Research Paper

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The Relative Age Effect Phenomenon in the 2013 UEFA European Under-17 Championship

Physical Education

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ABSTRACT

The categorization of the players according to their dates of birth is believed that provides equal opportunities for everyone because of the same chronological age. However, the research about the existence of Relative Age Effect (RAE) showed that it is not true. The participants of the study were all the players (n= 1094, M= 16.91, SD= .30) that took part in the UEFA European U17 Championship. The aim of the study was to examine the age distribution of players in quartiles, and how this distribution affected the performance of each team in the championship. Then it was examined the RAE according to the percentage of participations, and the playing positions of the players. Descriptive statistics, ANOVA, and post hoc comparisons were used. The distribution of the birth dates revealed significant RAE effect which was related to the team performance. There were also some trends which associate the RAE with the players' participations and playing positions.

INTRODUCTION

Sport federations in order to categorize athletes in developmental stages created cut-off dates. For instance, in 1997, FIFA imposed that the cut-off date for all the international tournaments will be 1st January as a start date and 31st December as an end date. That way, athletes can compete against other athletes that belong in the same age group. It is believed that this categorization provides equal opportunities to everyone because of same chronological age. Nevertheless research has shown that this is not completely true (Musch & Grondin, 2001; Cobley, Baker, Wattie, & McKenna, 2009). That is because even in groups of 1 year some athletes might have a difference of 12 months. That range of time can be substantially important in the selection process. Athletes born early in the selection year might have a strong advantage compare to others that are born late in the selection year.

The relative age refers to an athlete's age compared to the age of other athletes in the same selection year. The consequence of this is called Relative Age Effect (RAE) and more specifically may result in higher performance discrepancies (Barnsley, Thompson, & Legault, 1992). RAE has been studied extensively in various sports (Cobley et al., 2009) but mostly in soccer and hockey (Delorme, Boiche, & Raspaud, 2010; Helsen, van Winckel, & Williams, 2005; Lemez, Baker, Horton, Wattie, & Weir, 2013). Grondin, Deshaies, and Nault (1984) were the first to examine RAE and their findings revealed that players born in the first quartile were overrepresented. More recently Cobley and his colleagues (2009) conducted a review of RAE in sport. They found evidence that support the existence of RAE. Delorme and Raspaud (2009) found that RAE has more chances to occur in puberty due to more evident physical discrepancies. This is in accordance with past research which showed that during the puberty years (13-15 years for boys and 12-14 years for girls), the physical and performance differences are heightened (i.e. Baxter Jones, Helms, Baines-Preece, & Preece, 1994; Baxter-Jones, Helms, Maffull, Baines-Preece, & Preece, 1995; Malina, Ribeiro, Aroso, & Cumming, 2007). Consequently, athletes who are chronologically born earlier in a selection year have more chances to be selected as it is more likely they are more physically mature.

Differences of RAE are highlighted due to the physical characteristics (Delorme & Raspaud, 2009; Sherar, Baxter-Jones, Faulkner, & Russell, 2007), cognitive characteristics (Malina, 1994; Mush & Grondin, 2001), experience as a function of age (Ward & Williams, 2003; Ward, Hodges, Williams, & Starks, 2004), in perceptions of competence (Harter, 1978; Harter, 1993) and in perceptions of self-efficacy (Bandura, 1986). Especially in competitive and popular sports physical appearance is a crucial variable for selection. When coaches select athletes they probably select those that are stronger, faster, taller and in general look more promising. This wrong notion also happens because coaches want immediate results from their teams. In the study of Augste and Lames (2011) it was confirmed that when a team has strong RAE it has more possibilities of being successful. Helsen and his colleagues (2005) attributed RAE on three aspects. Firstly, talent identification and development are centered on physical attributes and not on technical skills. Secondly, during recruitment processes, big periods of age band (i.e. 24 month) focuses more on physical aspects. Lastly, they attribute RAE to exposure in high-level competition from a very young age. Collectively, research has shown that RAE is promoted and maintained.

The RAE has also been connected with higher rates of drop out. Mush and Grondin (2001) reported that RAE is responsible for discrepancy of age distribution but is also responsible for drop out between athletes that are born late in their selection year. Moreover athletes born early in their selection year get more playing time compared to those born late in their selection year (Veyens, Philippaerts, & Malina, 2005). Thus athletes born late would have negative experiences and might have low perception of competence. Low perceived competence in known to promote decreased motivation (Kirk, 2005). Therefore, athletes that are born late in their selection year have more possibilities of dropping out because of smaller playing time and also because of their low perceived competence (Guillet, Sarrazin, Carpenter, Trouilloud, & Cury, 2002). Recently a research on ice hockey by Lemez and his colleagues (2013) confirmed that players born late in their selection year have more possibilities to drop out. Their research supported the existence of RAE in participation rates in a 5year period 27% of athletes dropped out. The RAE combined with higher rates of drop out in younger athletes probably minimize the effectiveness of talent identification and development (Baker, Schorer, Cobley, 2010).

