28th ECSS Anniversary Congress, Paris/France, 4-7 July 2023

Are gymnastics competitions a self-fulfilling prophecy?

Lecocq, T.1, Tordi, N.1,2

Univ. Bourgogne Franche-Comté, 25000, Besançon, France.

INTRODUCTION:

In artistic gymnastic international competitions, access to All Around, Apparatus and Team finals are established based on the gualification round results. For a nation who aims for medals in all three finals, the composition of the qualification round's team is a major strategic choice. Coaches may find themselves facing the following question: which gymnasts will maximize the chances of individual and/or team finals. The purpose of this study is to see if it is possible to predict gymnastic result.

METHODS:

To answer this question, we collected results of international gymnast over a period of six months. Two predictions were calculated for each athlete: "Max", corresponding to his/her best score and "Mean" corresponding to the average of all the score collected over the 6-month window. Those 2 predictions were then compared to the results obtained on each apparatus during the 2022 European Championship at Munich. A total of 547 Junior and Senior competed in Women's and Men's Artistic Gymnastics (WAG and MAG). Several statistics were used to quantify the validity of our prediction: Pearson's Coefficient, RMSE, Paired Sample T-Test and Bland & Altman's Limits of Agreements. **RESULTS:**

Systematic error is higher for Max than for the Mean prediction. Junior WAG Floor (+0,055), Senior WAG Uneven Bar (0,015), Junior MAG Parallel (-0,037) and High Bar (-0,051), Senior MAG Parallel Bar (0,017) and Floor (-0,078) present the smallest bias while Senior Balance Beam (0,331) Junior and Senior Pommel Horse (0,286 and 0,304 respectively) are among the highest. Random errors are very similar between Max and Mean predictions. Junior and senior WAG Floor (0,447 and 0,360 respectively), Junior and Senior MAG Still Rings (0,382 and 0,651 respectively) display the smallest dispersion while Junior and Senior WAG Balance Beam (0,921 and 1,256 respectively) and Junior and Senior Pommel Horse (0,932 and 1,113) show the highest. RMSE results follow the same trend. All correlation between prediction and results are moderate, large, or very large ranging between 0,409 and 0,867. Larger correlations correspond to Senior WAG Floor (0,867), Senior MAG Vault (0,786), Junior MAG Still Rings (0,779) and Junior WAG Uneven Bars (0,757). Percentages of prediction contain within our Limits of Agreement range between 90,164% and 97,826% for every apparatus. Max predictions are systematically significantly superior to the event final score while mean prediction are significantly different on some apparatus.

CONCLUSION:

Considering all our indicators, Junior WAG Vault, Junior MAG Floor and Senior MAG Still Rings seem to be predictable based on their high validity and small dispersion. Other apparatus such as Pommel Horse or Balance Beam seems harder to predict due to their high variability. The validity of our predictions are in agreement with previous study interested in inter-day apparatus reliability [1].

[1] E. J. Bradshaw, P. A. Hume, et B. Aisbett, J Sports Sci, vol. 30 (2012)

Topic: Statistics and Analyses

Presentation

Poster

European Database of Sport Science (EDSS)

Supported by SporTools GmbH

