Original Article

Relationship between the shooting success rate and match result in soccer at the FIFA World Cup 2018

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Abstract

The success rate of individual game activities is one of the main indicators of individual game performance. The aim of our research was to point out the relationship between shooting success rate of the selected offensive individual game activity – shooting at the FIFA World Cup 2018 and the final result in the match. We assumed a statistically significant relationship between the shooting success rate and the result in semi-finalists matches. To obtain the required data was used the indirect observation method. We observed 23 matches of semi-finalists at the FIFA World Cup 2018. The frequency and success rate of this selected offensive individual game activity were written down in record sheets prepared in advance and these data were processed and evaluated based on mathematical-statistical methods. To determine the relationship between the shooting success rate and the final result in the match, we used a statistical method for the relationship analysis called the Chi-Squared Test. The results showed that the relationship between the shooting success rate and the final match result was not statistically significant ($p > 0.05$). In terms of the entire team, when speaking about the final result, the success rate of the final offensive individual game activity can be a significant indicator of the team's success in a match. The higher is the shooting success rate, the higher is the chance to score a goal, and so be successful in the match.

KeyWords: game performance analysis, soccer, FIFA World cup 2018, shooting

Introduction

Performance analysis in soccer aims to increase the knowledge of the teams' and players' game performance (Santos & Lago-Peñas 2019). Nowadays, the coaching process is deeply influenced by these scientific methodologies for the assessment and evaluation of a team's game performance (Sgro et al. 2016). Many authors dealt with the soccer game performance in their research works (Peráček et al. 2014; Bush et al. 2015; Benkovský et al. 2016; Sgro et al. 2015; Sgro et al. 2016; Gonzales-Rodenas et al. 2017; Holienka et al. 2017; Peixoto et al. 2017; Peráček et al. 2017; Vales-Vázquez et al. 2017; Babic & Holienka 2018; De Souza et al. 2018; Espada et al. 2018; Holienka et al. 2018; Lebedev et al. 2018; McLean et al. 2018; Mikulič et al. 2018; Smpokos et al. 2018; Babic 2019; Babic et al. 2019; Santos & Lago-Peñas 2019; Babic 2020). The individual game performance or rather player's actions during the match is characterized by the quantity and quality of the implemented individual game activities and other elements of the player's performance (Přidal 2012). One of the important offensive individual game activities, which substantially influence the team's result in a match is shooting. The shooting success rate is an indicator of the quality of dealing with game situations in the offensive game phase and it is an expression of the ratio of shots heading into the goal to all shots in the match. An important factor of shooting success rate is its accuracy and force. However, this doesn't necessarily mean that the player will score a goal because even accurate shots can be difficult for the goalkeeper in different ways. Holienka (2001) adds that the shooting success rate is dependent on the player's ability to use it when solving various difficult game situations under the pressure of the opponent and it also depends on the appropriate technique.

As every individual game activity, shooting is also a synthesis of two aspects, which are inseparable during the game. It is the technical and tactical aspect of it. Peráček & Pakusza (2011) stated that the technical side is a display of the complex dispositional structure of the player, which is reflecting in dealing with shooting in a certain situation. Individual skills and abilities influencing the success rate are conditioned by the level of development of coordination skills. The tactical aspect of shooting is influenced by the elemental factors resulting from the game situation, which are related to the quick orientation, evaluation of the game situation and the choice of the optimal way of shooting. Exceptional importance for the shooting effectiveness has the preparation of suitable shooting situations, which are the result of individual and team activities.

So, shooting is the final game activity of the offensive game phase. It is crucial to the match result and its aim is to achieve such directing of the ball into the goal so that the opponent cannot stop it.

