# A Simple Calculation Method to Classify and Individualize Sports Training: Ranking and Classification

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Data Analysis | Classification | Technical Note.

**Headline**

Coaches must be familiar with analyzing their athletes' data sets for multiple reasons, such as monitoring, predicting performance, and individualizing training; the latter has become crucial in recent times. This note will present a method for ranking the athletes' data set and classifying them into smaller groups.

**Discussion**

Nowadays, decisions made by coaches are increasingly supported by scientific knowledge (1). The use of statistics has taken a crucial role for data analysis, allowing us to perform exercises such as associations, predictions, performance evaluation, know the effectiveness of training programs, and establish athletes' physical characteristics according to their specialty (2). Sports scientists must translate the information to provide possible solutions for many different stakeholders, supporting the decision-making process on performance, injury, and sports talent detection. However, the amount of data collected daily has increased dramatically in recent years, whereas the time to analyze it has decreased (3). Proper data analysis and understanding of the data and attractive, informative reports are essential elements supporting sports scientist and coaches (4). Several methods have been reported by which coaches can easily use formulas and simple informational programs such as Excel to perform data analysis and visualization (2,5-8). A widespread form of decision support for coaches is the Traffic Light System. It allows us to quickly and objectively identify athletes' status in different variables that technical teams record during the season (8). On the other hand, the publication's current academic structure gives visibility only to new, unique, and innovative findings, implicitly instilling the need to produce statistically significant results (1,9). To avoid this problem, the scientific community and technical staffs could use other methods (models, statistics, among others) to report their sport-related findings (1,9-12); for example, the use of Magnitude Based Inferences instead of the common null hypothesis testing (10), or instead of using an evidence-based approach. This promotes

an "informed practice," a context-aware approach instead of simple specific conclusions (13). Therefore, a conceptual model is proposed within Sports Science that involves both "fast" and "slow" working methods (14). The "fast" approach is often adopted by professionals working in the field, making immediate decisions that directly impact practice (14). Several studies classified the sample into groups to determine differences between athletes' performance, such as fastest versus slowest, strongest versus weakest, or ranked them hierarchically (more than two groups) (15-17). Establishing a ranking group of athletes using an Excel spreadsheet with a Traffic Light System could help coaches individualize training loads and promote the ability to report findings to their team and the sports community.

**Method for Ranking the Team**

In a spreadsheet, we will organize the data of the physical tests we have taken (Figure 1. A). As an example, we will show records of the countermovement jump test. We will organize our data from largest to smallest; if we were to evaluate speed, it would be the opposite (lowest to highest). For this, we will use an Excel tool called "Sort & Filter" (Figure 1. B - C - D).

**Method for Classifying the Team into Groups**

After this, we will make four classifications according to performance (could be more or less), generating five boxes under our data list. First, we will obtain the average in the second and third cell with the function [=AVERAGE] (Figure 2. A). Then we will calculate the difference between the highest and lowest value (range) and divide it by 4 (/4) in the fifth cell (4 rankings) (Figure 2. B). The quotient of the range to the average in the first cell will be added to the first cell, and we will subtract this value to the fourth cell (Figure 2. C - D).

Finally, we will assign a qualitative value to our categories in order to classify our athletes. We will assign a Traffic Light color with the conditional format tool (Figure 3. A - B - C). In this case, they will be in a hierarchical order: very good (green), good (green), regular (yellow), and deficient (red) (Figure 3. D).

In this case, we classified the values equal or higher to the first cell as "Very Good", the values equal or higher to the second cell and lower to the first cell as "Good", the values equal or lower to the third cell and higher to the fourth cell as "Regular", and finally the values equal or lower to the fourth cell as "Deficient".

**IF or IFS function**

This method can be executed automatically through the function [=IF or =IFS] depending on the number of groups in the column where the classification will be (for example, column O in Figure 3.). It can be done with the above function, being as follows in this example because we have 4 groups: [=IFS(subject value(SV)>=Value VG; "VG";SV>=Value G; "G";SV>=Value D; "R";SV<=Value D; "D")]. With the permission of the authors (18) on a CMJ jump height data set of professional players, we performed a statistical analysis of MBI and PD (5,19,20) (Table 1). We can observe that there are very likely to almost certainly differences between all groups, with an effect size very large and a percent of differences larger than the coefficient of variation.

