



## PLAYERS' PARTICIPATION IN TEAM POSSESSIONS OF THE 2014 FIFA® WORLD CUP SEMI-FINALISTS

original paper

DOI: <https://doi.org/10.5114/hm.2021.104186>

© Wrocław University of Health and Sport Sciences

CAUAN DE ALMEIDA<sup>1</sup>, RODRIGO SANTOS<sup>2</sup>, LUCAS MANTOVANI<sup>2</sup>, ISRAEL TEOLDO<sup>3</sup>

<sup>1</sup> América Futebol Clube, Belo Horizonte, Brazil

<sup>2</sup> Universidade Federal de Viçosa, Viçosa, Brazil

<sup>3</sup> Centre of Research and Studies in Soccer, Department of Physical Education, Universidade Federal de Viçosa, Viçosa, Brazil

### ABSTRACT

**Purpose.** In soccer, teammates are required to behave in a synchronized fashion to generate an effective unity. The study aim was to compare the number of players participating in team possessions of the 4 semi-finalists of the 2014 FIFA® World Cup.

**Methods.** The sample of this observational study comprised 2372 team possessions of the 2014 FIFA® World Cup semi-finalists (Germany, Argentina, the Netherlands, and Brazil). Descriptive analysis was performed, and the Kolmogorov-Smirnov normality test was applied. The Kruskal-Wallis and Mann-Whitney tests served to verify the overall and specific effects of the number of players participating in team possessions. Effect sizes were reported as Pearson's  $r$ . The significance level was set at  $p < 0.05$ . The SPSS software version 22 was used for statistical procedures.

**Results.** The tournament winners (Germany) displayed significantly higher means of the number of players per possession than the Netherlands and Brazil ( $U = 144.797$ ;  $p < 0.001$ ; small effect; and  $U = 158.501$ ;  $p < 0.001$ ; small effect, respectively), as did the runners-up, Argentina ( $U = 140.253$ ;  $p = 0.012$ ; negligible effect; and  $U = 154.226$ ;  $p < 0.001$ ; small effect, respectively). The Netherlands had a significantly higher mean number of players participating in team possessions than Brazil ( $U = 160.467$ ;  $p = 0.014$ ; negligible effect).

**Conclusions.** The teams who reached the tournament final circulated the ball by using more players than those eliminated in the semi-finals. Future studies should verify the potential utilization of the number of players as an indicator of competitive success.

**Key words:** soccer, world cup, team possessions, number of players

### Introduction

Soccer is characterized by complexity, emphasized by the actions of cooperation between teammates and opposition between opponents. These actions require players to behave in a synchronized fashion, as a functional unity, in order to deal with the demands of the game [1–3]. The relations between players within a team are structured through the development of a model of play, which shapes the different scales of team (i.e., from individual to collective), in accordance with the various scenarios that emerge within the game [4, 5].

Therefore, with respect to offensive organization, interactions between teammates aim to generate instabilities to the opposition, as well as to create scoring opportunities. So as to enable this coordination, the number of possible effective interactions turns out to be a key aspect, as a higher number of passing options is likely to increase uncertainty for the opposing defence [6, 7].

With the purpose of providing empirical support to this claim, Lemoine et al. [8] investigated aspects related to the transmission of the ball, with the purpose of verifying the effectiveness of one-touch playing in 5-a-side soccer games. The authors observed that

---

*Correspondence address:* Rodrigo de Miranda Monteiro Santos, Universidade Federal de Viçosa, Av. P. H. Rolfs, s/n, Campus Universitário, Viçosa, MG, Brazil, Postal Code: 36.570-900, e-mail: [mirandamonteiro@globocom](mailto:mirandamonteiro@globocom)

Received: June 18, 2020

Accepted for publication: October 4, 2020

*Citation:* Almeida C, Santos R, Mantovani L, Teoldo I. Players' participation in team possessions of the 2014 FIFA® World Cup semi-finalists. Hum Mov. 2022;23(1):44–49; doi: <https://doi.org/10.5114/hm.2021.104186>.

