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THE RELATIVE AGE EFFECT IN JUNIOR FEMALE BASKETBALL PLAYERS

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ABSTRACT. Introduction: Sports activity interferes with physiological growth, adaptability accelerating and perfecting structural, functional and mental differentiation. The performance model is dependent on the total capacity of the players, on the psycho-social system resulting from the perfection of the executive functions, of the morphological, physiological, informational and decisional subsystems. **Objective:** The objectives underlying this work are the discovery and determination of the relative age effect (RAE) that leaves its mark on the system of failure or success in the lives of athletes, basketball players. By following the birth months of the athletes of a certain year, we try to prove that there is a close connection between the age advance in the life of certain athletes and their career success. The premise of the study is to analyze the impact of the RAE effect in the U16, U18 and U20 categories of the Romanian junior women's basketball teams. **Material and method:** In order to demonstrate a connection within this subject, the method used was the structuring of sportswomen in several age categories and the analysis of their results**. Results:** According to the conducted study, the existence of the relative age effect among the selected ones is found, but not in the way that those born in the first months of the year would have a substantial advantage**. Conclusions:** The results confirm the fact that there is a possibility for the younger ones to evolve with efficiency similar to their older colleagues.

Keywords: *relative age effect, women's basketball, performance, success.*

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Introduction

The relative age effect (RAE), also known as the date of birth effect, is used to describe a bias which may be found in the upper echelons of youth sports or sports clubs. The relative age effect is defined as the distant age difference between two children who were born in the same year, where the one born earlier benefits from an advance in physical and mental development and growth. (Delorme, 2009)

Thus, when speaking about their selection, those who are first focused on are the ones born in the early months of the year. Team members are selected based on their chronological age, and this can often influence success in sports career.

The relative age effect is relevant for professional sports where the "best of the best" are chosen, so knowing some specific selection methods can represent a long-term advantage. Understanding the impact of the relative age effect on individual and collective performance in a team sport is important not only for the sports club that gains added value, but also for each athlete and coach who become successful and achieves professional development. The relative advantage that some individuals have due to their date of birth can be wasted if not properly capitalized on in specific contexts through preparation and dedication.

Objective

This exploratory study aims to analyze the impact of the RAE effect in the U16, U18 and U20 age categories of the Romanian women's national basketball teams.

The study intends to find out whether female athletes from the national teams were selected due to the relative age effect and to what extent it influences their performance.

Material and method

The study analyzes the relative age effect in sports and its connection to performance for 36 participants from the Romanian women's national basketball teams, who participated in the European Basketball Championship 2022. The athletes are divided as follows:

- *for U16* - 12 players are part of the U16 group and are 16 years old, (most of them) being born in 2006, with 2 exceptions (born in 2007 and turning 15, but who are eligible for the category they belong to);

➢ *for U18* - 12 players are part of the U18 group, most of them being born in 2005, with the chronological age of 17 years and three exceptions who are born in 2004 and currently are 18 years old, thus falling into this category;

➢ *for U20* - 12 players, most of them being born in 2002, who are 20 years old, except for two athletes who are born in 2003 and are 19 years old.

Data collection

For data collection, we accessed the website of FIBA basketball federation https://www.fiba.basketball/, and then we selected the team categories, U16, U18 and U20, female athletes. We took the identification data of the female athletes, their months of birth, but also statistical elements about their performance in the game (such as the efficiency and minutes of playing time, but also how many games they played in that championship. From the website of the basketball federation, we also collected data on the points scored and rebounds from under the basket).

We structured the public information about the players related to their competition groups, and divided them into 4 quarters, hereafter referred to as Quintets or Q, by months of birth. Even if there are some exceptions among the female athletes and not all of them are born in the same calendar year, those representing age exceptions are eligible for being part of that group and may even have overcome certain barriers to get there. Thus, since there are 12 months, divided into 4 quarters, each Q includes 3 months. So we have Q1 for the months of January, February, March, Q2 for the months of April, May, June, Q3, which includes July, August and September, and Q4 with the remaining months, October, November and December. The variables that will be taken into consideration for carrying out this study are:

✓ ***dependent variables*** – performance during the game (operationalized by: efficiency, minutes of playing time, points scored and rebounds from under the basket);

✓ ***the independent variable*** – month of birth.

Statistical analysis

The obtained results were centralized in tables and interpreted statistically with Microsoft Excel program.

Results

The charts created for each team table include the top 3 athletes ranked for the dependent variables mentioned above (efficiency, points and rebounds).

