

ISSN: 2392-5442 ESSN : 2602-540X		<i>Sport system journal</i>
V/12 N/02. Year/2025		<i>International scientific journal published by: Ziane Achour –Djelfa- Algeria</i>
P 307 - 323		<i>Received: 2025-07-23A ccepted: 2025-08-22</i>

Rhythmic Motor Intervention in Speech-Language Pathology: Enhancing Reading Acquisition in Deaf Children through Embodied Timing

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Abstract:

This theoretical study explores the role of sport-based motor rhythm as a pedagogical tool for developing reading skills in children with hearing impairments. Using a descriptive-analytical approach, it examines key concepts related to rhythm, literacy, and auditory disability. It reviews prior research on the effects of rhythmic motor activities on learning, particularly among deaf learners. Findings suggest that motor rhythm can enhance foundational cognitive and perceptual abilities linked to reading, such as attention, temporal sequencing, and visuomotor memory. The study outlines a series of rhythm-based physical exercises suitable for school settings that integrate movement and written language. It recommends incorporating such activities into educational programs for deaf children and providing systematic training for teachers. This approach supports inclusive pedagogy and promotes access to learning in alignment with the cognitive profiles of children with hearing impairments.

Keywords: Physical education. Sport-based motor rhythm. Deaf child. Reading

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1. INTRODUCTION

Reading is one of the fundamental skills in the educational process, as it represents the gateway through which children access learning, acquire knowledge, and develop their thinking. However, this skill presents compounded challenges in the case of children with hearing impairments, who face difficulties in accessing spoken language and, consequently, in learning to read through traditional methods (Branson & Miller, 2002).

Hearing impairment negatively affects the development of phonological awareness and auditory-verbal coordination, making it essential to search for instructional approaches that align with the cognitive characteristics of these children. In this context, and in light of advances in educational research and neuroscience, motor education has emerged as a pedagogical approach capable of overcoming some of the perceptual barriers that hinder effective learning in individuals with special needs, particularly through structured rhythmic motor activities (Derri et al., 2001).

A remarkable contribution in this field was made by Swiss educator and musician Émile Jaques-Dalcroze, who, in the early 20th century, developed an educational method known as Dalcroze Eurhythmics, which integrates musical rhythm with structured movement. The method aims to develop temporal awareness, sensorimotor coordination, and synchronized interaction with time and space. Dalcroze emphasized the importance of movement synchronization and motor coordination in enhancing cognitive and intellectual abilities. He believed that children learn more deeply when their entire body is engaged in the learning process, especially through the rhythmic repetition of movements in response to external stimuli. This pedagogical perspective marked a turning point in the use of conscious movement as a tool for understanding time, language, and visual symbols—elements that directly intersect with the learning needs of deaf children, who rely primarily on visual and motor channels for input (Juntunen & Hyvönen, 2004).

Furthermore, recent studies in psychomotor psychology suggest that rhythm can serve as a training tool to enhance children's linguistic and cognitive skills. Regular motor rhythm activities have been shown to improve attention, working memory, and temporal discrimination—all cognitive processes essential for reading comprehension (Bhide, Power, & Goswami, 2013). This supports the view that motor rhythm is a viable educational tool that can be incorporated into the curricula for deaf children, particularly when integrated into school-based



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physical education in a way that aligns with language learning objectives (Zachopoulou et al., 2004).

Based on the above, the present study aims to highlight the role that sport-based motor rhythm can play in supporting reading acquisition in deaf children by analyzing key theoretical concepts, reviewing relevant research, and proposing practical exercises that can be incorporated into movement-based learning environments within the school setting.

Research Objectives:

- To explore the role of physical education, through the integration of rhythmic movement, in supporting reading acquisition among deaf children.

- To analyze the impact of rhythmic movement on the development of cognitive skills essential for reading, such as attention, temporal perception, and visuomotor coordination.

- To propose an educational framework for implementing rhythmic activities that can be integrated into the school environment, particularly within physical education classes designed for deaf students.

- To highlight the educational potential of structured movement as an alternative pedagogical tool that accommodates the perceptual characteristics of deaf children.

Significance of the Study:

- This study contributes to the enrichment of educational research by establishing a link between physical education and the acquisition of fundamental academic skills chief among them, reading—within the population of children with hearing impairments, through the lens of contemporary neuro-motor approaches.

