e-Acadêmica, v. 6, n. 2, e1262651, 2025
(CC BY 4.0) | ISSN 2675-8539 | DOI: http://dx.doi.org/10.52076/eacad-v6i2.651

The contribution of rhythmic gymnastics to the psychomotor development of preschool or kindergarten students

A contribuição da ginástica rítmica para o desenvolvimento psicomotor de crianças em idade pré-escolar ou do jardim de infância

Received: 07/31/2025 | Revised: 08/30/2025 | Accepted: 08/31/2025 | Published: 08/31/2025

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Abstract
Psychomotor development in preschool boys and girls is decisive in the maturity of motor, socio-affective, creative and expressive skills at five years of age; stage in which motor and socio-affective development milestones allow successful access to schooling. Given this, the present study aimed to identify the relationship of Rhythmic Gymnastics (RG) in the development of psychomotor skills in preschool children. Considering that this sport relates motor skills with harmonious, coordinated movements and the psyche, so that children adapt to their context in a harmonious and flexible way, feeling safe, stable, autonomous and independent by achieving maturity in motor skills such as laterality, directionality and balance. The methodology was based on a quantitative approach, with a quasi-experimental design, by determining an intentional non-probabilistic sample of 12 students to whom the Harris test was applied, which allowed determining the lateral dominance of the eye, hand and foot. The results revealed that working with GR at this level of study allows the development of skills with performance criteria of the socio-affective and motor areas, defining homogeneous laterality (left-handed / right-handed) more quickly. In conclusion, it is predicted that preschool children who worked GR will be successful in the reading-writing preparation processes, for this reason the incorporation of GR as a methodological strategy at this level of study is viable.
Keywords: Psychomotor skills, Rhythmic gymnastics, Preparatory, Harris test, Motor skills.

Resumo
O desenvolvimento psicomotor em meninas e meninos do ensino médio é decisivo para a maturidade das habilidades motoras, socioafetivas, criativas e expressivas aos cinco anos de idade; etapa em que os marcos do desenvolvimento motor e socioafetivo permitem um acesso bem-sucedido à escolarização. Diante disso, o presente estudo teve como objetivo identificar a relação da Ginástica Rítmica (GR) no desenvolvimento das habilidades psicomotoras em crianças do ensino médio. Considera-se que esse esporte relaciona habilidades motoras com movimentos harmônicos, coordenados e o psiquismo, de modo que as crianças se adaptem ao seu contexto de forma harmoniosa e flexível, sentindo-se seguras, estáveis, autônomas e independentes ao alcançar a maturidade em habilidades motoras como lateralidade, direcionalidade e equilíbrio. A metodologia baseou-se em uma abordagem quantitativa, com delineamento quase-experimental, determinando uma amostra intencional não probabilística de 12 estudantes, aos quais foi aplicado o teste de Harris, que permitiu determinar a dominância lateral do olho, da mão e do pé. Os resultados revelaram que o trabalho com a GR neste nível de ensino favorece o desenvolvimento de habilidades com critérios de desempenho nas áreas socioafetiva e motora, definindo a lateralidade homogênea (canhoto/destro) de forma mais rápida. Conclui-se que as crianças do ensino médio que praticaram GR tendem a obter sucesso nos processos de preparação para leitura e escrita; por esse motivo, a incorporação da GR como estratégia metodológica nesse nível de ensino mostra-se viável.
Palavras-chave: Habilidades psicomotoras, Ginástica rítmica, Pré-escolar, Teste de Harris, Habilidades motoras.

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1. Introduction

Rhythmic Gymnastics (RG) is a sport that merges elements of dance and gymnastics with the use of various apparatuses like hoops, balls, ribbons, and clubs. The routines are choreographed and demand a high level of elegance, agility, coordination, and accuracy (Dobrijević., 2021; Fernández et al., 1996). It is classified as an Olympic discipline that lies at the crossroads of technical skill and artistic expression. In this sport, athletes synchronize their bodily movements with the manipulation of the apparatuses, all in harmony with the accompanying music.

Rhythmic gymnastics is an ideal option for promoting students' psychomotor development, as it requires precise coordination between physical skills, body movements, and musical rhythm. The creative process in this discipline is comparable to the relationship between a musician and their instrument, where the coach and gymnast must act as one to achieve a harmonious performance (Pushkina., 2025; Fernández et al., 2016). This analogy can also be applied to the connection between a child and objects in early childhood education. Even when not practiced as an Olympic sport, rhythmic movement fosters gross motor development and strengthens muscle tone. Moreover, the use of appealing equipment such as balls and hoops captures children’s interest in physical activity, encouraging hand-eye-object coordination in sync with musical rhythm.

