

INFLUENCE OF CATEGORY SYSTEM ON THE POSSIBILITIES TO PARTICIPATE IN A MEN'S JUNIOR WORLD CHAMPIONSHIPS IN HANDBALL

Gutiérrez Óscar¹, Saavedra Miguel², Fernández Juan J²

¹University Miguel Hernández, Spain

²University A Coruña, Spain

Key words: *Relative age effect, handball, detection talent.*

Abstract: *The criteria's used for the International Handball Federation for the selection of the participants of the World Championship in the lower categories is based on the players born two years consecutively in the same category, starting the cut in the people born in an even year. During two seasons, these participants stay in the same category, and when the two years finalize the whole group move up to the next category.*

The sample is of 384 handball players that competed in the last World Championships of their category. The variables registered were the year of birth.

The study took into account if the players were born in an even or odd year. The differences between the portion of athletes born in an even year and an odd year were calculated with the binominal test contrasting the proportion of 50%.

In the male junior categories more players were born in an even year than an odd year, with significant differences.

Introduction

The influence of the date of birth in the performance of people has been studied in several investigations and its effect has been named as the *Relative Age Effect* (RAE). The first studies that analysed this effect (Armstrong, 1966; Freyman, 1965) were based on the education scope.

The first studies on RAE in the sport were done by Grondin, Deshaies and Nault (1984) in Canadian ice hockey and volleyball, finding an uneven distribution in the dates of birth of the participants in the different levels of both sports, proving that there were a lot of players born near to the cut-off date.

Cote, Macdonald, Baker and Abernethy (2006) studied to see if contextual factors related to "where" and "when" the athlete were born influenced in their possibilities to compete in a professional sport, analysing a sample of hockey, baseball, basketball and golf players. Regarding the place of birth more representation was found in cities with less than 500.000 habitants than those with more than this number.

Continuing with football at professional level Jullien, Turpin and Carling (2008) concluded that coaches tend to select players born in the first four months of the year.

The article of Delorme, Boiche and Raspaud (2009) investigated the importance of the effect of the relative age in professional French players in different sport disciplines, taking into account the possible influence of gender. No statistic significance was found in the relative age effect of the sports investigated, neither male neither female categories.

Other research analysed the RAE in the formation ages of sport groups, such as the essays by [Helsen](#), [Starkes](#) and [Van Winckel](#) (1998), whose results indicated that youth football players born between August and October (the first part of the year for the selection) are more probable to be identified as talented and to be exposed to higher levels of training, whilst the players born at the end of the year tended to drop out at 12 years of age. Also an essay with young footballers by Ashworth and Heyndels (2007), proved that players born after the cut-off date earned higher wages.

The results of the [Helsen](#), [Van Winckel](#) and [Williams](#) (2005) investigation show an excessive representation of players born in the first three months of the year (from January to March) for all youth National Teams in the under 15 years of age (U-15), U-16, U-17 and U-18, same being for the UEFA Sub-16 and the Meridian Cup. The players with a relatively older age are more probable of being identified as talents, because of the probable physical advantages that they have over the others.

Some articles add a new variable, such as the Gutiérrez, Pastor, González and Contreras (2010) study, whose objective was to identify the existence of the relative age effect in the youth category, in both elite football clubs and in Spanish amateurs. The conclusion was that there was an excessive representation of players selected that were born in the first months of the year in all groups analysed, although the elite groups showed significant variations in the date of birth and the distribution in relation to the Spanish population.

In basketball, the investigation by Esteva, Drobnic, Puigdellivol, Serratos and Chamorro (2006), determined a strong tendency to select players born in the first three months of the year compared to those born towards the end of the year. This tendency tends to lose its strength as the players go through the categories, until arriving to professional basketball. This is explained because in the first stages of the sport, the players are selected only because of their advanced maturity or other indicators such as height. This way, a great quantity of possible future talents are lost and other players have more opportunities of getting to become professional players only because they were born in the first three months of the year.

In other sports, the relative age effect has been studied too, such as baseball (Thompson, Barnsley & Stebelsky, 1991; 1992), hockey (Adonna & Yates, 2010), swimming (Baxter-Jones, 1995), tennis (Edgar & O'Donoghue, 2004) and rugby (Abernethy & Farrow, 2005).

