Difference of offensive structure between european and american top-level basketball

JAKOB HJORTH JØRGENSEN¹, ALEKSANDAR SELMANOVIĆ², KEANE THOMANN³

¹Department of Coaching Science, Lithuanian Sports University, LITHUANIA.

¹Faculty of Kinesiology, University of Split, CROATIA.

²Department of Physical Education, University of Dubrovnik, CROATIA.

³Missouri Southern State University, UNITED STATES OF AMERICA.

Published online: July 31, 2021

(Accepted for publication July 15, 2021)

DOI:10.7752/jpes.2021.s3253

Abstract:

The aim of this study was to determine if there were any structural differences in relation to offensive style of play between European and NBA basketball. The focus of the study was on types of offenses, their distribution, efficiency, and finishing actions. The sample was collected by analyzing 30 games of high qualitative rank of the European and American competition during the 2017-18 season. 15 European (11 Euroleague playoff games, 3 EuroCup semifinals and finals, 1 Champions League final) and 15 NBA playoff games were analyzed using video analysis software. The games involved 14 different European teams and 16 NBA teams. A total of 5027 possessions were categorized into 4 types of basic offense and 11 types of finishing actions using notational analysis. The analysis was performed using Sideline Sports - XPS Video Analyzer, where the following findings stand out: a) The results of the Chi²-test confirmed a statistically significant difference in the distribution of basic types of offenses between European and NBA basketball; b) European basketball had significantly more finishing actions of pick and roll and post up, whereas in the NBA 1v1 face to the basket occurred significantly more; c) No statistical significant difference in efficiency, except that pick and roll is executed for significantly higher points per possession in European basketball. The main conclusions of this study reveal differences in the basic offensive structure, regarding transition, early offense, set plays, and other offenses. Additionally, differences were found in the preference of the use of finishing actions in the two styles of play. European basketball is based more on set plays and control with significantly more use of pick and roll. American basketball relies significantly more on transition and early offense with significantly more use of one-on-one situations facing the basket. The study can help understand the nature of differences between two analyzed models of professional basketball and to establish specific structures that can be interpreted and evaluated constructively and used practicably and prospectively in coaching and other professional practices related to basketball.

Key Words: NBA, Euroleague, Offense, Finishing Action, Performance Analysis

Introduction

The game of basketball is a multifaceted game under constant development. It is also one of the most scientifically analyzed sports through notational analysis (García et al., 2013; Lorenzo et al., 2010). Teams are increasingly attracted to an analytical approach to the game. The offensive phase, both technically and tactically, is very saturated but highly diverse in terms of scientific studies. The game is played all over the world with slightly different rules. Overall, the game has the same objective. This study focuses on the structural differences between European and North American top professional leagues with an emphasis on tactical finishes on offense.

The collecting and recording of game-related indicators or factors that represent some of the basic parameters in evaluating sport can contribute to success or improved performance in games (Hughes & Bartlett, 2002). Identifying trends and structures is imperative in the effort to deliver optimal training and preparation as well as enhancing the ability of players to understand tactics and increase efficiency of decision-making (Courel-Ibáñez et al., 2018). To increase player cooperation, you need to detect the mechanisms of the game e.g., offensive aims such as optimal fast break situations and effectiveness of scoring situations and to facilitate this tactical assessment through game analysis becomes an important tool that may be used to develop practice schemes for improving players' decision-making during competition (Eccles, Ward, & Goodman, 2009). This research is focused on playoffs games as studies show that the NBA and the European competitions get more alike come playoffs time (Štrumbelj et al., 2013; Jungić et al., 2015; Milanović et al., 2014; Mandić et al., 2019). The focus of this study is on the offensive phase and the reason to look at the offensive phase is based on reported results that indicated outcomes of games were more influenced by offense than defense in the NBA (Mikołajec et al., 2013).

1988-----

Corresponding Author JAKOB HJORTH JØRGENSEN, E-mail: jakobhjorth@hotmail.com

Among basketball scholars and experts there is a general consensus that the National Basketball Association (NBA) is the strongest league in the World as most of the best players and coaches are present in this league. However, other leagues are catching up. The second strongest league is arguably the Euroleague. Games between NBA and Euroleague teams do not occur very often, making direct comparison difficult. When and if they take place, they are often pre-season or promotional games without competitive relevance. Direct comparison is also made difficult because of the difference in the rules governing the leagues.

Previous literature has indicated that there is a difference in the offensive preferences of Euroleague and NBA teams (Selmanović et al., 2015; Milanović et al., 2014; Mandić et al., 2019; Selmanović et al., 2019; Erčulj & Štrumbelj, 2015). Generally, the transition phase has been quite well investigated, maybe due to the fact that transition or fast breaks have shown to be the most efficient way to score (Milanović et al., 2014, Selmanović et al., 2017; Bazanov et al., 2006). Researchers have had a lot of focus on fast breaks and they generally agree that fast breaks are a very efficient way of scoring. Fast breaks were reported to be a crucial factor to winning as more fast breaks equal more wins (Evangelos et al., 2005) and therefore teams should strive to increase the number of fast breaks in games (Selmanović et al., 2015). Others reported that 80% of fast breaks ended with a shot in the lane area with a success rate of 73% (Garefis et al., 2007) and similarly it was concluded that the only predictor of a successful fast break was the finishing in the lane area (Conte et al., 2017). A comparative study between NBA and Euroleague suggests that American basketball holds a larger part of fast breaks 20.2% and 15.1%, respectively, and an enhancing factor is the ability of NBA teams to regain possession by either a defensive rebound or a steal (Milanović et al., 2014, Selmanović et al., 2015). Other comparative studies dealing with offensive structure at either lower-level competition or international competition (Remmert, 2003; Lehto et al., 2010) has given indication for values of points per possession in relation to finishing actions. In a study on the German league, the teams played man-to-man defense 98.1% of the time and scored an average of 0.88 PPP (Remmert & Lysien, 2020) and in another study 1.03 PPP was reported (Remmert & Chau, 2019). A study from the Estonian league the investigated team averaged 1.13 PPP (Bazanov et al., 2006). PPP is suggested to be a very useful statistical tool (Oliver, 2004).

