DOI 10.26773/smj.240704

SportMont

ORIGINAL SCIENTIFIC PAPER

# Positional Differences in the Efficacy of Critical End-of-Game Possessions in EuroLeague Basketball

Panagiotis Foteinakis[1], Stefania Pavlidou[1]

[1]Department of Physical Education and Sport Science, Democritus University of Thrace

**Abstract**

In close basketball games where the final score is within a 5-point difference, end-of-game possessions are very important. However, previous studies have not examined the efficiency of various play types' possessions regarding player positions. Therefore, the study aimed to identify play type actions during end-of-game possessions across player positions (guard, forward, and big) that directly influence the possession's outcome. The analysis evaluated 1009 possessions from 100 EuroLeague games from the 2022-2023 and 2023-2024 regular seasons using Sport Scout observation software (SportScout Group, Thessaloniki, Greece). The variables observed included isolation (ISO), pick and roll ball handler (PnRBH), pick and roll screener (PnRSC), off-ball screens (OBS), transition (TR), cuts (CUT), spot-up shooting (SUP), post-ups (PUP), handoffs (HO), inbound plays (IN), and putbacks (PB). Possession efficiency was evaluated based on points per possession (PPP) and the possession's outcome (positive or negative). Chi-square ($\chi 2$) tests compared categorical variables, while the Kruskal–Wallis test assessed PPP differences across player positions. Additionally, the chi-square automatic interaction detector (CHAID) decision tree model was used to classify data and make meaningful predictions for the possession play types. The findings revealed that player positions significantly influenced possession efficiency, with noticeable variations in possession distribution. Decision tree analysis underscored the impact of possession play types on outcomes across player positions. In conclusion, the study highlights the predominant role of guards in end-of-game possessions, relying heavily on isolation plays but achieving higher efficiency with teamwork-oriented strategies. Forwards demonstrate effectiveness in offensive rebounding situations and off-ball movement, while big players exhibit efficiency in proximity to the basket.

***Keywords:*** *basketball, play type, observation analysis, crunch time*

## Introduction

Observational analysis in basketball entails systematically examining various aspects of the game to gain insights into player performance and team dynamics. This analytical approach is essential for coaches, analysts, and researchers aiming to deepen their understanding of the sport. Evaluating critical performance indicators of players and teams is essential in sports analysis (Sarlis & Tjortjis, 2020).

The offensive strategies employed by teams are essential to their success (Fichman & O'Brien, 2019). Teams adopt various offensive play types tailored to the abilities of their players (Chen, Zhang & Xu, 2023). In basketball, a play type is a specific pattern or strategy a team utilizes during offensive possessions to create scoring opportunities. While a team typically incorporates multiple play types into its offensive playbook, not all may suit every player. Examples of play types include isolation (ISO), pick and roll (PnR), off-ball screens (OBS), transition (TR), cuts (CUT), spot-up

Correspondence:

Panagiotis Foteinakis
Democritus University of Thrace, Department of Physical Education and Sport Science, University Campus, 69132 Komotini, Greece
E-mail: pfotinak@phyed.duth.gr

shooting (SUP), post-ups (PUP), handoffs (HO), inbound plays (IN), and putbacks (PB) (Božović, 2021; Christmann, Akamphuber, Müllenbach & Güllich, 2018).

Classifying actions within play types and analyzing their relationship to the outcome of these actions allows coaches to develop and improve offenses based on team strengths and individual player abilities. Research into team offensive play types underscores the importance of PnR effectiveness for overall team success (Marmarinos, Apostolidis, Kostopoulos & Apostolidis, 2016), the efficacy of ISO actions in EuroLeague play (Matulaitis & Bietkis, 2021), and the effectiveness of shorter-duration actions (Christmann et al., 2018). Akinci (2023) discovered that playoff teams prominently used OBS possessions, while PnR ball handlers (PnRBH), and SUP possessions and points were used by highly skilled players.

Traditionally, basketball player positions have been classified into three main categories based on their similarities: guards, forwards, and centers (Sampaio, Ibañez Godoy, Gómez Ruano, Lorenzo Calvo, & Ortega Toro, 2008). The analysis of players' technical–tactical performance has been studied for several years (Remmert & Chau, 2019; Vaquera, García–Tormo, Gómez Ruano, & Morante, 2016). According to Sampaio, Janeira, Ibáñez, and Lorenzo (2006), evaluating players' game performance requires reference to specific normative data pertaining to their playing position. In recent years, researchers have increasingly employed dynamic and sophisticated analytical techniques such as decision trees (DT) to identify patterns in player behavior and performance (Morgan, Williams & Barnes, 2013).