- It offers a practical methodology that can benefit physical education teachers, speech therapists, and educators of deaf children through rhythmic movement activities that support reading from a functional and complementary perspective.

- It promotes educational inclusion and equal learning opportunities by supporting the right of deaf children to learn by their specific perceptual modalities, and by recognizing movement as a core educational medium rather than merely a supplementary activity.

Definition of Terms:

Physical Education:

Refers to the educational dimension concerned with developing children's motor, physical, and mental abilities through purposeful and structured activities. The aims of physical education go beyond improving physical fitness and health; they also include enhancing cognitive, social, and emotional functions, particularly when instructional approaches integrate movement and perception (Abdel-Ghani, 2018).

Rhythmic Movement:

Rhythmic movement refers to the performance of bodily motions in a regular and harmonious temporal pattern, where movements are repeated with balance and coordination. Such movement fosters the development of various cognitive functions, including attention, sensorimotor coordination, temporal perception, and information sequencing. Rhythmic activities are employed in motor education as an effective pedagogical tool, especially for children who rely primarily on visual and kinesthetic learning channels, as is the case with deaf children (Hassan, 2021).

Deaf Child:

A deaf child experiences severe or profound hearing loss that affects their ability to perceive spoken language and engage in verbal communication. This condition often results in delayed language acquisition and academic skills development. Effective education for deaf children requires the use of visual–motor strategies tailored to their perceptual style and specific learning needs (Al-Shalwi, 2016).

Reading:

Reading is a cognitive process aimed at interpreting written symbols and linking them to meaning. It involves the integration of multiple skills, including visual word recognition, comprehension, analysis, and the synthesis of information. Reading is considered a foundational pillar of academic learning, as it serves as a primary means for acquiring knowledge, constructing concepts, and fostering critical thinking (Suleiman, 2017).

Previous Studies:

Hassan (2021) – University of Algiers:

In a study entitled “Reading Difficulties among Deaf Children: A Psychological Approach,” the researcher adopted a descriptive-analytical methodology. The study sample included 25 deaf children from special education



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institutions. Using cognitive tests and analytical questionnaires, the study concluded that deficits in temporal perception and attention are key factors hindering the acquisition of reading skills. Furthermore, regular motor activities were shown to enhance these abilities, especially when integrated into purposeful educational contexts (Hassan, 2021).

Youssef (2020) – (Ain Shams University, Egypt):

The study, titled "Movement and Rhythm in the Development of Language Skills among Children with Hearing Impairments," employed a quasi-experimental design with a sample of 30 deaf children. The researcher implemented a rhythmic program within physical education sessions over six weeks. Results indicated improvements in reading comprehension and visuomotor coordination, as well as enhanced ability to perceive the sequencing of words within sentences (Youssef, 2020).

Zachopoulou, Tsapakidou, & Derri (2004) :

The study, "The Effect of a Creative Movement Program on the Development of Creative Thinking in Kindergarten Children," applied a structured creative movement program to a sample of 60 preschool children using an experimental design. It aimed to assess the impact of this program on skills such as creative thinking, attention, and short-term memory. Findings revealed that regular rhythmic movement contributes to the enhancement of cognitive processes essential for the later acquisition of linguistic concepts, such as temporal organization and information sequencing (Zachopoulou et al., 2004).

Bhide, Power, & Goswami (2013) –(University of Cambridge, UK):

This study, "The Effect of Rhythmic Movement on Reading Fluency in Children with Language Delays," compared the effectiveness of a rhythmic music-based program with that of a traditional educational program for children with reading difficulties. Using an experimental design, the study included a sample of 42 children aged 8 to 10. Results showed significant improvement in reading fluency and temporal attention among children exposed to rhythmic training, emphasizing the pedagogical value of structured rhythm (Bhide et al., 2013).

Tierney & Kraus (2013) – Northwestern University, USA:

In their study titled "The Ability to Move in Sync with Rhythm is Linked to Consistency in Neural Responses to Auditory Stimuli," the researchers explored

the relationship between rhythmic synchrony and neural stability in response to auditory input. Using a descriptive-analytical approach and a sample of 124 children, the study combined motor tests with EEG techniques. Results indicated that children with precise motor synchronization exhibited more consistent auditory processing, a foundation crucial for reading development (Tierney & Kraus, 2013).

