

10.2478/tperj-2026-0004

Women's artistic gymnastics at the Paris 2024 Olympic Games – Between prediction and reality (team and all-around finals)

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Abstract

Introduction. The predictability of performance in artistic gymnastics is a topic of interest in sports science research, as competition results are influenced by a complex combination of technical, biomechanical, physiological, and psychological factors. By analyzing the scores obtained on different apparatus, the evolution of results over time, and the level of difficulty of routines, researchers and coaches can identify trends that allow for estimating gymnasts' performance levels in future competitions.

Aim. The aim of this paper is to conduct an analysis comparing our predictions with the actual results achieved by athletes at the Paris 2024 Olympic Games, in the Team and All-Around Finals. We also aim to highlight the importance of predictive analysis in major competitions, in order to guide athletes' training in an efficient and targeted manner

Material and method. We analyzed the results achieved by gymnasts in the Team and All-Around Finals at the Paris 2024 Olympic Games and for each competition (Team Final and All-Around Final), we carried out a comparison between the predictions and the results obtained in the Olympic finals.

Results. The analysis of women's artistic gymnastics competitions highlights the dynamic and unpredictable nature of both the Team and All-Around events. Differences in regulations between qualifications and finals significantly influence the results, with higher scores in qualifications being explained by the possibility of discarding a lower score. Comparing team performances shows that rankings are not consistently maintained across competition stages, emphasizing the importance of tactical adaptation and the management of competitive pressure in the final. The predictions made prior to the competition proved largely valid, confirming the essential role of statistical analysis and forecasting in optimizing performance.

Key words: artistic gymnastics; performance prediction; Olympic Games; team finals; all-around finals.

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Introduction

The predictability of performance in artistic gymnastics is a topic of interest in sports science research, as competition results are influenced by a complex combination of technical, biomechanical, physiological, and psychological factors. Artistic gymnastics is considered a sport of high motor complexity, in which performance depends on the precision of technical execution, the difficulty of routines, and the consistency of execution under competitive conditions.

By analyzing the scores obtained on different apparatus, the evolution of results over time, and the level of difficulty of routines, researchers and coaches can identify trends that allow for estimating gymnasts' performance levels in future competitions. Additionally, the analysis of competition results makes it possible to evaluate how the components of the final score influence overall performance and contributes to identifying optimal strategies for selecting technical elements.

The specialized literature offers a limited range of studies addressing the analysis of results from previous competitions in order to predict future outcomes. Kiskin (2026) conducted a study aimed at identifying the main predictors of all-around performance and projecting future trends by analyzing official Olympic data to build multiple linear regression models. The regression analyses confirmed that both D (difficulty) and E (execution) scores are significant predictors of the total score. Notably, E scores on Uneven Bars and Balance Beam showed the highest standardized beta coefficients, highlighting the essential influence of execution on the final ranking.

Chen et al. (2023) also concluded that although improving difficulty scores can increase medal chances, gymnasts must focus on refining their technique on apparatus where errors frequently occur in order to improve execution scores.

Atiković & Kamenjašević (2021) conducted a study aimed at determining the impact of D (difficulty) and E (execution) scores on each apparatus in women's artistic gymnastics in relation to the final all-around result. They observed that vault scores register significantly higher values than the other disciplines included in the all-around competition, with differences that can reach up to two points between apparatus. They also concluded that D and E scores on Uneven Bars and E scores on Balance Beam are significant predictors of success in the all-around event, while D scores on Vault, Balance Beam, and Floor Exercise were not significant predictors for the all-around competition.

Aim

The aim of this paper is to conduct an analysis comparing our predictions with the actual results achieved by athletes at the Paris 2024 Olympic Games, in the Team and All-Around Finals.

We also aim to highlight the importance of predictive analysis in major competitions, in order to guide athletes' training in an efficient and targeted manner.

