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BODY AESTHETICS AND THE ARTISTIC COMPONENT IN RHYTHMIC GYMNASTICS: THE IMPACT OF A SPECIFIC TRAINING PROGRAM

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Abstract: *This study explores the impact of a specific artistic training program on body aesthetics and the artistic score in rhythmic gymnastics. The research was conducted over a 12-month period, involving 8 gymnasts aged between 9 and 10 years. The training program integrated exercises from ballet, dance, and theatre, focusing on the development of body expressiveness, movement fluidity, and postural control. The results of the paired samples t-test indicated a significant improvement in the artistic scores ($t = -2.902$, $p = 0.023$) and the difficulty scores ($t = -5.725$, $p = 0.001$) following the implementation of the program. However, the analysis of Pearson correlations ($r = -0.028$, $p = 0.947$ and $r = 0.136$, $p = 0.748$) and Spearman correlations ($\rho = -0.012$, $p = 0.977$ and $\rho = 0.287$, $p = 0.490$) did not reveal any statistically significant relationship between the artistic and difficulty scores. This lack of significance may be attributed to the small sample size and variability in judging during competitions. In conclusion, although the correlation between the two components was not statistically confirmed, both contribute to enhancing the competitive performance of the gymnasts. The results highlight the importance of an integrated training approach, where artistic development plays a crucial role in maximizing competitive outcomes.*

Key words: *body aesthetics, rhythmic gymnastics, training program, sports performance*

1. Introduction

Aesthetics encompasses a wide range of concepts and traits from nature and social reality, with art remaining the most important means of aesthetic education, expressed through visual representations, movement, sound, verbal expression, and more [1]. Moreover, even the appreciation of human movement can be a powerful aesthetic experience, where posture, movement, and choreographic structure significantly influence this evaluation [6], [8].

Rhythmic gymnastics is one of the main sports that involves choreography accompanied by selected music [7]. The artistic component plays a crucial role in

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rhythmic gymnastics, being one of the key elements that distinguishes this discipline from other sports. Its primary purpose is to convey emotion and expressive intent, achieved through three main aspects: musical accompaniment, artistic visual image, and expressiveness [15].

In rhythmic gymnastics, the complexity of technical elements must be complemented by a sophisticated artistic expression [3], which reflects not only physical abilities but also the capacity to tell a story through movement. The harmony between these two components determines the level of appreciation for a routine and can make the difference between a good and an outstanding gymnast.

Expressiveness, fluidity of movement, and harmonious body alignment contribute not only to the aesthetic beauty of routines but also to the final competition score. The process of developing expressive artistic movements within specific routines should be implemented from the initial training stages, beginning at ages 6–7 [11]. In this sport, gymnasts must perfectly combine technique and expressiveness to achieve a balance between difficulty and artistic presentation.

The aesthetic principle is inherent in all sports as a reflection of the physical perfection found in human nature [14]. However, in a sport such as rhythmic gymnastics—alongside other complex coordination-based disciplines — the measure of aesthetics reaches a maximum due to the specific direction set by the Code of Points of the International Gymnastics Federation (FIG). Aesthetics can therefore be identified throughout all movements in rhythmic gymnastics: from the technical execution of body and apparatus difficulties to dance steps, dynamic changes, or the overall character of the composition [2].

While technical training is thoroughly studied and practiced [13], the artistic component requires a specific approach inspired by domains such as ballet, dance, and theatre, which help develop aesthetic and expressive abilities [10]. For this reason, a well-structured artistic training program can positively influence gymnasts' performances by improving their posture, coordination, and stage presence. Choreographic training in rhythmic gymnastics enhances the understanding and expression of beauty, stimulates thinking and imagination, and contributes to the plastic and harmonious development of the technical difficulties performed by gymnasts during their routines [12].

As rhythmic gymnastics is mainly practiced by women, the identification of specific artistic styles in a 2019 study was based on feminine archetypes from Ancient Greek goddesses. Over 400 audiovisual materials were analyzed, resulting in the creation of a theoretical model of special artistic styles comprising 32 styles in rhythmic gymnastics [4]. These styles were described based on artistic criteria—musicality, choreography and dance, imagery, movement and emotional expressiveness, and compositional virtuosity—with specific artistic content defined for each.

A crucial aspect of modern training is the ability to translate technical complexity into a coherent artistic performance [5]. This requires not only rigorous physical training but also specific artistic preparation that enables gymnasts to develop bodily expressiveness and control. In this regard, integrating

exercises inspired by classical ballet and theatre into rhythmic gymnastics training has proven beneficial for harmonizing technical execution with artistic expression [9].

