

*Translated from the original in spanish*

## **Tasks to promote temporal perception in gymnasts of the pioneer category of rhythmic gymnastics**

### **Tareas para favorecer la percepción temporal en gimnastas de la categoría pioneril de gimnasia rítmica**

**Mercedes González Estupiñan,<sup>1</sup> Yarima Laffita Paulino,<sup>2</sup> Mercedes Miló Dubé<sup>3</sup>**

<sup>1</sup>Universidad de Matanzas, Facultad de Ciencias de la Cultura Física, Matanzas, Cuba. E-mail: mercedes.estupinan@umcc.cu

<sup>2</sup>Universidad de Matanzas, Facultad de Ciencias de la Cultura Física, Matanzas, Cuba. E-mail: yarima.laffita@umcc.cu

<sup>3</sup>Universidad de Pinar del Río, "Hermanos Saíz Montes de Oca", Facultad "Nancy Uranga Romagoza", Pinar del Río, Cuba. E-mail: mercedes.milo@upr.edu.cu

**Received:** May 6<sup>th</sup>, 2019.

**Approved:** September 9<sup>th</sup>, 2019.

#### **ABSTRACT**

The process of musical education in rhythmic gymnastics is important to achieve high competitive results from the current requirements of the score code. In its base it is the specialized perception of time, and its estimation will be different according to the individual characteristics of the subject; aspect that is trainable in many cases, when the temperamental characteristics do not mediate. However, at the present time the procedures that sustain the work of the trainers of the pioneer category in Matanzas to carry out this process are insufficient, what is evidenced in the low results in the evaluation of the artistic component in the competitive provincial event, due lack of harmony between the music and the movements. Based on this, the author proposed as an objective: to formulate tasks to favor the temporary perception of gymnasts of the pioneer category of rhythmic gymnastics of Matanzas. During the research, theoretical and empirical methods were used, among them: synthetic analytic, deductive inductive and as a fundamental empirical method the test of estimation of the elapsed time. The sample was made up of 36 gymnasts of this category. As a fundamental result, the tendencies of the gymnasts were obtained, which constitutes a tool for the work of the coaches and tasks are proposed for their education in the trainings. It was concluded that the greatest number of gymnasts are in the field of bradicrony, where 55.5 % of them estimated the slowest time and could be delayed in relation to the music performed.

**Keywords:** bradicronic; rhythmic gymnastics; perception of time; taquicronic.

## RESUMEN

El proceso de Educación Musical en la gimnasia rítmica es importante para lograr altos resultados competitivos a partir de las exigencias actuales del código de puntuación. En su base, se encuentra la percepción especializada de tiempo y su estimación será diferente atendiendo a las características individuales del sujeto; aspecto que es entrenable en muchos casos, cuando no median las características temperamentales. Sin embargo, en la actualidad son insuficientes los procedimientos que sustentan el trabajo de las entrenadoras de la categoría pioneril en Matanzas para llevar a cabo este proceso, lo que se evidencia en los bajos resultados en la evaluación del componente artístico en el evento competitivo provincial, por falta de armonía entre la música y los movimientos. A partir de ello, la autora se propuso como objetivo formular tareas para favorecer la percepción temporal de gimnastas de la categoría pioneril de gimnasia rítmica de Matanzas. Durante la investigación se utilizaron métodos teóricos y empíricos, entre ellos el analítico sintético, inductivo deductivo y como método empírico fundamental la prueba de estimación del tiempo transcurrido. Se conformó la muestra con 36 gimnastas de dicha categoría. Como resultado fundamental se obtuvo las tendencias de las gimnastas, lo que constituye una herramienta para el trabajo de las entrenadoras y se proponen tareas para su educación en los entrenamientos. Se concluyó que la mayor cantidad de gimnastas están en el campo de la bradicronia, donde el 55,5 % de ellas estimaron el tiempo más lento y pudieran retrasarse en relación a la música interpretada.

**Palabras clave:** bradicronia; gimnasia rítmica; percepción del tiempo; taquicronia.

## INTRODUCTION

The development of capacities and skills in a general way in sport is essential to achieve high results. Achieving a balance between physical, technical, psychological and theoretical preparation is a determining factor for the athlete's final performance. This is one of the fundamental objectives pursued by any coach who wants to have great results. From the initial ages in the different sports disciplines, establishing a relationship of psychological preparation with the rest of the indicators, which make up the preparation throughout the training macro cycle, is fundamental for obtaining excellent sports results, starting from the pedagogical tests to the fundamental competence.