In competitive basketball, match outcomes often depend on end-of-game possessions, with strategic maneuvers and tactical decisions of players under intense pressure playing a critical role (Bar–Eli & Tractinsky, 2000). During these critical moments, the ability of the players to rise to the occasion becomes the defining factor. However, few studies have explored the impact of different play types on game performance during end-of-game possessions at the player level in close EuroLeague contests.

The existing literature primarily categorizes players into playing positions like ball handlers, wings and bigs, exploring offensive structures, player roles, and possession styles in basketball. Still, it does not extensively analyze how these roles influence performance in clutch situations, with player play type being a relatively underexplored area, with limited research on this topic (Chen et al., 2023). While some studies touch upon the play types in critical end-of-game situations (Christmann et al., 2018; Foteinakis, Pavlidou & Stavropoulos, 2024), revealing that more cooperative play types were more efficient in crunch time situations and longer-lasting possessions were less effective, there is a lack of comparative analysis between different player positions in the context of critical end-of-game possessions.

Understanding how guards, forwards, and bigs perform in high-pressure situations and how their roles influence team success in crunch time across different play type possessions is essential for optimizing performance in late-game scenarios.

Addressing these research gaps can contribute to a better understanding of positional differences in the efficacy of critical end-of-game possessions and inform coaches, players and analysts in developing more effective game strategies. Therefore, this study aimed to identify the play type actions during end-of-game possessions across player positions (guard, forward, and big) that directly influence the outcome of each possession.

## Methods

*Sample, Data Collection, and Observation Instrument*

The study sample comprised 100 games from the 2022–2023 and 2023–2024 regular seasons of the EuroLeague, observed via the publicly accessible EuroLeague TV (http://tv.euroleague.net/). Matches were selected based on a criterion of ending with a score differential within five points to focus on games where the outcome remained uncertain in the final 2 min. Categorized as miscellaneous play types, 233 possessions were excluded from analysis, resulting in 1009 possessions recorded within the last 120 seconds of the fourth quarter and overtime. The mean score difference at the games' conclusion was 3.17 ± 1.44 points (mean ± SD).

The sample encompassed all EuroLeague teams from the specified regular seasons. As the study was purely observational, conducted in a natural setting without any experimentation, and the data collected were publicly televised and accessible, obtaining informed consent from the competitors was not deemed necessary (American Psychological Association Ethical Principles of Psychologists and Code of Conduct, 2002).

The Sport Scout observation analysis software (Sport Scout STA Ver. 3.2, SportScout Group, Thessaloniki, Greece), facilitated game analysis, with results recorded on a Microsoft Excel spreadsheet (Microsoft Inc., Washington USA).

*Procedure and Variables*

The games were analyzed by a seasoned professional basketball coach and Sports Sciences graduate with over 20 years of experience in basketball performance analysis. The observation protocol was designed to document the offensive play types used by the teams during the games. Based on previous research (Božović, 2021; Christmann et al., 2018), 11 play-type possessions were selected, with definitions provided in Table 1. Player positions were categorized into three levels: guard, forward, and big. To assess the efficiency of end-of-game possessions play types, the following variables were analyzed: points per possession (PPP) and possession outcome (whether a 2-point or 3-point shot was made, fouls without and with bonus free throws, goal fouls, and turnovers, including offensive fouls).

A possession was deemed positive if the team scored a two-point (2p) or three-point (3p) shot, obtained a basket and foul for 2p or 3p (2pF, 3pF), or received a foul without bonus free throws (FO) or with bonus free throws (FT1, FT2, FT3). Conversely, a possession was considered negative if the team missed a shot (−3p, −2p), committed any type of turnover (TO), or had a shot blocked (BL).

The observer reanalyzed five randomly selected games after a 4-week interval to validate the data. The results from the initial observation were compared with those from the second, yielding Cohen's Kappa intra-observer correlation coefficients ranging from 0.81 to 0.96, indicating excellent agreement rates (Altman, 1991).

