Turkish Journal of Sport and Exercise
http://dergipark.ulakbim.gov.tr/tsed/index
Year: 2016 - Volume: 18 - Issue: 1 - Pages: 64-69
DOI: 10.15314/tjse.14670

ISSN: 2147-5652

Relative age effect in Turkish soccer

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The paper presented orally at the 13th International Sports Sciences Congress, 07-09 November, Konya Turkey.
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Abstract

Relative Age Effect (RAE) refers to the difference between the individuals who were born in the early or the later period of the same year. The purpose of this study was to investigate the existence and prevalence of RAE in Turkish Soccer. The data were collected from 3074 (530 professional players and 2544 amateur players) active players who play for eight different age categories of 19 soccer clubs in Turkish First Soccer League. The significance of the distributions by birth month, distributions by quarter-year and the differences between groups were analyzed through chi-square test. For all categories, first month (January%=22.10), and first quarter (Q1%=44.44) of distributions by birth month and were found to be significantly high ($p<0.01$). The researchers observed the existence and prevalence of RAE in youth and professional teams of Turkish Soccer Clubs. Trainers should evaluate players carefully during talent selection, in order to eliminate this unfair competition.

Keywords: birth-month, relative age effect, soccer player, Turkish league.

INTRODUCTION

There is an important phenomenon in education and sports called Relative Age Effect (RAE). RAE refers to the individual advantage that individuals who were born earlier in the same year have over the ones who were born later in that year, among a group of individuals who are assigned a similar task (3,20,21,24).

Educational and sports institutions generally use chronological age periods while forming age categories according to individual features. The purpose of this method is taking developmental differences into consideration in order to provide appropriate education, activities, and evaluation. In other words, the purpose is providing a fair competition and equal opportunities for the individuals in the same category or age group. Earliest studies on the RAE in education report that children who were born in the first quarter of the same year among the same academic age group have better cognitive achievement, and motor skills, and better scores on standardized reading, math, and spelling tests than their peers who were born on the last quarter of that year (18,26,27). These differences are called RAE. RAE refers to the clear cognitive and biological distinction among the individuals in the same age group (2,21).

The primary study on RAE in sports was conducted by Grondin et al. (11) on professional ice hockey players, who reported that the players who were born on the first months of the year presented the highest distribution (5). Other studies conducted on the RAE phenomenon in various sport branches (1,21) and soccer (4,6,8,9,10,12,14,15,16,19,29,30) provide similar findings, that is players who were born in the first months or in the first quarter of the same year present higher distribution in selection to of formation of teams.

Cobley et al. (7) conducted a Meta-analysis on 38 studies on the subject matter. They studied RAE in 14 sport branches in 16 different countries on 253 independent samples between 1984 and 2007, and reported the prevalence of RAE. The analyses of categories

and skill levels revealed that RAE had medium effect, and the risk was higher for popular sport branches.

Previous researches show that there are some important questions that need to be answered. What criteria should coaches and trainers use to find young talents? From their point of view, a suggestion might be that they can take temporary developmental differences into consideration while evaluating young athletes. Another important suggestion might to re-evaluate the ranges while categorizing age groups. A pre-research on the topmost soccer teams of Turkey reported to existence of RAE on young players but it's not professional players (19).

There were a limited number of researches on the existence of RAE phenomenon in Turkish soccer. The present research is one of the pioneer studies on RAE in Turkish Soccer, and it studies the existence of RAE in Turkish Soccer. Besides, it studies the prevalence of RAE in terms of categories in professional and elite young teams in 1st League which serves as an important player source for Turkish Soccer.