The minutes of playing time were excluded from the analysis, because they are influenced by the coach's game strategy. The following tables present the centralized data, as follows:

Table 1. The Romanian national basketball team Under 16

No.	Athlete	Club	Date of birth	Month	Height	Minutes	Games	Efficiency	
1	S 1A	ACS Dan Dacia	06.02.2007	February	168	17.9	7	4.6	
2	S 2A	CSM Ploiesti	08.02.2006	February	184	18.6	7	6.6	
3	S 3A	ACS Dan Dacian	16.02.2006	February	177	7.5	6	-0.3	
4	S 4A	ACS Sepsi-SIC	19.02.2006	February	185	24.1	7	6.6	**Q1**
5	S 5A	ACS Dan Dacian	01.03.2006	March	187	4.3	5	-0.4	
6	S 6 A	CSM Ploiesti	31.03.2006	March	184	8.8	7	4.1	
7	S 7A	ACS Dan Dacian	03.08.2006	August	180	34.5	7	11.3	**Q3**
8	S 8A	ACS Dan Dacian	28.08.2006	August	174	15.5	7	3.9	
9	S 9A	ACS Champions Bucuresti	07.09.2006	September	180	26.1	7	11.4	
10	S 10 A	CSM Ploiesti	07.09.2007	September	175	16.7	7	1.3	
11	S 11A	ACS Dan Dacian	21.08.2006	September	166	31.1	7	4.1	
12	S 12A	ASBC Valbon Arad	13.11.2006	September	192	2.7	2	0.5	**Q4**

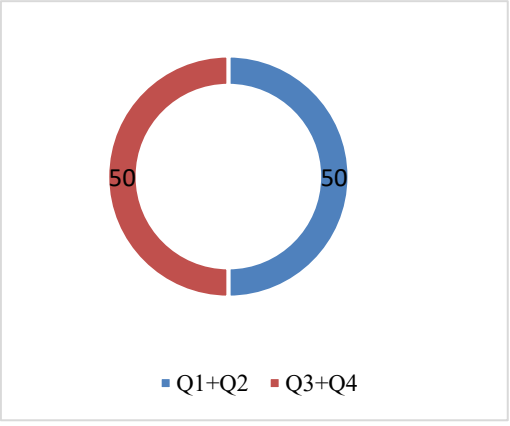

Fig. 1. *Chart for Table 1*

In this team category, we noticed that the relative age effect was highly visible, which is reflected in the composition of the team. 50% of the entire team is born in Q1, meaning they proved to have very good playing skills, which led to them being part of the national team.

Table 2. The Romanian national basketball team Under 18

No.	Athlete	Club	Date of birth	Month	Height	Minutes	Games	Efficiency	
1	S 1B	CSS Bucuresti	13.01.2004	January	180	22.8	4	-2	
2	S 2B	CSTBv Olimpia CSU Brasov	01.01.2005	January	168	4.5	7	-0.1	**Q1**
3	S 3B	LPS Satu Mare	18.01.2005	January	191	15.3	7	5	
4	S 4B	CSS Alexandria	17.02.2005	February	175	27.9	7	3.7	
5	S 5B	Cs Olimpia Bucuresti	17.05.2005	May	171	32.1	7	4.7	**Q2**
6	S 6B	ACS KSE Tg Secuiesc	11.07.2005	July	178	26.4	7	10.7	
7	S 7B	CSS 4 Bucuresti	26.09.2005	September	173	5	7	0.3	**Q3**
8	S 8B	LT Nagy Mozes	26.10.2005	October	162	12.4	7	2.1	
9	S 9B	C.S Agronomia Bucuresti	02.11.2005	November	169	23.3	7	10.9	
10	S 10B	CSS Bega Timisoara	18.12.2005	December	187	3.9	3	0.7	**Q4**
11	S 11B	CS Crisul Oradea	31.12.2004	December	168	5.3	7	-0.1	
12	S 12B	CSTBv Olimpia CSU Brasov	25.12.2004	December	170	22.1	7	7.9	

In Table 2, we notice that for the U18 team there is a slight change in the age effect situation, namely we no longer have a large share of athletes in Q1, but, as this is a larger age category, other aspects apply.

