

**Yusuf Köklü<sup>1</sup>**  
**Yunus Arslan<sup>2</sup>**  
**Utku Alemdaroğlu<sup>1</sup>**

## **EVIDENCE OF THE RELATIVE AGE EFFECT IN YOUTH SOCCER PLAYERS FROM TURKEY**

## **DOKAZ O UČINKU RELATIVNE STAROSTI PRI MLADIH NOGOMETASHIH IZ TURČIJE**

### **ABSTRACT**

The main purpose of this study was to ascertain whether the relative age effect (RAE) exists in development teams of soccer clubs across different professional leagues in Turkey. The players were allocated to one of six age subgroups (U14, U15, U16, U17, U19, U21) and league level was also considered as a factor; data on 8600 players in 408 professional teams were analyzed. Birth data and registration dates were collected by accessing the Turkish Football Federation's official website. The results showed that the RAE is strong and significant for each lower league and per age category ( $p < 0.01$ ). An ANOVA by professional league on the training experience (TE) of U14 age group showed significant differences ( $p < 0.01$ ), while the ANOVAs on U15, U16, U17, U19, did not show significant differences ( $p > 0.05$ ). An independent samples *t*-test on U21 soccer players' TE means also yielded no significant difference ( $p > 0.05$ ). In conclusion, amongst soccer players in development teams of professional clubs in Turkey, players born in the later months of the year are less likely to be selected than those born in the earlier months. It is also concluded that there is no association between TE and a player's league level.

**Key Words:** Birth date, player selection, talent identification, training experience

<sup>1</sup>*Pamukkale University, Faculty of Sport Sciences, Denizli, Turkey*

<sup>2</sup>*Nevşehir Hacı Bektaş Veli University, Faculty of Education Department of Physical Education and Sports Education, Nevşehir, Turkey*

*Corresponding author:*

Yusuf Köklü

Pamukkale University Faculty of Sport Sciences,

KINIKLI Kampusu, Denizli/ Turkey

E-mail: ykoklu@pau.edu.tr; yusufkoklu@hotmail.com

Tel: +90 258 296 14 03

### **IZVLEČEK**

Glavni namen te raziskave je ugotoviti, ali v razvojnih ekipah nogometnih klubov iz različnih profesionalnih lig v Turčiji obstaja učinek relativne starosti (RAE). Igralce smo razdelili na šest podskupin (U14, U15, U16, U17, U19 in U21) ter kot dejavnik upoštevali tudi raven lige. Analizirali smo podatke 8.600 igralcev iz 408 profesionalnih ekip. Datume rojstva in datume registracije smo pridobili na uradni spletni strani Nogometne zveze Turčije. Rezultati so pokazali, da je učinek RAE močan in značilen za vsako nižjo ligo in glede na starostno kategorijo ( $p < 0,01$ ). Izkušnje s treningi (TE) v profesionalnih ligah smo ugotavljali z ANOVO, kjer so rezultati starostne skupine U14 pokazali značilne razlike ( $p < 0,01$ ), medtem ko pri U15, U16, U17 in U19 ni bilo značilnih razlik ( $p > 0,05$ ). T-test za neodvisne vzorce pri srednji vrednosti TE nogometašev U21 ni pokazal značilnih razlik ( $p > 0,05$ ). Kot zaključek, med nogometaši v razvojnih ekipah turških profesionalnih klubov imajo igralci, rojeni v zadnjih mesecih leta, manj možnosti, da so izbrani, kot tisti, ki so rojeni v prvih mesecih leta. Zaključili smo tudi, da med TE in ravni lige ni povezave.

*Ključne besede:* datum rojstva, selekcija igralcev, odkrivanje talentov, izkušnje s treningi

## INTRODUCTION

Developing technologies and new training methods are used to improve player performance across a whole range of sports. At the same time, sports scientists and coaches need to take many factors into account in order to improve this performance. Baker and Horton (2004) divided these factors into variables having a *primary* influence, including genetics, training, and psychology, and variables that have a *secondary* influence, which include socio-cultural and contextual elements through their interaction with other variables.