Within the components of the preparation, specialized perceptions appear as a fundamental element in the success of many technical-tactical actions; these arise from the identification established by the athlete with balls or other objects, the environment in which he or she develops or some typical parameters of his or her event or sport. In sports practice, they are known as special senses and at their base, there is a very high differentiation of the activity of the analyzers who participate in the realization of the movements.

Specifically, the sense of time depends fundamentally on the equilibrium of the processes of excitation and inhibition of the cerebral cortex. It is for this reason that, sportsmen and sport women with temperament type two (choleric) can present serious difficulties with this perception, according to Sainz de la Torre, N. (2010).

The temperamental characteristics is one of the essential psychological factors that must be taken into account to establish the working relationship with the gymnast, discern between what to do and how to do? in each moment, are issues or aspects to keep in mind to carry out the process of sports preparation.

The research is carried out in the sports areas of Matanzas rhythmic gymnastics, where the initial preparation of the gymnasts of the pioneer category is carried out. The music component is a fundamental factor during this process, since it constitutes the fundamental axis of the choreographic montages.

Recognizing the importance of specialized perceptions and specifically those of time for rhythmic gymnastics we are looking for the right solutions for the following scientific problem: How to favor temporal perception in gymnasts of the pioneering category of rhythmic gymnastics?

Moreover, as an objective to formulate tasks to favor the temporary perception of gymnasts of the pioneer category of rhythmic gymnastics in Matanzas.

The nature of the study starts from the low results obtained in the evaluation of the artistic component during the provincial competition of 2017 in this category and from the particular characteristics of rhythmic gymnastics, where the establishment of the motor habit depends on the rhythm of performance of the movement and the character of the music, starting from the physical-technical preparation received in a determined period. The specialized perceptions here, therefore, are fundamental in the success of the technical actions, since these will be subordinated to the precision of the gymnast's perceptions about the conditions of the environment where they are performed.

From the study carried out, the coaches are offered a general and particular characterization of the gymnasts, taking into account the estimation of the elapsed time and its classification in tendencies such as bradicronia or tachycronia, aspects that can affect the relation between music and movement within the evaluation of the artistic component.

Criteria of several authors that deepen important aspects from the theory and the practice were found as antecedents of the research carried. Such is the case of González, M. (2010) who writes about perceptions:

"During the different training sessions in sports initiation, the child is accustomed to performing exercises in conditions of decreased or increased stimulation (senso-perceptual), with the aim of seeking greater activation of analyzers (visual, auditory, tactile, and kinesthetic), which facilitate the interiorization and exteriorization of the actions and technical-tactical operations or sports strategies with which the practitioner identifies. These reflections in the consciousness of the athlete occur in the form of knowledge and skills, and it is precisely through this psychological process that it is possible to improve motor representations and specifically thinking, with which the subject analyzes, compares or integrates in images, the aspects (temporo-space) of each action (technical-tactic), that is, it reflects with greater clarity the offensive and defensive intentions of the opponents, self-regulating with greater ease the conduct of combat". (González, 2010, p.3).

In the same way, it happens in rhythmic gymnastics; while the gymnast trains and internalizes each technical element with the adequate rhythm, she achieves a specialization of the differentiating function of the set of analyzers, she relates to the medium, the apparatus and the music, individually or collectively when working in joint exercises, until reaching a high level of development of these specialized perceptions; this constitutes in turn an indicator of a high level of training.

Another of the criteria found on specialized perceptions, specifically in rhythmic gymnastics, is offered by O'Farril, A. and Santos, A., (1982), when they refer:

In this sport, the actions have to do directly with the precision of perceptions, fundamentally tactile and kinesthetic, proprioceptive, as well as visual and auditory. The basis of these perceptions is a very high differentiation of the activity of the analyzers who participate in the action as a whole. The possibility of this differentiation takes place thanks to the systematic training that "cleans" the pathways that interconnect the analyzers with their corresponding areas at the suprasegment level. (O'Farril and Santos, 1982, p.10).