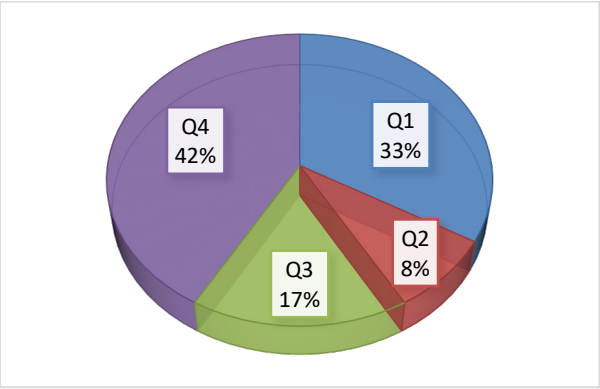

Fig. 2. *Chart for table 2 (Q1-January, February, March; Q2-April, May, June; Q3-July, August, September; Q4-October, November, December)*

Table 3. The Romanian national basketball team Under 20

No	Athlete	Club	Date of birth	Month	Height	Minutes	Games	Efficiency	
1	S 1C	ADC Parque del Sureste	28.01.2002	January	185	10.4	7	3.1	
2	S 2C	BC Sirius Târgu Mures	28.02.2002	February	174	15.1	6	7.3	**Q1**
3	S 3C	CSM Târgoviste	09.02.2002	February	174	4.2	7	0	
4	S 4C	Satu Mare	01.03.2003	March	170	30	6	8.8	
5	S 5C	Academia CSU Simona Halep	11.04.2002	April	176	27.7	7	9.4	
6	S 6C	CSS Alexandria	18.05.2002	May	182	3.9	7	1.1	**Q2**
7	S 7C	CSU ROOKIES Oradea	15.06.2002	June	172	6.7	5	0.2	
8	S 8C	ACS Sepsi-SIC	11.07.2002	July	187	22.1	7	8.7	**Q3**
9	S 9C	CSS Alexandria	22.07.2002	July	165	31.4	7	8.6	
10	S 10C	CSS Alexandria	31.10.2002	October	160	18.2	7	2.3	
11	S 11C	Wright State USA?	26.11.2003	November	182	20.4	7	9.4	**Q4**
12	S 12C	CSS Alexandria	08.12.2002	December	180	18.3	7	2.3	

If we take a look at the table and at its related chart, we notice that the share of female athletes who are part of Q3 and Q4 is higher than that of female athletes born in Q1 and Q2.

In Table 3, we notice that the relative age effect occurred in relation to the selection of female athletes. The predominant female athletes in this team category are the ones born in Q1 and Q2, leaving little space available for those born in Q3 and Q4.

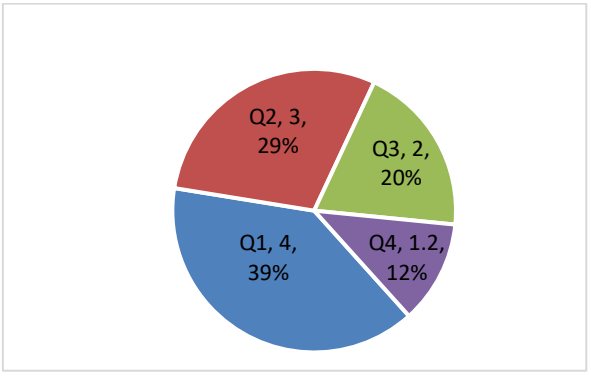

Fig. 3. *Chart for Table 3 (Q1-January, February, March; Q2-April, May, June; Q3-July, August, September; Q4-October, November, December)*