One secondary factor that has been identified as being important is the relative age of the players (Wattie, Schorer, & Baker, 2014). The term 'relative age' refers to a person's age relative to that of his/her peers within the same annual group. The variations in age within an annual age group have been referred to as 'relative age differences', and their consequences as the 'relative age effect' (RAE) (Gil et al., 2014; Wattie, Cobley, & Baker, 2008). Although a player born in January is eleven months older than one born in December of same year, both player will be grouped in the 'same' age category in an age-based system with January 1 as the cut-off date (Nicolas Delorme, Boiché, & Raspaud, 2009). However, at the age of peak growth, during adolescence, a boy may grow between 8 and 12 cm per annum; considering two players with the same maturity timing and the same expected adult height, one born in January could therefore be 10 cm taller than another born in December of the same year (Arrieta, Torres-Unda, Gil, & Irazusta, 2015).

The RAE has been widely studied in different sports such as Taekwondo (Albuquerque et al., 2012), Basketball (Delorme, Chalabaev, & Raspaud, 2011), Tennis (Ulbricht, Fernandez-Fernandez, Mendez-Villanueva, & Ferrauti, 2015), Baseball (Grondin & Koren, 2000), Handball (Schorer, Wattie, & Baker, 2013), Ice Hockey (Hancock, Ste-Marie, & Young, 2013), Swimming (Costa, Marques, Louro, Ferreira, & Marinho, 2013) and Rugby (Till et al., 2010). These analyses have identified sport contexts with distinctive RAE risks, such as basketball, soccer and ice hockey (Cobley et al., 2009).

There is an extensive and growing literature examining RAE in soccer (Carling et al., 2009; Del Campo et al., 2010; Deprez et al., 2012; Deprez et al., 2013; Gil et al., 2014; Helsen et al., 2005; Jimenez & Pain, 2008; Jullien et al., 2008; Lovell et al., 2015; Mujika et al., 2007; Mujika et al., 2009; Musch & Grondin, 2001; Romann & Fuchslocher, 2011, 2013; Sedano, Vaeyens & Redondo, 2015; Vaeyens, Philippaerts & Malina, 2005; Vincent & Glamser, 2006; Votteler & Höner, 2014; Williams, 2010). In these soccer-specific studies, evidence of a strong RAE has been consistently described and presented at many levels (i.e., professional leagues, lower leagues, international championships) across several countries (e.g., Belgium, Germany, England, Spain, United States of America) as a probable cause of young players being overlooked.

Physical development is an important factor that in the field positions within sports in which the RAE is most pronounced, and soccer is one of those sports, in which speed, strength, agility, ball-control, and coordination are all important requirements (van den Honert, 2012). Cobley et al. (2009) stated that the presence of RAE in teams with lower levels of soccer skills is not obvious. Some studies suggested (Malina, 1994; Malina et al., 2004) that both anthropometric size and conditional capabilities are linked to maturational development and are conditioned by age. Therefore the basing selection policy on the physical precocity or maturation of players may lead to a high rate of drop out of late maturing, yet highly skilled players (Carling et al., 2009).

To the authors' knowledge, no study specifically related to RAE has been carried out for all youth soccer teams associated with professional clubs in Turkey. Therefore, the presence of the RAE in Turkish youth soccer is still unclear, and there is a need to examine the size of the RAE in each annual age-group. Thus, based on the results of previous research on the RAE in several other countries, the main purpose of the present study was to examine the RAE in Turkish youth soccer players.

## METHODS

### Participants

The Turkish Football Federation (TFF), as the controlling body of soccer in Turkey, organizes and runs development leagues for young soccer players. The aim of these youth-development leagues is to identify and nurture talented players to represent their clubs at the professional level. A total of 8600 young soccer players from 408 professional teams competing in these development leagues considered in this study. The players were allocated to one of six subgroups according to their age and also divided according to league level. The sample consisted of 2281 players from 91 teams in the Under 14 (U14) age group, 1540 from 86 Under 15 (U15) teams, 932 from 53 Under 16 (U16) teams, 1084 from 61 Under 17 (U17) teams, 2141 from 81 Under 19 (U19) teams, and 622 players from 36 Under 21 (U21) teams. The data was limited to the 2015–2016 competitive season.