**Practical Applications**

- This method is easy to calculate and only requires an Excel spreadsheet, which most trainers are familiar with.
- Using this model allows to prescribe individualized training and meet the needs of each athlete.

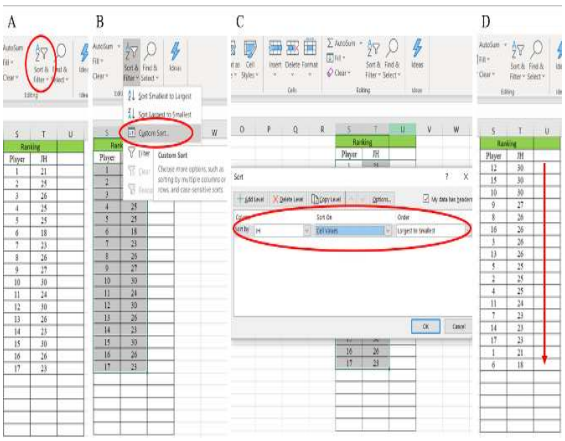

**Figure 1** - A: We organize the data of our players, select the players along with their values and press the "Sort & Filter" tool. B: In the list of options we select "Custom Sort". C: In Column, we enter the column where the values are, and in Order we enter "Largest to Smallest" and click “OK”. D: Our data will be organized from largest to smallest.

- It motivates the technical teams to report their findings to the sports community, adding value to their daily practice.
- This model contributes to decision-making, promoting better communication between coaches, researchers, sports scientists, and trainers.


**Figure 4** – Simple model of intervention within the team, where first it is evaluated, then the ranking is made, the group is classified, the training plans are designed, and finally it is evaluated again (re-test), in order to know the effectiveness of the training, through the analysis of the collected data. MBI magnitude-based inferences.