Materials and method

Building on the article published by Corlaci et al. (2024) and continuing the scientific approach developed through the analysis of the results obtained by gymnasts in the apparatus finals at the Paris 2024 Olympic Games (Corlaci et al., 2025), we analyzed the results achieved by gymnasts in the Team and All-Around Finals at the Paris 2024 Olympic Games.

Thus, for each competition (Team Final and All-Around Final), we carried out a comparison between the predictions made in the aforementioned article and the results obtained in the Olympic finals.

Results

Following the analysis of the results achieved by gymnasts in the Team and All-Around Finals at the Paris 2024 Olympic Games, we arrived at the following findings.

Table 1 and Figure 1 present the comparative results between prediction and reality, for the final score, in the Team Final.

Table 1. Comparative table between prediction and the results obtained in the Team Final

Place	Country	Qualification Score	Final Score	Difference between Prediction and Final Score
Prediction			166.000	0.000
Place 1	USA	172.296	171.286	5.286
Place 2	ITA	166.861	165.494	-0.506
Place 3	BRA	166.498	164.497	-1.503
Place 4	GBR	160.830	164.263	-1.737
Place 5	CAN	161.563	162.432	-3.568
Place 6	CHN	166.628	162.131	-3.869
Place 7	ROU	159.497	159.497	-6.503
Place 8	JPN	162.196	159.463	-6.537
Average			163.633	-2.367

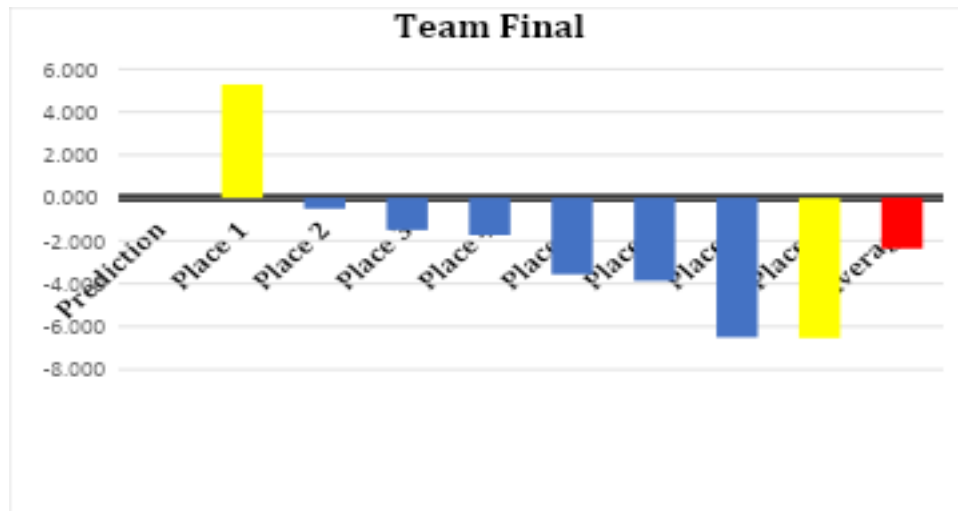


Fig. 1. Graphical representation of the difference between the predicted score and the final score obtained in the Team Final

Table 2 and Figure 2 present the comparative results between prediction and reality, for the final score, in the All-Around Final.

Table 2. Comparative table between prediction and the results obtained in the All-Around Final

Place	Name	Country	Final Score	Difference between Prediction and Final Score
Prediction			56.000	0.000
Place 1	BILES Simone	USA	59.131	3.131
Place 2	ANDRADE Rebeca	BRA	57.932	1.932
Place 3	LEE Sunisa	USA	56.465	0.465
Place 4	D'AMATO Alice	ITA	56.333	0.333
Place 5	NEMOUR Kaylia	ALG	55.899	-0.101
Place 6	BLACK Elisabeth	CAN	54.799	-1.201
Place 7	QIU Qiyuan	CHN	54.766	-1.234
Place 8	KEVRIC Helen	GER	54.598	-1.402
Place 9	SARAIVA Flavia	BRA	54.032	-1.968
Place 10	VISSER Naomi	NED	53.965	-2.035
Place 11	KISHI Rina	JPN	53.965	-2.035
Place 12	KINSELLA Alice	GBR	53.799	-2.201
Place 13	PASS Ruby	AUS	53.798	-2.202
Place 14	ESPOSITO Manila	ITA	53.599	-2.401
Place 15	NAKAMURA Haruka	JPN	53.099	-2.901