### Procedure

In Turkey, there are four official men's professional soccer leagues, the Super Toto Super League (SL), PTT League 1 (1L), Super Toto League 2 (2L) and Super Toto League 3 (3L). The professional soccer teams in these leagues have teams for the following age-groups: U14, U15, U16, U17, and U19. Additionally, SL and 1L professional teams have U21 teams. All these age-group categories have their own leagues, which are named the Coca-Cola Development Leagues.

To determine RAE, player birthdates within a specific age-category were categorized into birth quartiles (Q). The cut-off date for the soccer competition year in Turkey is January 1, so January was selected as the first month of the selection year and December as the last. Thus, players with birthdays between *1 January* and *31 March* were in the first quartile (Q1), those born from *1 April* to *30 June* were in the second quartile (Q2), those born from *1 July* to *30 September* were in the third quartile (Q3) and the final group was composed of players born from *1 October* to *31 December* (Q4).

To determine training experience (TE) effect, young soccer players' first license dates were obtained, and then subtracted from the year 2016; the results were considered as TE. Birth data and first license dates were collected by accessing the Turkish Football Federation (TFF)'s official website ([www.tff.org](http://www.tff.org)) which holds information of all licensed players.

### Statistics

The results are presented in terms of frequencies, means and standard deviations to summarize the data. To test the extent of the RAE in each age category (i.e., U14, U15, U16, U17, U19 and U21) and according to professional league (i.e., SL, 1L, 2L, 3L), a chi-square test was used to assess the

observed and expected birth distribution across the sample of young soccer players. Chi-square values were followed up by calculating Odds Ratios (*OR*) and 95% Confidence Intervals (95%*CI*) for the quartile distributions in order to examine subgroup differences. The *ORs* compared the birth-date distribution of a particular quartile (Q1, Q2 or Q3) with the reference group, which consisted of the youngest players (Q4). A higher *OR* indicates an increased incidence of players who were born in that particular quartile compared to the reference quartile Q4.

To investigate the extent of the TE effect, before using parametric tests, the assumption of normality was verified using the Kolmogorov-Smirnov test ( $0.09 \leq K-S \leq 0.24$ ;  $p > 0.05$ ), and to verify the assumption of homogeneity of variance, Levene's test ( $0.94 \leq F \leq 4.02$ ;  $p > 0.05$ ) was carried out. One-way analysis of variance (ANOVA) was used to compare TE mean differences in each age group (i.e., U14, U15, U16, U17, U19) by professional league (i.e., SL, 1L, 2L, 3L), and the Independent samples *t*-test was carried out for the U21 age group to compare SL and 1L results. Effect-Size Correlations (*ES*) were also calculated to determine practical differences (Cohen's *d*, where .2, .5, and .8 represent small, medium, and large *ES*, respectively;  $\eta^2$ , where .1, .3, and .5 represent small, medium, and large *ES*, respectively (Cohen, 1988)). Also, 95%*CI* was calculated for the difference between mean values for each of the estimated variables.

## RESULTS

This study examined the quarterly distribution of birth dates and training experience of 8600 young soccer players in 408 teams competing in development leagues in Turkey.

To address the main aim of the study, the examination of the presence of the RAE was guided by the following research question: is the quarterly distribution of birth dates of young soccer players in Turkey skewed towards the first quarter, indicating that the RAE exists? Table 1 displays the quarterly distribution of birth dates, and the results of *chi-square test*, *OR* comparisons and 95%*CI* for young soccer players.

