

Swedish Soccer is Searching for Talent but finding Age¹

Tomas Peterson

**Professor in Sports Science
The School of Teacher Education
Malmö university**

e-mail: tomas.peterson@lut.mah.se

The Relative Age Effect (RAE) in the selection systems of youth sports is by now a well documented phenomenon (Musch & Grondin 2002). Most studies, however, are based on cross-sectional data analysis. In this article the Relative Age Effects on football playing girls and boys in Sweden are analysed on different levels of selection, using both cross-sectional data and data from a longitudinal study. The research project "De avgörande åren"² ("The Decisive Years") examines the role of sport as an environment for fostering. Our starting point is the form and content of sports organisations. We are interested in the effects these organisations have on the goals of the sports movement program and also on the societal goals for support of sports in general. The present report presents some results from a study of selection and ranking mechanisms. The Swedish Football Association youth training program has the oldest, most extensive and most systematically applied selection structure to be found within Swedish sports. Furthermore, it has been used as a model for the training programs of most of the other sports organisations. Among all 12-year olds who are registered members of sports organisations, half of the boys and a quarter of the girls are active football players.³ The base of the selection structure for a year cohort can thus be as large as 20,000 – 30,000 boys and girls. Those that are considered to be the most talented are then selected out by a series of steps (zone, district, elite, pre-youth national team and youth national team). The goal of the selection procedure is to sift out the most talented players for future national team engagements.

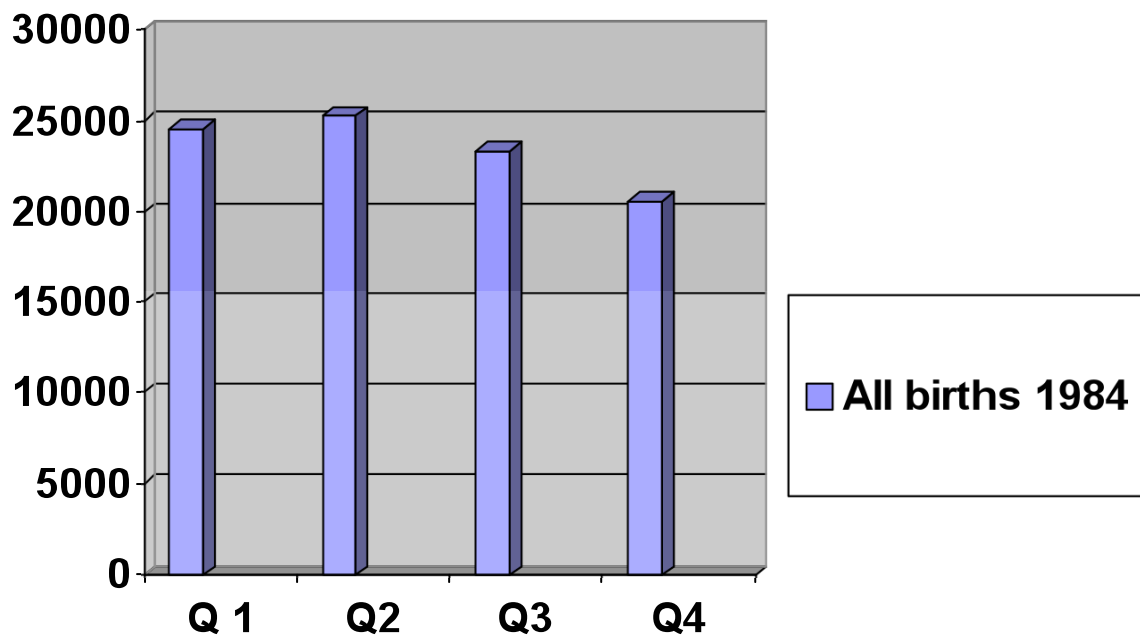
A closer examination of the selection process reveals, however, the importance of factors that are not self-evidently related to a talent for football. In this report I shall discuss *one* such factor, which our material has shown to exert a remarkably strong effect. This factor is the "season of birth"⁴. I will first present the empirical results and then discuss the consequences of the findings.