Additional studies about finishing actions showed different results regarding the preferences in the use of finishing actions (Solsona et al., 2020; Matulaitis & Bietkis, 2021; Zukolo et al., 2019). Studies suggest that there is no need to distinguish between modalities of set offenses (man, zone) as the use of zone defense rarely occurs. Selmanović et al. (2015) states that man-to-man offense represents 96% of offenses in Europe and 99% of offenses in the NBA. During the 2006 World Cup it was similarly reported that teams on average played man-to-man defenses 85.3% of the time (Polykratis et al., 2010). Lehto et al. (2010) reports that teams played man-to-man defense 89% of the time and state that the success of half court offenses does not vary greatly between man or zone defense.

The aim of this study is to determine if there are any structural differences in relation to offensive style of play between European and NBA basketball. The focus of the study is on types of offenses, their distribution, efficiency, and finishing actions.

Material & methods

The current study protocol was approved by the Lithuanian Sports University Ethics Committee. All research material (games) used for this observational study is available publicly online. Informed consent from athletes was not necessary as games were broadcast on television.

All video research was made with Sideline Sports - XPS Video Analyzer. The use of video editing software allows the researcher to perform notational analysis by tagging and storing relevant footage and to export generated data. Data was exported to Microsoft Excel for processing and to RStudio for additional statistical processing. Data was analyzed using the software RStudio (version 1.3.1093; RStudio PBC, Boston, MA, USA). Percentages were calculated using descriptive statistics. For the purpose of testing the difference between the NBA and European styles nonparametric statistical methods were applied, using χ^2 test in nominal value ($p < 0.05$), while t-test was used for independent samples for the purpose of determining differences in variables.

Sample procedure

The sample was collected by analyzing 30 games of high qualitative rank of the European and American competition during the 2017-18 season. The NBA games were selected by randomly selecting one game from each series of the NBA playoffs (15 games). By selecting in this manner, you ensure a broad representation of teams (16) in the sample.

The European games were selected by choosing the Euroleague Final Four games (4 games), 7 randomly selected games from the Euroleague Playoffs (each team had to be represented at least once), the final and semifinals of EuroCup (3 games), and the final of Champions League (1 game). The finals and semifinals of the presumed inferior European competitions (Champions League and EuroCup) were included to secure a broader representation of teams in the sample (14 teams) because the current format of the Euroleague playoffs only includes eight teams that qualify, and to assure that the data was not skewed by the preferences of one given team's style of play more teams were included. The final games of the other two main competitions were selected to ensure a highly competitive level of playoffs basketball.

The selected games generated a total of 5027 entities ($n = 5027$) of which 2886 entities were selected from 15 NBA games and 2141 entities ($n = 2141$) selected from 15 European games.

Sample variables

- Outcome of the possession
- Numerical result - points scored
- Type of offense
- Type of finishing action
- Ratio between offensive and defensive players

In previous research and in literature, possessions have been defined in multiple ways. In the current study, possessions are defined as follows.

A possession starts either by:

- a) inbound the ball after an opponent's made basket.
- b) inbound the ball after an opponent's turnover.
- c) inbound the ball after a defensive team rebound.
- d) securing a live ball by a defensive rebound after an opponent's missed basket.
- e) securing a live ball by stealing the ball from the opposition.
- f) in special cases inbound after one's own made last free throw (FT) e.g., after technical or flagrant fouls committed by the opponent.
- g) gaining possession after the initial jump ball (or in NBA only: after possession changing jump ball)

A possession ends either by:

- a) offensive team making a basket.
- b) defensive team gains possession of the ball.
- c) a team shooting FT (regardless of a potential miss of the last FT which would allow for an offensive rebound (OReb) and a continuation of offense - in such a case it is considered a new possession).

The possession outcome is either: made basket, missed basket, made basket plus 1 free throw, any number of free throws earned with prior made basket, and turnover. The numerical possession outcome is expressed numerically as 0 (miss or turnover), 1 (any number of FT - made 1 FT), 2 (made 2p FG or 2/2 FT, 2/3 FT), 3 (made 3p FG, made 2p FG + 1 FT, 3/3 FT), 4 (made 3p FG + 1 FT).

Offense generally occurs in two states, set offense (positional offense) and transition offense (fast break). This paper defines and uses four operational defined types of basketball offense: set (positional), transition, early offense, and other offenses.

1) The set offense or positional offense is the most frequently occurring form of offense (Milanović et al. 2014; Remmert 2003). The set offense is always played with a player formation (PF) of 5v5 with a set defense with defensive control (DC). DC is defined as when the defense initially establishes a controlled 5v5 defensive situation. The set offense is characterized by involving tactical maneuvers by the offense. The set phase can also include a transitional phase, but the transition phase is then shorter than the set phase. The set offense can be divided into modalities of playing against man-to-man defense or zone defense. Due to the scant use of zone defenses in Euroleague and the rules restricting the use of zone defense in the NBA these modalities have not been deemed important to track in the current study. In this paper, a possession is categorized as a positional play by default, if the final scoring action is preceded by either a sideline out of bounds play (SOB) or baseline out of bounds play (BOB) in the front court. The logic behind this is the defense has ample opportunity to gain DC.