Descriptive analyses identified uneven distributions of birth dates for each age group (see Table 1). Most of the young soccer players were born in the Q1 zone ( $n_{U14} = 978$ ,  $n_{U15} = 673$ ,  $n_{U16} = 467$ ,  $n_{U17} = 496$ ,  $n_{U19} = 822$ ,  $n_{U21} = 275$ ), followed by the Q2 ( $n_{U14} = 576$ ,  $n_{U15} = 380$ ,  $n_{U16} = 226$ ,  $n_{U17} = 252$ ,  $n_{U19} = 588$ ,  $n_{U21} = 143$ ), Q3 ( $n_{U14} = 483$ ,  $n_{U15} = 329$ ,  $n_{U16} = 164$ ,  $n_{U17} = 227$ ,  $n_{U19} = 450$ ,  $n_{U21} = 121$ ) and, finally, Q4 ( $n_{U14} = 241$ ,  $n_{U15} = 141$ ,  $n_{U16} = 104$ ,  $n_{U17} = 109$ ,  $n_{U19} = 328$ ,  $n_{U21} = 83$ ). The chi-square analyses indicated significant differences in the birth-date distributions by age category for the total sample of young soccer players ( $134.29 \leq X^2_{(3)} \leq 495.71$ ;  $p = 0.00$ ).

The results also showed that the RAE is strong and significant for each lower league level ( $p < 0.01$ ). Soccer players born earlier in the U14 age group were better represented at SL level ( $X^2_{(3)} = 144.13$ ;  $p = 0.00$ ), 1L ( $X^2_{(3)} = 160.94$ ;  $p = 0.00$ ), 2L ( $X^2_{(3)} = 120.74$ ;  $p = 0.00$ ) and 3L ( $X^2_{(3)} = 104.60$ ;  $p = 0.00$ ); a decreasing number of players were found to be born in the subsequent quarters. In U14 age group Q1 and Q2 are over-represented and *OR* comparisons also showed that Q1, Q2, and Q3 have a greater proportion of players than Q4 ( $0.61 \leq Q1$  vs.  $Q4 \leq 1.73$ ;  $0.77 \leq Q2$  vs.  $Q4 \leq 1.63$ ;  $0.98 \leq Q3$  vs.  $Q4 \leq 1.51$ ).

Similarly, the distributions of players were significantly different ( $p < 0.01$ ) in all other age groups: U15 ( $64.40 \leq X^2_{(3)} \leq 144.45$ ;  $p = 0.00$ ); U16 ( $61.82 \leq X^2_{(3)} \leq 90.00$ ;  $p = 0.00$ ), U17 ( $56.92 \leq X^2_{(3)} \leq 106.61$ ;  $p = 0.00$ ), U19 ( $31.00 \leq X^2_{(3)} \leq 101.79$ ;  $p = 0.00$ ), and U21 ( $56.67 \leq X^2_{(3)} \leq 78.93$ ;  $p = 0.00$ ). The prob-

Table 1. Quarterly distribution of birth dates for young soccer players (U14-U21) in Turkish professional soccer teams