As another aspect of the perceptive system, there appears temporality, integrated in the second functional unit of Luria: unit of reception, analysis, storage and processing of information, directly related to the left temporal region of the brain, where the ear and the kinesthetic sense have great importance; the latter makes possible to appreciate time, succession, rhythm and its measure. According to Martínez, P (2016) this is essential for the understanding of all processes of sensory, symbolic or cognitive information, distinguishing aspects such as orientation, organization and temporal structuring, the latter with two components: order and duration (quantitative aspect of temporal structuring).

On the other hand, according to Sainz de la Torre, N (2013), the estimation of time is mediated by emotions and depends fundamentally on the equilibrium of the processes of excitation and inhibition of the cerebral cortex. This subjective evaluation of time will also be different according to the individual characteristics of the subject. Thus, athletes can be found within the same sports team who can belong, naturally and without any emotion, to the following types:

- Bradicronic: they perceive the pass of time slowly; they have a tendency to delay their actions when delayed (the child often fails to catch a ball in the air).
- Tachychronic: they perceive the pass of time quickly, they have a tendency to haste in their actions (this student will release the ball long before the required time, even if he has not found his partner well placed, considering that 30 seconds have already passed).

The sense of time plays an essential role in the performance of actions in cyclic sports, these characteristics are trainable and after a certain time they can be ostensibly improved, but it is necessary to know the existence of these tendencies (tachychronicbradicronic), in spite of a special training, because it depends in much of its temperament, because it can modify something, but in essence it does not change.

Authors like Rudik, P.A. (1988) and Hoagland (1991), cited by Sainz de la Torre (2003), argue that to achieve movement coordination the athlete must have the

ability to accurately distribute the time in the elements performed, therefore, it becomes necessary during execution, each detail is adequately perceived in its temporal succession.

This not only implies "feeling the elapsed time" but also the internal rhythm of the exercise, whether in a cyclic or acyclic event and the different muscular tensions produced during its execution. They also demonstrated that the sense of time can vary when it is a matter of short minutes; this sense is altered with the change in body temperature and causes the practitioner to perceive the shortest time of the time elapsed and a delayed perception with its decrease.

In rhythmic gymnastics, how many times a trainer has wondered why a particular gymnast with a well-defined technique fails to maintain an adequate rhythm during her performances and the selected music does not match rhythmically with the exercises performed. Other times, when observing a competition, the public itself does not appreciate the history interpreted from the music and the exercises by the gymnast and the concordance between this and the movements is lost, aspect related to the artistic and that influences in the final result of the presented composition. And if one takes into account the studies carried out by Sainz de la Torre, N (2003) mentioned above, one is in the presence of a sporting discipline where individual or group performances for this pioneering category take place in brief minutes and seconds (115 to 130 for individual exercises and 215 to 230 for group exercises), this increases the body temperature and therefore, appreciate the time elapsed much shorter than what actually happens.

Among the researchers found on the relation between music and movement in rhythmic gymnastics are those of Gato, E.M. (2015), Piñera, V. (2003), Santos, Y. (2010). Ramos, D. (2011), Alemán, Y. (2012), which carry out studies on this important component of rhythmic gymnastics and highlight, indistinctly, how for some gymnasts it is difficult to link different types of movements, their memory fails, they are dislocated in time and space, they do not listen to music and a large number of errors are appreciated, which previously when they made isolated elements it was not possible to detect, these problems speak, according to Alemán, Y. (2012, p.35.) of a low level of development of coordination skills and insufficient education and development in training sessions.

On the other hand, Gato, E.M. (2015) and German, Y. (2012) offer different games for rhythm education; however, they do not delve into specialized perceptions of time, which may be the psychological factor that is affecting the basis for the development of the relationship of music with movements during gymnastic performances.

Other research found on the subject of perceptions in sport are those of: Sánchez, V. and L. Roque. (2015), Morgado, I. (2015), Martínez, Y. (2015), Martínez, P. (2016), Mondragón, T. (2018) and that of Mas, P.A. (2014), which uses in the same way the test of estimation of the time elapsed, in long jumpers of the school category, only that the result here, is associated to the precompetitive psychic tensions, which, according to the aforementioned author, are characterized through the behavior of the sportsmen and women in the minutes/hours before the competition and whose manifestations extend to the confrontation itself. These can be classified as:

- Indifferent: 29 to 27 seconds.
- Combatant or optimal disposition: 30 seconds.
- Febrile: more than 30 seconds.
- Apathetic: less than 26 seconds.