Additionally, incorporating dance methods into the educational and training process of gymnasts has been shown to be essential in cultivating artistic mastery, with positive effects observed in components such as: dance combinations ($p < 0.05$), reproduction of specific images ($p < 0.01$), development of rhythm perception ($p < 0.05$), and improvement of competitive performance quality ($p < 0.05$) [9].

Therefore, it is essential that training targets not only technical performance but also the development of gymnasts' artistic abilities, ensuring their complete evolution in both aesthetic and technical aspects. A well-structured program can have a major impact on competition performances, increasing the chances of achieving higher scores in the artistic component and receiving favorable evaluations from judges.

1.1. Purpose of the Study

The purpose of this study is to evaluate the impact of a specific artistic training program on body aesthetics and the scores obtained for the artistic component in rhythmic gymnastics, as well as to analyze the relationship between the artistic score and technical difficulty. By analyzing the effectiveness of this program, the study aims to demonstrate that a well-structured artistic preparation significantly contributes to improving coordination, expressiveness, and, consequently, the competitive performance of gymnasts.

In this context, the research seeks to answer the following questions:

a. To what extent does a specific artistic training program contribute to the improvement of body aesthetics in rhythmic gymnastics routines?
b. What is the impact of a training program focused on artistic development and body expressiveness on the scores obtained for the artistic component and technical difficulty in rhythmic gymnastics?

2. Materials and Methods

The research was conducted over a 12-month period (from June 2022 to June 2023), covering the time span between the 2022 and 2023 National Championship for Junior Level III in rhythmic gymnastics.

The selection of participants for this study was based on the following inclusion criteria:

(1) gymnasts with at least one year of competitive experience,
(2) aged between 9 and 10 years at the start of the study,
(3) consistent training participation, defined as attending a minimum of four training sessions per week, each lasting at least 150 minutes,
(4) participation in official competitions listed in the national calendar.

The exclusion criteria included:

(1) absences exceeding 20% of the total number of training sessions during the study period,
(2) injuries that could have influenced testing results,
(3) participation in alternative artistic training programs that might have affected the study outcomes.

Scores obtained by the eight gymnasts in the two benchmark competitions

(national level) were recorded, both for the artistic component and body difficulty. Between the two data collection points, the participants followed a training program focused on the development of the following artistic elements: body expressiveness, fluidity and grace of movement, body control, posture, and harmonious alignment of body segments.

The frequency of the artistic-focused training sessions was 2 out of 5 days per week, with each session lasting 30 minutes, while the remaining sessions were dedicated to technical training. The program was structured into three main blocks, each spanning three months, with intensive artistic preparation prior to competitions, according to the schedule presented in Table 1.

Artistic training plan Table 1

Month	Period	Exercises Included in the Program
Block 1 June 2022 – August 2022	Basic	Classical ballet elements – barre work (port de bras, pliés, and relevés). General exercises for mobility, flexibility, and coordination (Figure 1, Figure 2)
September 2022	Pre-competition Competition	Exercises for body expressiveness and fluidity (facial expression, movement exercises to music)
October 2022		Harmonization of difficulty, aesthetics, and technical execution components in competition routines
Block 2 November 2022 – January 2023	Transition + Basic	Exercises focused on posture and body alignment Video analysis integrated into training – precision and fluidity of movement (Figure 6)
February 2023	Pre-competition Competition	Exercises with resistance bands and yoga blocks to develop mobility (Figure 3, Figure 4)
March 2023		Harmonization of difficulty, aesthetics, and technical execution components in competition routines
Block 3 April 2023 - June 2023		Coordination and control exercises – repetition of body difficulty movements, with focus on fluidity and aesthetics (Figure 5)