*Statistical Analysis*

This study utilized SPSS 29 software (IBM Corp, Armonk,

**Table 1.** Definition and description of the examined play types and the offensive outcome of the possession.

| Variables | Definition and description |
|---|---|
| | **Offensive Outcome** |
| Positive | Possession finished with a made Field Goal for 2 or 3 points (2P, 3P), a basket and foul for 2-p or 3p (2PF, 3PF), and when the offense received a foul with no bonus Free Throws (FO) or a foul with bonus Free Throws (FT1, FT2, FT3). |
| Negative | Possession finished with a missed shot (-3P, -2P), made a turnover of any kind (TO, including offensive fouls) and had a blocked shot (BL). |
| PPP | The average number of points that a team scores during a possession. |
| **Offensive Play Types** | |
| Pick and Roll Ball-Handler (PnRBH) | Possession finished by the ball-handler in the pick-and-roll. Includes off-dribble shots or direct shots before dribbling off the screen, pull-ups, and floaters, by that player. Includes also possessions where the ball handler rejects the screen (dribbles away from the screen). |
| Pick and Roll Screener (PnRSC) | Possession play type where the ball-screener receives the ball. These are the slips, rolls, and pops from screeners in the pick-and-roll. |
| Transition (TR) | Transition possession before the defense is set within 5-8 seconds. |
| Spot Up (SUP) | Possession finished with a catch and shot or catch and drive. They can be catching and shooting, attacking a close-out by dribbling into a pull-up, dribbling into a floater, or driving to the rim. |
| Isolation (ISO) | Possession play type where the player is in a 1vs1 situation trying to size up and create space from his defender. |
| Hand-Offs (HO) | Possession play type where the screener with or without dribbling hands over the ball to a player cutting towards him, acting as an immediate screener creating space for his teammate. |
| Cuts (CUT) | Possession play type, in which the player without a screen cuts out or toward the ball to receive it. Includes backdoor cuts, flash cuts, and spacing when a player is getting open near the basket. |
| Putbacks (PB) | Possession play type where a tip in or quick shot happens after offensive rebound. |
| Post Ups (PUP) | Possession with the player receiving the ball with his back to the basket in proximity or inside the paint area. |
| Off Ball Screen (OBS) | Possession is generated by a player running off a screen, whether it be a pin-down, flare screen, elevator screen, or any other of the plethora of screen variations before they receive the ball. This includes curls and fades. |
| Miscellaneous (M) | Possession that does not fit in the above categories. Includes but is not limited to possessions such as: Players being fouled in the backcourt, errant passes out of bounds, possessions where the player dribbles into a pull-up 3-point shot in the halfcourt, inbounds passes that go directly out of bounds, technical fouls, etc. |
| Inbound Play (IN) | Possession that is generated from the sideline or the baseline and creates a spatial advantage for the player. For this study, the inbound play types were recorded only when it was concluded within 4 seconds after the inbound pass. |

NY, USA) for statistical analysis (Beddo & Kreuter, 2004). Contingency table analysis, employing a chi-square ($\chi 2$) distribution, was conducted for group comparisons among categorical variables (play type, player position, and offensive outcome). Interpretation of chi-square contingency-table test results was facilitated through post hoc and planned comparison procedures (Garcia-Perez & Nunez-Anton, 2003). Furthermore, a Kruskal–Wallis test was employed to assess the variance in PPP across player positions. To evaluate the relative significance of play type and player position in determining possession effectiveness and to construct an efficient end-of-game play type model, we developed a chi-square automatic interaction detector (CHAID) decision tree model. The model delineated parent nodes from no fewer than 100 cases and subsidiary nodes from no fewer than 50 cases. Classification trees, known for their capacity to model non-linear phenomena and make insightful predictions, were utilized to analyze the data (Marques & Ighalo, 2022). A value of $p < 0.05$ was applied to determine statistical significance.

## Results

According to the results (Table 2), a significant effect of the position of the player was observed regarding the frequency distribution of the different play types ($\chi 2=519.276$, df=20, $p < 0.001$). Guards used statistically more significant ISO play type possessions (31.2%, $p<0.001$), followed by PnRBH (23.9%, $p<0.001$), and SUP (16%) possessions. On the other hand, the predominant play-type possessions for the forward position were SUP (28.3%, $p<0.001$), followed by ISO (22.4%) possessions. PnRSC (29.8%, $p<0.001$), PB (16.2%, $p<0.001$), and PUP (12.6%, $p<0.001$) were the most frequent play-type possessions between the big position. Overall, guards finished 59.4% of the total end-of-game possessions, while forwards 21.7% and bigs 18.9%.