According to Peráček & Pakusza (2011) the players should respect certain principle regarding the success rate of finishing the offensive game phase by shooting at the goal:

- if the player is coming closer to the goal through the centre, it is better to shoot at the weaker side of the goalkeeper,
- important is also the height of the shot – it is best to shoot on the ground towards the goal post or to the upper corners of the goal,
- if the players approach the goal from the side, it is better to place the ball to the further goal post – where the goalkeeper's intervention is more complicated and it is possible to immediately shot the ball to the teammates after the ball rebound by the opponent's goalkeeper,
- from shorter distances the shot should be placed, from longer distances, it should be more swift,
- an important moment to increase the shooting success rate is the concealment of the shooting moment and the shooting direction – there should be predominant the short swift shooting without preparation and without previous visual signals, players should lie when shooting (indicate the shooting by a leg backswing).

The aim of this paper is to point out to the relationship between the shooting success rate of the FIFA World Cup 2018 semi-finalists and the final result in the soccer match. We tried to find out if there is any statistically significant relationship between the final offensive game activity (shooting) and the final match result. We assumed a statistically significant relationship between the shooting success rate and the result in semi-finalists matches.

In order to fulfil the objective of our work and to verify our hypothesis, we set the following tasks:

1. To find out the shooting success rate of the FIFA World Cup 2018 semi-finalists' teams.
2. To find out the relationship between the shooting success rate and the final match result of semi-finalists.

Methods

The research group was comprised of the players of the four best teams at the FIFA World cup 2018 in Russia. In the teams of France, Croatia, Belgium and England were watched all the players, who played in the observed matches ($n = 23$) with the exception of goalkeepers.

To obtain the required data for the final results, we used the indirect observation method. In our observation, we focused on the only offensive individual activity – and that was shooting.

We used the Chi-Squared Test to determine the relationship between the success rate of the final offensive individual game activity and the final match result of semi-finalists. The selected level of statistical significance was $p < 0.05$.

Results

Shooting success rate in matches of FIFA World Cup 2018 semi-finalists

The results of comparing the success rate of the only offensive individual game activity by the FIFA World Cup 2018 semi-finalists are stated in Figure 1. The shooting success rate was the highest by the France team, which placed 44.57 % of their shots into the goal area. The second-highest success rate was recorded by Belgium (38.43 %). England achieved 34.57 % shooting success rate and the team with the lowest shooting success rate was Croatia, which achieved the shooting success rate of 32.86 %.

Fig. 1 Comparison of semi-finalists at the FIFA World Cup 2018 in terms of the shooting success rate

FRANCE

Analysis of the France matches at the FIFA World Cup 2018 showed that their average shooting success rate was 44.57 %. In the final match against Croatia was their success rate clearly the highest amongst all the matches, it was exactly 88 %. Their lowest shooting success rate was in the quarterfinal match with Uruguay, in which only 30 % of shots were aimed at the goal. In terms of the shooting success rate in each match, France was in group phase matches of this championship more successful than their opponent. In the elimination part of the tournament was France twice as successful as its opponent and they achieved twice the lower shooting success rate as their opponent. In the eight final winning match against Argentina was the shooting success rate lower by 6 % and also in the quarterfinal with Uruguay was the opponent more successful in shooting than France by 6 %. In the semi-final match against Belgium achieved France in observed offensive game activity the success rate higher by 4% and in the final match was the difference in shooting success rate the highest. In the final match achieved France by 61 % higher success rate than Croatia.

Fig. 2 Shooting success rate of France team in matches at the FIFA World Cup 2018

Fig. 3 Shooting success rate in terms of the playing positions in France team
 FB – full backs, CB – central backs, CM – central midfielders, W – wingers, F - forwards

When comparing the playing positions in the France team, we found out that the shooting success rate was the highest by the wingers, who achieved the shooting success rate of 54 %. The second most successful playing position was the position of full backs, whose every second finishing was directed to the goal area. France forwards achieved only 37 % of shooting success rate.

The middle defenders achieved success rate by 4% smaller than forwards, who directed about every third shot into the goal area. The lowest shooting success rate was, in terms of shooting, found in the central midfielders, who achieved the success rate of 25 %.