Halliday (2015) – University of Leeds, UK:

The study, “The Impact of Rhythmic Movement on Reading Fluency in Children with Language Delays,” aimed to analyze the effects of regular rhythmic movement on the reading fluency of children aged 6 to 8 with delayed language development. Using an experimental methodology with a sample of 36 children, the results revealed significant improvements in both reading speed and accuracy following participation in the rhythmic movement program. This underscores the role of repetitive motor activities in enhancing reading performance (Halliday, 2015).

Synthesis of Previous Studies:

The reviewed literature offers several important insights that inform the framework of the present study. Most notably, international studies such as those by Bhide et al. (2013), Halliday (2015), and Tierney & Kraus (2013) have highlighted the positive influence of rhythmic movement on cognitive processes related to language, particularly reading skills and temporal attention. These studies employed experimental designs and utilized precise instruments (e.g., cognitive assessments, EEG), enhancing their scientific validity.

However, it is noteworthy that the majority of these studies were conducted with verbally fluent children experiencing learning difficulties, rather than with deaf children. This underscores the ongoing need for research specifically targeting the deaf population.

In contrast, Arabic studies such as those by Youssef (2020) and Hassan (2021) have emphasized the importance of incorporating rhythmic motor activities within special education settings, with a greater focus on the school environment. Both Arabic and international studies affirm the academic benefits of motor-based interventions. Nevertheless, few have explored the deep neurological or psychological mechanisms underlying these effects—an area this study seeks to address by integrating neuro-motor foundations into the understanding of reading acquisition.



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The present study distinguishes itself by combining pedagogical-motor aspects with the perceptual characteristics of deaf children. It proposes a practical model of rhythmic activities that can be implemented in physical education classes, aiming to fill a research gap regarding the role of rhythmic movement in developing reading skills among deaf learners, particularly within the school context.

The Concept of Rhythmic Movement:

Rhythmic movement refers to the performance of structured bodily motions following a consistent and harmonious temporal sequence, guided by either external stimuli (such as music) or internal auditory–motor patterns. According to Jaques-Dalcroze (1921), rhythmic movement is not merely muscular coordination; rather, it is a tool for activating temporal awareness, sensorimotor integration, and perceptual interaction with time and space.

Derri et al. (2001) demonstrated that rhythmic motor activities contribute to the development of fundamental motor skills as well as visual and temporal attention in children. Rhythmic movement has been shown to stimulate several cognitive functions related to learning, including:

- Sustained attention (Bhide et al., 2013)
- Temporal perception and motor sequencing (Tierney & Kraus, 2013)
- Visuomotor memory (Zachopoulou et al., 2004).

Reading as a Complex Perceptual Skill:

Reading is one of the foundational skills underpinning the educational process. It extends beyond the visual recognition of written symbols to encompass complex cognitive operations such as meaning construction, text analysis, and the application of acquired information in new contexts.

Suleiman (2017) notes that reading requires the integrated functioning of attention, perception, memory, and language skills that typically develop in tandem in hearing children through constant exposure to spoken language. For deaf children, however, the absence of auditory input presents a significant barrier to the development of these processes. It impairs phonological awareness and hinders the ability to understand the sequence and correspondence of spoken sounds to written symbols (Mayer, 2007).

Hassan (2021) emphasizes that deaf children often show notable delays in perceiving the temporal structure of written sentences, which affects their ability

to link words with meanings. Youssef (2020) further explains that reading in deaf learners is closely tied to visuomotor coordination, enabling them to visually track words across lines and grasp contextual relationships, particularly when reinforced by structured motor exercises that incorporate rhythmic repetition and bodily engagement.

Findings from Abdel-Ghani (2018) and Marschark & Hauser (2012) also suggest that deaf children do not acquire written language in the same way as hearing children. Instead, they require educational alternatives grounded in movement, visual perception, and temporal structuring. In the context of hearing impairment, reading demands multi-sensory support, with motor activity serving as one of the most critical channels.

Thus, the integration of rhythmic movement becomes essential in enhancing reading comprehension. It activates perceptual skills associated with timing, memory, and attention, allowing the deaf child to decode and interpret written symbols in ways that align with their unique perceptual strengths (Youssef, 2020).

Learning Characteristics of the Deaf Child:

Deaf children exhibit cognitive and perceptual characteristics that differ significantly from those of their hearing peers. This divergence stems primarily from the absence or reduction of auditory input, a fundamental channel for language development and phonological awareness in children. The impact of hearing loss extends beyond sensory limitations, influencing how information is received, organized, and processed (Marschark & Hauser, 2012).

