

# ANALYSIS OF BIRTH QUARTILE OF PROFESSIONAL SOCCER PLAYERS

**Luiz Carlos Couto de Albuquerque Moraes**

Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil

**Eduardo Macedo Penna**

Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil

**Renato Melo Ferreira**

Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil

**Varley Teoldo Costa**

Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil

**Alessandro Fahel Matos**

Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brasil

## **Abstract**

The categorization of the time of birth (quartiles) is shown to be a factor which influences the development of a talent in soccer, which in its structure has the division of categories into age groups. The aim of the present study is to assess and identify the quartiles of birth in professional players at different levels: the Brazilian National Championship First Division (20 clubs), the Second Division (16 clubs) and Libertadores da America Cup (32 clubs). Data of 2,073 players were collected and analyzed using the chi-square test. Differences were found in the quartile as well as the birth semester in all the three competitive levels analyzed. It was therefore concluded that the quartile of birth is a factor that has an influence in player selection, both in Brazil and in South America.

**Keywords:** Soccer - Talent - Age group

---

## **Introduction**

**F**ootball is one of the most widely practiced sports mode in the world, with multiple factors that are crucial to the development of an athlete, and anthropometric, physical, social, psychological and emotional characteristics. These characteristics can influence positively or negatively the development of sports talent (Davids, Burwitz, LEES, 2000, Williams 2000; REILLY; FRANKS; Bangsbo, 2000; REILLY, Williams 2000; BERTHON; FELLMANN, 2002; KEMI et al ., 2003).

Among several variables, one that has received attention from researchers is related to the categorization of the time of birth, i.e. the birth quartile (Stanaway; MINES, 1995; GLAMS Vicente, 2004; SIMMONS, PAULL, 2001). Birth quartile is considered the division of the year in four parts in the first quartile representing the months from January to March, the second quartile from April to June, the third from July to September and the fourth and last quarter from October to December (VAEYENS; PHILIPPAERTS; MALINA, 2005). However, there are few studies in Brazil that seek to analyze unconventional parameters in widespread modes, as the birth quartile of the athletes in football.

Musch and Hay (1999) reflect, in their survey conducted with football players, that there are significant differences between athletes born on the 1st and 2nd quartile compared to the general population. Helsen, Winckel and Williams (2005) present a high diversity of players born in the first quartile (January to March) selections in the under-15 under-18 in several countries (Belgium, Denmark, Spain, Portugal, France, Italy, Germany and New Zealand). Vaeyens, Philippaerts and Malina (2005) analyzed the birth quartile of 2757 semi-professional and amateur football athletes in Belgium, and the result was shown that most of their teams were composed of players born in the first half of the year. Corroborating the above results, the study of Glams and Vincent (2004) found that there is a predominance of American athletes, born earlier in their year that became professional football players.

Other sports have done similar research about the birth quartile of athletes. In tennis, Edgar and O'Donoghue (2006) showed that 58.9% of the senior players and 59.5% of the elite junior were born in the first 6 months of the year, thus demonstrating pre-selection of athletes according to their date of birth to this sport.

Côté et al. (2006) evaluated athletes of several group sports modes in the United States and Canada, and also identified a predominance of players born in the first half. The main results of this study show that in both, the American hockey (56.3%) and the Canadian hockey (59.8%), there is a predominance of professional athletes born in the first half of the year.

However, analyzing this variable in the female population, Vicent and Glams (2006) found no significant differences ( $P = 0.556$ ) in the distribution of quartiles in 804 women in the Olympic Development

Program of the United States in football.

Daniel and Janssen (1987) conducted an investigative study by making a historical retreat to verify that the birth quartile interfered significantly in the training of professional athletes for ice hockey in the 60s and 70s. As a result, no significant difference in this group was found, showing thereby that the effect of birth quartile in the selection of athletes was a recent phenomenon in this sport.

In their study, Musch and Hay (1999) report that the physical advantages achieved by athletes are evident, generated from the maturation process begun earlier. However, psychological factors, which are not always mentioned in studies on the quartile, may be even more damaging, considering the impact of low self-esteem and low motivation that can be generated in unsuccessful athletes when there is favoritism for those born earlier. According to Musch and Grodin (2001), the effects of the quartile can also be harmful to the athlete favored because it is more developed, the charge for better performance and results is large, creating an unfavorable environment for the practice, which can lead the athlete to leave the sport or lose their status as chosen.

Several factors will influence an athlete to achieve the professionalism within the sport. Moraes e Souza (2004, p. 118) and Moraes and Salmela (2003, p. 165) point out that, in the development of athletes, the influence of good coaches, encouraging parents, structured training and quality environment in which it is inserted, are some of these factors.