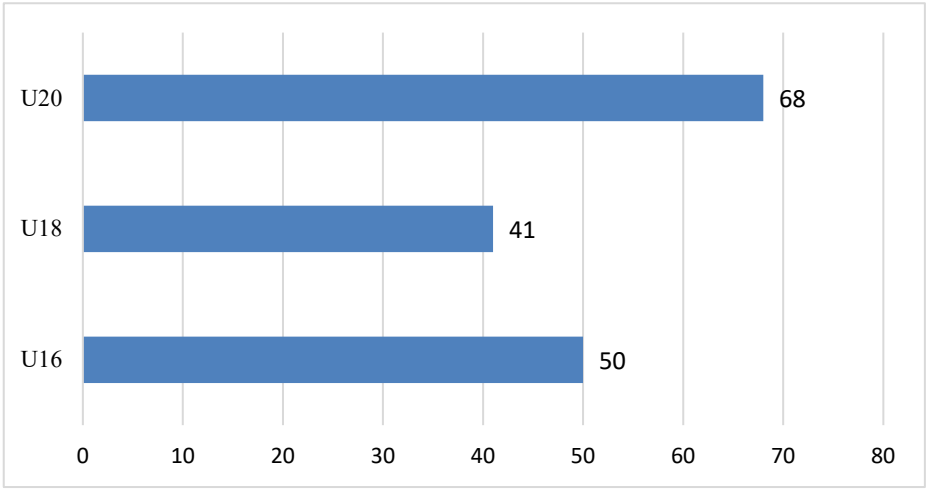

Fig. 4. *Comparison between the U16, U18 and U20 teams*

As we can easily observe, team U20 is the only one of the three where we have a marked relative age effect applied in the selection process of the female players. The percentage is 68% for female athletes who are part of Q1 and Q2, and 32% for the female athletes who are part of Q3 and Q4.

Chart 4 represents a comparison between the U16, U18 and U20 teams, whose purpose is to find out which of them has the largest share of female athletes born in Q1 and Q2 compared to Q3 and Q4, thus proving the presence of the relative age effect.

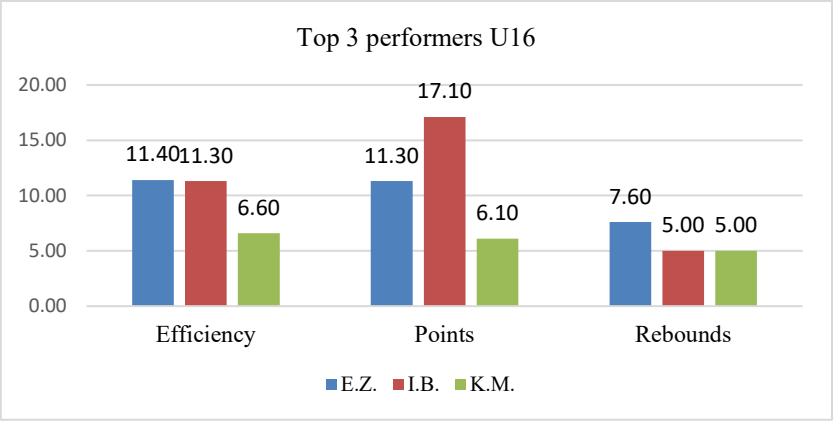

Fig 5. *Top 3 performers U16*

We should point out that in this category, although the relative age effect is present, the first two players in terms of efficiency, scored points and rebounds are part of Q3.

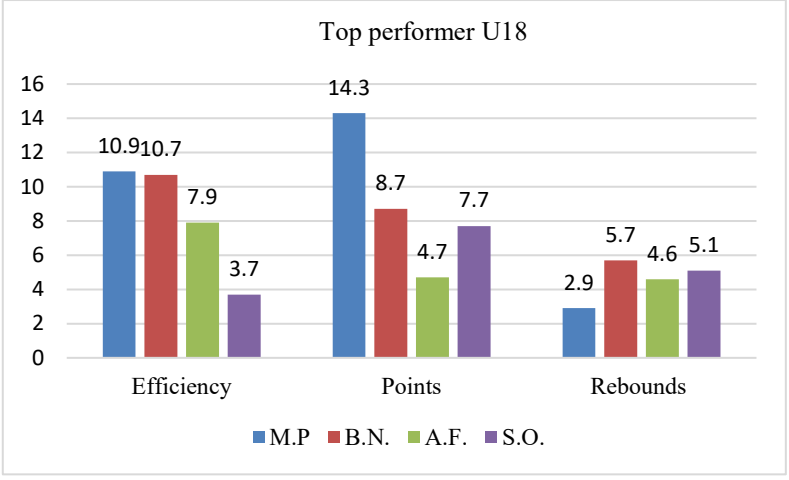

Fig. 6. *Top performer U18 for table 2*

The fictitious example we give for this situation is the European basketball championship 2022, for which, in order to participate in the U18 team, you must be born at least in 2004 and in 2005, at the most. In this national team, not only do we not have the relative age effect, but we see a completely opposite effect, where the best turned out to be those born later.