Rhythmic Gymnastics brings together music, the body, and apparatuses as interconnected elements that foster children's creativity, imagination, sense of rhythm, and expressive movement (Juntunen.,2024; Barta., 2002). Given its complexity, it is seen as a valuable method for enhancing students' psychomotor skills, making it relevant for sensory and motor education. These perspectives underscore the artistic, athletic, and technical qualities of Rhythmic Gymnastics, as well as its multidisciplinary approach that integrates physical, aesthetic, and musical aspects.

Consequently, movement is a key factor in the overall development of young children, especially at the age of five, when motor abilities are more firmly established. At this stage, it is appropriate to introduce Rhythmic Gymnastics activities into early education programs, taking into account several major motor milestones for five-year-olds, such as successfully starting, turning, and stopping while playing; running and jumping a distance of 71 to 91 centimeters; going down a long flight of stairs independently, alternating feet; and hopping on one foot for up to 4.8 meters with ease (Papalia, 2009).

Rhythmic Gymnastics (RG), when used as a methodological tool to enhance body expression in preparatory-level children, is grounded in various educational theories and approaches. One of the key frameworks is the cognitive development theory proposed by renowned Swiss psychologist Jean Piaget (Main, P., 2021; Piaget, 1952). Specifically, it draws on the preoperational stage, which spans from ages 2 to 7. This developmental phase is marked by notable advancements in language use, symbolic thinking, and motor development, although children's reasoning during this time remains somewhat illogical and egocentric.

The theorist described this stage as fundamental for the development of symbolic thinking. Children begin to use symbols such as words and objects to represent other items and ideas. This becomes evident in activities like imaginative play, role-playing, communication, body expression, and drawing. At this point, children make significant progress in symbolic abilities, often expressed through body movements and the use of objects during play, contributing to both psychomotor and cognitive development (Cankaya., 2023; Piaget., 1952).

Building on these theoretical foundations, the present study aims to explore how rhythmic gymnastics can support the development of psychomotor skills in preschool children, with a particular focus on laterality, coordination, and motor-cognitive integration. Given this, the present study aimed to identify the relationship of GR in the development of psychomotor skills in preschool children.

Intuitive Thinking and Animism in Early Childhood

During this phase, children rely more on intuitive than logical thinking. It's common to see them interact with inanimate

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objects like hula hoops, balls, and balloons, assigning them human-like qualities. This makes Rhythmic Gymnastics especially appealing, as it aligns with the tendency toward animism, where children believe such objects possess life and consciousness (Cool., 2024; Piaget, 1964).

It is important to highlight that a key feature at this age is the development of symbolic thinking, which is expressed through symbolic play. In this type of play, children have the ability to mentally transform one object into another. Rhythmic Gymnastics supports this form of symbolic play, a natural activity in their daily routines or learning processes that fosters the gradual development of psychomotor skills and abstract thinking.

The sociocultural theory provides a valuable framework for understanding how social environments and cultural interactions shape the development of children's abilities, including psychomotor skills, through social engagement such as play and sports (Glăveanu.,2021; Vygotsky., 1978). Consequently, as a sport, Rhythmic Gymnastics encourages the growth of executive functions like language and memory, thanks to communicative interactions with teachers, coaches, instructors, and peers that facilitate learning.

It is emphasized that learning and development are deeply connected to the social and cultural environment surrounding the child (Vygotsky, 2001). When Rhythmic Gymnastics is used as a teaching and learning strategy—beyond simply being a sport it fosters social and psychomotor skills through the child's interactions within the educational setting. According to this theoretical foundation, a child's development occurs through an inseparable relationship with their social environment.

A key aspect of Rhythmic Gymnastics is the early development of children's observational and modeling abilities, a concept supported by the Social Learning Theory (Han., 2022; Bandura., 1977). Bandura explains that learning begins at an early age through observing and imitating others. Within the realm of psychomotor development, children acquire new movements and forms of expression by watching their peers and teachers, thereby enhancing both motor and social skills.