MATERIAL & METHODS

Participants

Turkish Football Federation (TFF) organizes four professional leagues for male soccer players. Turkish First Football League (TFFL) is the second highest rank professional league in Turkish Soccer. In 2013-2014 soccer seasons, nineteen soccer clubs participated in First League. These clubs participate in league competitions organized by TFF with their teams of eight different categories. Data related to birth date of the soccer players were obtained from Turkish Football Federation (TFF) web page (28) where highlighted "non-commercial use of content of this site is allowed for only personal uses". Also TFF officials stated that this statement on a web page was an explicit permission for scientific studies. Therefore, usual appropriate ethics committee clearance was not required. Nevertheless, to ensure team and player confidentiality, all performance data were anonymized before analysis.

Data set of the present research was collected from 530 professional, and 2544 young male, a total of 3074 soccer players. These players play actively for 19 professional and 133 young teams in Turkish First Football League in 2013-2014 soccer seasons. Foreign soccer players were excluded from the research.

Data design and analysis

The existence of RAE was studied in 8 age categories (Under-U-13, U-14, U-15, U-16, U-17, U-19, A2 "sub-professional players", A "professional players" teams) defined by TFF. While forming the categories, birth month start was taken as "January 1st", and the end was taken as "December 31st", and Quarter-Year (Q) evaluations were done on three-months basis (e.g. Q1=January, February, March). Using the statistical packaged software, test of normality (Kolmogorov-Smirnov) was conducted on players' birth month distributions, and then significance of birth month distributions, quarter-year distributions and differences between groups was tested with chi-square test. In order to present differences more clearly, distribution frequencies were presented in graphics. Significance level was taken as 0.01 and 0.05 for all analyses.

RESULTS

Table 1 shows birth month and quarter year distributions of soccer players who play for soccer clubs in TFFL in 8 competition categories. Additionally, the differences and significance on in-category distributions were presented here. According to Kolmogorov-Smirnov test results, birth month distributions of players don't present "Normal Distribution" ($p<0.01$). There is excessive accumulation for birth rates in the first month (January=22.10%) and the first quarter (January-February-March=44.44%) of the year for all categories. According to results of Chi-Square tests conducted for each category (Table 1), birth month distributions for the first month and first quarter of the year are high at a significant level ($p<0.01$).

Except for Professional teams (A), for all categories, birth date month distributions of soccer players present a declining trend from

the first quarter of the year to the last. For A teams, Q3 has a higher frequency than Q2. Still, Q4 has the lowest frequency (Figure2).

In terms of the distributions by categories, the most striking high rates can be observed in U13, U14 and U17 categories. For U13, U14 and U17 categories, birth rate for the first quarter(Q1) respectively are; %50.0; %48.2 and %46.7: for the last quarter(Q4); %10.1, %11.0 and 11.1%. Lowest birth rate for last quarter (Q4) was observed in U16 category (9.7%) (Figure2).

Table 1. Distributions of Turkish First Football League clubs players of eight categories by birth-month and quarter-year.

Category	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	N	sd	X^2
	Q1				Q2			Q3			Q4				
A	91	63	58	39	37	42	38	47	37	35	26	17	530	11	92.19**
	212 (40.0%)				118			122			78 (14.72%)			3	72.54**
A2	77	39	37	35	27	25	30	34	20	22	12	15	373	11	100.15**
	153 (41.02%)				87			84			49(13.14%)			3	60.62**
U19	74	41	33	33	26	29	21	28	18	25	13	13	354	11	99.02**
	148 (41.81%)				88			67			51(14.41%)			3	61.12**
U17	110	48	39	26	34	29	28	33	28	21	13	13	422	11	204.56**
	197(46.68%)				89			89			47(11.14%)			3	116.96**
U16	92	39	47	36	34	26	30	29	22	14	15	9	393	11	158.12**
	178 (45.29%)				96			81			38 (9.67%)			3	104.76**
U15	104	59	40	33	26	41	34	29	21	29	14	9	439	11	186.94**
	203 (46.24%)				100			84			52 (11.85%)			3	116.53**
U14	88	44	44	22	23	29	28	26	21	18	13	9	365	11	159.22**
	176 (48.22%)				74			75			40 (10.96%)			3	113.65**
U13	43	28	28	14	18	10	17	14	6	10	5	5	198	11	87.33**
	99 (50.0%)				42			37			20 (10.01%)			3	71.37**
Total	679 (22.1)	361 (11.7)	326 (10.6)	238 (7.7)	225 (7.3)	231 (7.5)	226 (7.4)	240 (7.8)	173 (5.6)	174 (5.7)	111 (3.6)	90 (2.9)	3074	11	1015.41**
	1366 (44.44%)				694			639			375 (12.2%)			3	695.08**