first-touch passing (i.e., when players did not contact the ball before passing it to a teammate) generated more instability to the opposition's defence when compared with sequences in which players touched the ball prior to a pass. In a similar fashion, Lemoine and Julien [9] verified that one-touch passing, besides exploiting passes in the opposition's backfoot and making deep passes behind the defence's back, also provided an economic, reliable, and safe alternative to progress towards the opponents' goal, in addition to creating more complexity to the opposition. Also, findings revealed that, on average, players did not need to increase their movement speed in order to keep the ball circulating at a quick tempo [9].

Although the information provided by the aforementioned studies is of uncontested relevance, the authors did not account for the number of players involved in the sequences (i.e., there is no information on how many players, on average, contacted the ball during the offensive sequences). This may happen to be a relevant variable, as a higher number of players directly engaged in ball circulation could influence the number of available passing options, and consequently increase uncertainty for the opposition and the chances of creating scoring opportunities. In this respect, several studies [10–12] demonstrated that the addition of extra players for the attacking team (i.e., the player was allowed to provide support only to the team in possession of the ball) in small-sided games increased the team's effective-play space and ball circulation, as well as players' tactical behaviour efficiency.

However, despite the importance of investigating the effectiveness of playing styles and additional players on teams' performances, to our knowledge, studies that sought to identify successful patterns of ball circulation through the analysis of the number of players participating in offensive sequences are relatively scarce in literature. Also, most of the studies that addressed this issue resorted to controlled drills and/or small-sided games, which could have affected the generalizability of the findings with respect to the representativeness of these tasks in relation to competitive contexts [13]. Therefore, analysing the average number of players that directly participate (i.e., contact the ball) in offensive sequences performed in professional tournaments, as well as its association with competitive results, is paramount to uncover the importance of this variable across different contexts and to verify its potential as an indicator of success. Besides, intercontinental tournaments, particularly the FIFA® World Cup, are representative models to help identify the idiosyncrasies of teams and players from different regions of

the globe within the same competition [14]. Finally, the FIFA® World Cup is contested by the most talented players in the world, and is considered the main stage where the best national teams display the latest playing styles. Therefore, investigating how the World Cup semi-finalists use these talented players to circulate the ball and increase instability for the opposing defences throughout the tournament is likely to provide an appropriate reference for analysis [15].

Thus, the aim of this study was to analyse the number of players participating in the team possessions of the 4 semi-finalists of the 2014 FIFA® World Cup. We hypothesized that this variable was capable of distinguishing the teams who reached the final from those eliminated in the semi-finals.

## Material and methods

### Sample

The sample comprised 2372 offensive sequences (team possessions) of the 7 matches of each of the 4 semi-finalists (Germany, Argentina, Brazil, and the Netherlands) of the 2014 FIFA® World Cup. We analysed the number of players of the team in possession who contacted the ball during these offensive sequences.

### Data collection procedures

In this study, the observational methodology was applied, with a punctual, nomothetic, unidimensional design [16]. The data were collected from videos of the matches broadcast by a local TV station. Video analysis was performed with the LongoMatch® video software (version 0.20.8) and registered in spreadsheets of Microsoft® Excel 2016 for Windows®.

The analysis of the number of players was based on the concept proposed by Garganta [17], who identifies this variable as an indicator of players' degree of participation in an offensive sequence. Also, the author defines the start of a team's possession when one of the players fulfils at least one of the following criteria: (i) performs at least 3 consecutive ball touches; (ii) correctly passes the ball to a teammate; (iii) shoots the ball towards the opponent's goal.