CROATIA

Croatia at the FIFA World Cup 2018 achieved the shooting success rate of 32.86 %. The lowest shooting success rate was recorded in the group phase match, in which Croatia defeated Iceland in a ratio of 2:1. In this match, the shooting success rate was only 23%. The highest shooting success rate was recorded in the base group match of Croatia, in which they defeated the team of Argentina in a ratio of 3:0. In this match had the Croatians the success rate of 43 %. During this tournament was Croatia more successful in shooting than their opponents in three matches and their success rate was lower four times. In the semi-final match with England was their shooting success rate higher by 5 %. A lower shooting success rate was recorded in the match with Argentina, in which had Croatia the shooting success rate, despite their victory 3:0, lower by 1 % than Argentina.

Also in the victory over Iceland achieved Croatians by 10 % lower shooting success rate. In the match with Russia was the difference 19 % in favour of Russia and the highest difference was recorded in the final match against France, in which were the French by 61 % more successful than Croatians.

Fig. 4 Shooting success rate of the Croatia team in matches at the FIFA World Cup 2018

Fig. 5 Shooting success rate in terms of the playing positions in the Croatia team

FB – full backs, CB – central backs, CM – central midfielders, W – wingers, F - forwards

A comparison of the playing positions in terms of the shooting success rate in the Croatia team showed that the highest success rate achieved the wingers, whose success rate was 41 %. The forwards achieved a 38 % shooting success rate and the success rate value of central midfielders represented 36 %. The lowest shooting success rate was recorded by the players of the defensive formation. The success rate of the full backs was 14 % and the lowest success rate was ascertained by the central backs, who achieved the shooting success rate of only 11 %.

BELGIUM

Belgium played the championship with the shooting success rate of 38.43 %. The lowest shooting success rate was recorded by the Belgians in the last match of the group phase, in which they managed to defeat the English in a ratio of 1:0. In this match was the shooting success rate only at the level of 27 %. The highest success rate was recorded in the second match, in which Belgians played against Tunisia. In this match, Belgium won in a ratio of 5:2 and the shooting success rate was 57 %. Belgium has always been in matches of group phase more successful in shooting than its opponents. On the contrary, in the elimination phase of the tournament, the Belgians were not more successful in shooting than their opponent, not even once. In the eight-finals with Japan was their success rate lower by 4 % and in the quarterfinal with Brasilia was the difference 6 %, in the semi-final match with France were the world champions more successful than their opponent by 4 % and in the match in which they fought for the third place, was the shooting success rate the same by both teams, that is 33 %.

Fig. 6 Shooting success rate of the Belgium team in matches at the FIFA World Cup 2018

Fig. 7 Shooting success rate in terms of the playing positions in the Belgium team
FB – full backs, CB – central backs, CM – central midfielders, W – wingers, F - forwards

The comparison of the playing positions in terms of the shooting success rate has shown interesting results. The highest shooting success rate is stated by the playing position of full backs. The full backs achieved the success rate of 63 %. The second-highest success rate achieved the forwards, whose value of success rate represented 48 %. The wingers were successful in shooting at the level of 42 %. Every fourth shot of the central backs was pointed at the opponent's goal and so they achieved only a 25 % success rate. The lowest shooting success rate achieved the central midfielders of Belgium, whose success rate value was 12 %.

ENGLAND

At this championship achieved England the shooting success rate of 34.57 %. The lowest shooting success rate was recorded in the last match of the group phase, in which they were defeated by the Belgium team with the narrowest difference. In this match was their success rate of only 8 %. The highest shooting success rate of the England team was recorded in their high victory over Panama, in which was their success rate at the level of 67 %, which is a relatively high number. During the championship was England more successful in shooting success rate than other teams only in two matches. In the first match against Tunisia was this difference 42 % in favour of England and in the match with Panama were the English by 54 % more successful as their opponent. In other matches the English achieved lower success rate than their opponent, respectively in the third-place match with Belgium, they had the same success rate as Belgium (33 %). In the eight-final match against Colombia achieved the England team by 4 % lower success rate, in the quarterfinals with Sweden was this difference 26 % and in the semi-finals with Croatia fell the English behind them in terms of the shooting success rate by 5 %.