2) The transitional phase is defined as possessions where the defense does not gain DC and most often the PF of the offense outnumber the defense ($O > D$) or they are even ($O = D$) - however special transition situations occur where offenses complete plays even though they are outnumbered ($O < D$). The transitional phase is characterized by the absence of TM and is formed randomly. In some investigations the transition phase is subcategorized in primary and secondary fast breaks. However, there is no difference in distribution of types of fast breaks and early offense between NBA and Euroleague. Primary and secondary fast breaks represent approximately 30% each and early offense 40% (Selmanović et al. 2015).

3) Early offense (EO) is a hybrid of two main categories and has elements from both. EO is played with a PF 5v5 as set offense and offenses can use basic TM but the difference is the absence of DC. EO is also characterized by the fact that the transition phase is longer than the positional phase.

4) The plays that for some reason do not fit any of the three categories above are placed in the other category.

Types of Finishing Action

Eleven types of finishing actions are defined and categorized in this investigation:

- 1) FACE: Scoring actions when a player attacks facing the basket. The offensive player trying to beat the opposition without any teammates involved while facing the basket.
- 2) POST: Scoring actions with a player trying to beat the opposition with his back to the basket. Also commonly referred to as posting up.
- 3) SPOT: Spot up shooting defined by situations when offensive players perform a jump shot after receiving a pass from a teammate without making a move of his own.
- 4) CUT: Cut to or away from the basket is movement of an offensive player leading to a scoring action without the use of screens or dribbling.

- 5) DISH: A penetrating player dishing off (very short pass) the ball to an open teammate close to the basket.
- 6) PNR: Pick and roll is defined as a situation where two offensive players are working together. The ball handler receives a screen (pick) from the screener. The ball handler uses this screen to get off a shot, drive to the basket to finish or to make a pass to the screener who is rolling to the basket.
- 7) POP: Pick and pop is defined as a situation where two offensive players are working together. The ball handler receives a screen (pick) from the screener. The ball handler uses this screen to draw attention to free up space allowing the screener to perform a jump shot after popping or flaring out.
- 8) HAND: Handoffs are defined as situations where two offensive players are working together. Initially, the situation resembles the PNR- and POP-situations but the pass made from the ball handler to the other player is made at close range (within touching distance). After the ball handler hands over the ball, he immediately becomes the screener hereafter.
- 9) OFF: Off-ball screens are situations where the scoring action occurs after the use of screens set away from the ball handler allowing him to pass to an open teammate for a shot or layup.
- 10) PUTB: Putbacks after offensive rebounds are situations when an offensive player puts himself in a position allowing him to attempt scoring after performing an offensive rebound following a missed shot from a teammate.
- 11) MISC: Miscellaneous finishing actions that do not fit any of the above listed scoring actions.

Ratio between offensive/defensive players

Set plays and early offenses are defined in this investigation as situations with PF of 5v5. If a transition possession is detected it is analyzed and categorized according to the ratio between offense and defense. Hypothetical outputs can range from 1v0 to 5v4 (1v0, 1v1, 1v2, 1v3, 1v4, 1v5, 2v0, 2v1, 2v2, 2v3, 2v4, 2v5, 3v0, 3v1, 3v2, 3v3, 3v4, 3v5, 4v0, 4v1, 4v2, 4v3, 4v4, 4v5, 5v0, 5v1, 5v2, 5v3, 5v4).

Results

This study has investigated a total of 30 basketball games from season 2017-18 and a total of 5027 possessions and 1335 minutes played (Table 1). On average in European games, 165 points was scored (min. 143; max. 194; SD 14.7) whereas American games hold an average of 211 points/game (min. 187; max. 249; SD 17.2).

Table 1: Basic descriptive statistics of European and American basketball offenses

	EURO	NBA
Number of games analyzed	15	15
Number of teams in sample	14	16
Minutes played	610	725
Total possessions	2141	2886
Possessions / game*	142.7	192.4
Possessions / minute	3.51	3.98
Points / game*	165	211
Points / minute	4.06	4.36

*includes overtime games

Distribution of Types of Offenses

When looking at types of offense in European and American basketball (Table 2), this study found a statistically significant difference ($\chi^2=54.98$, $df=3$, $p<0.001$) in the distribution of types of offense: transition, early offense, set plays, and other offenses. Furthermore, when comparing European to American basketball, it was shown that American basketball relied statistically significantly more on transition ($\chi^2=19.27$, $p<0.001$) and early offense ($\chi^2=23.86$, $p<0.001$). The Europeans relied more on set plays ($\chi^2=30.88$, $p<0.001$) and other offenses ($\chi^2=9.19$, $p=0.002$).

Table 2: Types of offense in European and American basketball

	EURO		NBA		χ^2	p -value
	n	%	n	%		
Transition	142	6.6	293	10.2	19,27	<0.001*
Early offense	249	11.6	477	16.5	23,86	<0.001*
Set play	1669	78.0	2049	71.0	30,88	<0.001*
Other	81	3.9	67	2.3	9,19	0.002*
Total	2141	100	2886	100		

$\chi^2 = 54.98$, $df = 3$, $p < 0.001$ *

Points per Possession in Basic Types of Offenses

When investigating points per possession (PPP) on the total sample of all possessions, it was found that there was a statistically significant difference ($p=0.047$) during transition (Table 3), where European teams

produced a statistically significantly larger PPP (1.486 ± 1.023 , $n=142$) compared to the American (1.266 ± 1.103 , $n=293$). The other categories showed no statistically significant ($p > 0.05$) differences.