In compensating for auditory deficits, deaf children rely heavily on visual and kinesthetic channels, making them more responsive to interactive modalities that emphasize gesture, movement, and visual cues. Halliday (2015) observed that incorporating regular rhythmic movement into educational activities for children with language delays—including deaf children—leads to notable improvements in reading performance and temporal attention. This finding aligns with Hassan's (2021) field study in Algeria, which concluded that deaf children struggle with temporal perception and visual sequencing, two of the major obstacles to reading acquisition, especially when instruction is delivered through non-interactive, traditional methods.

Al-Shalwi (2016) emphasized that deaf children tend to learn more effectively through visual-sensory repetition and grasp abstract concepts more readily when presented in visuo-motor interactive formats. This aligns with the theory of embodied learning (Wilson, 2002), which posits that knowledge is not



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constructed solely in the mind but rather through the body's interaction with time and space.

Youssef (2020) also highlighted that incorporating rhythmic elements into instruction enhances sensorimotor coordination and strengthens the ability to perceive the temporal sequencing of information, thereby facilitating the comprehension of written sentences. Abdel-Ghani (2018) further emphasized the importance of creating a learning environment that aligns with the visual–motor perceptual style of the deaf child, advocating for the replacement of traditional verbal instruction with movement-based and temporally structured teaching strategies.

Accordingly, understanding the learning characteristics of deaf children from a sensory–temporal perspective provides a vital framework for rethinking educational practices. It supports the use of rhythmic movement as a cognitive mediator to reinforce reading acquisition and optimize learning experiences for deaf learners.

The Relationship between Rhythmic Movement and Cognitive Processes Involved in Reading:

Research has consistently shown that rhythmic movement plays a significant and effective role in supporting core cognitive processes related to reading, such as attention, temporal organization, and visuomotor coordination

A recent study by Ahokas et al. (2024), titled “Rhythm and Reading: The Relationship Between Musical Rhythm Training and the Development of Reading Competence,” found that training children in both musical and bodily rhythm led to a notable improvement in working memory—a foundational cognitive function directly linked to reading comprehension and the ability to follow textual sequences. These benefits were particularly evident among children with lower reading proficiency.

Similarly, Bhide et al. (2013) demonstrated that the integrative processes involved in rhythmic activities enhance temporal awareness and both auditory and visual attention, which form a critical basis for processing linguistic information. In line with this, Tierney & Kraus (2013) revealed a clear association between motor synchronization abilities and the precision of neural responses, suggesting a direct neurophysiological link between motor coordination and the comprehension of linguistic patterns.

Moreover, the study by Ben Sadiq (2013), which implemented a bodily rhythmic articulation technique with cochlear-implemented children in Jeddah, showed marked improvement in phonemic articulation and early-stage phonological reading skills. This finding underscores the efficacy of rhythmic movement in developing foundational reading abilities.

In this context, rhythmic movement can be understood as a strategic educational tool that stimulates the cognitive functions essential for reading, particularly in deaf children. By activating visual–motor learning channels and facilitating the temporal structuring of information, rhythmic movement serves as a practical and effective compensatory mechanism for the absence of auditory input.

The Neurological Explanation of the Role of Rhythmic Movement in the Development of Reading Skills:

Findings in cognitive neuroscience indicate that performing regular rhythmic movements activates not only motor-related brain regions but also neural networks involved in language processing and attention. Brain imaging studies using EEG and fMRI have shown that motor synchronization stimulates multiple brain areas, including the cerebellum, the motor cortex, the right parietal cortex, and Broca's area—all of which are essential for temporal processing and linguistic sequencing.

Tierney and Kraus (2013) demonstrated that children with higher synchronization ability to rhythmic patterns exhibit more stable and consistent neural responses to auditory stimuli. This enhanced neural consistency improves their ability to process phonological patterns in language, an essential skill for reading acquisition.

Similarly, Ahissar et al. (2001) identified a strong correlation between temporal response accuracy in the auditory cortex and the ability to understand sounds and words, even in cases of partial or impaired hearing. In this context, Goswami (2011) proposed the Temporal Sampling Framework, suggesting that the child's brain requires an internal rhythmic timing mechanism to efficiently process the temporal structure of spoken language. Any disruption in this timing system can negatively affect reading skills.