This research is based on the same test mentioned above, but its fundamental purpose is to offer coaches a way of favoring the relationship between movement music and rhythmic gymnastics, based on the diagnosis of trends in the estimation of time in gymnasts, which makes it possible to individualize the systemic process of musical educational influences during training and the appropriate selection of music for individual or group exercises, indispensable aspects for achieving success in this sporting discipline, since these results can be associated with the temperamental characteristics of small gymnasts.

## **MATERIALS AND METHODS**

In order to achieve the objectives, set, an intentional sample was selected consisting of 36 gymnasts with an average age of 7.2 years and 2.2 years of systematic practice in this sport, all participants in the provincial competition held in the province.

Theoretical and practical methods were used, among the first ones the analysis-synthesis; induction-deduction and between the second ones the measurement, through the test of perception of elapsed time, which is described below:

### **Measurement. Elapsed time perception test. Elapsed time estimation test**

Definition of what it measures the skill of accurately perceiving time for 30 seconds.

Objective: to determine the difficulties of gymnasts in the perception of time.

Theoretical foundation: it is standardized and was selected from the work of Sainz de la Torre, N. (2003) for the following aspects:

- Effective and easy to perform.
- It is used in different age groups, including ages six to eight, subject of research.

Methodology: the gymnast is given a stopwatch, she is asked to start walking and observe the elapsed time period for 30 seconds, at which time she must stop. Subsequently she must repeat this task five times, without visual control, only mentally calculating when the mentioned seconds have elapsed. The errors of estimation by excess or by defect are registered.

Task: the stopwatch must be stopped when you consider that 30 seconds have elapsed.

**Standardization conditions:**

1. All gymnasts in the sports area are asked to do it individually before training begins.
2. The trainer explains what the task consists of and demonstrates the exercise prior to the practical performance of the gymnasts. She must stand next to him to check the correct execution of the test and record the results.
3. Silence during the test and discipline of the rest of the team is an indispensable requirement.
4. The five attempts are recorded in the protocol drawn up for it, without interruption between them.

Means and instruments: a stopwatch and the protocol for collecting the data.

Form of qualification: in seconds.

Researchers: the trainer.

Protocol for data collection. (Chart 1)

**Chart 1.** - Protocol for the collection of data

No.	Intentos	Promedio	Magnitud del error	Tendencias
1	1 2 3 4 5			
2				
3				
4				
5				
6				

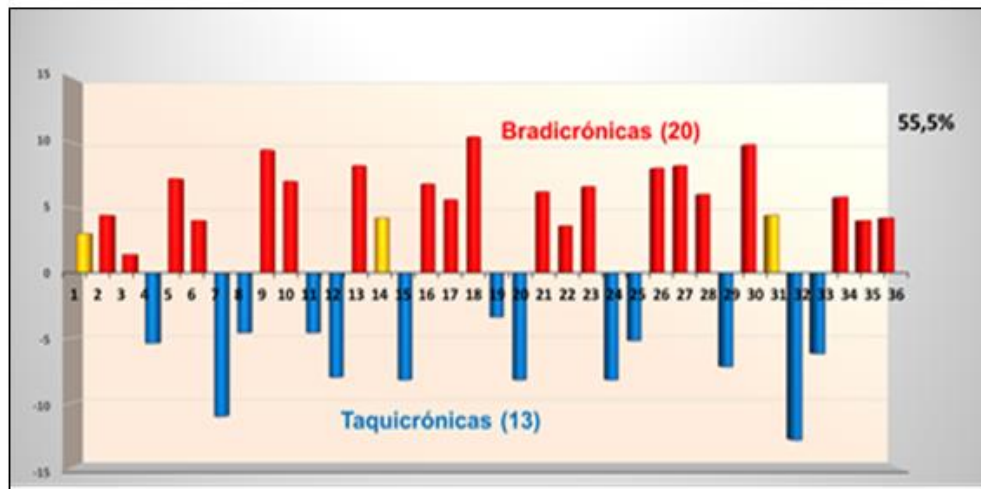
Information processing: the average value of the results obtained in the five attempts (magnitude of the error) was calculated, each gymnast was classified according to this value and the trend was obtained.