### Data analysis procedures

Descriptive analyses (means and standard deviation) were performed for the number of players who contacted the ball; the Kolmogorov-Smirnov normality test was applied. The Kruskal-Wallis test served to

verify the overall effect of the number of players among teams; it was followed by the Mann-Whitney *U* post-hoc test. Effect sizes were determined by rank-biserial correlation (*r*) [18]. The magnitude of effect sizes was classified as follows: negligible effect ( $< 0.1$ ), small effect ( $0.1-0.3$ ), intermediate effect ( $0.3-0.5$ ), and large effect ( $> 0.5$ ) [19]. The significance level was set at  $p < 0.05$ . Reliability was calculated with the test-retest method, with a 20-day interval for reanalysis in order to avoid task familiarity issues [20]. The values of Cohen's kappa ( $\kappa$ ) were used to assess inter- ( $\kappa = 0.769$ ) and intra-observer ( $\kappa = 0.771$ ) agreement. Observers reanalysed 224 offensive sequences (16.42% of the sample), a higher percentage than the one (10%) recommended by literature [21]. All statistical procedures were performed by using the IBM SPSS software, version 22.0.

### Ethical approval

The conducted research is not related to either human or animal use.

### Results

There was a main effect of the number of players ( $H = 50.35$ ;  $p < 0.001$ ). It was possible to observe that the tournament winner (Germany) had significantly more players participating in team possessions when compared with the Netherlands and Brazil ( $U = 144.797$ ;  $p < 0.001$ ;  $r = 0.103$ ; and  $U = 158.501$ ;  $p < 0.001$ ;  $r = 0.176$ , respectively), although not with the runners-up, Argentina ( $U = 168.387$ ;  $p = 0.235$ ). In addition, the results displayed a significantly higher average number of players participating in Argentina's team possessions in comparison with the Netherlands and Brazil ( $U = 140.253$ ;  $p = 0.012$ ;  $r = 0.075$ ; and  $U = 154.226$ ;

$p < 0.001$ ;  $r = 0.147$ , respectively), who were the third- and fourth-placed teams, respectively. Also, the Netherlands had, on average, a significantly higher number of players participating in team possessions than the fourth-placed team, Brazil ( $U = 160.467$ ;  $p = 0.014$ ;  $r = 0.069$ ) (Table 1).

### Discussion

The aim of this study was to analyse the number of players participating in the team possessions of the 4 semi-finalists of the 2014 FIFA® World Cup. The findings revealed that the teams who reached the tournament's final (Germany and Argentina) displayed significantly higher mean numbers of players participating in the team possessions in comparison with the remaining teams. Therefore, it is possible to assume that the German and Argentinian teams employed a style of play predominantly characterized by an indirect attacking method, with more teammates providing constant support to the player in possession during the offensive phase [22, 23]. Teams usually take most advantage of this offensive method, formally known as positional attack, when a large number of different players participate in team possessions, most likely as a result of increased support to the player in possession.

After having normalized the data from a study by Reep and Benjamin [24] – who had claimed that short passing sequences led to more goals than those with more passes – Hughes and Franks [25] observed a significantly higher frequency of shots per possession at longer passing sequences (i.e., team possessions with more than 8 passes) compared with those with fewer passes. Although the data did not include the number of players participating in these passing sequences, it

Table 1. Means and standard deviations of the analysed variables, in accordance with the teams' final tournament placement

Teams	Final placement	Total TP	Total NP	NP (mean $\pm$ SD)	Comparisons	<i>p</i>
Germany	1 <sup>st</sup>	613	2829	4.62 $\pm$ 2.3	1 <sup>st</sup> vs. 2 <sup>nd</sup>	0.235
Argentina	2 <sup>nd</sup>	572	2535	4.43 $\pm$ 2.2	2 <sup>nd</sup> vs. 3 <sup>rd</sup>	0.013*
Netherlands	3 <sup>rd</sup>	537	2226	4.15 $\pm$ 2.3	3 <sup>rd</sup> vs. 4 <sup>th</sup>	0.010*
Brazil	4 <sup>th</sup>	650	2444	3.76 $\pm$ 2.0	1 <sup>st</sup> vs. 4 <sup>th</sup>	$< 0.001$ *
					1 <sup>st</sup> vs. 3 <sup>rd</sup>	$< 0.001$ *
					2 <sup>nd</sup> vs. 4 <sup>th</sup>	$< 0.001$ *