The negative effects of birth quartile, especially at younger ages, can be detected by reviewing the stages of development presented by Bloom (1985, p. 416) and the influence of family investigated by Csikszentmihalyi, Rathunde and Whalen (1993, p. 162 ) in studies on the development of talent.

Bloom (1985, p. 421) discusses the different phases, which state that the initial stage of the development (between 11-12 years old) is the critical period for the child to remain practicing the sport over the years. Csikszentmihalyi, Rathunde and Whalen (1993, p. 165) argue that the enjoyment of practice and personal fulfillment causes the child to remain practicing in their area of interest. Moraes, Salmela and Durand-bush (1999, p. 177) argue that it is in the intermediate phase between 12 and 15 years of age, that practitioners acquire a greater attraction for a particular sport, a crucial moment, because it

happens, in case of football, with those involved in the selection process of teams, known as "sieving".

Through the above mentioned factors and the lack of studies in this area, the aim of this study was to evaluate and identify the birth quartiles of professional athletes at different competitive levels: Campeonato Brasileiro Série A, Campeonato Brasileiro Série B and Copa Libertadores.

## **Materials and methods**

### Sample

The sample comprised 2073 athletes who operate in 20 Brazilian clubs participating in Série A, 16 clubs participating in the Brazilian Série B and the 32 teams participating in Copa Libertadores in 2008. This study was approved by the Ethics Committee of the Universidade Federal de Minas Gerais, under protocol number ETIC 128/08, approved on May 21st, 2008.

### Procedure

A tool to capture the birth data of athletes were the official websites of the clubs contesting Series A and B of Brazilian football and the Copa Libertadores, 2008, in addition to magazines. Any apparent contradiction found would result in the sample exclusion. The data were initially obtained through specialized magazines, then confronted with the websites of the institutions and, finally, with the websites of football confederations. The data were transcribed to a spreadsheet for further analysis.

### Statistical analysis

Descriptive analyses were performed, consisting of average and standard deviation, and percentage to characterize the profile of the sample information and the Chi-square to compare the differences between quartiles.

## **Results**

The results concerning the distribution of birth quartiles of three

different competitive levels are shown in Table 1. To compare the players who competed in the Campeonato Brasileiro Série A, we found a value for the Chi-square  $X^2 = 32,486$ . For Série B, the value found was  $X^2 = 20,502$ . Since the test applied by the players who competed in Copa Libertadores the value found was  $X^2 = 34,873$ , meaning therefore that the three cases were significant differences regarding the distribution of birth quartiles of the players ( $p > 0.05$ ).

Table 1: Distribution of birth quartiles of the Série A and Série B of the Brazilian Football Championship and the Copa Libertadores (2008)

	Série A	Série B	Libertadores	Total
<b>1st Quartile</b>	213	136	296	645 (31.12%)
<b>2nd Quartile</b>	214	97	267	578 (27.88%)
<b>3rd Quartile</b>	155	101	220	476 (22.96%)
<b>4th Quartile</b>	126	72	176	374 (18.04%)
<b>Total</b>	708	406	959	2073

Table 2 presents the results concerning the distribution of dates of birth of players from Série A and Série B and Copa Libertadores da América in 2008, divided into semesters.

Table 2: Distribution by semester, dates of birth of players from Series A and B of the Brazilian Football Championship and Copa Libertadores (2008).

	Série A	Série B	Libertadores	Total
<b>1st Semester</b>	427	233	563	1223 (59%)
<b>2nd Semester</b>	281	173	396	850 (41%)
<b>Total</b>	708	406	959	2073

For comparison by semesters between players who competed in Campeonato Brasileiro Série A, we found a value for Chi-square test,  $X^2 = 30,107$ . For Série B, the value found was  $X^2 = 8867$ . Since the test applied by the players of Copa Libertadores, the value found was  $X^2 = 29,081$ . In all three cases, there were significant differences regarding the distribution of births of half the players ( $p > 0.05$ ).

## Discussion

The results of this study concur with some previous studies found inequality in the distribution of both, semesters and quartiles of the birth of Brazilian and South American players, not unlike the results found with European (HELSEN; Winckel, Williams 2005 ) and American players (Glasmar Vicente, 2004).

Based on these results, the influence of the birth quartile in the selection and detection of talent for football is clear. However, an important aspect to consider is the multifaceted process that football has for the selection of athletes in their most vulnerable people, particularly in Brazil. This process, known as "sieving", consists of a subjective assessment in which coaches and the finders pick the athletes who will be cast in future teams. Moraes and Medeiros Filho (2006, p. 108) describe that this process values those athletes who have an early biological maturation, and psychological characteristics that are only superficially evaluated, due to the short time available for evaluation and the plethora of candidates evaluated. Thus, it is evident the influence of birth quartile in this process, as athletes born earlier in the year of selection may have physical advantages over those born later. Thus, during the selection process of athletes, several young players could be wrongly singled out as gifted for having a higher physical strength while others may be unsuccessful and not selected for their biological later maturation.