Evaluation regulations:

- Bradicronic (B), when in three or more trials the stopwatch stops for more than 30 seconds. (They perceive the pass of time slowly)
- Tachycronic (T), when in three or more tests it stops the same before 30 seconds. (They perceive the pass of time in a faster way).
- Without tendency (ST), when in one test a perfect value is obtained (0 error) and in the rest, two reach values above the reference time and two below - as well as in the case of three perfect results, one by excess and another by default.

## RESULTS AND DISCUSSION

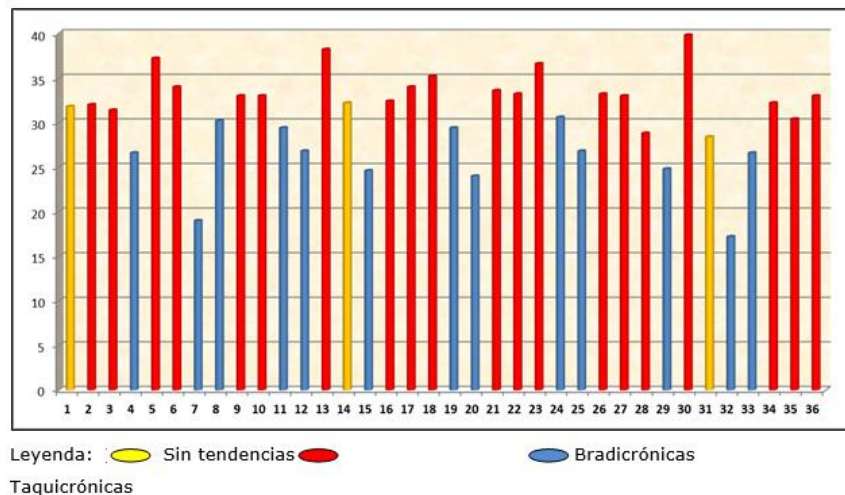
The figure 1 shows the results obtained in terms of the magnitude of the error, the limitations and better precision in the estimation of the elapsed time of the entire sample investigated. (Figure 1)



**Fig. 1.** – Obtained tend from the time perception test

The dimension of the error is observed and the gymnasts with better precision and greater difficulties in estimating the time elapsed in 30 seconds were highlighted. The best result was achieved by girl #1, with an average of three seconds of error. On the other hand, there are the numbers 7 and 32 that obtained the worst average results with -11 and -12.8, both with a tachychronic tendency.

Another of the results obtained was the trend of the gymnasts derived from the average time estimate made by each of them. (Figure 2)



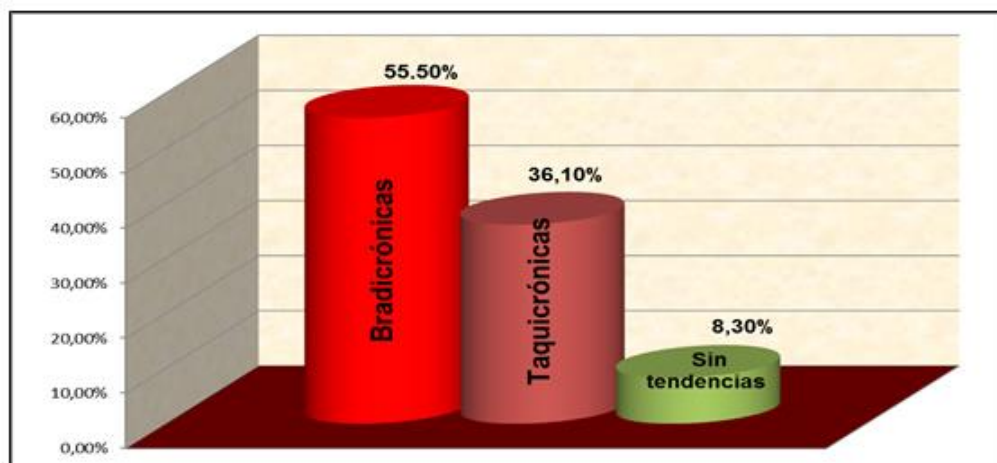
**Fig. 2.** - Result obtained in gymnast's trends



Of the 36 gymnasts sampled, only three of them (8 %), the one, the 14 and the 31, marked in yellow, show very good level of expression of the estimate of elapsed time, as they obtained a perfect value (30 seconds) in a trial and 2 and -2 in the rest. Classified as non-trend.