¹ I would like to thank Jochen Musch and Mats Franzén for comments, and Mats also for guiding me in the world of statistics.

² Mats Franzén, Per Nilsson & Tomas Peterson: De avgörande åren – en longitudinell studie av barn, ungdom och idrott. Forskningsprogram (1996). The theoretical basis for the project can be found in Peterson (1998), its context in Peterson (2000b), previous results in Franzén et al (1997, 1998, 2000), Peterson (2000a, 2002), Carlsson & Hinic (2000), Franzén & Peterson (2001,2002) and Tobiasson (2001).

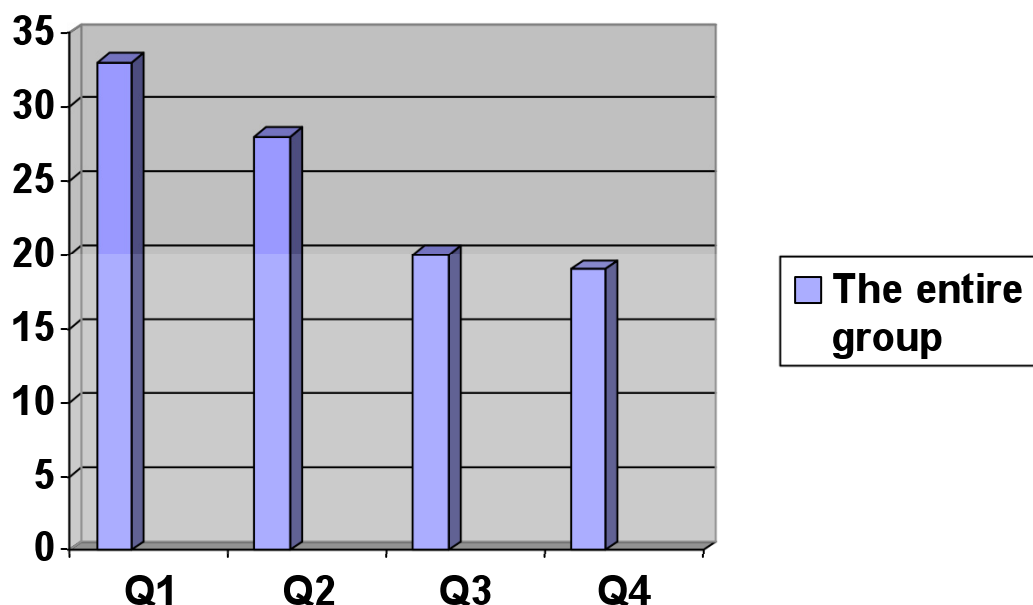
³ Lars-Magnus Engström, Idrottsvanor i förändring, Stockholm 1989

⁴ By "season of birth" we mean the season that encompasses the birthday of an individual. This could be on a monthly, quarterly or half-yearly basis.



About 100,000 children are born each year in Sweden and 1984 was no exception. However, we must also take into account a number of children that were born in other countries and subsequently migrated to Sweden. Figure 1 shows the seasonal distribution of births by quarter in absolute values. More children were born in the first half of the year and the difference between the second and fourth quarter is about 6,000 children. This distribution is similar to those of other years. As previously mentioned, one may expect a significant fraction of these children to participate in organised football activities at some time between the ages of 5 and 12. One might also be inclined to assume that the distribution of their seasonal date of birth resembled that of the whole age cohort, as there is no reason to expect *a priori* that an interest for football should be correlated with seasonal birth date.