Malina et al. (2000) found that the presence of young players in the elite club who had their biological maturation (bone maturation) late decreases with advancing chronological age. Thus, the authors show that football systematically excludes those individuals who have a late biological maturation, thereby promoting those individuals who have developed it earlier. This may indicate that the biological maturation (and, consequently, the birth quartile) plays an important role in the selection of athletes in football.

Helsen et al. (2000) present two possible reasons for this. First, the role that physical attributes play in the detection of talent in a sport like football, where strength and speed are essential for a good performance. It is clear that faster and stronger athletes have an advantage, but several players with technical potential may be wasted by being born later, showing a late biological maturation. Another point made by the authors was related to the structure presented by



competitive football, especially in the younger categories. By grouping the players into categories that last two years, it creates a huge physical difference (especially in the younger categories) among those born in beginning of the first competitive year and those born in the second competitive year. This second group has a greater chance of being identified as gifted and not to leave the sport.

However, an important consideration to be made is related to the goal of the basic categories of clubs in Brazil and South America. As football is the most popular sport in those countries, the pressure on the players and coaches while collecting the results are intense, even among the young ones. Compared to other sports, we can say that football has a high competitiveness in early grades (HELSEN et al., 2000). Therefore, it is up to each club to reflect that the main objective of their basic categories are the titles to be won and the short term training of their young players or the mission to train future players who will join professional teams from each club.

The results for the three competitive analyzed levels (Série A, Série B and Copa Libertadores da América) reflect that the effect of birth quartile is present in three cases. This shows that the selection process of athletes seems to be similar between the clubs competing for a championship of a lower technical level (Série B), clubs that are the elite of Brazilian football (Série A) and among the best clubs in the continent (disputing Copa Libertadores). Thus, we can conclude that the competition for space between the professional clubs of three different competitive levels is not recommended, when the goal is the selection of the best athletes, for athletes born in the second half are a minority represented in these teams. Therefore, either these athletes permanently abandoned the practice of football, or are at an even lower competitive level. However, in their meta-analysis study, Coubley et al. (2009) found that the higher the competitive level, the greater the risk of the effects of birth quartile. The authors stress that the likely effects of birth quartile are the result of a combination of factors involving the number of months separating the groups, the skill level of the group, the sporting context and age category.

It is important to point out that this cross-sectional study focused on the analysis of the distribution of quartile and semester of the birth of adult professional players. This difference found may reflect the result of a selection process of athletes which started since their initiation in the sport to the extent of professionalism.

## Conclusion

The results of this study corroborate some findings in the literature. The significant difference present in three different competitive levels, both with respect to the quartile and to the semester of the birth, shows that the effect of birth quartile is one factor that influences the selection of athletes for Brazilian and South American football. It is suggested further longitudinal and sectional studies, to clarify all the factors involved in the analysis of birth quartiles of athletes.

---

## References

BERTHON, P.; FELLMANN, N. General review of maximal aerobic velocity measurement at laboratory. *Journal of Sports Medicine and Physical Fitness*, v. 42, n. 3, p. 257-266, Sept. 2002.

BLOOM, B. S. *Developing talent in young people*. New York: Ballentine, 1985.

CÔTÉ, J. et al. When “where” is more important than “when”: Birthplace and birth date effects on the achievement of sporting expertise. *Journal of Sports Sciences*, v. 24, n. 10, p. 1065-1073, Oct. 2006.

COUBLEY, S. et al. Annual age-grouping and athlete development. A meta-analytical review of relative age effect in sport. *Sport Medicine*, v. 39, n. 3, p. 235-256, 2009.

CSIKSZENTMIHALYI, M.; RATHUNDE, K.; WHALEN, S. *Talented teenagers: the roots of success & failure*. Cambridge: Cambridge University Press, 1993.

DANIEL, T. E.; JANSSEN, C. T. More on the relative age effect. *Cahper Journal*, v. 53, p. 21-24, 1987.

DAVIDS, K.; BURWITZ, L.; LEES, A. Understating and measuring coordination and control in kicking skill in soccer: Implication for talent identification and skill acquisition. *Journal of Sport Science*, v. 18, n. 9, p. 703-714, Sept. 2000.



EDGAR, S.; O'DONOGHUE, P. Season of birth distribution of elite tennis players. *Journal of Sport Science*. v. 23, n. 10, p. 1013-1020, Oct. 2006.