Table 3: PPP all possessions

	EURO		NBA		<i>T</i> -score	<i>p</i> -value
	Mean	SD	Mean	SD		
Transition	1.486	1.023	1.266	1.103	1.994	0.047*
Early offense	1.273	1.160	1.119	1.176	1.679	0.094
Set play	1.128	1.182	1.079	1.166	1.268	0.205
Other	0.753	0.874	0.821	0.869	-0.471	0.638
Total	1.154	1.165	1.098	1.157	1.684	0.092

Transition and Early Offense

Distribution. It was found that the NBA had an overall statistically significantly ($p < 0.001$) higher use of transition and early offense (Trans+EO) compared to their European counterparts (EURO 18.3%, NBA 26.7%). In comparison to Europe, the Americans had higher usage rates of transitions except from Trans O>D, where no statistically significant difference was found. The NBA ($n=101$, 2.8%) had a statistically significantly ($p=0.022$) higher use of transitions with equal ratio between offense and defense (Trans O=D) compared to the Europeans ($n=51$, 2.0%). The NBA ($n=94$, 2.6%) also had a statistically significantly ($p < 0.001$) higher use of transitions with offense outnumbered by defense (Trans O<D) compared to the Europeans ($n=29$, 1.2%).

Points per Possession. When investigating PPP specifically during transition and early offense, it was found when looking at all transitions combined the Europeans executed significantly better as stated in Table 4. The Europeans (1.350 ± 1.115) also scored a statistically significantly ($p=0.013$) higher PPP in the combined transition and early offense situations (Trans+EO) than the Americans (1.175 ± 1.150). In Trans O>D, Trans O=D, Trans O<D, Early offense, no statistically significant ($p > 0.05$) differences were detected.

Table 4: Transition and Early Offense

	EURO		NBA		Chi ²	<i>p</i> -value
	<i>n</i>	%	<i>n</i>	%		
Trans O>D	62	2.5	98	2.7	0.997	0.318
Trans O=D	51	2.0	101	2.8	5.236	0.022*
Trans O<D	29	1.2	94	2.6	18.641	<0.001*
Early offense	249	11.6	477	16.5	23.864	<0.001*
Trans+EO	391	18.3	770	26.7	49.040	<0.001*

Finishing Actions

Fishing Actions - All Possessions. When investigating all possessions combined, this study indicated that there was a difference in the distribution of finishing actions between European and American basketball (Table 5). Furthermore, when looking at all possessions, there was a statistically significant difference ($p < 0.001$) in the use of FACE being more prevalent in America (35.3%, $n=895$) compared to Europe (25.6%, $n=469$). The use of PNR was also statistically significantly ($p < 0.001$) more used in Europe (20.6%, $n=377$) compared to America (13.7%, $n=348$). Additionally, it occurred that POST was more statistically significantly ($p=0.003$) present in European basketball (10.4%, $n=190$) compared to America (7.8%, $n=198$). In the rest of the finishing actions, no statistically significant ($p > 0.05$) differences were found. When investigating PPP, no statistically significant ($p > 0.05$) differences were found in either category except from PNR, where the Europeans (1.329 ± 1.112) scored statistically significantly ($p=0.036$) higher than the Americans (1.155 ± 1.110).

Table 5: All Possessions: Finishing Actions and Points per Possessions

	EURO		NBA		Chi ²	<i>p</i> -value	EURO		NBA		<i>T</i> -score	<i>p</i> -value
	<i>n</i>	%	<i>n</i>	%			PPP	SD	PPP	SD		
FACE	469	25.59	895	35.32	46.913	<0.001*	1.198	1.112	1.153	1.120	0.710	0.478
POST	190	10.37	198	7.81	8.556	0.003*	1.258	0.966	1.273	1.001	-0.148	0.882
SPOT	326	17.79	422	16.65	0.959	0.327	1.482	1.475	1.358	1.461	1.144	0.253
CUT	96	5.24	158	6.24	1.933	0.164	1.708	0.724	1.595	0.814	1.121	0.263
DISH	59	3.22	77	3.04	0.114	0.735	1.475	0.971	1.662	0.788	-1.244	0.216
PNR	377	20.57	348	13.73	35.879	<0.001*	1.329	1.112	1.155	1.110	2.103	0.036*
POP	19	1.04	37	1.46	1.508	0.220	1.316	1.455	0.838	1.191	1.318	0.193
HAND	22	1.20	48	1.89	3.248	0.072	1.591	1.260	1.042	1.320	1.639	0.106
OFF	94	5.13	150	5.92	1.263	0.261	1.447	1.250	1.327	1.223	0.740	0.460
PUTB	101	5.51	132	5.21	0.191	0.662	1.406	0.961	1.303	0.949	0.816	0.415
MISC	80	4.36	69	2.72	8.696	0.003*	1.228	0.791	1.145	0.827	0.509	0.611

Chi² = 87.161, df = 10, $p < 0.001$ *

Finishing Actions - Transition. If you look at transition possessions as isolated cases, there was no statistically significant difference found ($\chi^2=7.117$, $p=0.310$) when considering totals nor the various finishing actions. When you look at PPP values for the transition phase, there are also no statistically significant ($p>0.05$) differences, except from SPOT where the Europeans (2.133 ± 1.156) perform statistically significantly ($p=0.023$) better than the Americans (1.143 ± 1.458).

Finishing Actions - Early Offense. During the early offense phase (Table 9) there was a statistically significant spread in the distribution of finishing actions when looking at totals ($\chi^2=26.693$, $p<0.001$) and there was found a statistically significant difference in the use of FACE here as well ($\chi^2=6.903$, $p=0.009$). FACE was the most frequently in both styles of play but it was used 38.4% of the time by the American teams whereas the Europeans use FACE 28.1% of the time. The use of PNR was not statistically significantly ($p>0.05$) greater in Europe during this phase, nor was the rest of the finishing actions.