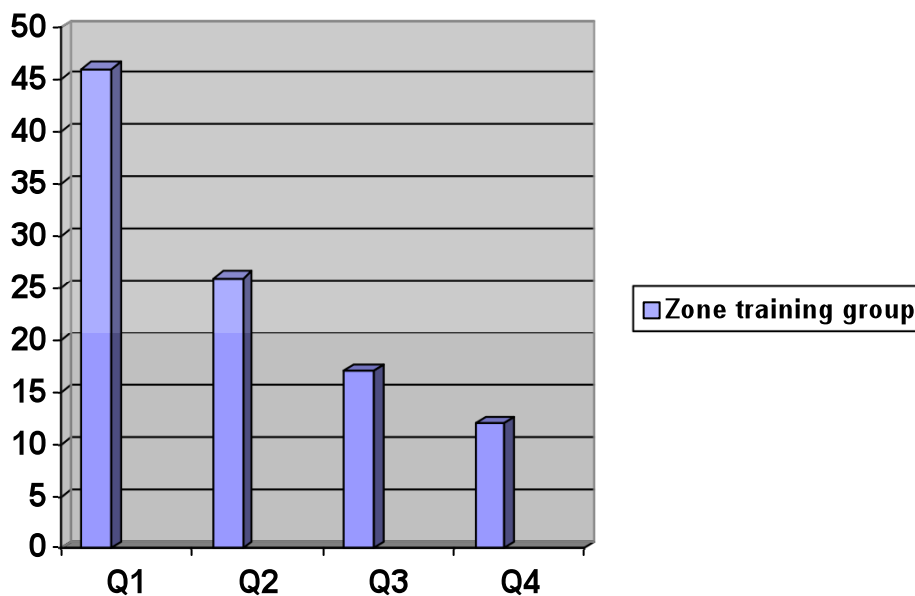
At the age of 13 a little over 900 of these children joined the "Decisive Years" project. This group is not a representative sample of Swedish football youth, but taking into account the strategic variables of the selection process and the size of the group, one would expect it to be reasonably representative regarding seasonal date of birth. The actual distribution of births according to quarter of the year in the group is shown in Figure 2 (in percent, n = 907).



In order to study the differences between the distributions of the soccer players and the distribution of the general population, I have constructed a discrimination index⁵, scaled between 0 and 1. The index for Figure 2 is 0.16.

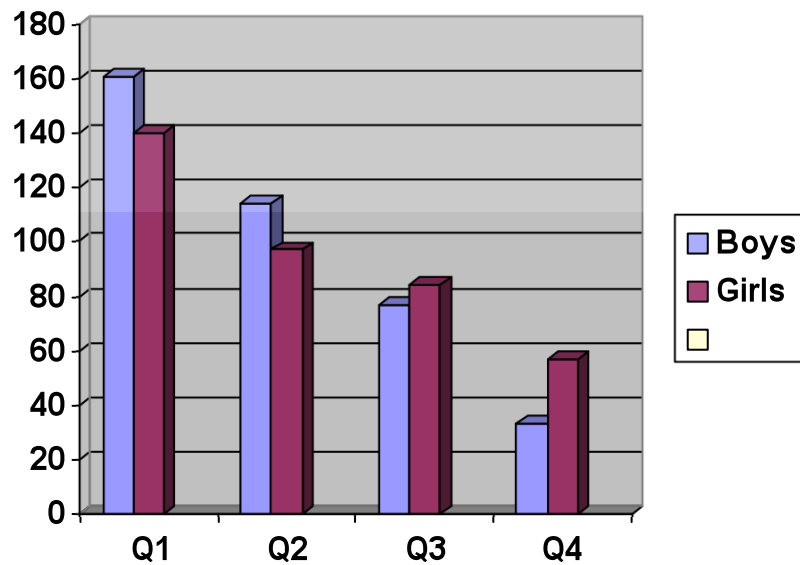
It is at once apparent that the age distribution differs from that which one would expect on demographic grounds. Those 13-year olds who were born in the first half of the year are strongly overrepresented and this cannot be accounted for by the simple fact that the birth rate for the first half of the year was somewhat higher than that in the second half. We do not know for certain if this bias was already present when the children enrolled in their clubs. An alternative, and equally plausible, assumption is that this difference has come about because of a selection process occurring after enrolment and discriminating against children born in the second half of the year. We shall return to a discussion of the characteristics of this hypothetical selection process later in this article.