GLAMSER, F. D.; VICENT, J. The relative age effect among elite American youth soccer players, *Journal of Sport Behavior*, v. 17, n. 1, p. 31-39, March, 2004.

HELSEN, W. F. et al. The roles of talent, physical precocity and practice in the development of soccer expertise, *Journal of Sport Science*, v. 18, n. 9, p. 727-736, Sept. 2000.

HELSEN, W. F.; WINCKEL, J. V.; WILLIAMS, M. The relative age effect in youth soccer across Europe. *Journal of Sport Science*, v. 23, n. 6, p. 629-636, June, 2005.

KEMI, O. J. et al. Soccer specific testing of maximal oxygen uptake. *Journal of Sports Medicine and Physical Fitness*, v. 43, n. 2, p. 139-144, June, 2003.

MALINA, R. M. et al. Height, mass and skeletal maturity of elite Portuguese soccer players aged 11-16 years. *Journal of Sport Science*, v. 18, n. 9, p. 685-693, Sept. 2000.

MORAES, L. C. C. A.; SALMELA, J. H.; DURAND-BUSH, N. Modelos de desenvolvimento de talentos. In: SAMULSKI, D. M. *Novos conceitos em treinamento esportivo*. Brasília: Publicações INDESP, 1999. p. 172-190.

MORAES, L. C. C. A.; SALMELA, J. H. Expertise no esporte: considerações contextuais. In: SILAMI-GARCIA, E; LEMOS K. L. M. *Temas atuais em Educação Física e esportes VII*. Belo Horizonte: Health, , 2003. p. 159-172.

MORAES, L. C. C. A.; SOUSA, C. D. A. As diferentes influências da tríade pais-atletas-treinadores na trajetória de desenvolvimento de judocas brasileiros de nível internacional. In: SILAMI-GARCIA, E; LEMOS K. L. M. *Temas atuais em Educação Física e esportes IX*. Belo Horizonte: Editora Gráfica Silveira Ltda, 2004. p. 111-132.

MORAES, L. C. C. A.; MEDEIROS FILHO, E. S. Peneiradas: estudo do processo de seleção de jovens futebolistas. In: SILAMI-

GARCIA, E; LEMOS K. L. M. *Temas Atuais em Educação Física e esportes XI*. Belo Horizonte: Instituto Casa da Educação Física, 2006. p. 101-117.

MUSCH J.; GRONDIN S. Unequal competition as an impediment to personal development: A review of the relative age effect in sport. *Developmental Review*, v. 21, n. 2, p. 147- 167, June, 2001.

MUSCH, J.; HAY, R. The relative age effect in soccer: Cross-cultural evidence for a systematic discrimination against children born late in the competition year. *Sociology of Sport Journal*, v. 16, n. 1, p. 54-64, Mar. 1999.

REILLY, T.; WILLIAMS, A. M. Talent identification and development in soccer. *Journal of Sport Sciences*, v. 18, n. 9, p. 657-667, Sept. 2000.

REILLY, T.; FRANKS, A.; BANGSBO, J. Anthropometric and physiological predispositions for elite soccer. *Journal of Sport Science*, v. 18, n. 9, p. 669-683, Sept. 2000.

SIMMONS, C.; PAULL, G. C. Season-of-birth bias in association football. *Journal Sport of Science*, v. 19, n. 9, p. 677-686, Sept. 2001.

STANAWAY, K. B.; MINES, T. M. Lack of season of birth effect among American athletes. *Perceptual and Motor Skill*, v. 81, n. 3, p. 952-954, Dec. 1995.

VAEYENS, R.; PHILIPPAERTS, R. M.; MALINA, R. M. The relative age effect in soccer: A match-related perspective. *Journal of Sports Science*, v. 23, n. 7, p. 747-756, July, 2005.

VICENT, J.; GLAMSER, F. D. Gender differences in the relative age effect among US Olympic Development Program youth soccer players, *Journal of Sports Science*, v. 24, n. 4, p. 405-413, Apr. 2006.

WILLIAMS, A. M. Perceptual skill in soccer: implications for talent identification and development. *Journal of Sport Science*, v. 18, n. 9, p. 737-750, Sept. 2000.

Recebido em: 15-07-2009  
Revisado em: 23-07-2009  
Aprovado em: 26-10-2009

**Endereço para correspondência:**

renato.mf@hotmail.com  
Renato Melo Ferreira  
Universidade Federal de Minas Gerais  
Av. Presidente Antônio Carlos  
CENESP - LAPES - Pampulha  
CEP: 31270-901 - Belo Horizonte, MG - Brasil