This process not only promotes the development of motor skills but also enhances social abilities, as children internalize and replicate what they observe, especially when these actions bring them enjoyment or satisfaction. From this perspective, Rhythmic Gymnastics supports the development of essential capacities such as attention, since students need to focus on the instructor's guidance whether a teacher or coach in an educational setting. This key executive function then enables the growth of cognitive, language, and social skills. In terms of social development, children learn to accept others and work collaboratively, achieving maturity not only in psychomotor skills but also cognitively and socioemotionally.

As a methodological strategy for psychomotor development, Rhythmic Gymnastics becomes a vital tool. Through rhythm, movement, and imitation, it fosters the holistic growth of children. Therefore, it is practical and effective to implement it in educational contexts, where the teacher serves as a model by demonstrating movements for children to imitate, promoting active and participative learning. Peers also play a significant role by offering diverse examples of movements and expressions, thereby broadening each child's skill set.

Holistic Development in Early Childhood

Psychomotor development in early childhood is comprehensive and holistic, encompassing not only the refinement of motor and psychological abilities but also cognitive, neurological, social, and language domains. Since the preschool stage has a profound influence on later developmental phases, it is crucial to carefully consider the activities and methods used during this time, as early childhood lays the foundation for acquiring essential skills.

2. Methodology

A social survey was conducted with children in a study of a quantitative nature (Pereira et al., 2018) using simple

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descriptive statistics with data classes and absolute and relative frequency percentage values (Shitsuka et al., 2018). The study adhered to ethical aspects, with guardians signing the informed consent form (ICF) allowing the disclosure of data for scientific purposes, and it was approved by an ethics committee. This study involved a group of 12 children, all aged 5 years, currently enrolled in the preparatory level of early childhood education. The selection of participants was carried out using a non-probabilistic, intentional sampling method, considering their age, school level, and availability to engage in the proposed activities.

To assess psychomotor development, the Harris Test was administered, an established tool designed to evaluate lateral dominance of the eye, hand, and foot. Each child was assessed individually in a controlled and child-friendly environment that ensured comfort, focus, and reliability of results. The evaluation followed the standardized procedures of the Harris Test, allowing for a consistent and structured assessment process. The data obtained provided valuable insights into the children's motor organization and lateral preference, essential components of psychomotor maturity. These findings served as a foundational basis for understanding the potential impact of rhythmic gymnastics as an educational strategy to foster the development of laterality, directionality, and balance at an early age-skills that are crucial for later academic success, particularly in reading and writing acquisition.

3. Results

First part – Laterality: Hand dominance

The children were asked to perform various actions, such as throwing a ball and imitating everyday movements like brushing their teeth, blowing their nose, combing their hair, opening a door, and cutting with scissors. Out of the 12 participants, 10 performed these tasks with their right hand, showing a clear right-hand dominance, while 2 used their left hand. In conclusion, 83% of the children are right-handed and 17% are left-handed, as shown in Table 1.

Table 1 - Laterality: Dominant Hand Preference.

Valid	Frequency	Percentage
D	10	83
d	-	-
I	2	17
i	.	.
X	-	-
Total	12	100

Source: Authors' own elaboration.

Second part: Lower laterality – foot dominance

The children were asked to kick a ball, then to take off their shoes and try to write a letter with their big toe. They were also asked to perform the following balance exercises: hopping on one foot, standing on one foot, turning on one foot, and lifting one leg onto a table.

The results (Table 2) showed that 8 children (66.66%) have right foot dominance, meaning they are right-footed. Two children (16.6%) showed left foot dominance and are considered left-footed. The remaining 16.6% were not clearly defined.

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Table 2 - Laterality: Dominant Foot Preference.

Valid	Frequency	Percentage
D	8	66,8
d	-	-
I	2	16.6
i	-	-
X	2	16.6
Total	12	100

Source: Authors' own elaboration.

Third part – Eye dominance

In addition to assessing motor laterality, it is essential to determine which eye is dominant. For this purpose, three tests were conducted, described as follows:

- Sighting test: This involves using a cardboard piece measuring 15 x 25 cm with a small hole of 0.5 cm in diameter, through which the child observes different objects or elements.
- Telescope test
- Kaleidoscope test

The children completed the three eye dominance tests, revealing that 9 of them have right-eye dominance, representing 75% of the group. Meanwhile, 2 students showed left-eye dominance, and 1 student did not have a clearly defined ocular laterality, accounting for 8.4%, as shown in Table 3.