This model offers a compelling explanation of how regular rhythmic movement can enhance the stability of linguistic processing in deaf children by engaging alternative neural pathways. Through rhythmic entrainment, motor activity contributes to temporal alignment within the brain's language systems,



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thereby compensating for the lack of auditory input and supporting reading development (Ahissar et al., 2001; Tierney & Kraus, 2013; Goswami, 2011).

Theoretical Frameworks Guiding the Study:

This study arises from the need to understand how rhythmic movement can support reading skills in deaf children by employing movement as a perceptual mediator that compensates for the absence of auditory input. To achieve this objective, the study draws on several theoretical frameworks that constitute its conceptual foundation:

Jaques-Dalcroze Theory:

This theory provides a foundational perspective on the integration of rhythm, movement, and perception. Jaques-Dalcroze emphasized that structured movement enhances the coordination between the senses and time, thus enabling the formation of a perceptual structure that facilitates language reception. His work on rhythmic musical education laid the groundwork for this idea, later supported by studies in both music and physical education for children (Jaques-Dalcroze, 1921; Juntunen & Hyvönen, 2004).

Sensorimotor Learning Theory:

Based on the cognitive stages proposed by Piaget—particularly the sensorimotor stage—this theory asserts that children learn through bodily interaction with their environment, and that knowledge develops gradually via sensory and motor experiences, especially in early childhood. Effective learning occurs when motor activity synchronizes with temporal and spatial perception, activating sensorimotor integration and enhancing higher cognitive abilities such as memory, attention, and planning (Piaget, 1952)

Vygotsky's Social Learning Theory:

This theory posits that learning is constructed through social interaction and symbolic mediators such as language, gestures, and movement. Vygotsky argued that knowledge is not acquired in isolation, but rather shaped within a cultural and social context. His concept of the Zone of Proximal Development (ZPD) highlights the child's capacity for cognitive growth when guided by a more experienced individual. This applies particularly to deaf children, who rely on visual-motor media for learning and use movement as a means of conceptual understanding. In this context, rhythmic movement functions as a cognitive mediator that stimulates temporal perception and linguistic organization,

promoting text comprehension through embodied interaction, fully aligned with Vygotsky's emphasis on non-verbal mediators in education (Vygotsky, 1978; Daniels, 2001).

Embodied Cognition Theory:

Emerging from the work of scholars such as Margaret Wilson, George Lakoff, and Mark Johnson, this theory suggests that cognition is not confined to the brain but occurs through the body's experience within sensorimotor, spatial, and temporal contexts. Movement is not merely a physical act but a cognitive component involved in concept and meaning formation. For deaf children—who depend primarily on visual and kinesthetic modalities—rhythmic movement becomes a powerful educational tool that stimulates temporal perception, repetition, and attention, thus facilitating access to written language (Wilson, 2002).

Multiple Intelligences Theory:

Proposed by Howard Gardner (1983), this theory challenges the traditional view of intelligence as solely verbal or logical. Gardner identifies multiple forms of intelligence, including bodily–kinesthetic and musical intelligence, which can be leveraged in teaching deaf children who may face challenges in verbal language acquisition. These intelligences offer alternative learning pathways, and rhythmic motor activities provide an effective means to develop their linguistic and reading skills based on their perceptual strengths (Gardner, 1983).

Dual Coding Theory:

Developed by Allan Paivio in the 1970s, this theory suggests that information is processed through two parallel systems: a verbal system and a visual/pictorial system. In the case of deaf children, who have limited access to auditory input, the visual–motor system becomes crucial. Rhythmic movement serves as an instructional mediator that activates the non-verbal system, helping children build robust mental representations and comprehend written texts through the association of structured movement with abstract concepts (Paivio, 1986).

Practical Models of Rhythmic-Motor Exercises to Stimulate Reading in Deaf Children:

Although these exercises are specifically designed to suit the perceptual characteristics of deaf children, their underlying principles are adaptable for use with other groups, such as children with reading difficulties, language delays, or even preschoolers, within the framework of multisensory learning.



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Exercise 1: “Stepping on Words”

Target Group:

This exercise is designed for deaf children who struggle with recognizing written symbols due to the absence of auditory input. It may also be used with preschoolers or children who experience visual tracking difficulties or challenges in temporal sequencing.

Objective of the Exercise:

To train the child in visual tracking of written words within a structured motor sequence.

To enhance focused attention and temporal perception through rhythmic repetition.

To establish a bodily–linguistic connection between the word and its meaning, thereby reinforcing the mental representation of the word through a sensorimotor approach.