Finishing Actions - Set play. The Americans (33.7%) used a statistically significantly ($p<0.001$) larger amount of FACE (Table 6) compared to the Europeans (24.1%). The Europeans (23.8%) had a statistically significantly ($p<0.001$) bigger frequency of PNR compared to the Americans (15.7%). The statistically significant ($p=0.018$) difference of the use of POST was also evident during set plays (EURO 10.8%, NBA 8.4%). Furthermore, there was found a statistically significant difference in the use of SPOT ($\chi^2=4.026$, $p=0.044$) and CUT ($\chi^2=4.022$, $p=0.045$), however these results were not significant if you considered Yates' correction (SPOT: $\chi^2=3.840$, $p=0.05005$; CUT: $\chi^2=4.022$, $p=0.056$).

Finishing Actions - Points per Possession. The Europeans (1.329 ± 1.112) produced a statistically significantly ($p=0.036$) higher PPP in PNR than the Americans (1.155 ± 1.110) when considering all possessions. The remaining finishing actions did not produce any statistically significant differences.

Table 6: Set play: Finishing Actions and Points per Possessions

	EURO		NBA				EURO		NBA			
	n	%	n	%	χ^2	p -value	PPP	SD	PPP	SD	T -score	p -value
FACE	345	24.1	603	33.7	35.106	<0.001*	1.154	1.129	1.103	1.137	0.664	0.507
POST	155	10.8	150	8.4	5.583	0.018*	1.200	0.976	1.240	1.015	0.351	0.726
SPOT	267	18.7	286	16.0	4.026	0.044* [#]	1.404	1.469	1.371	1.459	0.272	0.786
CUT	43	3.0	78	4.4	4.022	0.045* [#]	1.721	0.766	1.500	0.908	1.351	0.179
DISH	45	3.1	59	3.3	0.058	0.810	1.444	1.013	1.661	0.779	-1.233	0.220
PNR	340	23.8	281	15.7	33.235	<0.001*	1.341	1.108	1.149	1.101	2.151	0.032*
POP	17	1.2	32	1.8	1.908	0.167	1.294	1.448	0.750	1.164	1.430	0.159
HAND 21	1.5	38	2.1	1.898	0.168		1.571	1.287	1.237	1.344	0.929	0.357
OFF	93	6.5	143	8.0	2.596	0.107	1.430	1.246	1.329	1.226	0.617	0.538
PUTB	82	5.7	102	5.7	0.002	0.968	1.427	0.969	1.392	0.914	0.249	0.804
MISC	22	1.5	17	1.0	0.130	0.130	1.045	0.899	1.529	0.624	-1.893	0.066

$\chi^2 = 72.324$, $df = 10$, $p < 0.001$ *

[#]if Yates correction is considered then these categories are not statistically significantly different;

SPOT ($\chi^2 = 3.840$, $p = 0.05005$), CUT ($\chi^2 = 4.022$, $p = 0.056$)

Discussion

According to the criteria set in this investigation, it is evident that the presented results show a significant difference between European and American basketball ($\chi^2 = 54.98$, $df = 3$, $p < 0.001$) in terms of distribution of types of offense (set plays, transition, early offense, and other offenses). This confirms that the types of offenses do not have an equal representation in European and American basketball. Furthermore, it is shown that American basketball relies statistically significantly more on transition ($\chi^2 = 19.27$, p -value < 0.001) and early offense ($\chi^2 = 23.86$, p -value < 0.001) whereas European basketball relies statistically significantly more on set plays ($\chi^2 = 30.88$, p -value < 0.001). Other researchers have reported statistically significant differences ($\chi^2 = 28.13$, $df = 2$, p -value < 0.001) in comparative studies between the Euroleague and the NBA (Milanović et al., 2014; Selmanović et al., 2015). However, the categories of basic offense were slightly different as they only used three categories (set, transition, other) compared to the four used in this study. The results reported were similar in terms of more transition plays present in the NBA. In this study, it was found that transition and early offense (Trans+EO) combined for Euro 18.3% vs. NBA 26.7% (Table 4) compared to Euro 15.1%, NBA 20.2% reported in the other studies. This confirmed the idea that the NBA plays a more straightforward style of play based on quicker, less schematic, and more improvised offensive game. The tendencies were also mentioned by Selmanović et al. (2019) suggesting that the American style of play is more of a hybrid between organized and improvised play. A study on the Beijing Olympics in 2008 reports transition and early offense at 16.6%, based on five games only (Lehto et al., 2010).

This investigation has shown that the NBA does not produce statistically significantly more PPP in either of the types of offense or combined totals even though the NBA is considered the strongest league. On the contrary, it is shown that European basketball (1.486 ± 1.023 , $n = 142$) produced a statistically significantly larger PPP ($p < 0.05$) in transition compared to the NBA (1.266 ± 1.103 , $n = 293$). These results indicate that

European basketball is more conservative and calculating as suggested by Štrumbelj et al. (2013). The NBA is driven more and more by analytics (Davenport, 2014) and therefore it makes sense from an analytics standpoint to get as many transition and early offense situations as possible to maximize offensive output as they are the most efficient possessions (Christman et al., 2018). Transition and early offense were also reported to be the most efficient ways of scoring by other studies (Matulis & Bietkis, 2021). It has previously been reported by Milanović et al. (2014) that the NBA was slightly more efficient than Euroleague when considering transition offense.

It was expected that the NBA would have a significantly higher use of transition and early offense (Trans+EO). This study confirms that the NBA ($n = 770$, 26.7%) has an overall statistically significantly higher use of transition and early offense compared to their European counterparts ($n = 391$, 18.3%). The higher use of transition and early offense in the NBA compared to Europe (20.2% vs. 15.1% respectively) is also reported by other researchers (Milanović et al., 2014; Selmanović et al., 2015).