Club training becomes linked to district training activities when the clubs send their "most talented" 13-year olds to local zone training camps. The cut-off date of January 1st applied throughout the entire career of the players in the sample. We can see in Figure 3 the seasonal age distribution of those players in the study who were sent by their clubs to these camps (values in percent, n = 239). The bias in the results is increased and this shows clearly that the probability to be sent to a zone training camp is strongly linked to an early seasonal birth date (the discrimination index being increased to 0.38). *This in turn indicates that there is some sort of relationship between ideas about talent in 13-year olds and their seasonal birth date.*



⁵ The index measures the divergence from the expected value, that is the difference between the distribution of birth of month in the different groups ("The entire group", "zone training group" etc.) and the entire population of children born in 1984.

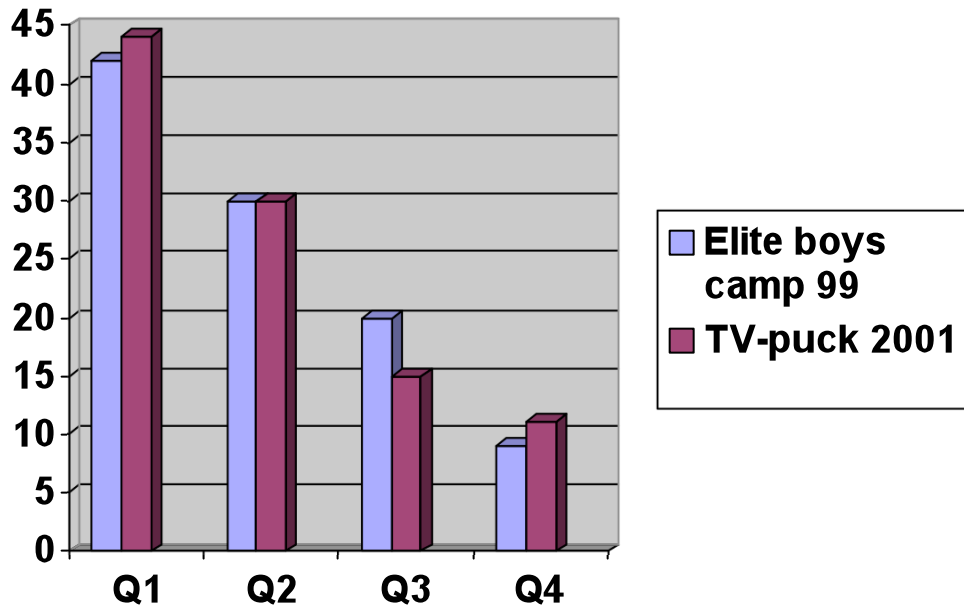
From each zone training camp the district then chooses a troop that will be part of a



selection process that continues through a number of district training camps. Finally the districts transfer responsibility to the national level of the Football Association when they send a 16-player troop to the elite training camps for boys and girls in Halmstad. This selection occurs when the children are 15 years old. Figure 4 shows the seasonal age distribution at these camps, grouped according to sex (absolute values are: girls $n = 378$, boys = 385). 53 of the 239 boys and girls from our sample that were selected for the zone training camps succeeded in reaching the elite camp level. The age distribution of this group is very like that of the entire elite camp population.

These results show that there is a systematic difference in the probability that a child will be promoted within youth football that correlates with the child's seasonal age. The earlier season of birth, the greater is the probability that the child will be selected for the elite training camp. This result holds for both girls and boys, but the correlation between month of birth and promotion is stronger for boys (the discrimination index being 0.35 for the boys, 0.22 for the girls and 0.28 for the boys and girls together).

The correlation is not unique for football. Figure 5 shows a comparison between the selection systems for Swedish football- and ice hockey playing boys. In both cases the comparison has been made at the age of 15. For football, the sample comprised boys attending the elite training camp for 1999 (in percent, $n=384$) and for ice hockey, the boys playing in the "TV-puck" competition of 2001 (in percent, $n=455$). The cut-off date of January 1st is the same in football and ishockey. The discrimination index is 0.35 for the football players and 0.42 for the ishockey players.



By tracing the individual boys and girls from our sample group who attended the elite training camp, we find that the internal selection process shows great precision: all 53 were also chosen for the first zone training camp. Those who did not qualify for this level were effectively barred from further selection. Of the 45 boys and 26 girls born 1984 who up to 2002 played in their youth national teams, only 2 of the boys did not attend the 1999 elite camp (one girl was born in 1985 and she participated in the girls' elite camp of 2000). In other words, for a large part of each yearly cohort of football players the chance of a "national team career" is already over at the age of 13.

