Interest

The authors declare no conflict of interest. All analyses, interpretations, and conclusions are the sole responsibility of the authors and do not necessarily reflect the views of their affiliated institutions.
Here is your reference list rewritten in full APA 7th edition format, with consistent punctuation, capitalization, and journal citation style.

References

1. Al-Kafi, I. (2009). Talents and measures of talent and creativity. Alexandria: Alexandria Book Center.
2. Al-Kinani, M. (2010). The psychology of the creative child. Amman: Dar Wael Publication.
3. Al-Soror, N. (2011). A guide for children's growth and development until the age of six. Amman: Dar Wael Publication.
4. Barnett, L. (1990). Playfulness: Definition, design, and measurement. Play & Culture, 3, 319–336.
5. Barnett, L. (1991). The playful child: Measurement of disposition to play. Play & Culture, 4, 51–74.
6. Benoit, H., & Gal, N. (2011). L'expérience corporelle. Paris: Éditions EPS.
7. Christian, M. K. (2012). The construct of playfulness. Cleveland, OH: Department of Psychology, Case Western Reserve University.
8. Cornelli, R. S. (2010). Towards a new measure of playfulness: The capacity to fully and freely engage in play (Doctoral dissertation). Loyola University Chicago.
9. Díaz-Pereira, A. D. (2015). The evolution of motor creativity during primary education. Journal of Human Sport & Exercise, 10(1), 98–107. https://doi.org/10.14198/jhse
10. Journal Officiel de la République Algérienne. (1976). 33, 29.
11. Lester, S., & Russell, W. (2010). Children's right to play: An examination of the importance of play in the lives of children worldwide. The Hague: Bernard van Leer Foundation.
12. Mahmoud, A. A. (2019). Motor kinetic learning. Amman, Jordan: Dar Hamid for Publication and Distribution.
13. Mahmoud, A. M. (2019). Sports motor learning. Amman, Jordan: Dar Hammed for Publishing and Distribution.
14. McBride, R. (1992). Critical thinking—An overview with implications for physical education. Journal of Teaching in Physical Education, 11(2), 112–123. https://www.researchgate.net
15. Peqini, E., & Misja, B. (2024). The importance of senso-perceptive skills in children of primary school age: Literature summary. Sustainability and Sports Science Journal, 2(4), 211–225. https://doi.org/10.55860/VZPM2744
16. Rentzou, K. (2013). Greek preschool children's playful behaviour: Assessment and correlation with personal and family variables. Early Child Development and Care, 183(11), 1733–1745. https://doi.org/10.1080/03004430.2012.752736
17. Selby, E. S. (2005). The creative personality. American Psychological Association, 49(4), 300–313. [https://doi.org/10.1177/0016986205049004](https://doi.org/10.1177/001698620504900404)

18. Yildiz, R., Yildiz, A., Zorlular, R., & Elbasan, B. (2024). Relationship between sensory processing skills and motor skills in 12-month-old infants. Journal of Developmental & Physical Disabilities. Advance online publication. https://pmc.ncbi.nlm.nih.gov/articles/PMC11422172/
19. Khorkova, M., et al. (2024). The relationship of creativity and motor creativity with physical activity and motor fitness in children aged 8–9 years. Frontiers in Psychology. https://pmc.ncbi.nlm.nih.gov/articles/PMC11674535/
20. Håkstad, R. B., Øberg, G. K., Girolami, G. L., & Dusing, S. C. (2021). Enactive explorations of children's sensory-motor play and therapeutic handling in physical therapy. Frontiers in Psychology, 12, 703. https://pmc.ncbi.nlm.nih.gov/articles/PMC9592846/
21. Shi, P., et al. (2022). Motor skills and cognitive benefits in children and adolescents. Children, 9, 1088. https://pmc.ncbi.nlm.nih.gov/articles/PMC9721199/
22. Faber, L., et al. (2022). Motor skills, visual perception, and visual-motor integration in children with ASD. Research in Developmental Disabilities, 125, 104. https://www.sciencedirect.com/science/article/pii/S175094672200085X
23. Wen, L., & Wu, Z. (2025). The impact of sensory integration-based sports training on motor and social skill development in children with ASD. Scientific Reports, 15, Article 19974. https://www.nature.com/articles/s41598-025-05393-3
24. Alsaedi, R. H., et al. (2025). Relation between executive functioning, sensory processing, and motor performance disruptions in children with autism. BMC Pediatrics, 25(1). https://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-025-05756-9