Fig. 8 Shooting success rate of the England team in matches at the FIFA World Cup 2018

Fig. 9 Success rate in terms of the playing positions in the England team

FB – full backs, CB – central backs, CM – central midfielders, W – wingers, F - forwards

In England team, the most successful amongst the playing positions were the central backs, whose success rate was 50 %. They were followed by forwards, whose success rate value represented 43 %. The central midfielders achieved the success rate of 32 %, the full backs had the success rate of 25 %. The lowest success rate was recorded by the wingers, whose success rate was only 14 %. Relationship between the shooting success rate and the final result in the FIFA World Cup 2018 semi-finalist matches. In the winning matches of the semi-finalists at the FIFA World Cup 2018 was found out the average shooting success rate at the level of 41.56 %. In matches that ended in a draw between the semi-finalists and their opponents was the average shooting success rate 34 %. The lowest success rate achieved the semi-finalists in matches, in which they were defeated. In

these matches, the average shooting success rate was only at the level of 25.25 %. In Figure 10 is stated a graph with the average shooting success rate of semi-finalists in terms of the match result.

Fig. 10 Shooting success rate in relation to the match results of semi-finalists at the FIFA World Cup 2018

Figures 1-10 shows the final values of shooting success rate obtained from the analysed matches of semi-finalists at the FIFA World Cup 2018. We obtained from the record sheets the total number of successful and unsuccessful shooting attempts, which was then entered into the pivot table of observed values. During this championship, the semi-final players finished the offensive phase 394 times in total with shooting, of which 148 attempts were directed at the goal area. This overall result represents the shooting success rate of 37.56 %.

When finding out the relationship between shooting and final result in matches of semi-finalists at the FIFA World Cup 2018, we used two degrees of freedom at a 5 % level of statistical significance ($p < 0.05$). Our Chi-Squared test value of the test criterion for the shooting was lower than 5.991. Based on this fact, we claim that there is no statistically significant relationship between the shooting and the final result in semi-finalists' match ($p < 0.05$)

Discussion

The shooting success rate is one of the indicators, which certainly influences also the final result in every match. Several authors agree with this statement in their research works and they state that the overall shots and shots on goals are one of the most important factors influencing the success rate of the team in a match (Bush et al. 2015; Gonzales-Rodenas et al. 2017; Peixoto et al. 2017). Of course, there is a large number of other indicators, against which could one argue, if they have an impact on the final result or not. Differences in the shooting success rate between the semi-finalists were very low and that's why we think that there is no statistically significant connection between its success rate and the final team ranking. But we can say for sure that in terms of result, that the team, which scores in a match more goals than the opponent will always be more successful. This is probably the only one indicator, which always holds true. Because of that, we decided to present in Table 1 the differences in the shooting success rate between teams, which won the competition and compare them with the success rate of teams, which ended in the tournament in the last place. The aim of this observation was to point out to the connection between the success rate of the final individual offensive game activity and the final ranking in the long-term leading European competitions. The results were obtained from 288 matches and selected teams played in the 2018/2019 competition year the highest English, Spanish, German and Italian league.

Table 1 Comparison of selected teams in terms of shooting success rate in relation to the final ranking in the competition

Country	Champion	Eliminated	Overall shoots		Successful shoots		Unsuccessful shoots		Shooting rate (%)	success
<i>England</i>	Man. City	Huddersfield	683	394	260	112	423	282	38,07	28,43
<i>Spain</i>	Barcelona	Vallecano	562	457	261	151	301	306	46,44	33,04
<i>Germany</i>	Bayern	Norimberg	636	358	255	105	381	253	40,09	29,33
<i>Italy</i>	Juventus	Chievo	442	284	228	122	214	162	51,58	42,96

The results of this research show that there were differences in shooting success rate between teams in each of the four observed competitions. These differences ranged from 8.62 % to 13.40 %.