Table 3 - Eye Dominance.

Valid	Frequency	Percentage
D	9	75
d	-	-
I	2	16.6
i	-	-
X	1	8,4
Total	12	100

Source: Authors' own elaboration.

Fourth part – Auditory dominance

To assess ear dominance, the children were asked to place their ear against the wall and try to identify what was being said on the other side. Then, the exercise was repeated by placing the ear on the floor to attempt to hear what was being spoken in the room below.

The children completed the two exercises to assess auditory laterality. It was determined that 9 of them have right-ear dominance, meaning they hear better when placing their right ear against the wall or floor, representing 75% of the group. Meanwhile, two students showed left-ear dominance. Finally, one student did not have a clearly defined auditory laterality, accounting for 8.4%, as shown in Table 4.

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Table 4 - Auditory dominance.

Valid	Frequency	Percentage
D	9	75
d	-	-
I	2	16.6
i	-	-
X	1	8,4
Total	12	100

Source: Authors' own elaboration.

4. Discussion

The individual analysis of each student revealed that, during early childhood education, the boys and girls in the preparatory level who engaged in physical activity through the application of Rhythmic Gymnastics as a methodological resource achieved between 80% and 90% development of defined laterality whether superior, inferior, ocular, or auditory (Zhao., 2024).

Within the assessed group, only one child did not clearly define their laterality, indicating some immaturity relative to their age. Therefore, it is considered appropriate to conduct a more detailed assessment to determine the extent to which developmental milestones for their age have been reached. The findings of this study demonstrate that Rhythmic Gymnastics not only helps children improve their ability to use both sides of the body but also provides a strong foundation for their overall motor and cognitive development, supporting similar results reported by (Sukmawati et al., 2024), who observed significant improvements in gross motor skills in 5–6-year-old children following rhythmic gymnastics interventions.

The present study demonstrates that Rhythmic Gymnastics significantly enhances motor skills, balance, proprioception, coordination, and executive functions such as concentration and attention, all of which are critical components of children's developmental processes. Consequently, its implementation within preparatory-level education, serving as the transitional stage between early childhood education and formal schooling, facilitates the development of competencies related to coordination and motor control. This is attributable to the requirement for coordinated movement of various body parts, fostering the integration of body-to-body and body-to-object relationships, which are essential for proprioceptive development and the acquisition of psychomotor abilities fundamental to the onset of literacy skills, including reading and writing. These findings are consistent with (Arifin et al., 2025), who reported that literacy-based rhythmic gymnastics improved gross motor skills, coordination, and reading comprehension in early primary students.

From a neurodevelopmental perspective, Rhythmic Gymnastics facilitates interhemispheric communication, enhancing neural connectivity and promoting neuroplasticity. This process is essential for the development of cognitive and motor skills related to laterality and lays a foundational role in preparing children for early reading and writing skills acquisition (Arifin et al., 2025).

Through the coordinated movements of the arms, hands, and legs, as well as the integration of body-object interaction and eye-hand coordination, children aged 5 to 6 years can, by engaging in repetitive exercises and symmetrical movements within Rhythmic Gymnastics, identify and strengthen their dominant hand, foot, and eye. This is critical for the proper establishment of laterality (Wahyuniati., 2025).

Additionally, the study found that beyond enhancing motor competencies related to laterality and coordination, Rhythmic Gymnastics significantly contributes to the development of concentration and discipline. These executive functions enable children to maintain focus on daily activities such as academic tasks, free play, hobbies, and family responsibilities,

thereby improving their ability to follow instructions and supporting the comprehensive development of laterality (Contreras et al., 2022).

5. Conclusion

This study demonstrates that rhythmic gymnastics is a valuable pedagogical strategy for fostering psychomotor development in early childhood education, particularly regarding laterality, coordination, balance, and overall body awareness. The structured movements and engaging use of apparatuses facilitate the refinement of essential motor skills that support foundational academic abilities, such as reading and writing. The findings indicate that rhythmic gymnastics contributes to the early consolidation of lateral dominance, including manual, pedal, ocular, and auditory preferences, thereby enhancing neurodevelopment and promoting motor-cognitive integration. Furthermore, the discipline supports the development of executive functions, including attention, concentration, and self-regulation, which are essential for effective learning, social interaction, and active participation in both educational and everyday contexts.

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