Baker, Schorer and Cogley (2010) revised the possible causes of the RAE and suggest some solutions. The most use explication for justifying the RAE is the process of maturation of the athletes: the athletes born nearer the cut-off date have higher values of performance than the younger ones (Barnsley & Thompson, 1988; Malina, 1994; Malina, Bouchard & Bar-Or, 2004). The solutions suggested tend to be related to the variation of the age, which means that the RAE changes but is persistent (Helsen, Starkes & Van Winckel, 2000; Musch & Hay, 1999; Simmons & Paull, 2001). Other solutions suggest an enormous administrative complexity, such as the one by Barnsley and Thompson (1988) who say that the selection of participants should adjust to a certain distribution or control of the average age in all sorts of teams Helsen *et al.* (1998; 2000).

In handball there are few studies that analyse RAE. Schorer [Baker, Lotz](#) and [Büsch](#) (2010) analysed the existing relations between motivation, relative age and the size of the population for predicting the possibility of being chosen in a national talent programme for handball. No differences were found related to motivation. Although RAE was present in the full sample, no differences were found in the distribution between athletes selected and not selected. Neither was any relation found between motivation, age and size of the population.

The essay by Schorer, Baker, Büsch, Wilhelm and Pabst (2009a) with a sample of young German handball players determined the existence of RAE. But they proved no differences in height or weight in

the technical abilities between older and younger players, meaning that RAE cannot be used to attribute this cause.

Schorer, Schorer, Cogley, Büsch, Bräutigam and Baker (2009b) did another investigation with 3 studies. The objective of the first was to determine the influence of the level of competition and the gender in RAE, for which they used a sample of 1513 boys (13-16 years of age) and 1734 girls (12-15 years of age). They determined that the RAE decreases as the levels advance and that the men are less consistent than women.

The second study analysed the participation in elite sport, the nationality of the athlete and how long they stay in the adult stage, using a sample of 2291 players from the German first division and 4824 from the second German division between the 1998/99 and 2005/06 season. It seems that in foreign players the RAE is higher, the authors put this down to the selection processes that the players go through to get into these leagues.

The third study related the position of play and its effect on RAE, in 1298 players of the German first division between the 2004/05 and 2007/08 seasons. The backcourt players suffered an important RAE. These players must have certain anthropometric measurements and should be tall and wide. These players are responsible of throwing at long distances and there were more of them born in the two first quarters of the year, but this is only in left backs as the right backs were born in the two middle quarters.

The selection system of the International Handball Federation (IHF) for World Championship participants in the lower categories is based on the athletes born in two consecutive years in the same category, starting the cut on an even year. During two seasons, these participants stay in the same category and at the end of the two years the whole group moves onto the next category. This way the athletes born on an even year will always be the older ones of their generation, whilst the ones born on the odd year will be the younger ones of the group.

The aim of this investigation is to determine if the year of birth influences in achieving the elite in international handball.

Methods

Variables and samples

The sample is made up off 384 handball players that played in the last Men’s World Championship at junior level. The World Championship was held in 2011.

The registered variables were the year of birth and the level of competition. The information was gathered from the International Handball Federation website (<http://www.ihf.info/>).

Data Analysis

The analysis of RAE usually uses as a reference which part of the year the individual was born. In this present essay, because of the selection process of the participants in the World Championships used by the International Handball Federation the reference used was if the athlete was born on an even or an odd year. This way the ones born on an even year are the elders of the group during the two years, in both junior and youth categories.

The differences in the proportion of athletes born on an even or odd year were calculated using the binominal test contrasting at 50%. As a similar way to Lesma, Pérez-González and Salinero (2011), the RAE Coefficient was defined as the coefficient between the number of players born in the supposing advantage year and the number of players born in the supposed disadvantage year. Always being as in this case, that the periods of time are the same. In this study the RAE Coefficient represents the number of players born on an even year (supposed advantage period) compared to the number of players born on an odd year (supposed disadvantage period).

In all cases we used a significance level less than 5% ($p < 0.05$).

Results

In the male junior categories more players were born on an even year than an odd year (1.70). This means that for every player born in even year there are 1.70 players born in an odd year 1.70.

		Frequency	%	R.A.E. Coefficient. ¹	Significance *
Junior Male	Even	242	63	242/142= 1,70	0,000**
	Odd	142	37		
	Total	384	100		

* Binomial Test.
 ** Statistically significant.
¹R.A.E. Coefficient is defined as the coefficient between the number of players born in

the supposing advantage year and the number of players born in the supposed disadvantage year.