- Twenty of them marked in red and representing the highest percentage (55.5 %), have a tendency to be bradycronic; they stopped the stopwatch over 30 seconds, that is, they perceived the decursar of the slowest time. Important detail for their coaches, since they could be characterized by the delay in the execution of their actions.
- Thirteen of the gymnasts (36.1 %), now marked in blue, have a tendency to be tachycronic, they perceive the decursar of the fastest time and stopped the stopwatch below the 30 seconds established, indicator to be taken into account by the coaches, because they may have haste in their exercises.
- Gymnasts with bradycronic and tachycronic tendencies may have difficulties between the music and the movements, due to delaying or anticipating their actions, which affects the evaluation of the artistic components during their performances.

In the same way, the general evaluation of the predominant tendency is presented, expressed in percent, where it is appreciated that the bradycronia was the one with the highest percentage (55, 50 %), this is a result to take into account for the selection of the gymnasts to integrate a group or for the appropriate selection of the music to interpret in the staging. (Figure 3)



**Fig. 3.** - General evaluation of the trends obtained

The research findings found are of great practical importance for rhythmic gymnastics trainers, the evaluation of the particularities of the perception of time of gymnasts, is translated into a view on the temperamental tendency of them, if one takes into consideration that mobility is a property of the processes of excitation and inhibition of the cerebral cortex.

The coaches, taking into account the tendency obtained (bradiconia or tachycronia), can incorporate certain technical exercises with greater or lesser complexity, attending to the internal rhythm of the same, individualized activities to improve the coordination of movements, harmonize actions and achieve greater efficiency and

body availability in the proposed activities, while using the music according to the particularities of each gymnast or group of them and if they are joint exercises to assess the temperamental particularities to balance the time of the music and the proposed exercises.

On this study, particularly in rhythmic gymnastics, no references have been found in the bibliography, however, it arises from the coincidence in the difficulty of the relationship movement music observed and cited by Gato, E.M. (2015), Piñera, V. (2003), Santos, Y. (2010), Ramos, D. (2011), Alemán, Y. (2012), but unlike them, the trend in the perception of gymnasts' time is first studied, so that the coach can use games, methodological indications and other elements provided in these investigations, initially considering the particularities of gymnasts. Based on the results obtained, tasks are proposed to favor their treatment during training.

### **Tasks to favor the temporary perception in gymnasts of the pioneer category of rhythmic gymnastics of Matanzas**

- Teach notions of past and future events.
- Teach that motor actions are related to concepts such as: duration and speed.
- Explain and demonstrate that each body movement occurs in a certain time and rhythm.
- Orient simple exercises, do the count and take the right time with clapping.
- To indicate the realization of own counts during the execution of certain exercises.
- Perform exercises at different speeds, starting with the spontaneous.
- Place the work in pairs or in teams, where one girl counts certain exercises and the rest follows, exchange pairs or the selected girl to lead the team.
- Carry out simple exercises by counting and varying the speed of the exercises.
- Count exercises at different times.
- Use the metro-rhythmic during classes, i.e. the gymnasts keep a count of the exercises in relation to the pulse of the music.
- Indicate gymnasts to represent a movement in their mind, without executing it, ask them to refer to its duration.
- Perform the above indication using the individual or group exercise.
- Walking, during recovery, certain times that gymnasts must identify by stopping the march. E.g.: 30 seconds.
- Identify the optimal time of an individual exercise. With the help of a stopwatch or a common clock, the girl can perceive the magnitude of the time that must elapse during the execution of her individual exercise. This activity can be done for the whole.
- Identify the individual exercises she performs in a certain piece of her music and in the same way for the ensemble.