Concerning the effectiveness (positive or negative) of the possession between the positions of the players, CHAID analysis was used (Figure 1). The end-of-game possessions play type and the different positions of the players were the independent variables included in the model. The root of this tree contains all 1009 ob-

**Table 2.** The percentages of the possessions play-type regarding the position of the player.

| Play Types | Position of the Player | | | |
|---|---|---|---|---|
| | Guard | Forward | Big | Total |
| Transition | 13.9%** | 10.3% | 6.9%** | 11.8% |
| PnR Ball-Handler | 23.9%** | 6.9%** | - | 15.7% |
| PnR Screener | - | 2.7%* | 29.8%** | 6.2% |
| Isolation | 31.2%** | 22.4% | 9.9%** | 25.3% |
| Spot Up | 16% | 28.3%** | 9.4%** | 17.4% |
| Post Up | 0.7%** | 5.5% | 12.6%** | 4% |
| Putback | 0.5%** | 4.6% | 16.2%** | 4.4% |
| Hand-Off | 1.2% | 0.5% | 1% | 1% |
| Off Ball Screen | 3.7%* | 2.3% | 0.5%* | 2.8% |
| Inbound | 8.2% | 10.5% | 3.7%* | 7.8% |
| Cut | 0.8%** | 5.9%* | 9.9%** | 3.7% |
| Total | 59.4%** | 21.7% | 18.9% | 100% |

Note Bottom row (total) percentages are row-wise: Total distribution of play types between the position of the players. Right column (total) percentages are column-wise: total distribution of play-types. Percentages within cells are column-wise: distribution of play types within the position of the player. *p < 0.05; **p < .001.

servations in this dataset. 506 (50.1%) possessions had a positive outcome. The model successfully classified 294 of 506 positive outcomes of possession (58.1%) and 287 of the 503 negative possession outcomes (57.1%). The big position (Node 2) was found to have 62.3% possessions with a positive outcome, which is a statistically more significant result ($\chi2$=17.838, df=1, p<0.001) compared with guard and forward positions (47.3% positive possessions, Node 1). Regarding the play type of the possessions, guard and forward positions were found to be statistically more effective ($\chi2$=19.315, df=2, p<0.05), when the end-of-game possessions were PUP, PnRBH, TR, HO, PB, and CUT (54.9% positive outcome, Node 3), while possession play type SUP (65.2% negative outcome, Node 5) and ISO, PnRSC, OBS and IN possession play types were less effective (54% negative outcome, Node 4). Concerning the position of the big players, the results revealed that play-type possessions of TR, HO, PB, CUT, and IN ($\chi2$=14.857, df=1, p<0.05) were statistically more effective (80.3% positive outcome, Node 7) compared with PUP, PnRBH, ISO, PnRSC, SUP and OBS play type possessions (51.7% positive outcome, Node 6).

Regarding the efficiency of the possession, the Kruskal-Wallis test indicated that there was no significant difference in PPP across the positions of the players ($\chi2$=5.708, df=2,

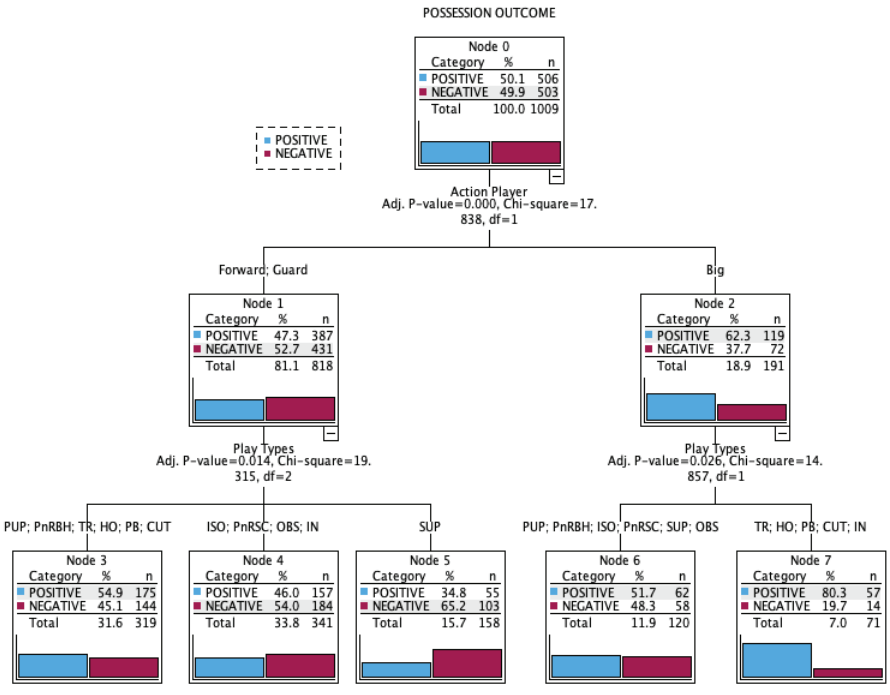


FIGURE 1. CHAID tree describing the frequency effectiveness (%) of the classification and predictive end of game play type possessions.
Note PUP - post-ups; PnRBH - pick and roll ball handler; TR - transition; HO – handoffs; PB – putbacks; CUT – cuts; ISO – isolation; PnRSC - pick and roll screener; OBS - off-ball screens; IN - inbound plays; SUP - spot-up shooting