Discussion

Some studies on RAE determine the effect of grouping individuals by taking into account the age of the participants. Generally the analysis is done using the reference of which quarter the individual is born in, starting with the hypothesis of that athletes born in the first quarter of the year have more advantages on the younger because they are more developed. But, in the case of handball international players are grouped into categories (junior and youth) starting with the individuals born on an even year, meaning that these are the elders of the group. This same group formed by individuals born on an even year and individuals born the following year being an odd year, stay together during two years competing in the same category, moving onto the next age group at the end of the two year period.

The adoption of a criteria based on a cut-off age is aimed at obtaining athletes that have the same opportunities in achieving success, trying this way to balance out the competition (Helsen *et al.*, 2005). But, posterior studies have proven that it hasn't been possible to obtain this objective proposed (Malina, 1994; Musch & Grondin, 2001).

The analysis of the sample, made up of all the participants in the last Men's Júnior World Championship (n=384) and we can observe that in junior categories, there is a clear significant difference in favour of those players born on an even year, as they obtained ($p < 0,001$) in the sample (table 3). The junior male players born on an even year (n=242) are 26% more than those born on an odd year (n=142).

There a number of studies that demonstrate, same as this present investigation, the existence of RAE in sport formation categories (Barnsley, Thompson, & Legault, 1992; Bäumlér, 2000; Baxter-Jones, Helms, Maffull, Baines-Preece & Preece, 1995, Gutiérrez *et al.*, 2010; Helsen *et al.*, 1998, 2000; Vaeyens, Philippaerts & Malina, 2005).

The criteria adopted by the IHF of grouping players in blocks of years proves stronger the RAE and explains the essays done on the maturation processes (Fenzel, 1992; Helsen *et al.*, 2000; Malina *et al.*, 2004; Malina, 1994, 1999; Philippaerts *et al.*, 2006; Reilly, 2000; Simmons & Paull, 2001). This way, the selectors of the national teams of junior and youth categories tend to choose players born in the first year of selection (even year), meaning that having a more advanced

maturity process, more anthropometric, physical and cognitive development supposes an advantage against players born on an odd year.

Investigators have come up with a series of solutions for reducing this effect such as: alternating the cut-off date (Hurley, Lior & Tracze, 2001) propose competitions with smaller age groups (Glamser & Vincent, 2004) or separate players in the same category according to their performance (Kaiserman, 2005).

However all these possible solutions are against the philosophy of handball and its organizing entity, the IHF. Another proposal more in line with the IHF, respecting its criteria of using age as a reference, and a way to decrease the effect of RAE in handball competitions at maximum international level in the formation categories and the same way as García and Salvadores (2005), suggest is to permit players to change categories when the year has finished, allowing players born on an even year to be the elders of the group in one season but the following season, for the same category the elders would be the ones born on an odd year.

Conclusion

The results gathered show the existence of RAE in handball international players in junior categories.

The system used at present by the IHF for organizing competitions means that players born on an even year are more likely to be chosen for junior and youth categories than fellow athletes born in an odd year.

Perspective

To be able to reduce the existence in RAE in competitions at the highest level in handball formation categories (junior and youth) the International Handball Federation should change its participant selection system, in a way that each year, the elder players of the group will move up a category. That way, each season, the groups will renovate themselves and the younger individuals one year will be the elder individuals in the following season. In this manner, the tendency of those in charge of selecting players born in an even year would be reduced, as this doesn't seem to be decisive criteria for the detection process of talent.

References

Abernethy, B. & Farrow, D. (2005). Contextual factors influencing the development of expertise in Australian athletes. *Proceedings of the 11th World Congress of Sport Psychology*, Sydney, Australia.