Total TP – overall number of team possessions, total NP – number of players participating in team possessions, NP – average number of players participating in team possessions

Comparisons between teams in accordance with their final placement in the competition and values of statistical significance (*p*) are shown at the right of the table.

\* Statistically significant difference ( $p < 0.05$ )

is difficult to conceive that such frequency of passes in a single team possession would have been possible with only 2 or 3 different players, for instance, contacting the ball. However, it also needs to be pondered that the data replicated in the study derive from matches played between 1953 and 1968, a period when the space near the ball was less densely occupied, which allowed for (theoretically, at least) longer passing sequences with fewer players [26].

More recently, Lago-Ballesteros et al. [27] analysed the influence of different playing tactics on successfully achieving possession in the penalty area (score-box). Although the authors concluded that direct attacks and counterattacks led to more possessions in the penalty area when compared with elaborate (positional) attacks, their findings showed that offensive sequences in which 6 or more players contacted the ball (described as ‘macrogroup’ possessions) resulted in possessions in the score-box in more than 67% of cases. Also, ‘macrogroup’ possessions led to significantly more ball possessions in the penalty area when compared with ‘micro-’ (1–3 players involved) and ‘mesogroup’ (4–5 players involved) possessions [27]. We argue that one of the factors that may have contributed to these seemingly conflicting findings is the degree of ambiguity of the criteria proposed by the authors to analyse the variable ‘team possession type’ (categorized as elaborate attack, direct attack, and counterattack), since some of the definitions (e.g., ‘meticulous build-up consisting of many passes between defence and midfield’) may not have been sufficiently accurate and detailed to allow for a more objective analysis. In addition, despite having displayed a substantial ( $\kappa = 0.78$ ) strength of agreement [28], the inter-observer reliability for the ‘team possession type’ variable exhibited the lowest value among all the variables analysed in the study [27].

Most importantly, it was possible to observe that our findings were substantiated by data reported in previous research that indicated the effectiveness of a particular style of ball circulation (i.e., longer passing sequences, with more players contacting the ball) on successful attacking outcomes [29, 30]. Moreover, the fact that the differences between the teams were in accordance with their final placement in the tournament (except between the winners and runners-up, which could be one of the reasons why the final match was closely contested, having been decided only in extra-time) suggests that the number of players directly involved in team possessions may be an indicator of success in this competition [31].

Still, it should be mentioned that only the 7 matches

played by each semi-finalist during the 2014 FIFA® World Cup were analysed (totalling 28 analysed matches). Hence, further studies are necessary to verify whether our findings are also applicable to teams eliminated in previous tournament stages [32]. Also, researchers should consider including other variables in the analyses, such as the amplitude of ball circulation or the positional roles of players involved in team possessions, as well as investigating matches from the latest World Cup edition or perhaps even incorporating competitions at the club level. Finally, our findings may have relevant implications to coaches, as they should encourage players who were usually restricted to off-the-ball or defensive actions to participate more directly in team possessions in order to generate more complexity and unpredictability to the opposition, which might contribute to long-term competitive success.

## Conclusions

This study investigated the number of players participating in team possessions of the 4 semi-finalists of the 2014 FIFA® World Cup. The findings indicated that the finalists (Germany and Argentina) had more players participating in team possessions in comparison with the teams who were eliminated in the semi-finals (the Netherlands and Brazil). Researchers should conduct further investigations in order to increase the likelihood of generalizability of these findings with respect to other tournaments.