Place 16	OU Yushan	CHN	52.898	-3.102
Place 17	BARBOSU Ana	ROU	52.465	-3.535
Place 18	FENTON Georgia-Mae	GBR	51.766	-4.234
Place 19	STEWART Ava	CAN	51.632	-4.368
Place 20	MARTINS Filipa	POR	51.232	-4.768
Place 21	CZIFRA Bettina Lili	HUN	51.099	-4.901
Place 22	GHIGOARTA Amalia	ROU	50.732	-5.268
Place 23	BLANCO Luisa	COL	50.199	-5.801
Place 24	VOSS Sarah	GER	49.999	-6.001
Average			53.675	-2.325

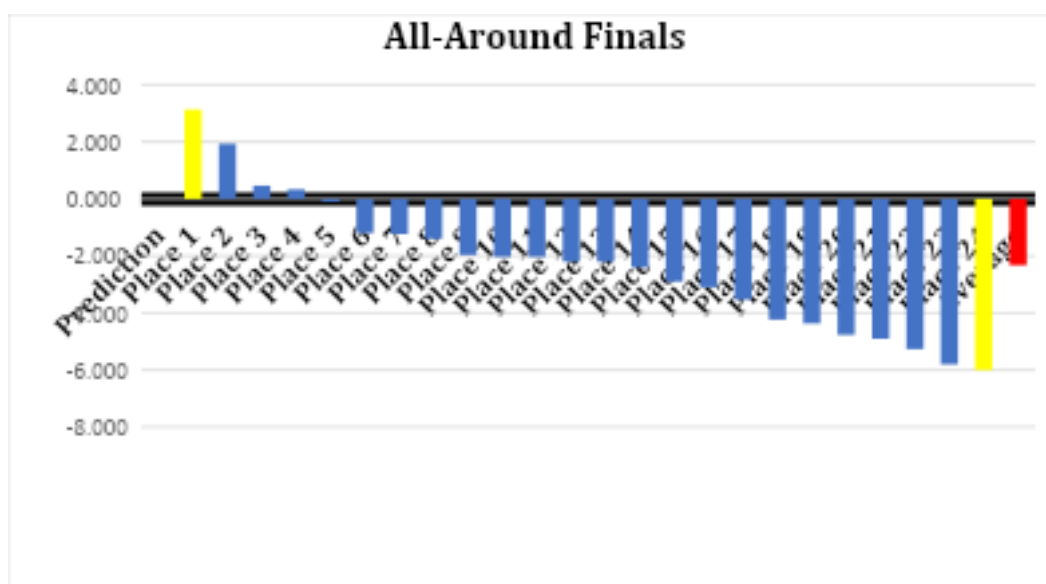


Fig. 2. Graphical representation of the difference between the predicted score and the final score obtained in the All-Around Final

Discussions

In the Team Final, the top eight countries qualified: the United States of America, Italy, Brazil, Great Britain, Canada, China, Romania, and Japan. The team competition is the most captivating event in Women's Artistic Gymnastics, managing to keep everyone in suspense—spectators, viewers, online followers, as well as the athletes, coaches, and their staff.

Each competition—whether qualifications or finals—is different. To support this statement, in the qualification round, four gymnasts compete, and the best three scores are counted, whereas in the Team Final, three gymnasts compete and all three scores are taken into account.

From Table 1, we observe the teams' scores in qualifications and in the Team Final. The final scores recorded by teams in qualifications were higher. This is due to the fact that four out of the five team members competed, with only the best three scores on each apparatus being counted.