- Adonna, V. & Yates, P. (2010). A Closer Look at the Relative Age Effect in the National Hockey League. *Journal of Quantitative Analysis in Sports*, 6 (4), Article 9.
- Armstrong, H. G. (1966). A comparison of the performance of summer and autumn-born children at eleven and sixteen. *British Journal of Educational Psychology*, 36, 72–76.
- Ashworth, J. & Heyndels, B. (2007). Selection bias and peer effects in team sports: The effect of age grouping on earnings of German soccer players. *Journal of Sports Economics*, 8, 355–377.
- Baker, J., Schorer, J. & Cobley, S. (2010). Relative age effects. An inevitable consequence of elite sport? *Sportwissenschaft*, 40:26-30.
- Barnsley, R. H. & Thompson, A. H. (1988). Birthdate and success in minor hockey: the key to the NHL. *Canadian Journal of Behavioural Science*, 20, 167–176.
- Barnsley, R. H., Thompson, A. H. & Legault, P. (1992). Family planning: Football style. The relative age effect in football. *International Review for the Sociology of Sport*, 27(1), 77-88.
- Bäumler, G. (2000). The relative age effect in soccer and its interaction with chronological age. *Sportonomics*, 6(1), 25-30.
- Baxter-Jones, A. (1995). Growth and development of young athletes. Should competition levels be age related? *Sports Medicine*, 20, 59–64.
- Baxter-Jones, A., Helms, P., Maffull, N., Baines-Preece, J. & Preece, M. (1995). Growth and development of male gymnasts, swimmers, soccer and tennis players: A longitudinal study. *Annals of Human Biology*, 22, 381-394.
- Cote, J., Macdonald, D. J., Baker, J. & Abernethy, B. (2006). When "where" is more important than "when": Birthplace and birthdate effects on the achievement of sporting expertise. *Journal of Sports Sciences*, 24(10), 1065-1073.
- Delorme, N., Boiche, J. & Raspaud, M. (2009). The Relative Age Effect in Elite Sport: The French Case. [*Research Quarterly for Exercise and Sport*](#), 80(2), 336-344.
- Edgar, S. & O'Donoghue, P. (1995). Season of birth distribution of elite tennis players. *Journal of Sports Sciences*, 23, 1013–1020.
- Esteva, S., Drobic, F., Puigdellivol, J., Serratos, L. & Chamorro, M. (2006). Fecha de nacimiento y éxito en el baloncesto profesional. *Medicina de l'esport*, 41(149).
- Fenzel, L. M. (1992). The effect of relative age on self-esteem, role strain, GPA, and anxiety. *Journal of Early Adolescence*, 12, 253-266.

- Freyman, R. (1965). Further evidence on the effect of date of birth on subsequent school performance. *Educational Research*, 8, 58–64.
- García, V. & Salvadores, J. (2005). The relative age effect in football. *Training Fútbol*, 115, 36-42. (In Spanish: English abstract).
- Glamser, F. D. & Vincent, J. (2004). The relative age effect among elite american youth soccer players. *Journal of Sport Behavior*, 27(1), 31-38.
- Grondin, S., Deshaies, P. & Nault, L. P. (1984). Trimestres de naissance et participation au hockey et au volleyball. *La Revue Québécoise de l'Activité Physique*, 2, 97–103.
- Gutiérrez, D., Pastor, J. C., Gonzalez, S. & Contreras, O. R. (2010). The relative age effect in youth soccer players from Spain. *Journal of Sports Science and Medicine*, 9, 190-198.
- [Helsen](#), W. F., [Starkes](#), J. L. & [Van Winckel](#), J. (1998). The influence of relative age on success and dropout in male soccer players. *American Journal of Human Biology*, 10(6), 791-798.
- Helsen, W. F., Starkes, J. L. & Van Winckel, J. (2000). Effect of a change in selection year on success in male soccer players. *American Journal of Human Biology*, 12, 729–735.
- [Helsen](#), W. F., [Van Winckel](#), J. & [Williams](#), A. M. (2005). The relative age effect in youth soccer across Europe. *Journal of Sports Sciences*, 23, 629–636.
- Hurley, W., Lior, D. & Tracze, S. (2001). A proposal to reduce the age discrimination in Canadian minor hockey. *Journal of Sport Management*, 16(3), 250.
- Jullien, H., Turpin, A. & Carling, C. (2008). Influence of birth date on the career of French professional soccer players. *Science & Sports*, 23, 149-155.
- Kaiserman, K. (2005). Skill based division of talent in recreational youth leagues. Available from URL:
http://www.sportskids.com/nl/newsletter/newsletter1_archive.asp
- Lesma, M. L., Pérez-González, B. & Salinero, J. L. (2011). Relative age effect (RAE) in spanish league. *Journal of Sport and Health Research*, 3(1), 35-46.
- Malina, R. M. (1994). Physical growth and biological maturation of young athletes. *Exercise and Sport Sciences Reviews*, 22, 389-434.
- Malina, R. M. (1999). Talent identification and selection in sport. *Technique*, 19, 16-19.
- Malina, R. M., Bouchard, C. & Bar-Or, O. (2004). *Growth, maturation, and physical activity*. Champaign Illinois: Human Kinetics.