The pattern that has emerged in this study can also be found at the other end of the Football Association training ladder (even though the numbers are relatively small). A total of 16 out of 907 youths who entered the study at 13 years old had played on the national team by the age of 17 (1999-2001). Their seasonal age distribution is shown in Figure 6 (absolute values, n = 12 boys and 4 girls). The discrimination index is 0.48.

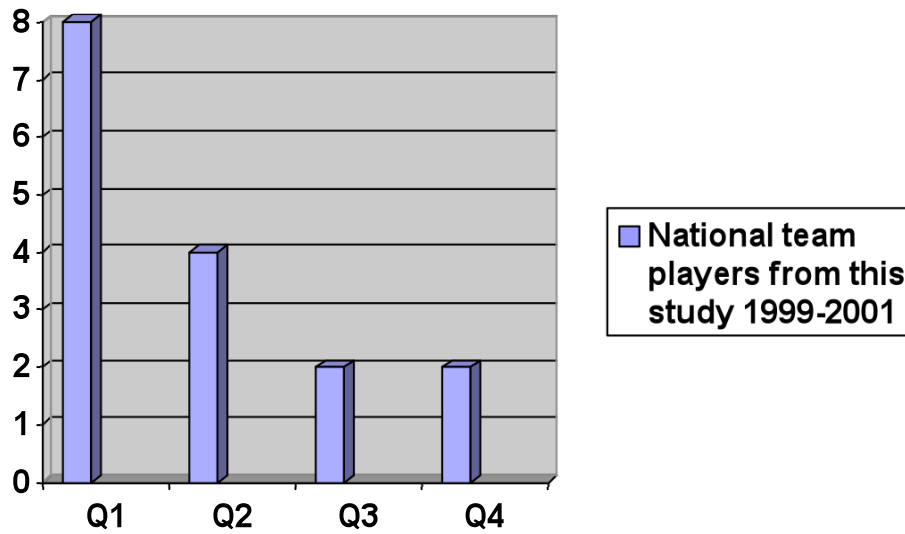
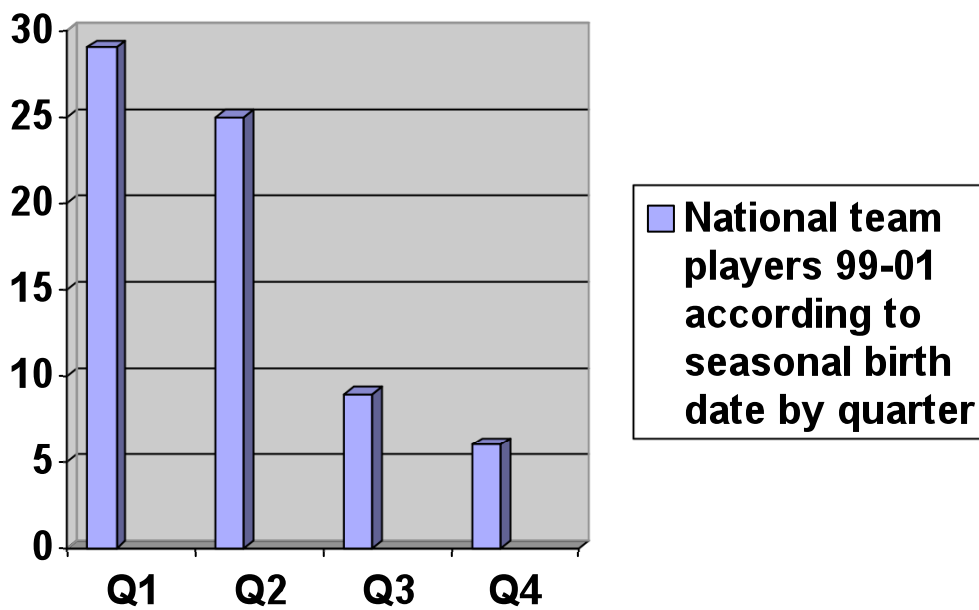
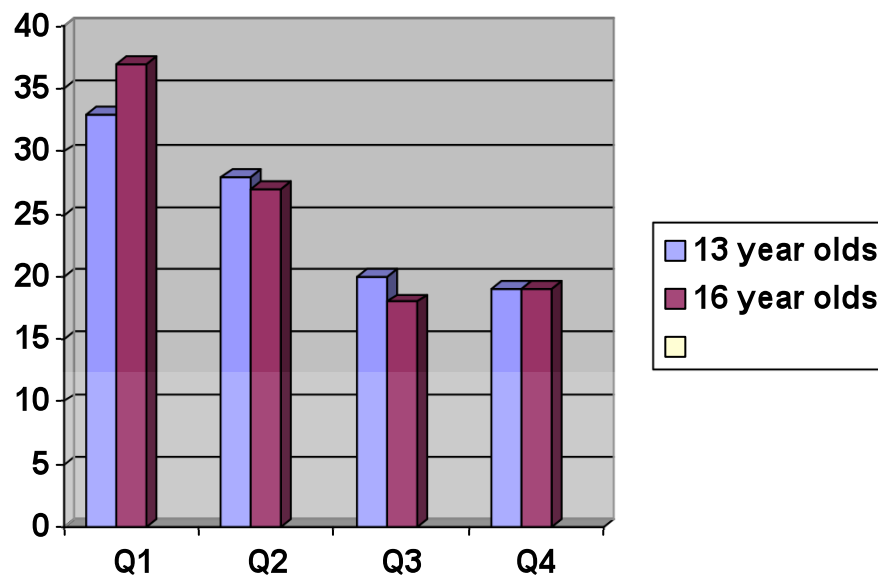