Age Group	UL	n	Quarter of Birth				X <sup>2</sup>	OR Comparisons [95%CI]		
			Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>		Q <sub>1</sub> vs. Q <sub>4</sub>	Q <sub>2</sub> vs. Q <sub>4</sub>	Q <sub>3</sub> vs. Q <sub>4</sub>
U14	SL	398	195	100	69	34	144.13a	1.51b [1.02-2.25]	1.27 [0.83-1.95]	1.01 [0.65-1.58]
	1L	455	217	122	80	34	160.94a	1.73a [1.17-2.57]	1.63b [1.08-2.47]	1.20 [0.78-1.86]
	2L	584	251	139	125	68	120.74a	0.87 [0.64-1.20]	0.80 [0.57-1.13]	0.88 [0.62-1.25]
	3L	844	315	215	209	105	104.60a	0.61a [0.46-0.82]	0.77 [0.56-1.04]	0.98 [0.72-1.34]
	Total	2281	978	576	483	241	495.71a			
U15	SL	340	164	68	55	22	144.45a	1.74b[1.07-2.83]	1.17 [0.69-1.99]	1.48 [0.87-2.52]
	1L	332	162	91	68	25	113.81a	1.47 [0.92-2.34]	1.46 [0.89-2.39]	1.20 [0.72-2.00]
	2L	311	131	75	77	28	64.40a	0.97 [0.61-1.53]	0.99 [0.61-1.61]	1.23 [0.75-2.00]
	3L	557	216	146	129	66	81.91a	0.53a [0.37-0.77]	0.70 [0.48-1.04]	0.73 [0.49-1.09]
	Total	1540	673	380	329	141	382.32a			
U16	SL	298	136	77	51	34	80.28 a	0.84 [0.53-1.33]	1.06 [0.64-1.74]	0.92 [0.54-1.57]
	1L	265	131	57	47	30	90.00 a	0.96 [0.60-1.53]	0.83 [0.49-1.39]	0.99 [0.57-1.70]
	2L	209	110	51	38	17	88.33 a	1.57 [0.89-2.76]	1.49 [0.81-2.73]	1.54 [0.81-2.90]
	3L	160	90	41	28	23	61.82 a	0.84 [0.50-1.41]	0.78 [0.43-1.38]	0.72 [0.39-1.34]
	Total	932	467	226	164	104	316.32 a			
U17	SL	267	135	63	48	21	106.61 a	1.56 [0.93-2.62]	1.39 [0.80-2.43]	1.12 [0.63-1.99]
	1L	250	117	54	49	30	68.49 a	0.81 [0.50-1.29]	0.71 [0.42-1.20]	0.72 [0.42-1.22]
	2L	304	123	75	76	30	56.92 a	0.86 [0.54-1.38]	1.11 [0.67-1.83]	1.32 [0.80-2.19]
	3L	263	121	60	54	28	70.70 a	0.93 [0.57-1.50]	0.90 [0.53-1.51]	0.90 [0.53-1.52]
	Total	1084	496	252	227	109	292.12 a			
U19	SL	441	183	123	100	35	101.79 a	2.39a [1.62-3.53]	2.21a [1.48-3.31]	2.39a [1.57-3.62]
	1L	428	170	125	86	47	77.88 a	1.55b [1.09-2.21]	1.88b [1.32-2.69]	1.41 [0.95-2.08]
	2L	581	221	156	122	159	31.00 a	0.39a [0.29-0.50]	0.38a [0.28-0.50]	0.39a [0.29-0.53]
	3L	691	248	184	142	87	83.89 a	1.19 [0.89-1.59]	1.26 [0.93-1.70]	1.27 [0.93-1.75]
	Total	2141	822	588	450	328	246.20 a			
U21	SL	319	145	71	65	38	78.93 a	1.32 [0.80-2.16]	1.16 [0.67-2.00]	1.37 [0.78-2.40]
	1L	303	130	72	56	45	56.67 a	0.75 [0.46-1.23]	0.85 [0.49-1.47]	0.72 [0.41-1.27]
	Total	622	275	143	121	83	134.29 a			

Note: UL: Upper League; SL= Super League; 1L= League 1; 2L= League 2; 3L= League 3; n= sample size; Q= quartile; OR= odds ratio; CI = confidence interval for odds ratio; a p< 0.01; bp< 0. 05.

ability of being selected for a soccer team was higher for players born in the Q1 zone compared with players born in Q4 zone [U15 ( $0.53 \leq OR \leq 1.74$ ), U16 ( $0.84 \leq OR \leq 1.57$ ), U17 ( $0.85 \leq OR \leq 1.56$ ), U19 ( $0.39 \leq OR \leq 2.39$ ), U21 ( $0.75 \leq OR \leq 1.32$ )]; it was also higher for those born in the Q2 and Q3 zones compared to the Q4 zone (see Table 1).

The second purpose of this research was to examine the presence of a TE effect for young soccer players in Turkey. Table 2 displays the TE characteristics of young soccer players (U14-U19) and the results of ANOVAs.