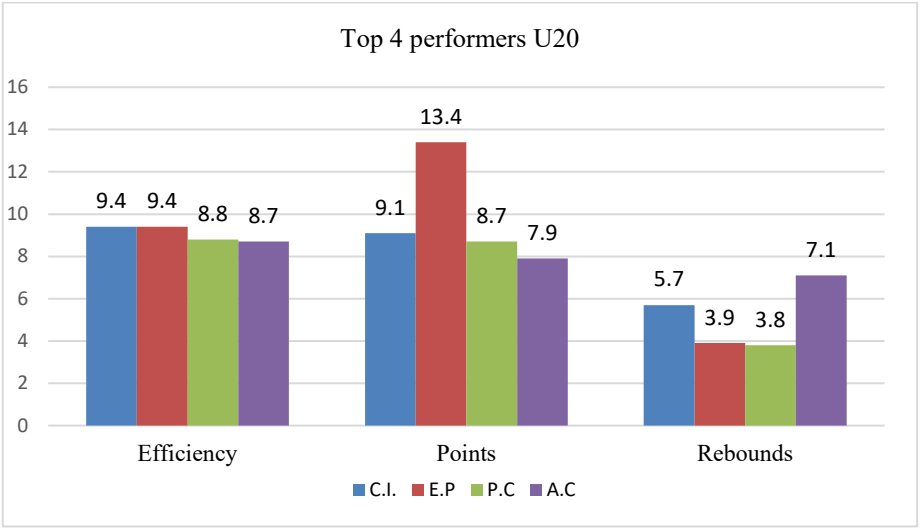

Fig. 7. *Top 4 performers U20*

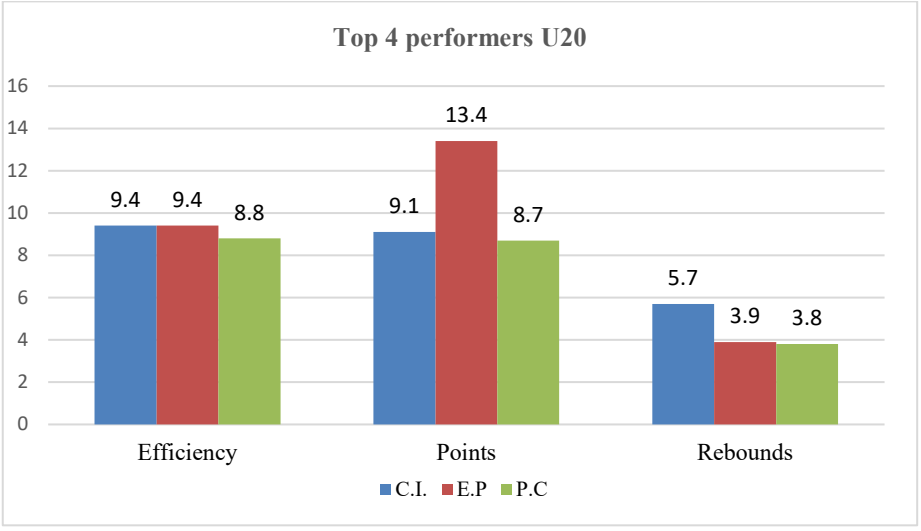

Fig. 8. *Top 4 performers U20*

In this structure, we gave two small forwards in the same age category, namely C. I. and P. C. We can say both athletes are very talented and their results speak for themselves, but the ratio here is a little bit more complex. Both C.I. and P.C. are born in the same year, but both are also one year younger than the other team members.

Discussion

The relative age effect (RAE) is constantly mentioned in the literature, including as regards basketball. For example, the purpose of the study carried out by Kelly, A. L., 2021 is to follow the path taken by the members of regional youth basketball teams in England, from the U16, U18 and U20 categories, to the senior national teams. The result was that the number of players allocated to the mentioned teams was almost double for those born in Q1 and Q2 compared to those born in Q3 and Q4.

Riaza and Calvo (2020) pointed out in their study the presence of the RAE in the U14-U18 age categories, where, out of 7502 measurements a 44% presence of the relative age effect was found, a percentage that decreases with the age of the subjects.

Conclusions

The results largely show the presence of the relative age effect, i.e. 50% in the U16 category, and 68% in the U20 category. The only group in which the RAE is found in a different form is the U18, where the younger ones, more numerous, ended up playing alongside older colleagues.

In the U18 category, the RAE is interpreted differently; thus, 75% of all team members are a year younger, yet their performance was better. Each team we have analyzed included some exceptions. Female athletes who meet the minimum age, but handle the requirements performing better than their colleagues.

It is true that those in Q1 are more likely to be better than those in Q4, but this depends on the 3 effects that were extensively explained in the first part of this paper. These are the Matthew Effect, the 10,000-hour rule, and, only at the end, the relative age effect. However, there will always be exceptions that deviate from the rule.

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