The aim of the present study was to examine the potential Rela-

tive Age Effect at the UEFA European Under-17 Championship. More specifically, we examined the percentages of age distribution grouped in quartiles. This was done for the overall number of athletes and for each team separately. Secondly, it was examined the relation of teams' qualification in the championship with their athletes' quartile percentages. Thirdly, it was examined the percentage of participation for the overall number of athletes based on their quartile. One more factor that was tested was the relationship between the age of the coach and the players' birth of dates. Finally it was investigated the athletes' quartile distribution in relation with their playing position (for each team separately and for the overall number of athletes in total). The study had one extra aim which was to investigate if there is any possible relation between coaches' age and the existence of RAE in their teams.

MATERIAL AND METHODS

Participants

The total number of participants was 1094 male soccer athletes and 53 coaches and their age ranged from 15 to 17 (*M*= 16.91, SD= .30) and from 35 to 58 (*M*= 45, SD= 5.91) respectively. All of them were members of 53 national teams, which participated in the 2013 UEFA European Under-17 Championship. The birth dates and other data (i.e. playing position) were obtained either from the home web pages of the national teams or from the official website of the 2013 UEFA European Under-17 Championship (http://www.uefa.com/under17/).

Assessment test

The data were collected from the 2013 UEFA European Under-17 Championship. Firstly, the authors examined the athletes' dates of birth which were divided in five different groups. There were created four age groups for the different quartiles of a year (Q^1: 1/1-31/3/1996; Q^2: 1/4-31/6/1996; Q^3: 1/7-31/9/1996; and Q^4: 1/10-31/12/1996) and one group for the players that were born in another year (Q^5: younger than 17 years old). Then, the athletes' positions were collected, which were divided, according to the official UEFA classification, in the following four groups: Goalkeepers, Defenders, Midfielders, and Attackers. Furthermore, the total participations of each player in the tournament were counted. Then participations were divided in the following groups: 1-10% of participations, 11-20%, 21-30%, 31-40%, 41-50%, 51-60%, 61-70%, 71-80%, 81-90%, 91-100% of participations. Regarding the coaches their dates of birth were collected and categorized in the following three groups: "less than 40 years old", "from 41 to 49 years old", and "more than 50 years old". Finally, concerning the teams' performance, we examined the final ranking, and the wins' percentage of the qualifying round for each national team. According to the final ranking we developed five groups. In the first group we included all the teams that played in the qualifying round, in the second group the teams that promoted to the elite round, in the third group the teams that promoted for the group stage, in the fourth and fifth group the teams that participated in the semi-finals and in the final round respectively.

Tournament procedures

The 2013 UEFA European Under-17 Championship consisted of three distinct stages: the qualifying round, the elite round and the final tournament. The qualifying round, played in autumn 2012, was made up of 13 groups of four teams playing in one-venue mini-tournaments. The top two from each progressed alongside the third-placed teams with the best records against the top pair in their group. In the elite round, played in early 2013 spring, those 27 qualifiers plus the top seed gave a bye; competed in seven mini-tournament groups of four. The group winners progressed to the finals and joined the hosts. At the final tournament "group stage" the contenders were split into two groups of four, with the top two progressing to the semi-finals, with the showpiece to follow.

Statistical Analysis

All statistical analyses were performed using the SPSS package (v. 17). Descriptive statistics for the variables were computed using the SPSS frequencies procedure. Crosstabulation was also used to group the participants according to their specific characteristics. Then, analysis of variance (ANOVA) was used to indicate the differences among the groups of participants concerning the independent variables. Finally, post hoc comparisons by Dunnett and Bonferronni tests were used to examine the differences among the sub-groups.

RESULTS

The descriptive statistics emphasize some differences on the distribution of the age groups of the Under-17 national teams. The colored columns present the different age group quartile. The three lists of columns present the age group distribution for the *total number of the teams*, the *qualified teams*, and the *not qualified teams*. It is clear that around the half of the athletes were born in the first quartile of the year (Q^1). On the other hand, only 5 to 10 percent was born the last quartile of the year (Q^4). According to the performance of the teams it is obvious that the teams which promoted to the group stage (eight teams) consisted more of athletes who were born in the first and the second quartile of the year (Q^1 & Q^2) than the other teams which did not promote (figure 1).