Exercise Description:

The instructor prepares a set of cards displaying simple, familiar words (e.g., sun, cat, door, book...). These cards are arranged on the floor in a straight line or a circular path. The child is asked to stand at the beginning of the path and proceed by stepping or hopping on each card at a regular rhythmic pace (e.g., one step every two seconds), maintaining visual focus on the word and pronouncing it if possible.

A simple percussion instrument—such as a drum or metronome—may be used to maintain a consistent tempo. The exercise is repeated three times, with the order of the word cards shuffled each time, which helps to train attention, visual–motor sequencing, and word recognition within a temporal framework.

(Based on principles from Jaques-Dalcroze, 1921).

Exercise 2: Rhythmic Clapping of Letters

Target Group:

This exercise is designed for deaf children, particularly those in the early stages of reading acquisition, as well as children with difficulties in sequential processing or structural awareness of words.

Objective of the Exercise:

-To develop temporal perception about linguistic units.



-To enhance working memory through synchronized repetition of movement and mental imagery.

-To support sensorimotor and visuomotor coordination in the processing of written words.

Exercise Description:

The child is presented with a set of written words (e.g., "tree", "book", "school"). Upon displaying a word, the child is asked to clap several times corresponding to the number of letters in the word (ex, "pen" = 3 claps).

In more advanced stages, the child may clap once per letter, following the sequential position of each character in the word.

The activity is performed within a regular rhythmic tempo, which can be maintained using a metronome or a hand drum to ensure temporal consistency. This structured rhythm reinforces timing, repetition, and motor control. (Paivio, 1986)

This exercise is based on the principles of Dual Coding Theory developed by Allan Paivio, which posits that the brain processes information through two complementary systems: a verbal system and a non-verbal (imagery/motor) system. For deaf learners, the visual-motor system plays a central role in accessing written language. This exercise activates that system by physically representing the structure of words through consistent rhythmic clapping, thereby enhancing letter awareness and supporting word decoding. (Paivio, 1986).

Exercise 3: Movement – Word – Symbol

Target Group:

This exercise is designed for deaf children who rely primarily on visual and kinesthetic channels for learning, as well as children with difficulties in abstract reasoning or language delays.

Objective of the Exercise:

To enhance the sensorimotor representation of vocabulary.

To support motor memory by associating words with tangible physical actions.

To facilitate comprehension of abstract concepts through motor-based encoding.

Exercise Description:

Each word is paired with a distinctive physical gesture that visually represents its meaning.

For example:



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The word “tree” = raising the arms upward like branches.

The word “ball” = making a circular motion with the hands.

When the child sees the written word—either on a flashcard or the board—they are asked to perform the corresponding movement. The activity is conducted with a regular rhythmic tempo (e.g., a new word is shown every three seconds).

The exercise can also be organized as a sequential series of words, with the child performing the corresponding gestures in order, reinforcing temporal sequencing and vocabulary recall. (Inspired by Piaget, 1952).

Conclusion:

This theoretical study has highlighted the vital role of rhythmic movement in supporting reading acquisition among deaf children. It has done so by analyzing key concepts related to structured movement, temporal perception, and written language, within a neuro-motor framework that accounts for the specific perceptual characteristics of children with hearing impairments. Findings from previous research confirm that rhythmic movement effectively enhances attention, cognitive organization, and visuo-motor memory—all of which are directly linked to the development of reading skills.

By aiming to shed light on a non-traditional pathway for teaching reading, this study proposes several educational directions that may help improve pedagogical practices within school environments, including:

- The integration of rhythmic-motor activities into educational curricula designed for deaf children—particularly in physical education and language classes—due to their capacity to facilitate the transition between movement and meaning.

- The training of teachers and special education professionals in scientifically grounded methods of rhythmic instruction, taking into account the visual-motor learning style of deaf learners and promoting synergy between movement and written language.

- The encouragement of academic research in the Arab and Algerian context to explore rhythm as an alternative pedagogical entry point, through the development of culturally and educationally appropriate teaching and assessment tools.

- The adoption of a collaborative approach in schools, involving language teachers, physical education instructors, and speech therapists, to ensure the

coordinated and effective use of movement-based activities in support of academic skill development.

These recommendations are not presented as ready-made solutions, but rather as an invitation to reimagine educational approaches for deaf learners. They call for a reassessment of the relationship between body, time, and language, within a holistic educational model that links movement and cognition.

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