Comparing the results obtained by the top eight teams in the qualification and final rounds, we observe the following: the USA, Italy, China, Brazil, and Japan achieved higher scores in qualifications than in the final; Canada and Great Britain achieved lower scores in qualifications than in the final; Romania obtained the same score in both competitions, although the ranking of the top eight teams did not remain the same in the final compared to the qualification round.

Regarding our prediction presented in the previously mentioned article, we concluded that the gold medal in the Team Final would be won by the team achieving a score of 166.000 points. This estimate is confirmed, considering that second place, obtained by Italy, totaled 165.494 points. The United States women's team impressed with spectacular routines, a high level of difficulty, and virtuosity, exceeding our previous forecast. The USA adopted a discreet preparation strategy, limiting visibility into their overall preparation and potential performance, choosing not to participate in the continental competition analyzed in our study.

The driving force of the USA team was Simone Biles. To understand her contribution, her significantly higher value compared to her teammates increased the team's final scores by approximately two points on each apparatus, raising the total team score beyond our expectations.

From the perspective of preparation components for such a major competition, tactical preparation holds a defining role. In team competitions, tactical preparation must be approached with a comprehensive view of all participating teams. A limited focus solely on one's own team is insufficient and cannot lead to the desired performance. Forecasting and prediction, combined with efficient training planning, always bring teams closer to the desired results.

Depending on the competition level, prediction and forecasting should be indispensable in training approaches, taking into account the athletes' level, health status, performance readiness, and previous results. Competitions can be categorized as: national competitions, international competitions, regional international competitions, continental competitions, World Cups, World Championships, and Olympic Games.

In the All-Around Final, the top 24 gymnasts qualified. The statistical analysis was conducted based on the results obtained in this final.

- From Table 2, we observe the athletes' scores and note the following:
- Final scores ranged between 59.000 and 49.990 points, with an average of 53.675 points;
- The top three athletes in this final were not among those who participated in the previously analyzed continental competitions.

Our prediction regarding the score expected to win the Women's All-Around competition was 56.000 points, and Alice D'Amato (Italy) slightly exceeded this prediction. She placed fourth with a score of 56.333 points.

In the All-Around competition, we are dealing with complete athletes who perform high-value routines, maintaining a balance between difficulty and execution across all four apparatus. The fact that the top three athletes exceeded the values estimated in our prediction once again confirms the high level and commitment consistently demonstrated at the Olympic Games.

In the Women's All-Around competition as well, athletes adopt a comprehensive preparation approach, encompassing artistic, technical, theoretical, psychological, and physical components, with tactical preparation playing an essential role during the Olympic cycle year. Athletes, together with their coaches, prefer a discreet training approach in terms of performance visibility, ensuring that they deliver a truly remarkable performance during the Olympic competition.

Conclusion

The analysis of women's artistic gymnastics competitions highlights the dynamic and unpredictable nature of both the Team and All-Around events. Differences in regulations between qualifications and finals significantly influence the results, with higher scores in qualifications being explained by the possibility of discarding a lower score.

Comparing team performances shows that rankings are not consistently maintained across competition stages, emphasizing the importance of tactical adaptation and the management of competitive pressure in the final. The results achieved by teams such as the United States of America confirm the effectiveness of discreet preparation strategies and the capitalization on exceptional athletes, whose individual contributions can decisively influence the final score.

The predictions made prior to the competition proved largely valid, confirming the essential role of statistical analysis and forecasting in optimizing performance. However, the fact that some athletes and teams exceeded these estimates highlights the high and continuously evolving level of gymnastics at the Olympic level.

In the All-Around event, the results confirm the trend toward complete performances, based on a balance between difficulty and execution across all apparatus. At the same time, the emergence of top athletes who did not participate in continental competitions suggests the existence of preparation strategies aimed at maximizing performance in major events.

Overall, tactical preparation, alongside the other components of training, emerges as a determining factor of success, requiring an integrated approach based on thorough knowledge of opponents, analysis of the competitive context, and rigorous planning. Thus, prediction and forecasting become indispensable tools in achieving peak performance in women's artistic gymnastics.

Acknowledgments

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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