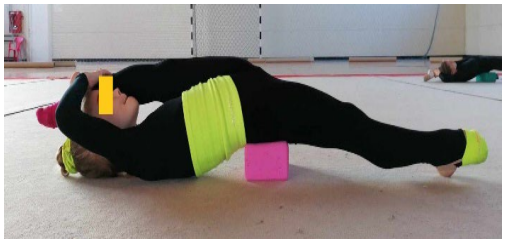

Fig.1. *Mobility exercises*

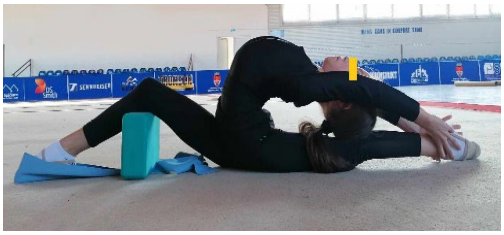

Fig.2. *Mobility exercises*

Fig.3. *Exercises with Resistance Bands*

Fig. 4. *Exercises with Yoga Blocks*

Fig. 5. *Coordination and Control Exercises*

Fig. 6. *Exercises Focused on Posture and Body Alignment*

The data were tested for normality using the Shapiro–Wilk test to verify their distribution. To compare the scores obtained before and after the training program, a paired samples t-test was used, considering that the data were normally distributed. The relationship between the artistic score and technical difficulty was analyzed using both Pearson and Spearman correlation coefficients. All statistical analyses were performed using SPSS software, and the significance threshold was set at $p < 0.05$.

2.1. Data analysis

To assess the impact of the specific artistic training program on gymnasts' performance, two major components were evaluated post-intervention: the score for the artistic component and the score for technical difficulty.

For the artistic component, scores were assigned by four judges who were either FIG-certified or nationally licensed, according to the 2022–2024 Code of Points [2]. The evaluation took place during official national competitions and included aspects such as musical interpretation, expressiveness, fluidity of movement, and the gymnast's connection to the theme of the routine.

The difficulty score was determined in accordance with the FIG Code of Points, considering body difficulties, apparatus handling, and connections between elements. This score was assigned by a separate panel of judges specializing in difficulty and was calculated based on the average of the individual scores given.

3. Results and Discussion

The 16 individual routines were evaluated from three specific perspectives—difficulty, execution, and artistry—by 12 judges holding FIG international or national licenses (4 for difficulty, 4 for execution, and 4 for artistry), from an objective standpoint. The results obtained are presented in Table 2.

Before the statistical interpretation of the data, the normality of the scores obtained for the artistic component in the two targeted competitions was tested using SPSS software, to determine whether they were normally distributed. Given the small dataset, the Shapiro–Wilk normality test was chosen, and the results are presented in Table 3.

Table 2

Results obtained in competition 1 (Pre-Implementation) and competition 2 (Post-Implementation) for the artistic and difficulty components

Competition 1 – 2022			**Competition 2 – 2023**		
Subject	**Artistic score**	**Difficulty score**	**Subject**	**Artistic score**	**Difficulty score**
S1	6.100	5.400	**S1**	7.150	5.800
S2	6.400	5.200	**S2**	6.400	6.100
S3	5.650	4.000	**S3**	6.300	4.200
S4	5.500	3.800	**S4**	6.250	4.800
S5	5.650	5.900	**S5**	7.250	7.400
S6	6.500	2.500	**S6**	6.000	4.100
S7	6.050	3.300	**S7**	7.950	4.600
S8	5.500	2.900	**S8**	7.750	4.200

Table 3

Results of the Shapiro–Wilk Normality Test Applied to Artistic Score Data

	Shapiro-Wilk		
	Statistic	df	Sig.
Score_artistic_Comp1	.881	8	.194
Score_artistic_Comp2	.902	8	.299

Given that the data are normally distributed, a paired samples t-test was applied to determine whether there are significant differences between Competition 1 and Competition 2.

Paired Samples t-Test Applied to Artistic Scores Table 4

	Mean	Std. Dev	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed
				Lower	Upper			
Score_artistic – Comp1 Score_artistic – Comp2	-.9625	.937988	.331629	-1.746678	-.178322	-2.902	7	.023

The results of the paired samples t-test in Table 4 for the artistic scores (t = -2.902, p = 0.023) indicate a statistically significant difference between the artistic scores before and after the implementation of the specific training program, with a notable improvement observed after the program.

The results of the paired samples t-test in Table 5, reflecting the difficulty component (t = -5.725, p = 0.001), show that the difference is also statistically significant for the difficulty scores, indicating a substantial improvement following the implementation of the three-block training program. These findings suggest that the artistic training program had a positive impact on both the artistic component and the difficulty of the routines.

Paired Samples t-Test Applied to difficulty scores Table 5

	Mean	Std. Dev	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed
				Lower	Upper			
Score_difficulty – Comp1 Score_difficulty –Comp2	-1.0250	.506388	.179035	-1.448351	-.601649	-5.725	7	.001

In addition, the Pearson correlation coefficient was applied—given the normal distribution of the data—to the pairs of difficulty and artistic scores from both competitions, in order to determine whether there is a relationship between these scores.