** P<0,01

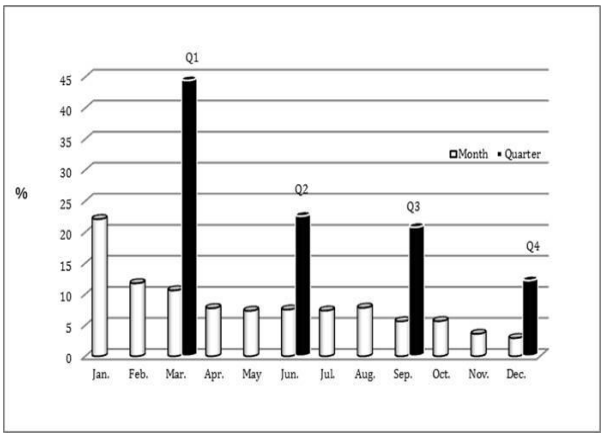

Figure 1. Distributions of all players in Turkish First League Clubs by Birth-Month and Quarter-Yea

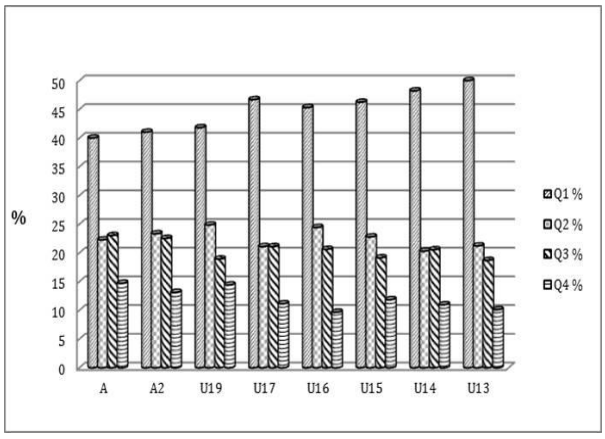

Figure 2. Distribution of Birth Rate Soccer Players in the eight categories in Turkish First Football League by Quarter-Year

DISCUSSION

The findings of the present research show that, there is a significant tendency increasing from the last months to first months for the birth-month and quarter-year distribution of professional soccer players playing for the teams in Turkish First League. This finding indicates the existence of Relative Age Effect in Turkish Soccer. Some previous researches produced similar results. A research conducted by Mulazimoglu (9) on professional and young teams of Turkish Super League; another research conducted by Helsen et al. (15) on professional soccer teams of ten different European countries in two different seasons; another conducted by Wiium et al. (29) on professional soccer players playing for Norwegian Football League teams, and a research conducted by Cobley et al. (6) on the history of German Bundesliga teams reported the existence of Relative Age Effect.

In youth categories, especially in U17, U15 and U14 teams, birth rates in the first month of the year (January) and in the first quarter of the year were significantly higher than the birth rates in the last month (December), and the last quarter of the year. The prevalence of RAE shows that, among young soccer players who were put in the same age category, the ones who were born earlier in the same year were preferred over the ones who were born later in that year. This negative and unfair competition has a place in player selection criteria for young teams, and creates some important problems. Researches on Relative Age Effect (RAE) on upper categories of soccer emphasize the prevalence of RAE. However, RAE is more common in youth teams of lower categories. Previous studies on the existence of RAE among young soccer players define RAE as a maturation disadvantage. Helsen et al. (14) reported that birth-month distributions of soccer players in U-15, U-16, U-17 and U-18 soccer teams of ten countries, and also U-16, U-18, U-14 and U-12 soccer teams that participated in international tournaments had a decreasing trend from the first months to the last months of the year. In accordance with these findings, older soccer players are considered as more talented than the younger ones due to their physical advantage.