Conclusions

Even though our hypothesis has not been confirmed and we have not proved any statistically significant relationship between the shooting success rate and the final result in match, we hold the opinion that the success rate of the final individual offensive game activity is, in terms of the entire team, a significant indicator and shows if the team will be successful in a match or not. In the case of higher shooting success rate, there is actually a higher chance of scoring a goal and being more successful in the match. Currently, there are many research works, which study the relationships between various indicators to the final result in a match and in the future we recommend to search for other factors, which could have a significant relationship to the final result not only in terms of material but also statistical significance.

References

- Babic, M. (2019). Individuálny herný výkon mládežníckych reprezentačných brankárov Slovenska U17. [Individual game performance of national youth soccer goalkeepers]. *Futbalový tréning*, 19(2), 26-28. ISSN 2453-9953.
- Babic, M. (2020). Individuálny herný výkon mládežníckych brankárov vo futbale. [Individual game performance of youth soccer goalkeepers]. *Futbalový tréning*, 20(1), 18-19. ISSN 2453-9953.
- Babic, M., & Holienka, M. (2018). Riešenie hernej situácie „malá domov“ vybranými brankármi na MS 2018 vo futbale. [Back-pass of selected soccer goalkeepers at the World cup 2018]. *Žiak, pohyb, edukácia. Vedecký zborník 2018*. Bratislava: Univerzita Komenského v Bratislave, s. 18-26. ISBN 978-80-223-4582-8.
- Babic, M., Holienka, M. & Obetko, M. (2019). Vybrané ukazovatele herného výkonu reprezentačných brankárov Slovenska v kategórii U16 vo futbale. [Selected indicators of national youth soccer goalkeepers' game performance]. *Telesná výchova & šport*, 29(3), 17-21. ISSN 1335-2245.
- Benkovský, L., Mikulič, M., Gregora, P., & Peráček, P., (2016). The effectiveness of sports training younger pupils in football. *Studia Sportiva*, 10(1), 117-128.
- Bush, M., Barnes, C., Archer, D.T., Hogg, B., & Bradley, P.S., (2015). Evolution of match performance parameters for various playing positions in the English Premier League. *Human Movement Science*, 39(1), 1-11.
- De Souza, N.M., Caetano, F.G., Santiago, P.R.P., Cunha, S.A., Torres, R.D.S., & Moura, F.A., (2018). Space configuration and numerical relationship during professional soccer matches: A proposal for small-sided game design. *Human Movement*, 19(5), 121-128.
- Espada, M., Fernandes, C., Martins, C., Leitao, H., Figueiredo, T., & Santos, F., (2018). Goal characterization after ball recovery in players of both genders of First league soccer teams in Portugal. *Human Movement*, 19(5), 73-81.
- Gonzalez-Rodenas, J., Lopez-Bondia, I., Calabuig, F., Pérez-Turpin, J.A., & Aranda, R., (2017). Creation of goal scoring opportunities by means of different types of offensive actions in US Major league soccer. *Human Movement*, 18(5), 106-116.
- Holienka, M., (2001). *Futbal: Hra - kondícia - tréning*. Bratislava: Slovenský futbalový zväz. ISBN 80-88901-07-3.
- Holienka, M., Babic, M., & Smoleňák, S. (2017). Hodnotenie herného výkonu brankárov v zápasoch ME 2016 vo futbale. [Assessment performance goalkeepers in football matches on the EURO 2016]. *Žiak, pohyb, edukácia. Vedecký zborník 2017*. Bratislava: Univerzita Komenského, s. 81-93. ISBN 978-80-223-4370-1.
- Holienka, M., Peráček, P., Zapletalová, L., Mikulič, M., Babic, M., & Nagy, N., (2018). *Vybrané aspekty herného výkonu futbalistov kategórie U21*. [Selected aspects of U21 soccer players' game performance]. Bratislava: Slovenská vedecká spoločnosť pre telesnú výchovu a šport. ISBN 978-80-89075-67-6.
- Lebedev, S., Abdula, A., Bezyasichny, B., Karpets, L., Shpanko, T., & Efremenko, A., (2018). Model indicators of technical and tactical actions for highly qualified footballers with different roles in the Premier League of Ukraine. *Journal of Physical Education and Sport*, 18(2), 706-709.
- McLean, S., Salmon, P.M., Gorman, A.D., Stevens, N.J., & Solomon, C., (2018). A social network analysis of the goal scoring passing networks of the 2016 European Football Championships. *Human Movement Science*, 57(1), 400-408.
- Mikulič, M., Peráček, P., & Babic, M. (2018). Vplyv prípravných hier na herný výkon elitných mládežníckych hráčov vo futbale. [Impact of small-sided games on the game performance of elite youth soccer players]. *Zborník vedeckých prác Katedry športových hier FTVŠ UK č. 25*. Bratislava: Slovenská vedecká spoločnosť pre telesnú výchovu a šport, s. 116-133. ISBN 978-80-89075-75-1.
- Peixoto, D., Praça, G.M., Bredt, S., & Clemente, F.M., (2017). Comparison of network processes between successful and unsuccessful offensive sequences in elite soccer. *Human Movement*, 18(5), 48-54.
- Peráček, P., & Pakusza, Z., (2011). *Futbal*. [Soccer]. Bratislava: IRIS. ISBN 978-80-89238-55-2.
- Peráček, P., Kopúň, P., Peráčeková, J., Pintérová, Z., Gregora, P., Chovancová, A., Benkovský, L., & Mikulič, M., (2014). *Talent vo futbale I.: Identifikácia, selekcia*. [Talent in soccer I.: Identification, selection].