## Acknowledgments

This work was supported by SEESP-MG, FAPEMIG, CNPq, Funarbe, the Dean’s Office for Graduate and Research Studies, and the Centre of Life and Health Sciences at the Universidade Federal de Viçosa, Brazil. The study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Brazil (finance code: 001).

## Disclosure statement

No author has any financial interest or received any financial benefit from this research.

## Conflict of interest

The authors state no conflict of interest.

## References

1. Gréhaigne J-F, Bouthier D, David B. Dynamic-system analysis of opponent relationships in collective actions in soccer. *J Sports Sci.* 1997;15(2):137–149; doi: 10.1080/026404197367416.



2. McGarry T. Soccer as a dynamical system: some theoretical considerations. In: Reilly T, Cabri J, Araújo D (eds.), *Science and football V: the proceedings of the Fifth World Congress on Science and Football*. London: Routledge; 2005; 570–579.
3. Silva P, Chung D, Carvalho T, Cardoso T, Davids K, Araújo D, et al. Practice effects on intra-team synergies in football teams. *Hum Mov Sci*. 2016;46:39–51; doi: 10.1016/j.humov.2015.11.017.
4. Teoldo I, Guilherme J, Garganta J. *Training football for smart playing: on tactical performance of teams and players*. Curitiba: Appris; 2017.
5. McGarry T. Applied and theoretical perspectives of performance analysis in sport: scientific issues and challenges. *Int J Perform Anal Sport*. 2009;9(1):128–140; doi: 10.1080/24748668.2009.11868469.
6. Lemoine A, Jullien H. Study of the production of information in the context of the instantaneous transmission of the ball in football [in French]. *J Rech Interv Educ Phys Sport*. 2004;6:47–55.
7. Dugrand M. *Football, from transparency to complexity* [in French]. Paris: Presses Universitaires de France; 1989.
8. Lemoine A, Jullien H, Ahmaidi S. Technical and tactical analysis of one-touch playing in soccer – study of the production of information. *Int J Perform Anal Sport*. 2005;5(1):83–103; doi: 10.1080/24748668.2005.11868318.
9. Lemoine A, Jullien H. Defensive play and patterns of play in football [in French]. *J Rech Interv Educ Phys Sport*. 2008;15:5–19; doi: 10.4000/ejrieps.5776.
10. Praça GM, Folgado H, Pereira de Andrade AG, Greco PJ. Influence of additional players on collective tactical behavior in small-sided soccer games. *Rev Bras Cineantropom Desempenho Hum*. 2016;18(1):62–71; doi: 10.5007/1980-0037.2015v17n5p62.
11. Padilha MB, Guilherme J, Serra-Olivares J, Roca A, Teoldo I. The influence of floaters on players' tactical behaviour in small-sided and conditioned soccer games. *Int J Perform Anal Sport*. 2017;17(5):721–736; doi: 10.1080/24748668.2017.1390723.
12. Moniz F, Scaglia A, Sarmento H, García-Calvo T, Teoldo I. Effect of an inside floater on soccer players tactical behaviour in small sided and conditioned games. *J Hum Kinet*. 2020;71(1):167–177; doi: 10.2478/hukin-2019-0080.
13. Santos R, Duarte R, Davids K, Teoldo I. Interpersonal coordination in soccer: interpreting literature to enhance the representativeness of task design, from dyads to teams. *Front Psychol*. 2018;9:2550; doi: 10.3389/fpsyg.2018.02550.
14. McLean S, Salmon PM, Gorman AD, Naughton M, Solomon C. Do inter-continental playing styles exist? Using social network analysis to compare goals from the 2016 EURO and COPA football tournaments knockout stages. *Theor Issues Ergon Sci*. 2017;18(4):370–383; doi: 10.1080/1463922X.2017.1290158.