Musch, J. & Grondin, S. (2001). Unequal competition as an impediment to personal development: a review of the relative age effect in sport. *Developmental Review*, 21(2), 147-167.

Philippaerts, R. M., Vaeyens, R., Janssens, M., Van Renterghem, B., Matthys, D., Craen, R., Bourgois, J., Vrijens, J., Beunen, G. & Malina, R.M. (2006). The relationship between peak height velocity and physical performance in youth football players. *Journal of Sports Sciences*, 24, 221-230.

Reilly, B. F. (2000). Anthropometric and physiological predispositions for elite soccer. *Journal of Sports Sciences*, 18, 669-683.

Schorer, J., Baker, J., Büsch, D., Wilhelm, A. & Pabst, J. (2009a). Relative age, talent identification and youth skill development: Do relatively younger athletes have superior technical skills? *Talent Development and Excellence*, 1, 45-56.

Schorer, J., Cogley, S., Büsch, D., Bräutigam, H. & Baker, J. (2009b). Influences of competition level, gender, player nationality, career stage and playing position on relative age effects. *Scandinavian Journal of Medicine & Science in Sports*, 19: 720-730.

[Schorer, J.](#); [Baker, J.](#); [Lotz, S.](#) & [Büsch, D.](#) (2010). Influence of early environmental constraints on achievement motivation in talented young handball players. *International Journal of Sport Psychology*, 41, (1) 42-57.

Simmons, C. & Paull, G. C. (2001). Season-of-birth bias in association football. *Journal of Sports Sciences*, 8, 677–686.

Thompson, A. H., Barnsley, R. H. & Stebelsky, G. (1991). Born to play ball – the relative age effect and Major-League Baseball. *Sociology of Sport Journal*, 8, 146–151.

Thompson, A. H., Barnsley, R. H. & Stebelsky, G. (1992). Baseball performance and the relative age effect: Does little neutralize birthdate selection bias? *Nine*, 1, 19–30.

Vaeyens, R., Philippaerts, R. M. & Malina, R. M. (2005). The relative age effect in soccer: A match-related perspective. *Journal of Sports Sciences*, 23(7), 747-756.

Titlu: Influența sistemului de clasificare asupra posibilitățile de participare masculină la campionatele mondiale de la handbal.

Cuvinte cheie: efectul de vârstă relativă, handbal, talent de detectare.

Rezumat: Criteriile de selectare folosite de Federatia Internațională de Handbal pentru selectarea participanților la Campionatul Mondial din

categoriile inferioare se bazează pe jucători născuți în doi ani consecutivi în aceeași categorie, plecând de la persoanele născute chiar în același an. Pe parcursul a două sezoane, acești participanți rămân în aceeași categorie, și atunci când cei doi ani se termină întregul grup se deplasează până la următoarea categorie. Eșantionul este de 384 de jucători de handbal, care au concurat în ultimul Campionat Mondial din categoria lor. Variabila înregistrată a fost anul nașterii. Studiul a luat în considerare în cazul în care jucătorii s-au născut într-un an par sau impar. Diferențele dintre partea de sportivi născuți într-un an par și un an impar au fost calculate cu testul binomial proporție de 50%. În categoriile de sex masculin de juniori mai mulți jucatori s-au născut într-un an par decât într-un an impar, cu diferențe semnificative.

Titre: Influence de système de classification des sur les possibilités de participer à un homme \ 's championnat mondial junior à handball.

Mots clés: effet de l'âge relatif, le handball, le talent de détection.

Résumé: Les critères d \ 'utiliser pour la Fédération Internationale de Handball pour la sélection des participants du Championnat du Monde dans les catégories inférieures est basée sur les joueurs nés deux années consécutives dans la même catégorie, de commencer la coupe dans les personnes nées dans un même année. Pendant deux saisons, ces participants à rester dans la même catégorie, et quand les deux ans de finaliser l'ensemble du groupe se déplacer jusqu'à la prochaine catégorie. L'échantillon est de 384 joueurs de handball qui ont participé dans les derniers championnats du monde de leur catégorie. Les variables enregistrées étaient de l'année de naissance. L'étude a pris en compte si les joueurs sont nés dans une année paire ou impaire. Les différences entre la partie des athlètes nés en une année paire et une année impaire ont été calculés avec le test binomial comparant la proportion de 50%. Dans les catégories juniors masculins plus de joueurs sont nés en une année paire, même d'une année impaire, avec des différences significatives.