- Bratislava: Univerzita Komenského v Bratislave: Fakulta telesnej výchovy a športu: Slovenská vedecká spoločnosť pre telesnú výchovu a šport. ISBN 978-80-971646-2-1.
- Peráček, P., Varga, K., Gregora, P., & Mikulič, M. (2017). Selected indicators of an individual game performance of a goalkeeper at the European Championship among the 17-year-old elite soccer players. *Journal of Physical Education and Sport*, 17(1), 188-193.
- Přidal, V., (2012). *Herný výkon v športových hrách: Pojem - štruktúra - diagnostika*. [Game performance in sportsgames: Concept - structure - diagnosis] 2. upravené vydanie. Bratislava: ICM Agency. ISBN 978-80-89257-49-2.
- Santos, P.M., & Lago-Penas, C., (2019). Defensive positioning on the pitch in relation with situational variables of a professional football team during regaining possession. *Human Movement*, 20(2), 50–56.
- Sgro, F., Barresi, M., & Lipoma, M., (2015). The analysis of discriminant factors related to team match performances in the 2012 European Football Championship. *Journal of Physical Education and Sport*, 15(3), 460–465.
- Sgro, F., Crisafulli, G., & Lipoma, M., (2016). Technical performance profiles in the European Football Championship 2016. *Journal of Physical Education and Sport*, 16(4), 1304–1309.
- Smpokos, E., Mourikis, C., & Linardakis, M., (2018). Differences in motor activities of Greek professional football players who play most of the season (2016/17). *Journal of Physical Education and Sport*, 18(Suppl. 1), 490–496.
- Vales-Vázquez, A., Casal-López, C., Gómez-Rodríguez, P., Blanco-Pita, H., & Serra-Olivares, J., (2017). Competitive profile differences between the best-ranked European football Championships. *Human Movement*, 18(5), 97–105.