p=0.058) with a mean rank PPP score of 498.37 for guards, 477.30 for forwards, and 539.37 for bigs. As depicted in Table 2, guard's most effective play-type possession was TR (1.31 PPP), followed by CUT (1.20 PPP) and PnRBH (1.09 PPP). Forwards, on the other hand, produced 2.5 PPP from OBS possessions, 1.55 PPP from CUT, and 1.20 PPP from PUP. IN (1.83 PPP), TR (1.67 PPP), and CUT (1.59 PPP) produced higher-scoring possessions for the big playing position.

**Table 3.** Points Per Possession (PPP) between the playing position of the players regarding the play type of the possession.

| Efficiency (Points Per Possession, PPP) | | | | |
|---|---|---|---|---|
| **Play Types** | **Position of the Player** | | | |
| | Guard | Forward | Big | Total |
| Transition | 1.30 | .88 | 1.67 | 1.25 |
| PnR Ball-Handler | 1.11 | .42 | - | 1.05 |
| PnR Screener | - | .33 | 1.09 | 1.02 |
| Isolation | .96 | 0.98 | 1.16 | .98 |
| Spot Up | .95 | .87 | 1.22 | .95 |
| Post Up | .25 | 1.33 | .70 | .85 |
| Putback | 2 | .80 | 1.35 | 1.27 |
| Hand-Off | 2.2 | 0 | 1 | 1.80 |
| Off Ball Screen | .68 | 2.6 | - | 1 |
| Inbound | 1.02 | 1.0 | 1.83 | 1.08 |
| Cut | 1.20 | 1.54 | 1.74 | 1.59 |
| Total | 1.05 | .97 | 1.22 | 1.07 |

Note Bottom row (total) is row-wise: Total PPP between the position of the players. The right column (total) is column-wise: total PPP of all positions for the different play types. PPP within cells is column-wise: PPP of the play types within the position of the player.

## Discussion

The assessment of players' positions and performance is a continual focus for researchers (Babaee et al., 2021; Chen et al., 2023; Rangel, Ugrinowitsch, & Lamas, 2019; Sampaio et al., 2006; Wang & Zheng, 2022). For researchers, delving into specific roles can refine basketball performance analysis at a micro level (from teams to individuals), offering practitioners more tailored insights (Zhai, Guo, Zhang, Li & Liu, 2021). Variations in playing positions have been shown to impact ball possession, highlighting the importance of coaches and players understanding positional demands (Te Wierike, Huijgen, Jonker, Elferink–Gemser & Visscher, 2018). However, exploration of possession play types across playing positions remains limited, particularly in the final minutes of games.

Our findings revealed that guards accounted for 59.4% of total possessions in the last 2 min of the fourth quarter and overtime, with ISO play type actions being the most prevalent (31.2% of total possessions), followed by PnRBH actions (23.9%) and SUP (16%). This trend can be attributed to the central role of guards in ball distribution, ball handling, controlling game rhythm, passing, and organizing offensive tactics (Fewell, Armbruster, Ingraham, Petersen & Waters, 2012). As highlighted by Courel–Ibáñez, McRobert, Toro, and Vélez (2017), guards primarily bear the responsibility for ball handling and shooting, which are pivotal aspects of the offense. Ball handlers have a crucial role within the team, with a significant portion of set offense initiated through ball screens (Vaquera et al., 2016). The prominence of PnRBH possessions (second most frequent) aligns with findings from previous studies (Akinci, 2023; Demenius, 2020).

Forwards accounted for 21.7% of the total end-of-game possessions, with the most frequent play type actions being SUP (28.3%) and ISO (22.4%). Forwards are responsible for shooting from long and medium distances and play a crucial role during fast break situations, either shooting or passing (Courel–Ibáñez et al., 2017). However, players in the big position completed 18.9% of the total possessions, more frequently utilizing PnRSC actions (29.8%), followed by PB (16.2%). Previous studies on player classification consistently illustrate the comparatively lower offensive role of players in the big position (Chen et al., 2023). As noted by Çene (2018) in his study, players in the center position with specific skills, such as long-range shooting or high post-up efficiency, are rare on most teams, which may explain the lower percentage contribution of the big position in end-of-game possessions.