It is also confirmed that the NBA has a more straightforward approach to attacking during the transition and early offense phases if you look at the phases individually. The NBA (2.8%) has a statistically significantly higher use of transitions with equal ratio between offense and defense (Trans O=D) compared to Europe (2.0%). Additionally, the NBA (2.6%, EURO 1.2%) also has a statistically significantly higher use of transitions where the offense is outnumbered by the defense (Trans O<D).

The assumption that the Europeans ($n = 62$, 2.5%) would have a larger representation of transitions where the offense outnumber the defense (Trans O>D) was rejected as the Americans ($n = 98$, 2.7%) attack in equal numbers and no significant difference was found ($\chi^2 = 0.997$, $p = 0.318$). The numbers suggest that the Europeans are as willing as the Americans to attack in transition when outnumbering the opponent, even though their approach in general appears more conservative. Selmanović et al. (2015) reports a slightly higher use of primary break in Europe (Euro 29.6%, NBA 27.6%), no difference in secondary break (Euro 31.1%, NBA 31.0%), and a small difference in the use of early offense (Euro 39.3%, NBA 41.4%). The study concluded that there was no statistically significant difference in the distribution ($\chi^2 = 0.607$, $df = 2$, $p = 0.7383$).

This adaptation to different styles is something to consider when the NBA is looking for European talent and vice versa when European clubs look to sign American imports. The NBA is generally doing a good job of evaluating foreign talent for instance in relation to the annual draft (Salador, 2011; Bieniek et al., 2014). Even though the NBA is considered superior, it does not execute better than the Europeans in any transition and early offense categories. Actually, it turns out that when looking at all transitions combined the Europeans execute significantly better. The Europeans (1.350 ± 1.115) also scored a statistically significantly higher PPP in the combined transition and early offense situations compared to the Americans (1.175 ± 1.150). This could be because the European system is based on a larger degree of schematic offense and control as proposed by Selmanović et al. (2019).

This study can confirm there is a clear difference in the preference of the use of finishing actions between European and American basketball ($\chi^2 = 87.161$, $p < 0.001$).

Furthermore, it is found that the use of FACE is statistically significantly more prevalent in the NBA (35.3%, $n = 895$) compared to Europe (25.6%, $n = 469$). This can be seen as odd since the NBA to a large extent is analytics driven and FACE is one of the least effective ways of attacking according to this study with a PPP of $1,153 \pm 1,120$. Another study also reports isolation plays (FACE) in Euroleague to be more likely to end up inefficiently rather than efficiently (Matulis & Bietkis, 2021). According to this study, FACE in European competition ranks the lowest in efficiency with $1,198 \pm 1,112$ PPP.

Even though teams preach unselfish play (Scarlattelli, 2015; Colás, 2012), this does not necessarily transcend into rewards given to players scoring compared to players making assists. It is suggested that a player's future salary is increased by approximately \$22,000 per FG personally scored and decreased by \$6,000 per assist made (Uhlmann & Barnes, 2014). This suggests NBA teams tend to financially reward selfish isolation play (FACE) over team-oriented play, which naturally is a huge incentive for players (Smith et al., 2004; Goldman, 2007). The reason for this could be that players that can create something on their own tend to have a high value and big role on teams (Matulis & Bietkis, 2021).

The use of PNR is also confirmed to be statistically significantly more used in Europe (20.6%, $n = 377$) compared to America (13.7%, $n = 348$). Additionally, it occurs that POST is more present in European basketball (10.4%, $n = 190$) compared to America (7.8%, $n = 198$). This could be supported by the assumptions presented by Erčulj & Štrumbelj (2015) who partially explained the absence of the hook shot in the NBA by inferior technique of NBA centers compared to European centers. The inferior skill set of NBA centers in turn could be the reason for NBA teams using POST less frequently than their European counterparts.

Selmanović et al. (2019) also reports differences in the use of different finishing actions during the 2011-12 season. The Americans are characterized by a higher frequency of FACE (Euro 13.6%, NBA 19.4%) and SPOT (Euro 15.4%, 16.4%), whereas the Europeans have a higher frequency of PNR (Euro 16.6%, NBA 15.3%), POST (Euro 7.9%, 5.9%), and PUTB (Euro 4.3%, NBA 3.8%). This means that the two main categories (FACE, PNR) come out with similar findings in the current study and the earlier studies done by Selmanović and colleagues. POST is also found to be prevalently used in European basketball as mentioned by Selmanović et al.

(2019). Remmert (2003) reported FACE 17.2%, POST 13.5%, and PNR 16.4% in a study on mixed leagues which therefore is not directly comparable.

During set plays there are statistically significant differences found in relation to the use of FACE in the NBA and the prevalence in Europe towards PNR. Furthermore, POST and SPOT are significantly more frequent in Europe whereas CUT is significantly more frequent in the NBA.

The Europeans (Mean 1.329 ± 1.112) produce a statistically significantly higher PPP in PNR than the Americans (Mean 1.155 ± 1.110) when considering all possessions ($p = 0.036$).

If you consider each type of offense, then the results suggest that the Europeans (2.133 ± 1.356) produce a statistically significantly higher PPP ($p = 0.023$) in SPOT than the Americans (1.143 ± 1.458) during the transition phase. During early offense there are found no statistically significant differences in any categories. When only considering set play, the statistically significant difference in PNR is also evident as when considering all possessions (EURO mean 1.341 ± 1.108 ; NBA mean 1.149 ± 1.101 ; $p = 0.032$).