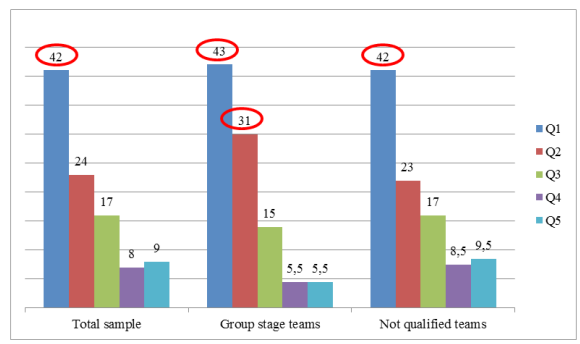

Figure 1: Age group percentages' distribution of the Under-17 national teams.

The descriptive statistics of the table 1 show the distribution of the age groups according to the percentage of *athletes' participations*. The columns present the participations' percentages of the athletes for the different age groups. It is clear that the older an athlete was the more matches in that tournament he participated.

Participations (%)

Dates of Birth	0 - 10	11 - 20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70	71 - 80	81 - 90	91 - 100
Q^1	2,3%	2,7%	,4%	6,0%	3,7%	1,0%	5,8%	,8%	3,8%	15,4%
Q^2	1,1%	1,6%	,8%	2,9%	2,7%	,3%	3,8%	,5%	1,2%	9,1%
Q^3	1,1%	1,4%	,2%	2,6%	1,3%	,2%	1,6%	,5%	1,3%	6,9%
Q^4	,8%	,2%	,0%	1,1%	,8%	,2%	1,3%	,3%	,3%	3,1%
Q^5	,9%	,4%	,0%	1,4%	1,2%	,0%	1,5%	,0%	,6%	3,1%

Table 1: Participation frequencies according to the age groups.

On the table 2 is presented the distribution of the age groups according to their *playing position*. The columns present the positions' percentages of the athletes for the different age groups. It is obvious that the midfielders and the defenders consist of the oldest athletes of the pitch.

Positions

Dates of Birth	Goalkeepers	Defenders	Midfielders	Attackers
Q^1	4,3%	13,3%	15,0%	9,4%
Q^2	2,2%	8,9%	7,4%	5,6%
Q^3	2,4%	5,8%	5,0%	3,7%
Q^4	,8%	2,4%	3,1%	1,7%
Q^5	1,6%	2,0%	3,1%	2,3%

Table 2: Position frequencies according to the age groups.

Analysis of variance (ANOVA) was used in order to examine the significance of the differences among the age groups concerning the *performance* of the teams, the *athletes' participations* and *playing positions*, and the *age of the coach*. Then Dunnett and Bonferronni tests were used for the differences among the sub-

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groups. The ANOVA (Table 3) revealed statistically significant main effects at the p< .001 level, for the different age groups concerning the team performance which was measured from the final ranking of each team {$F_{(4, 2074)}$= 7,293, p= .000}.

ANOVA

Source of variation	SS	df	MS	F	p
Between groups	44,959	4	11,240	7,293	,000
Within groups	3196,485	2074	1,541		
Total	3241,444	2078			

Table 3: Analysis of variance for the differences among the age groups concerning the team performance (final ranking).

Post hoc comparisons using the Dunnett test (Table 4) indicated that there are significant differences among the mean scores of the age groups. The group of players that were born the second quartile of the year presented higher performance than the groups of players that were born the first (p< .10), the third (p< .05), and the fourth quartile of the year (p< .001), and also the group of players that were born the following years (p< .001). On the other hand the group of players that were born the first quartile of the year presented higher performance than the group of players that were born the following years (p< .10).

Dunnett comparisons

(I) Age groups	(J) Age groups	Mean Difference (I-J)	Std. Error	Sig.
Q^1	Q^2	-,194	,070	,054
	Q^5	,288	,110	,089
Q^2	Q^3	,287	,088	,011
	Q^4	,431	,108	,001
	Q^5	,482	,117	,000

Table 4: Significant Dunnett comparisons among the age groups concerning the team performance (final ranking).

The ANOVA (Table 5) revealed statistically significant main effects at the p< .005 level, for the different age groups concerning the team performance which was measured from the wins percentage of the qualifying round {$F_{(4, 2002)}$= 3,025, p= .017}. Post hoc comparisons using the Dunnett test indicated that there are significant differences among the mean scores of the age groups. Specifically, the group of players that were born the first quartile of the year presented higher performance than the group of players that were born the third quartile of the year (p< .10).