In terms of the effectiveness of possession play types, although ISO and SUP were among the most common actions for guards in this study, their efficiency did not rank highest among the play types, consistent with previous findings (Zukolo, Dizdar, Selmanović & Vidranski, 2019). Matulaitis and Bietkis (2021) noted in their research that ISO possessions at the end of the ball possessions tend to be inefficient. Similarly, Christmann et al. (2018) found in their examination of endgame possessions of close NBA matches that ISO possessions were the least effective, attributed to their static nature and prolonged duration, similar to our results. Conversely, TR (1.30 PPP) and CUT (1.20 PPP) play type actions emerged as the most efficient among guards in end-of-game possessions. These offensive strategies prioritize teamwork and have demonstrated efficacy in various studies (Christmann et al., 2018; Foteinakis et al., 2024; Matulaitis & Bietkis, 2021; Zukolo et al., 2019). In particular, TR possessions have been noted for their high efficiency (Matulaitis & Bietkis, 2021), prompting coaches to strategize for increased opportunities for TR possessions (Christmann et al., 2018). PnRBH play type actions were also highly effective, yielding 1.11 PPP, consistent with findings from other studies (Christmann et al., 2018; Foteinakis et al., 2024). Overall, guards exhibited an efficiency

of 1.05 PPP across all end-of-game possessions in this study.

In the forward playing position, OBS (2.6 PPP), CUT (1.54 PPP), and PUP (1.33 PPP) play type possessions were the most effective at the end of the game. Stavropoulos, Papadopoulou, & Kolias (2021), in their assessment of OBS effectiveness on the weak side, highlighted its dependency on various factors, such as defensive tactics, player attributes, the game score, finishing moves, and screen types. In our study, OBS yielded a notably high 2.6 PPP, primarily due to the limited number of possessions recorded for the forward position (n=5). Although CUT may not be as prevalent as other offensive strategies, it still holds statistical significance in influencing game outcomes (Akinci, 2023). PUP possessions, as emphasized by Akinci (2023), play a significant role in EuroLeague playoff performances. Zukolo et al. (2019) stated that winning teams demonstrated greater efficiency in possessions with back-to-the-basket plays than defeated teams. Matulaitis and Bietkis (2021) found that winning teams exhibited increased frequency and efficiency in low post-offense. In our study, the forward position recorded a PPP efficiency of 0.97.

Although the big playing position recorded the lowest percentage of end-of-game possessions in our study, their possessions exhibited the highest efficiency among the three playing position groups (1.22 PPP). The significance of the big playing position in basketball success is well-established (Chen et al., 2023). The lower frequency of end-of-game possessions for big players can be attributed to their reliance on teammate support for execution. However, their efficiency in specific play types is notable, with IN (1.83 PPP), CUT (1.74 PPP), and TR (1.67 PPP) possessions aligning with the characteristics of the big playing position, where plays near the basket tend to have higher success rates. Additionally, PB possessions yielded 1.35 PPP for big players. Chen et al. (2023) identified cuts, low post offense, and free throws as defining aspects of the offensive role of big players, highlighting the importance of off-ball movement and offensive rebounding. Ozmen (2016) found that EuroLeague teams with a single additional offensive rebound have a 6.3% higher chance of winning. Conversely, Lutz (2012) suggested in his study that big players do not typically positively affect game outcomes. This finding contrasts with our results regarding the efficiency of the big playing position.

The decision tree analysis revealed that positive possession outcomes were associated with the use of TR, HO, PB, IN, and CUT play type possessions for the big playing position. Conversely, the most effective play types for guards and forwards combined included PUP, PnRBH, TR, HO, PB, and CUT possessions. These findings underscore the importance of coaches balancing inside–outside gameplay among guard, forward, and big playing positions and recruiting players who can collaborate effectively and work as a team during end-of-game possessions.

This study offers novel insights into the efficiency of end-of-game possessions across playing positions, providing a fresh perspective on possession play types in close games. This nuanced approach enhances our understanding of how different player roles contribute to team success, addressing the gap in research on positional differences in late-game scenarios. By advancing our understanding of how player positions across different play type possessions influence team success, enriches the existing body of knowledge in the field. On the contrary, this research focused on offensive contributions and overlooked the defensive aspect of the game, limiting the study's comprehensive understanding of positional efficacy in different play types in late-game scenarios. Future research endeavors, incorporating larger game samples and advanced statistical methodologies like cluster analysis or machine learning, hold promise for further elucidating the roles of playing positions in possession efficacy at the end of a game.

