



Press Release

## Quantifying the role of chance in professional football

***A German Sport University Cologne study shows, half of all goals scored are influenced by chance***

Cologne, June 7, 2021

***In the German Bundesliga, FC Bayern Munich has just become champion for the ninth time in a row. Yet there are always those great moments in professional football that come like a bolt out of the blue, for example Greece winning the European Championship title in 2004 or Leicester City's grabbing that sensational Premier League title in 2016, which begs the question: Can we always find a systematic explanation for success? Or does chance ultimately play a decisive role?***

In football, chance is defined as actions or situations occurring during the game that cannot be planned and are therefore difficult to train for. Take for instance deflected shots, balls that rebound off the post only to be kicked straight into the goal or goals that are unintentionally assisted by a defender. The primary focus of most researchers has been on analysing success factors, to enable the coach to build these systematically into the training programme. But they have often neglected to include the pure chance factor at play. This is because of the difficulty of integrating such random chance factors into training routines and game patterns.

A recent study led by Prof. Dr. Daniel Memmert, Executive Head of the Institute of Exercise Training and Sports Informatics at the German Sport University Cologne shows that such factors still warrant closer examination. The research team analysed a total of 7,263 goals scored in the English Premier League in the 2012/13 to 2018/19 seasons, leading to the publication in the *Journal of Sports Sciences* of the largest Big Data study to date, on chance as a factor in professional football. In order to be able to quantify randomness in football by identifying chance and its influence in the goal-scoring process, six basic variables were selected, including goals following a rebound, long-range shots, deflected shots or goals created by defensive errors like, for instance, own goals. In addition, the study takes into account nine further situational variables, which include season, matchday, match location, match situation, goal number or team strength. All 7,263 goals were then evaluated for the presence of the variables mentioned.

The researchers' findings turn up surprising results: in almost every second goal scored (46%), some form of random influence has been identified. Furthermore, there is a pronounced increase in the proportion of chance goals scored by weaker teams, but also for goals scored when

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**Paper:**

The influence of randomness on goals in football decreases over time. An empirical analysis of randomness involved in goal scoring in the English Premier League

[Link](#)

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the current scoreline is a draw. Moreover, the occurrence of chance goals is dependent on the match situation (open play, free kick, corner, penalty kick). Sport scientist Fabian Wunderlich, first author of the recently published paper sums up the findings: "The results clearly highlight the essential role of chance in football, as almost every second goal benefits from random influence." Wunderlich goes on to note: "Another interesting finding is that the proportion of chance goals has dropped from 50 per cent to 44 per cent over the seven seasons. This might be caused by the fact that match preparation is becoming increasingly professional and data-based driven, or that players are becoming better trained technically as well as tactically."

Within the evaluated data set of 2,451 matches, more than 60 per cent of all matches ended either in a draw or with a goal difference of one goal. "A single random goal can therefore be enough to significantly change the outcome of a match. Thus, chance is not only highly relevant in the case of that particular goal. Chance also plays a significant role in deciding the final score of the match," concludes co-author, Prof. Dr. Memmert.

The research team is convinced that a better understanding of random influences in football can have important implications for research and practice. Coaches and match analysts should bring chance into the equation as a decisive factor while taking much greater cognizance of the difference between performance and success. Memmert suggests, "Coaches could even consider deliberately creating uncontrollable situations to provoke random influences in the goal-scoring process".

Indeed, the relevance of chance seems to be diminishing, at least according to this study. However, pure chance and good luck are still likely to continue throwing up one or two surprises in football.

*By the way: Prof. Memmert is guest in the latest episode of our sport science podcast ["Eine Runde mit..."](#), sharing his expertise on the role of chance but also discussing many other influences affecting the game of football today.*