Research Deficiencies

One of the major deficiencies in a comparative study across leagues is the challenge of differences in the rules governing the leagues. In Europe the game is played according to the international FIBA-rules, whereas the NBA has its own set of rules. One of the most important differences is the obvious duration of a game. According to FIBA-rules a game is 40 minutes, and the NBA plays for 48 minutes. The NBA court is slightly bigger, and the 3-point-arc is further away from the hoop in the NBA. Additionally, the NBA has restrictions on the use of zone defense and has also deployed restrictions for the defense in the lane area (Defensive Three-Seconds Rule) - a rule implemented to emphasize 1v1-play as it is considered more spectator friendly by American standards. This could be one of the catalysts for the NBA to play more situations ending with FACE as finishing action. In Europe, a player is allowed to touch the ball (when the ball has touched the rim) within the cylinder above the rim and this is not allowed in the NBA (would be called as offensive interference) - something that could influence the number of putbacks (PUTB) in games. You also find more less evident differences to the governance of rules of definitions regarding criteria for calling fouls. Historically, there have been rule changes both in FIBA and the NBA that can pose a challenge in direct comparison. Regarding efficiency, the PPP is not that widely used (Lehto et al., 2010 Remmert, 2003) which could be an obstacle. PPP is very similar to the traditionally used offensive rating in the NBA. Offensive Rating ($ORTg_i$) = $PTS_i/POSS_i \times 100$ (Oliver, 2004; Kubatko et al., 2007). For easier comparison more traditional statistics such as FG%, 2pFG%, 3pFG% etc. could be used as they are more widely indicated and more commonly known and used.

Suggestions and Recommendations

It is recommended that further research is conducted to see if the trend is the same over time as the development of the game is not static. The game styles will change and be inspired by each other and the influx of players that move between Europe and America will also help transfer playing styles. However, the actual development can only be recorded if it is researched. For future studies, it is recommended to include more nuances in the finishing actions; particularly how the pick and roll situations play out. The pick and roll has multiple endings e.g. finish with drive by ball handler, pull up by ball handler, and finish by roll-man; and these sub-finishing actions are very interesting and hold distinct features and qualities that separate them and often relate to how defenses chose to guard the pick and roll and it is also recommended to set a standard in relation to efficiency for easier comparison across all leagues. The NBA uses offensive rating and some European based researchers used points per possession - others again used terms as successful, unsuccessful, neutral and many more. No matter what you do it has to be seen in respect to the league average. For instance, an offensive rating does not necessarily mean a successful team if the defense is bad. Therefore, to compare historical stats you have to take league average into account.

Conclusions

The primary goal of this study was to identify and interpret the differences between defined phase types and the realization of different types of basketball offenses in American and European top-level basketball. The main findings of the comparative study were that: 1) the types of offense differ between European and NBA basketball, with European teams playing more set plays while the NBA showing more transition and early offense; 2) European basketball had significantly more finishing actions of post-up and pick and roll with a higher PPP in pick and roll, while in the NBA 1v1 face to the basket was significantly more common; and 3) European teams also generate a significantly higher number of points per possession during transition and early offense. However, the Americans produce more total points during these phases as the proportion of offenses finished during the transition and early offense phases are higher in the NBA.

The study can help to understand the nature of differences between two analyzed models of professional basketball and establish specific structures that can be constructively interpreted and evaluated and used practically and prospectively in coaching and other professional practices related to basketball. Generally, the results could also be interpreted as a testament to the more deliberate and schematic style of European teams. On the other hand, in American basketball the total amount of points scored during transition and early offense is higher due to a larger volume. Defining relevant structures of the game allows coaches and players to better understand the underlying systems and should thereby be better suited to perform successfully.

Generally, the results of this study have scientific and practical significance and adds to existing knowledge about structural components of European and American basketball. The results of this study can be used in coaching to justify the distribution of training load focusing on specific tactical (types of offense) and technical (finishing actions) aspects of the game. Additionally, the approach of this study can be applied in a team's preparational phase and help to reveal precise information on specific structural features of opponents. The method will indicate elements present in the game of opponents both in terms of pre-planned tactics but also tendencies regarding their preferred choice of solution to situations occurring randomly. The current trends in basketball points towards a data driven approach in game preparation and decision-making processes regarding player acquisition and tactical decisions.

Conflicts of interests: The authors declare no conflict of interest.

Acknowledgements: The authors wish to thank Mads Hjorth Jensen for many helpful suggestions throughout the process of writing this article.

References:

- Bazanov, B., Vöhandu, P., & Haljand, R. (2006). Trends in offensive team activity in basketball. *Baltic Journal of Sport and Health Sciences*, 2(61).
- Bieniek, P., Augustyn, K., Zubik, M., & Kwater, K. (2014). Diversification of game-related indicators in novice NBA players. *Journal of Health Sciences*, 4(3), 141-147.
- 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.
- Colás, Y., & Colas, S. (2012). What we mean when we say" play the right way": Strategic fundamentals, morality, and race in the culture of basketball. *The Journal of the Midwest Modern Language Association*, 109-125.
- Conte, D., Favero, T. G., Niederhausen, M., Capranica, L., & Tessitore, A. (2017). Determinants of the effectiveness of fast break actions in elite and sub-elite Italian men's basketball games. *Biology of sport*, 34(2), 177.
- Courel-Ibáñez, J., McRobert, A. P., Ortega Toro, E., & Cárdenas Vélez, D. (2018). Inside game effectiveness in NBA basketball: Analysis of collective interactions. *Kinesiology: International journal of fundamental and applied kinesiology*, 50(2), 218-227.
- Davenport, T. H. (2014). Analytics in sports: The new science of winning. *International Institute for Analytics*, 2, 1-28.
- Eccles, D. W., Ward, P., & Woodman, T. (2009). Competition-specific preparation and expert performance. *Psychology of Sport and Exercise*, 10(1), 96-107.
- Erčulj, F., & Štrumbelj, E. (2015). Basketball shot types and shot success in different levels of competitive basketball. *PloS one*, 10(6).
- Evangelos, T., Alexandros, K., & Nikolaos, A. (2005). Analysis of fast breaks in basketball. *International Journal of Performance Analysis in Sport*, 5(2), 17-22.
- García, J., Ibáñez, S. J., De Santos, R. M., Leite, N., & Sampaio, J. (2013). Identifying basketball performance indicators in regular season and playoff games. *Journal of human kinetics*, 36(1), 161-168.
- Garefis, A., Tsitskaris, G., Mexas, K., & Kyriakou, D. (2007). Comparison of the effectiveness of fast breaks in two high level basketball championships. *International Journal of Performance Analysis in Sport*, 7(3), 9-17.
- Goldman, T. (2007, February 7). *Almost NBA-players take home paltry salaries*. National Public Radio. <https://www.npr.org/templates/story/story.php?storyId=7239948&t=1615638195439>
- Hughes, M. D., & Bartlett, R. M. (2002). The use of performance indicators in performance analysis. *Journal of sports sciences*, 20(10), 739-754.
- Jungić, S., Jovanović, J., Mihajlović, M., & Simović, S. (2015). Comparative Analysis of Competitive Balance of Basketball Leagues. *Choregia*, 11(1).
- Kubatko, J., Oliver, D., Pelton, K., & Rosenbaum, D. T. (2007). A starting point for analyzing basketball statistics. *Journal of quantitative analysis in sports*, 3(3).
- Lehto, H., Häyrynen, M., Fay, T., Tammivaara, A., & Dettmann, H. (2010). Technical and tactical game analysis of elite basketball in three different levels. *KIHU's publication series* (19), 33.
- Lorenzo, A., Gómez, M. Á., Ortega, E., Ibáñez, S. J., & Sampaio, J. (2010). Game related statistics which discriminate between winning and losing under-16 male basketball games. *Journal of sports science & medicine*, 9(4), 664.
- Mandić, R., Jakovljević, S., Erčulj, F., & Štrumbelj, E. (2019). Trends in NBA and Euroleague basketball: Analysis and comparison of statistical data from 2000 to 2017. *PloS one*, 14(10).
- 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.

- Milanović, D., Selmanović, A., & Škegro, D. (2014). Characteristics and differences of basic types of offenses in European and American top-level basketball. In 7TH INTERNATIONAL SCIENTIFIC CONFERENCE ON KINESIOLOGY (p. 400).
- Mikołajec, K., Maszczyk, A., & Zajac, T. (2013). Game indicators determining sports performance in the NBA. *Journal of human kinetics*, 37(1), 145-151.
- Oliver, D. (2004). *Basketball on paper: rules and tools for performance analysis*. Potomac Books, Inc..
- Polykratis, M., Tsamourtzis, E., Mavridis, G., & Zaggelidis, G. (2010). Relation of effectiveness in pick n'roll application between the national Greek team of and its opponents during the men's world basketball championship of 2006. *Journal of Physical Education and Sport*, 29(4), 57-67.
- Remmert, H. (2003). Analysis of group-tactical offensive behavior in elite basketball on the basis of a process orientated model. *European Journal of Sport Science*, 3(3), 1-12.
- 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.
- Remmert, H., & Lysien, M. (2020). Analysis of offensive-defensive interactions within ball screens as preparative and finishing offensive actions in a random sample of regular season games of the German easyCredit Basketball Bundesliga 2017/18. [In German: Analyse der Interaktionen im direkten Block als vorbereitende und abschließende Angriffshandlung in zufällig ausgewählten Hauptrundenspielen der easyCredit Basketball Bundesliga 2017/18]. *German Journal of Exercise and Sport Research*, 1-11.
- Salador, K. (2011). Forecasting performance of international players in the NBA. In *Proceedings of the MIT Sloan Sports Analytics Conference* (pp. 1-18).
- Scarlatelli, L. (2015, August 9). *Championship Cultures: Selflessness*. Fastmodel Sports. <https://team.fastmodelsports.com/2015/08/09/championship-cultures-selflessness/>
- Selmanović, A., Milanović, L., & Brekalo, M. (2017). Analysis of ball conversion in European and American professional basketball games. In *Proceedings book of 8th International Scientific Conference on Kinesiology*, 406-410.
- Selmanović, A., Milanović, D. & Škegro, D., (2019). Finishing actions in relation with basketball offense outcome types in NBA and Euroleague. *Acta Kinesiologica*, 13(1), 29-34.
- Selmanović, A., Škegro, D., & Milanović, D. (2015). Basic characteristics of offensive modalities in the Euroleague and the NBA. *Acta Kinesiologica*, 9(2), 83-87.
- Solsona, E., Serna, J., Muñoz-Arroyave, V., & Ramos, J. A. E. (2020). Offensive analysis in EUROLEAGUE final four. *Revista Brasileira de Cineantropometria & Desempenho Humano*, 22.
- Smith, D., Bell, G. D., & Kilgo, J. (2004). *The Carolina way: Leadership lessons from a life in coaching*. Penguin.
- Štrumbelj, E., Vračar, P., Robnik-Šikonja, M., Dežman, B., & Erčulj, F. (2013). A decade of euroleague basketball: An analysis of trends and recent rule change effects. *Journal of human kinetics*, 38(1), 183-189.
- Uhlmann, E. L., & Barnes, C. M. (2014). Selfish play increases during high-stakes NBA games and is rewarded with more lucrative contracts. *PloS one*, 9(4), e95745.
- Zukolo, Z., Dizdar, D., Selmanović, A., & Vidranski (2019), T. The role of finishing actions in the final result of the basketball match. *Sport Science* 12 (2019) Suppl 1: 90-95.