Understanding positional differences in end-of-game possessions regarding the different play types, allows coaches to make strategic adjustments, lineup changes and play-calling tailored to the players strengths and weaknesses. Additionally, coaches can foster a supportive team culture, emphasizing in team collaboration and chemistry, which has been proved critical during end-of-game possessions. Gaining insights from the positional differences can also serve to guide player development and inform scouting reports against opposing teams by analyzing tendencies and vulnerabilities during critical possessions. By implementing these practical implications, teams can optimize their game performance during critical end-of-game possessions, ultimately leading to improved success in close contested games.

**Acknowledgments**
There are no acknowledgments.

**Conflict of Interest**
The authors declare that there is no conflict of interest.

**Received:** 03 February 2024 | **Accepted:** 13 May 2024 | **Published:** 01 June 2024

**References**

Akinci, Y. (2023). Examining the Differences Between Playoff Teams and Non-Playoff Teams in Men's Euroleague; Play-Type Statistics Perspective. *SAGE Open*, *13*(4), 21582440231220155. doi: 10.1177/21582440231220.

Altman, D. (1991). *Practical Statistics for Medical Research*. Chapman & Hall, London, UK. doi: 10.1201/9780429258589.

Babaee Khobdeh, S., Yamaghani, M. R., & Khodaparast Sareshkeh, S. (2021). Clustering of basketball players using self-organizing map neural networks. *Journal of Applied Research on Industrial Engineering*, *8*(4), 412-428. doi: 10.22105/jarie.2021.276107.1270.

Bar-Eli, M., & Tractinsky, N. (2000). Criticality of game situations and decision making in basketball: an application of performance crisis perspective. *Psychology of Sport and Exercise*, *1*(1), 27-39. doi: 10.1016/S1469-0292(00)00005-4.

Beddo, V., & Kreuter, F. (2004). A handbook of statistical analyses using SPSS. *Journal of Statistical Software*, *11*, 1-4. doi: 10.18637/jss.v011.b02

Božović, B. (2021). The Use of "Synergy Sports Technology" for the Collection of Basketball Game Statistics. In *Sinteza 2021-International Scientific Conference on Information Technology and Data Related Research* (pp. 272-276). Singidunum University. doi: 10.15308/Sinteza-2021-272-276.

Çene, E. (2018). What is the difference between a winning and a losing team: insights from Euroleague basketball. *International Journal of Performance Analysis in Sport*, *18*(1), 55-68. doi: 10.1080/24748668.2018.1446234.

Chen, R., Zhang, M., & Xu, X. (2023). Modeling the influence of basketball players' offense roles on team performance. *Frontiers in Psychology*, *14*. doi: 10.3389/fpsyg.2023.1256796.

Christmann, J., Akamphuber, M., Müllenbach, A. L., & Güllich, A. (2018). Crunch time in the NBA–The effectiveness of different play types in the endgame of close matches in professional basketball. *International Journal of Sports Science & Coaching*, *13*(6), 1090-1099. doi: 10.1177/174795411877248.

Courel-Ibáñez, J., McRobert, A. P., Toro, E. O., & Vélez, D. C. (2017). Collective behaviour in basketball: a systematic review. *International Journal of Performance Analysis in Sport*, *17*(1-2), 44-64. doi: 10.1080/24748668.2017.1303982.

Demenius, J. (2020). *Offensive modalities and their influence on basketball efficiency between winning and losing teams (Unpublished Master Thesis).* Kaunas, Lithuania: Lithuanian Sports University.

Ethical Principles of Psychologists and Code of Conduct. (2002). Ethical principles of psychologists and code of conduct. *The American Psychologist*, *57*(12), 1060-1073. doi: 10.1037/0003-066X.47.12.1597.

Fewell, J. H., Armbruster, D., Ingraham, J., Petersen, A., & Waters, J. S. (2012). Basketball teams as strategic networks. *PloS One*, *7*(11), e47445. doi:

10.1371/journal.pone.0047445.

Fichman, M., & O'Brien, J. R. (2019). Optimal shot selection strategies for the NBA. *Journal of Quantitative Analysis in Sports*, *15*(3), 203-211. doi: 10.1515/jqas-2017-0113

Foteinakis, P., Pavlidou, S., & Stavropoulos N. (2024). Analysis of the effectiveness of different play types in the end of game possessions of close EuroLeague matches. *Journal of Human Sport and Exercise, 19*(2), 617-630. doi: 10.14198/jhse.2024.192.16

Garcia-Perez, M. A., & Nunez-Anton, V. (2003). Cellwise residual analysis in two-way contingency tables. *Educational and Psychological Measurement*, *63*(5), 825-839. doi: 10.1177/0013164403251.