Table 2. Training experience characteristics (mean  $\pm$  standard deviation) of young soccer players (U14-U19) and results of ANOVAs by leagues

Age Group	UL	n	$M \pm SD$	<i>F</i>	95% CI	ES
U14	SL	398	2.77 $\pm$ 0.46	7.82*	2.52-3.02	0.21
	1L	455	2.55 $\pm$ 0.43		2.30-2.79	
	2L	584	2.49 $\pm$ 0.37		2.27-2.70	
	3L	844	2.09 $\pm$ 0.63		1.91-2.26	
U15	SL	340	1.93 $\pm$ 0.51	2.15	1.76-2.09	0.07
	1L	332	1.84 $\pm$ 0.32		1.68-2.00	
	2L	311	2.05 $\pm$ 0.30		1.89-2.21	
	3L	557	2.07 $\pm$ 0.25		1.95-2.19	
U16	SL	298	4.05 $\pm$ 0.47	1.14	3.82-4.28	0.06
	1L	265	3.80 $\pm$ 0.57		3.56-4.04	
	2L	209	3.76 $\pm$ 0.33		3.49-4.03	
	3L	160	3.89 $\pm$ 0.37		3.57-4.20	
U17	SL	267	5.23 $\pm$ 0.50	1.77	4.96-5.51	0.08
	1L	250	5.02 $\pm$ 0.61		4.73-5.31	
	2L	304	4.96 $\pm$ 0.53		4.70-5.23	
	3L	263	4.78 $\pm$ 0.51		4.51-5.06	
U19	SL	441	6.83 $\pm$ 0.61	2.59	6.50-7.16	0.09
	1L	428	6.39 $\pm$ 0.64		6.06-6.72	
	2L	581	6.50 $\pm$ 0.40		6.20-6.89	
	3L	691	6.23 $\pm$ 0.95		5.95-6.52	

Note: UL: Upper League; SL= Super League; 1L= League 1; 2L= League 2; 3L = League 3; n= sample size; 95% CI = 95% confidence interval; ES = effect size; \* $p < 0.01$ .

The ANOVA by professional leagues on TE means for the U14 age group was significant ( $F(3, 87) = 7.82$ ,  $p = 0.00$ ,  $\eta^2 = .21$ ). Post hoc analysis (the *Tukey* test) of the ANOVA for the TE means revealed significant differences between SL and 3L, 1L and 3L and 2L and 3L, with U14 SL, 1L and 2L teams having higher TEs than 3L. In contrast, the ANOVAs on the U15, U16, U17, and U19 age groups' TE means did not indicate significant differences across professional leagues ( $p > 0.05$ ).

Table 3 presents the TE characteristics of U21 soccer players and the results of the independent samples *t*-test of TE means, which did not yield a significant difference ( $t_{(34)} = 0.09$ ,  $p > 0.05$ ; Cohen's  $d = 0.02$ ).

Table 3. Training experience characteristics (mean  $\pm$  standard deviation) of soccer players (U21) and results of *t*-test by leagues

Age Group	UL	n	<i>M</i> $\pm$ <i>SD</i>	<i>t</i>	95% <i>CI</i>	<i>ES</i>
U21	SL	319	7.98 $\pm$ 0.61	0.09	7.47-8.54	0.02
	1L	303	7.96 $\pm$ 0.93		7.45-8.52	

Note: UL: Upper League; SL= Super League; 1L= League 1; 2L= League 2; 3L= League 3; n= sample size; 95% CI = 95% confidence interval; ES = effect size.

## DISCUSSION

In choosing soccer teams, coaches pay careful attention to players' test results, physical characteristics and technical skill from a young age. Players who gain attention because of these test performance and physical characteristics subsequently, after long years of training may become elite athletes. Studies have shown that RAE is undoubtedly something that coaches need to take into account when evaluating player performance. Although a large number of studies of RAE in soccer players have been carried out in several countries, no large-scale research has been conducted in Turkey on the subject. For this reason, this study aimed to investigate RAE in Turkish Development League players from U14 to U21.