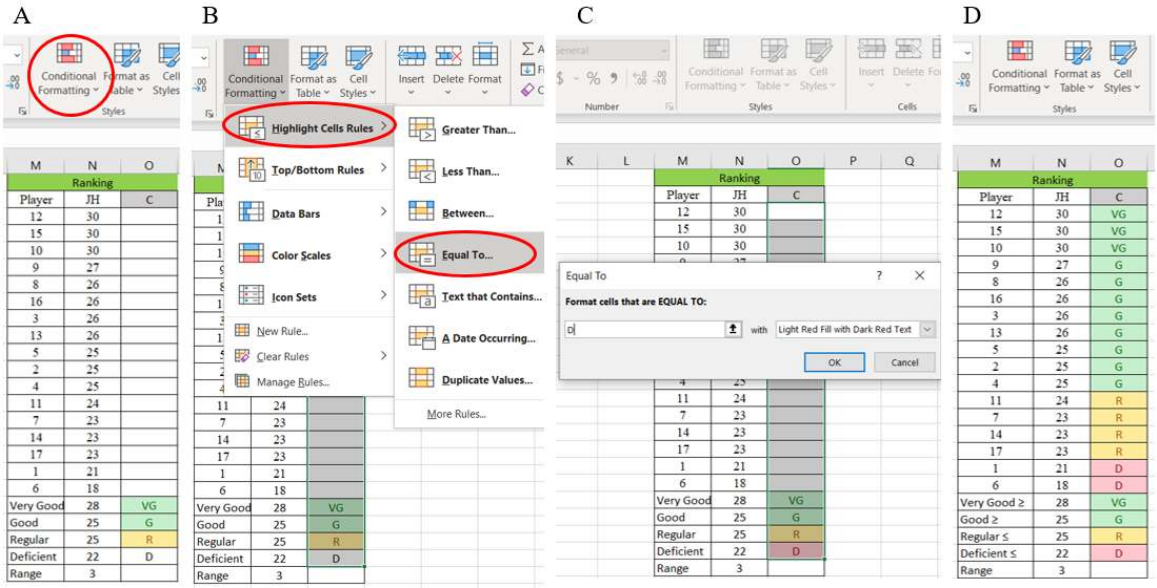


**Figure 3** – A: Select the data from the column adjacent to the values and click on the "Conditional Formatting" tool option. B: In "Conditional Formatting" you select the option "Highlight Cells Rules", and then the option "Equal To". C: In "Equal To" the classification is entered, in this case D (deficient) is entered, so that it is conditioned in red (repeat with all the classifications). D: The classifications are entered manually, in this case VG (very good), G (good), R (regular) and (deficient) D, depending on the values.

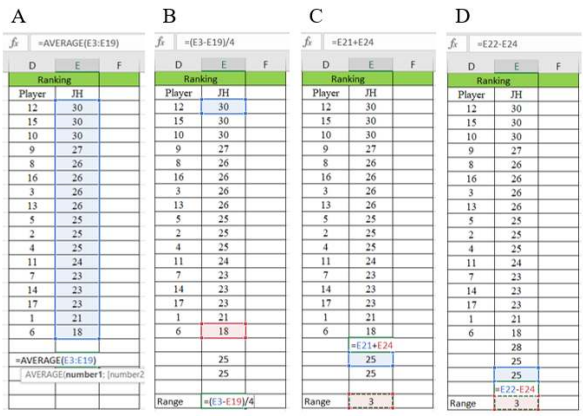


**Figure 2** – A: We will calculate the average in the second extra cell, and replicate in the third one. B: We will calculate the range in the fifth extra cell and divide it by 4. C: In the first extra cell we will add to the average the value calculated in B. D: In the fourth extra cell we will subtract the value of B from the average.

**Table 1. Description and differences between groups**

| | | | | | | |
|---|---|---|---|---|---|---|
| Very Good | M; ±SD; SWD; CV | 45.97 | ±2.02 | 0.40 | 4.38 | |
| vs | Percent differences | Coefficient variation | Chances | Outcome | Effect Size | Outcome |
| Good | 13.54 | 3.18 | 99/1/1 | very likely | 3.8 | very large |
| Regular | 20.50 | 3.24 | 100/0/0 | almost certainly | 5.6 | very large |
| Deficient | 31.61 | 3.35 | 100/0/0 | almost certainly | 8.2 | very large |
| Good | M; ±SD; SWD; CV | 40.14 | ±0.79 | 0.16 | 1.98 | |
| vs | Percent differences | Coefficient variation | Chances | Outcome | Effect Size | Outcome |
| Regular | 7.00 | 2.03 | 100/0/0 | almost certainly | 3.4 | very large |
| Deficient | 18.27 | 2.15 | 100/0/0 | almost certainly | 8.6 | very large |
| Regular | M; ±SD; SWD; CV | 37.42 | ±0.78 | 0.16 | 2.09 | |
| vs | Percent differences | Coefficient variation | Chances | Outcome | Effect Size | Outcome |
| Deficient | 11.30 | 2.20 | 100/0/0 | almost certainly | 5.1 | very large |
| Deficient | M; ±SD; SWD; CV | 33.42 | ±0.78 | 0.16 | 2.32 | |

M mean; SD standard deviation; SWD small worthwhile differences; CV coefficient variation

## Conclusions

The present method is easy to calculate and serves to classify groups according to their performance and individualize the training prescription. Also, it allows the development of new research models, starting from the club, team, and/or federation, based on their context or sports reality as an "informed practice" (13) (figure 4.). This method will allow us to develop profiles of our athletes in different categories according to their age, physical characteristics, playing positions, among others. Finally, these records could be used to develop sports guidelines and help directives guide the development and detection of sports talent. Promote and contribute a clear and direct communication channel between sports scientists, coaches, and researchers (21) allow us to favor the decision-making process in the conduction of our training plans and programs and thus optimize the performance of our athletes and/or team. “It is time for us to think of others first again.” (22). *You can find an excel spreadsheet with the if function included to classify your athletes.

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