15. Yi Q, Gómez MA, Wang L, Huang G, Zhang H, Liu H. Technical and physical match performance of teams in the 2018 FIFA World Cup: effects of two different playing styles. *J Sports Sci*. 2019;37(22):2569–2577; doi: 10.1080/02640414.2019.1648120.
16. Preciado M, Anguera MT, Olarte M, Lapresa D. Observational studies in male elite football: a systematic mixed study review. *Front Psychol*. 2019;10:2077; doi: 10.3389/fpsyg.2019.02077.
17. Garganta JM. *Tactical modelling of a football game: a study of the organization of the offensive phase in high performance teams* [in Portuguese]. Porto: Universidade do Porto; 1997.
18. Cureton EE. Rank-biserial correlation. *Psychometrika*. 1956;21(3):287–290; doi: 10.1007/BF02289138.
19. Cohen J. *Statistical power analysis for the behavioral sciences*, 2<sup>nd</sup> ed. New York: Lawrence Erlbaum Associates; 1988.
20. Robinson G, O'Donoghue P. A weighted kappa statistic for reliability testing in performance analysis of sport. *Int J Perform Anal Sport*. 2007;7(1):12–19; doi: 10.1080/24748668.2007.11868383.
21. Tabachnick BG, Fidell LS. *Using multivariate statistics: international edition*, 6<sup>th</sup> ed. London: Pearson Education; 2012.
22. Clemente FM, Sarmento H, Praça GM, Nikolaidis PT, Rosemann T, Knechtle B. Variations of network centralities between playing positions in favorable and unfavorable close and unbalanced scores during the 2018 FIFA World Cup. *Front Psychol*. 2019;10:1802; doi: 10.3389/fpsyg.2019.01802.
23. Sarmento H, Clemente FM, Gonçalves E, Harper LD, Dias D, Figueiredo A. Analysis of the offensive process of AS Monaco professional soccer team: a mixed-method approach. *Chaos Soliton Fract*. 2020;133:109676; doi: 10.1016/j.chaos.2020.109676.
24. Reep C, Benjamin B. Skill and chance in association football. *J R Stat Soc Ser A*. 1968;131(4):581–585; doi: 10.2307/2343726.
25. Hughes M, Franks I. Analysis of passing sequences, shots and goals in soccer. *J Sports Sci*. 2005;23(5):509–514; doi: 10.1080/02640410410001716779.
26. Wallace JL, Norton KI. Evolution of World Cup soccer final games 1966–2010: game structure, speed and play patterns. *J Sci Med Sport*. 2014;17(2):223–228; doi: 10.1016/j.jsams.2013.03.016.
27. Lago-Ballesteros J, Lago-Peñas C, Rey E. The effect of playing tactics and situational variables on achieving score-box possessions in a professional soccer team. *J Sports Sci*. 2012;30(14):1455–1461; doi: 10.1080/02640414.2012.712715.
28. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33(1):159–174; doi: 10.2307/2529310.
29. Yi Q, Liu H, Nassis GP, Gómez M-Á. Evolutionary trends of players' technical characteristics in the UEFA Champions League. *Front Psychol*. 2020;11:1032; doi: 10.3389/fpsyg.2020.01032.

30. Aquino R, Garganta J, Manechini JPV, Bedo BLS, Pugina EF. Effects of match situational variables on possession: the case of England Premier League season 2015/16. *Mot Rev Educ Fis.* 2017;23(3):e101794; doi: 10.1590/S1980-6574201700030015.
31. Alves DL, Osiecki R, Palumbo DP, Moiano-Junior JVM, Oneda G, Cruz R. What variables can differentiate winning and losing teams in the group and final stages of the 2018 FIFA World Cup? *Int J Perform Anal Sport.* 2019;19(2):248–257; doi: 10.1080/24748668.2019.1593096.
32. Lord F, Pyne DB, Welvaert M, Mara JK. Methods of performance analysis in team invasion sports: a systematic review. *J Sports Sci.* 2020;38(20):2338–2349; doi: 10.1080/02640414.2020.1785185.