As main conclusions of the work it is obtained that the majority of the difficulties were found in the field of the bradicronia, 55,5 % of the gymnasts perceived the slowest time and could be delayed in relation to the interpreted music, tasks are formulated to favor the temporary perception of gymnasts of the pioneer category of rhythmic gymnastics of Matanzas, which constitutes a way for the intervention in the training, with individualized character, to overcome the difficulties that were observed.

## BIBLIOGRAPHIC REFERENCES

- Alemán Peña, Y. (2016). Indicaciones metodológicas para favorecer la educación musical que reciben las practicantes de gimnasia rítmica, en las categorías iniciales (Trabajo de diploma inédito). Facultad de Cultura Física, Matanzas, Cuba.
- González, E. M. G. (2015). La coordinación música-movimiento en atletas de gimnasia rítmica, categoría 7 años de Holguín. Revista científica especializada en Cultura Física y Deportes, 12(26), 36-49. Recuperado de <https://deporvida.uho.edu.cu/index.php/deporvida/article/view/295>
- González, M. S. (2010). Alternativa metodológica de entrenamiento perceptivo visual para mejorar la eficacia motriz defensiva en boxeadores escolares de 13-4 años (Tesis de doctorado). Universidad de Ciencias de la Cultura Física y el Deporte "Manuel Fajardo". La Habana, Cuba.
- Martínez, P. (2016). Temporalidad, ritmo y desarrollo infantil. Publicaciones Didácticas. No 69. Código PD: 069034. Recuperado de <https://studylib.es/doc/4818963/temporalidad--ritmo-y-desarrollo-infantil>
- Martínez, Y. (2015). *La edad distorsiona nuestra percepción del tiempo*. Tendencias Científicas. Recuperado de [https://www.tendencias21.net/La-edad-distorsiona-nuestra-percepcion-del-tiempo\\_a41703.html](https://www.tendencias21.net/La-edad-distorsiona-nuestra-percepcion-del-tiempo_a41703.html)
- Mas, P. A. (2014). Control de las tensiones precompetitivas mediante pruebas de estimación del tiempo en saltadores de longitud categoría escolar en la E.I.D.E. 'Luis Augusto Turcios Lima' en la Provincia de Matanzas. Revista Digital EfeDeportes.com- Buenos Aires, 18 (188). Recuperado de <https://www.efdeportes.com/efd188/control-de-las-tensiones-en-saltadores-de-longitud.htm>
- Mondragón, T. (2018). ¿La percepción del tiempo es real? Academiaplay. Recuperado de <https://academiaplay.es/percepcion-tiempo-es-real/>
- Morgado, I. (2015). La percepción del tiempo. Revista Scilogs. ISSN 1133-9837.
- O' Farril, A., & Santos, A. (1982). Gimnasia rítmica deportiva. La Habana, Cuba: Editorial Pueblo y Educación.
- Piñera, R. V. (2003). Manual para el entrenador de gimnasia rítmica. Nivel 2. Capítulo 6. Consideraciones para el montaje de las rutinas (individual y grupos). SICCED.
- Ramos, D. (2015). Juegos musicales para favorecer el trabajo con la música en la categoría pioneril de Gimnasia Rítmica (Trabajo de diploma inédito). Facultad de Cultura Física, Matanzas, Cuba.
- Sainz de la Torre, N. (2010). Psicopedagogía de la Educación Física y el deporte escolar. La Habana, Cuba: Editorial Deporte. Recuperado de <http://ucha.blogia.com/2013/102201-psicopedagogia-de-la-educacion-fisica-y-el-deporte-escolar.php>

Sánchez, V. y L. Roque. (2015). Temporalidad y ritmo en niños de 4 a 6 años. Alto Rendimiento (Ciencia deportiva, entrenamiento y fitness). Recuperado de: <http://altorendimiento.com/temporalidad-y-ritmo-en-ninos-de-4-a-6-anos/ultado>

Santos, Y. (2010). Pasos metodológicos para propiciar la familiarización de las alumnas de gimnasia rítmica con la música antes del montaje de los ejercicios individuales. Revista Digital EfeDeportes.com- Buenos Aires 14 (140). Recuperado de <https://www.efdeportes.com/efd140/familiarizacion-con-la-musica.htm>



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International license.

Copyright (c) 2019 Mercedes González Estupiñan