Table 6

Pearson Correlation Coefficient Applied to Difficulty and Artistic Scores from Competition 1

		Score_artistic_Comp1	Scor_difficulty_Comp1
Score_artistic_ Comp1	Pearson Correlation	1	-.028
	Sig.(2-tailed)		.947
	N	8	8
Score_difficulty_ Comp1	Pearson Correlation	-.028	1
	Sig.(2-tailed)	.947	
	N	8	8

Table 7

Pearson Correlation Coefficient Applied to Difficulty and Artistic Scores from Competition 2

		Score_artistic_Comp2	Scor_difficulty_Comp2
Score_artistic_ Comp2	Pearson Correlation	1	.136
	Sig.(2-tailed)		.748
	N	8	8
Score_difficulty_ Comp2	Pearson Correlation	.136	1
	Sig.(2-tailed)	.748	
	N	8	8

For the correlated data from Competition 1, the Pearson correlation coefficient between artistic scores and difficulty scores is -0.028, with a p-value of 0.947, as shown in Table 6. This coefficient is very close to 0, indicating that there is virtually no correlation between the two variables. The p-value of 0.947 is much higher than 0.05, which means that there is no statistically significant correlation between the artistic and difficulty scores in Competition 1.

For the correlated data from Competition 2, the Pearson correlation coefficient between artistic scores and difficulty scores is 0.136, with a p-value of 0.748. The coefficient of 0.136 indicates a very weak positive correlation between the two variables, but it is too small to suggest a clear relationship. The p-value of 0.748 is again much higher than 0.05, indicating that there is no statistically significant correlation between the artistic and difficulty scores in Competition 2.

To examine whether the relationship between artistic and difficulty scores might be non-linear, the Spearman correlation coefficient was also applied. The results showed a weak and statistically non-significant correlation ($\rho = -0.012$, $p = 0.977$ for Competition 1 and $\rho = 0.287$, $p = 0.490$ for Competition 2), confirming the conclusions drawn from the Pearson test.

This lack of statistically significant correlation does not, however, exclude the actual influence of the artistic component on difficulty. It may be explained by the small number of participants and the variability of scores within the competition.

Although the results indicate no statistically significant correlation between artistic and difficulty scores, both components contribute to the overall performance of gymnasts in competition and must be harmonized in order to achieve a balanced and aesthetically pleasing routine.

3.1. Study limitations

While this study provides valuable insight into the impact of an artistic training program on rhythmic gymnasts' performance, several limitations must be acknowledged:

1. **Small sample size** – With only eight gymnasts included, the generalizability of the findings is limited. A larger sample could offer more robust data and stronger statistical power.
2. **Scoring variability** – Despite adherence to FIG Code of Points criteria, subjectivity in judging may have influenced the correlation analysis.
3. **Study duration** – The 12-month training period allowed short-term assessment, but long-term effects of artistic preparation on difficulty remain unexplored.
4. **Limited variables** – The analysis focused solely on artistic and difficulty scores, without accounting for other relevant factors such as previous competitive experience, initial artistic expressiveness, or execution scores.

These limitations highlight the need for future research with larger samples, objective measures of artistic expressiveness, and long-term performance tracking.

4. Conclusions

This study demonstrated that the integration of a specific artistic training program in rhythmic gymnastics can have a

significant impact on body aesthetics and competition scores. Statistical analysis revealed a notable improvement in both the artistic and technical difficulty scores, highlighting the effectiveness of this type of preparation.

However, the correlation analysis showed no statistically significant relationship between artistic and difficulty scores. This result does not disprove the impact of artistic training on overall performance, but may be attributed to the small sample size, judging variability, and the complex interaction between artistic expressiveness and technical difficulty.

In practice, optimal performance in rhythmic gymnastics requires the harmonization of artistic expressiveness and technical execution. Artistic training remains a key element in distinguishing performance at the competitive level. Although this relationship was not statistically confirmed in the current study, empirical observations and score evolution suggest that artistic preparation is essential for achieving high-level performance.

Our study emphasizes the need for integrated training in which the development of artistic expressiveness is not treated as secondary, but as a fundamental component of athletic success. Future research involving larger samples and more objective evaluation methods may further explore the complex relationship between technique, artistry, and performance in greater detail.

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