Lutz, D. (2012, March). A cluster analysis of NBA players. In *Proceedings of the MIT Sloan Sports Analytics Conference, Boston, MA, USA.* Retrieved May 12, 2024 from: https://www.scribd.com/document/314119691/44-Lutz-Cluster-Analysis-NBA

Marmarinos, C., Apostolidis, N., Kostopoulos, N., & Apostolidis, A. (2016). Efficacy of the "pick and roll" offense in top level European basketball teams. *Journal of Human Kinetics*, *51*, 121. doi: 10.1515/hukin-2015-0176.

Marques, G., & Ighalo, J. O. (2022). *Current Trends and Advances in Computer-Aided Intelligent Environmental Data Engineering*. Academic Press. doi: 10.1016/B978-0-323-85597-6.00027-6.

Matulaitis, K., & Bietkis, T. (2021). Prediction of offensive possession ends in elite basketball teams. *International Journal of Environmental Research and Public Health*, *18*(3), 1083. doi: 10.3390/ijerph18031083.

Morgan, S., Williams, M. D., & Barnes, C. (2013). Applying decision tree induction for identification of important attributes in one-versus-one player interactions: A hockey exemplar. *Journal of Sports Sciences*, *31*(10), 1031-1037. doi: 10.1080/02640414.2013.770906

Özmen, M. U. (2016). Marginal contribution of game statistics to probability of winning at different levels of competition in basketball: Evidence from the Euroleague. *International Journal of Sports Science & Coaching*, *11*(1), 98-107. doi: 10.1177/17479541156248.

Rangel, W., Ugrinowitsch, C., & Lamas, L. (2019). Basketball players' versatility: Assessing the diversity of tactical roles. *International Journal of Sports Science & Coaching*, *14*(4), 552-561. doi: 10.1177/17479541198596.

Remmert, H., & Chau, A. T. (2019). Players' decisions within ball screens in elite German men's basketball: observation of offensive–defensive interactions using a process-orientated state-event model. *International Journal of Performance Analysis in Sport*, *19*(1), 1-13. doi: 10.1080/24748668.2018.1534198.

Sampaio, J., Ibañez Godoy, S. J., Gómez Ruano, M. Á., Lorenzo Calvo, A., & Ortega Toro, E. (2008). Game location influences basketball players performance across playing positions. *International Journal of Sport Psychology*, *39*(3), 43-50. Retrieved from: https://oa.upm.es/2521/1/INVE_MEM_2008_56650.pdf.

Sampaio, J., Janeira, M., Ibáñez, S., & Lorenzo, A. (2006). Discriminant analysis of game-related statistics between basketball guards, forwards and centres in three professional leagues. *European Journal of Sport Science*, *6*(3), 173-178. doi: 10.1080/17461390600676200.

Sarlis, V., & Tjortjis, C. (2020). Sports analytics—Evaluation of basketball players and team performance. *Information Systems*, *93*, 101562. doi: 10.1016/j.is.2020.101562.

Stavropoulos, N., Papadopoulou, A., & Kolias, P. (2021). Evaluating the Efficiency of Off-Ball Screens in Elite Basketball Teams via Second-Order Markov Modelling. *Mathematics*, *9*(16), 1991. doi: 10.3390/math9161991.

Te Wierike, S. C. M., Huijgen, B. C. H., Jonker, L., Elferink-Gemser, M. T., & Visscher, C. (2018). The importance and development of ball control and (self-reported) self-regulatory skills in basketball players for different positions. *Journal of Sports Sciences*, *36*(6), 710-716. doi: 10.1080/02640414.2017.1334954.

Vaquera, A., García-Tormo, J. V., Gómez Ruano, M. A., & Morante, J. C. (2016). An exploration of ball screen effectiveness on elite basketball teams. *International Journal of Performance Analysis in Sport*, *16*(2), 475-485. doi: 10.1080/24748668.2016.11868902.

Wang, F., & Zheng, G. (2022). Examining positional difference in basketball players' field goal accuracy using Bayesian Hierarchical Model. *International Journal of Sports Science & Coaching*, *17*(4), 848-859. doi: 10.1177/17479541221096.

Zhai, Z., Guo, Y., Zhang S., Li, Y. & Liu, H. (2021) Explaining Positional Differences of Performance Profiles for the Elite Female Basketball Players. *Frontiers in Psychology*. 11:558750. doi: 10.3389/fpsyg.2020.558750.

Zukolo, Z., Dizdar, D., Selmanović, A., & Vidranski, T. (2019). The role of finishing actions in the final result of the basketball match. *Journal of Sports Sciences*, *12*, 90-95.