Gil et al. (9) reported that, among the pre-pubertal soccer players (9.75 ± 0.30 years old) who were born in the same year, there was a significant difference in anthropometric and physical performances between the one who were earlier and later in the same year. Carling et al. (4) compared the anthropometric and fitness features of 160 young U-14 academy male soccer players, in terms of the month and quarter of the year they were born in; and they found that there wasn't a significant difference in terms of physical performance, but the players who were born earlier had significantly higher scores in fitness tests. In accordance with these findings, they reported that physical development changed among individuals, and in puberty this change had a very different course. Therefore, this disadvantage occurring during talent selection among young players result in dropouts (8,13).

Delorme et al. (8) studied the relationship between dropouts and birth-month among French male soccer players, and found that in lower age categories (U-9, U-11, U-13, U-15 and U-18), players who were born in the last quarter of the year had a higher rate of dropouts. They reported a high esoteric distribution in especially in U-13 and U-15 categories, which refer to adolescence in male individuals. They reported that, there was no significant difference in the distributions in U-7 category, and suggested two important findings at this point: first, among the individuals in an age group, the ones who were born later didn't take up sports at all due to developmental disadvantages; and second, they dropout as they weren't preferred during talent selection.

RAE is considered as a chronic problem in all sport branches, and some researchers who aimed at eliminating disadvantage suggested that timing of growth spurts during adolescence, and the individual differences in pace affected sport-specific talents. Changes in central nervous system as a biological result of adolescence affect neural control and perception skills (17). Concordantly, growth and developmental differences should be taken

into consideration during early-age talent selection and youth development processes through soccer-specific tests, and young players should be provided with equal opportunities (4). With a multi-discipline approach, different periods of selection year (23) and birth-months in anthropometric, physiological, psychological, and soccer-specific technical skills should be taken into consideration during talent selection. Additionally, another research that suggested a substantial method conducted by Pierson et al. (22) on Canadian Hockey National League players claimed that RAE could be reduced with the implementation of a model involving three precautions. The first of these precautions is, forming youth leagues with categories of six-month periods instead of a year time. Second is; forming biological age or developmental age categories, and third is, providing less talented players among younger players with extra support and encouragement. The researchers suggested that RAE can be reduced at 96% by implementing these precautions.

Consequently, like other similar researches conducted in different countries before, the present research revealed the existence of "Relative Age Effect" in professional and elite young category teams in Turkish 1st Soccer League. Therefore, early development can be a disadvantage in player selection. The players who were born later in the same year have a disadvantage of physical structure and maturation, which result in not being selected to teams for them. Due to disadvantage, many talented but late matured individuals cannot find the opportunity to prove themselves.

Trainers should be careful during player selection process in order to eliminate this unfair competition. In order to provide this, trainers and coaches should have knowledge of child and youth development while selecting soccer players and forming teams.

Detection of talented players who reach at physical and physiological maturation late is of utmost importance in order to prevent dropouts and make more correct decisions in elimination (16).

As well as trainers, federations that organize Soccer competitions are responsible for the prevention RAE phenomenon from the lower to the upper categories. By narrowing down the 1-year period while forming the age categories in accordance with the support of child development experts can bring a solution to this problem at some extent. Parents also should be aware of this phenomenon, and establish an effective communication with the involved parties to support this process. Further studies on the subject matter can examine the real reasons of the existence of relative age effect in detail, and offer more accurate solutions. Further studies can examine the trainer opinions, player expectations, and rule maker's principles related to the existence of this phenomenon. These suggestions offered in the present research aim at preventing the damage caused by RAE on young players, the existence of which has been proven by many international studies.

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