The most important finding is that RAE can be seen in all leagues and in all age groups involved in the study. We found that the numbers of players born in the first three months of the year were greater than the numbers of those born in the last three months and that this difference was statistically significant. This finding is backed up by the OR values. This shows that soccer players in Turkey born in the first three months of the year are more likely to be picked for teams and thus more likely to become elite athletes (see Table 1).

Our findings are in line with those of a number of other studies (Bliss & Brickley, 2011; Costa et al., 2012; Del Campo et al., 2010; Gil et al., 2014; Helsen et al., 2012; Helsen et al., 2005; Kirkendall, 2014; Mujika et al., 2009; Sallaoui et al., 2014; Vaeyens et al., 2005; Votteler & Höner, 2014; Wiium et al., 2010). For example, a study carried out on 5943 young soccer players in the US (Kirkendall, 2014) also found significant differences in RAE such that those born in the first quarter of the year were better represented in teams than those born in the final quarter, although this situation was not found to have a significant effect on match results. Gil et al. (2014) carried out a study on 88 young soccer players in Spain, finding significant differences between those born in the first months of the year and those born at the end of the year in terms of anthropometric measurements and physical performance. This study also identified a RAE in its sample. On the basis of investigation of the physical and physiological measurements of 19 young English soccer players, Bliss and Brickley (2011) found that those born in the first half of the year were both physically and physiologically more mature than those born in the second half of the year. Wiium et al. (2010) also investigated the presence of RAE in Norwegian professional soccer players. Across 217 players in 14 teams taking part in the study, the results showed a significantly greater proportion were born in the first half of the year, indicating the presence of a RAE in

Norwegian soccer. Costa et al. (2012) investigated the historical presence of a RAE in Brazilian soccer by examining the records of professional soccer players born between 1921 and 1926. The results showed that there was a RAE and, moreover, revealed that it had grown considerably over years. In short, all of these studies revealed the presence of a soccer-related RAE across a range of countries, age groups, and league levels.

One of the interesting findings of this study is that this effect can be seen not only in higher level leagues but also at lower levels. The reason for this effect could be that coaches tend to select players who mature earlier, that is, those born in the first three months of the year. This preference could arise from coaches' desire for or worries about the success of their younger age group teams. Another finding is that the relative lack of players born in the last three months of the year in the lower age groups (U14, U15 and U16) is also seen in the higher age groups (U17, U18, U19 and U21). In this way, it may be concluded that children who are more physically developed at younger ages, once selected, continue playing for the team up to the more elite age groups. From the point of view of TE, statistically significant differences were not found between league levels in the Turkish development leagues with the exception of the U14 age group (see Tables 2 and 3). This finding indicates that, apart from U14s, ages at which the players start the sport are comparable. On this basis it can be said that in Turkey the age at which players start training is not indicated as a significant factor in terms of the league level the players end up playing in.

The most important limitation of this study is that it cannot show the association between anthropometric and physical performance values. This study carried out an assessment of the current situation, but information regarding how the RAE is reflected in Turkish development league players' anthropometric and physical measures has not been presented, although this is necessary to better understand RAE. Future research should therefore seek to understand the effects of RAE on anthropometric and physical performance.

## CONCLUSION

This study of soccer players in the development teams of Turkish professional clubs has revealed that there are fewer players born in the later months of the year and that coaches, whether consciously or not, select more players born in the earlier months of the year. The most important factors in long-term player management are the selection of the best players and the planning of their training to ensure that areas where they need to improve are worked on. Coaches' preferences for players who mature early and who may be nearly 10-11 months older than their contemporaries could result in a situation where truly talented players born in the later months of the year are overlooked. On the basis of the data presented in this study, it is recommended that, in particular when choosing players in younger age categories, coaches consider the possibility of RAE and bear in mind that the physical development of players born in the later months of the year may lag behind that of players who are born in the earlier months of the year. Therefore, coaches may consider more technical and tactical features than physical development in player selection in the young age group. In addition, coaches can create more player teams during player selection and increase the number of players born in the last month of the team.



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