ANOVA

Source of variation	SS	df	MS	F	p
Between groups	5,477	4	1,369	3,025	,017
Within groups	906,021	2002	,453		
Total	911,498	2006			

Table 5: Analysis of variance for the differences among the age groups concerning the team performance (wins percentage of the qualifying round).

As far as the rest of the variables the analysis of variance indicated that there were not significant differences among the different age groups. Specifically, the different age groups did not differ statistically significant concerning the participations {$F_{(4, 2074)}$= ,434, p= .785, *ns*} and the positions of the players {$F_{(4, 2074)}$= 1,205, p= .307, *ns*}, and also the age of the coach {$F_{(4, 2074)}$= 1,483, p= .205, *ns*}.

DISCUSSION

The current study examined the potential Relative Age Effect of the national teams, which participated in the 2013 UEFA European Under-17 Championship. The RAE is associated with many physical, physiological, psychological, and cognitive characteristics (Delorme & Raspaud, 2009; Sherar et al., 2007). The consequences of these relationships are reflected on both the individual development (i.e. experience) and the team performance (Augste & Lames, 2011; Ward et al., 2004). It is concluded that more than the 40% of the athletes that participated in the tournament were born the first quartile of the selection year. Additionally, around 65% of the total number of the participants was born the first semester of the year. The rest 35% of the players was distributed in the second semester of the year and the following years. This finding is supported from the literature review which concluded that around 50% of the youth academies, club, and national players were born the first quartile of the year and 70% in total were born the first semester of the year (Augste & Lames, 2011; Helsen et al., 2005; Jimenez & Pain, 2008; Meylan, Cronin, Oliver, & Hughes, 2010; Romann & Fuchslocher, 2013; Williams, 2010). The second aim of the study was to examine the relation of age distribution of each team with its performance. The finding about the positive relation between performance and RAE in club level (Augste & Lames, 2011) was also supported in international level by the current study. Specifically, the researchers concluded that the national teams which consisted of players that were born the second quartile of the year presented higher performance than the teams which consisted of younger players. Although the descriptive statistics showed similar relationship between the first quartile players and the third or fourth quartiles, the differences among the groups were not significant. This finding is probably explained by difficulties on measuring the team performance because of the cup rules of the tournament (less matches than a league for each team). However it is obvious that national teams with older athletes were significantly more successful than the others.

It was also examined the association between game parameters and RAE, and they concluded some trends. Concerning the *game participations*, although there were not significant differences among the groups, there was a trend for a gradual decrease of participations from the first to the last quartile of the selection year. This finding is also supported from the literature review as far as the semi-professional and amateur soccer players (Vaeyens et al., 2005). An explanation about the lack of significant differences among the age groups might be the top level of athletes that were selected for the national teams. As far as the *playing position* although there was a trend that older players were playing as midfielders, the differences among the age groups were not significant. This finding is supported from the literature review (Gutierrez Diaz, Pastor Vicedo, Gonzalez Villora, & Contreras Jordan, 2010; Jimenez & Pain, 2008) and a possible explanation is the distribution of the players among the age groups. Concerning the *age of the coach* and its relationship to the selection of the athletes it was not found any significant difference in the distribution between the age groups.

CONCLUSIONS

The Relative Age Effect is an extremely factor that affects sports and especially those which demand physical strength (i.e. soccer). Many athletes take greater advantages than the younger because of many parameters which are associated to the RAE (psychological support, experiences, extra training). Consequently, day by day the older players improve their performance more than the others. This phenomenon is still also obvious in the selection of the top national players of each age. Although, the performance is related to the RAE, this way of players' promotion to a higher competitive level is unfair. Many younger players are excluded although their talent is probably equally or higher than the older players of each year. In contrast to the modern principles about the talent identification, the training programs, and the equally participation of youngster to sports, the RAE increases the dropping out rates of the younger and probably the weaker players. Less competitive goals, training of coaches about talent promotion and changes in the structure of the soccer associations probably will improve the situation. However, more research about differences because of the sex, the age, and the level of the players, and also the development of intervention programs would lighten the phenomenon. The identification of a talent is a more complex procedure than what

the managers believe. The selection system that is adopted from the sport federations emphasize on the performance. Many talented younger players do not take part in international championships, national cups, and leagues, even in friendly games because the coaches choose the physical and physiological stronger players.

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