Figure 7 shows the same figures for the period 1999-2001 for all youth national team players born 1984 (absolute values, n = 45 boys and 25 girls, the girl born 1985 has been excluded). The discrimination index is 0.49.



These results show that, no matter whether one considers our sample population or the elite camp population, one arrives at the same conclusion: factors that have no relation to "talent for football" have a strong influence on the selection process. Of course it is true that elite player selection is not the only career opportunity at the club level. In most clubs everyone who wants to can play at least up to the level of the first senior season. However, a comparison of our sample population at the start in 1997 with those that were still active in clubs three years later (46%) did not change the picture: those that remained showed a clear bias in favour of the first quarter (Figure 8 below). An existing selection acting at the 13-year old level (whose roots must be therefore be sought at an even younger age) had been reinforced, in spite of the fact that most of the clubs in the study did not consider themselves to promote elite activities for the age groups in question. The discrimination index is 0.21.



The inescapable conclusion is that there is a systematic difference in the probability with which a young player will be selected, such that

- The earlier ones seasonal date of birth, the greater the probability that one will be selected
- and
- This bias continues to exert itself at different levels of selection from club level up to the national team level.

The seasonal age distribution in the original sample already showed a bias between the first and second half of the year, which was not present for those born in the third and fourth quarters. We are not able to state conclusively why this should be so. But since most of the children had been active from the age of 5- 8, one could suspect that a selection in terms of seasonal age is already at work for even the youngest cohorts. The pattern would be enhanced at the age of 13, when the clubs send players to the local zone training camps, and by the time the districts send their teams to the elite training camps, a strongly significant correlation has been established for the boys. The correlation is not as strong for the girls, but it is possible that if our material was

broken down according to sex, then the same difference might be found throughout the selection process.

The correlation between seasonal age and selection can also be found at the national team level. Nearly half of the players on the youth national teams (boys and girls) were born during the first three months of the year, and nearly eight out of ten during the first half of the year.

Selection by physical development

So far I have only stated that a correlation exists in the football-training program that obviously affects selection. I want now to consider a possible basis for this correlation and what consequences it may have for Swedish football. The first point to note is *not so much that the correlation exists, but what it expresses*. The characteristics that create differences between individuals that are born within the same calendar year are mainly related to *physical development*, and can be simply expressed in terms of height, girth, weight and co-ordination. Clearly intellectual and social development should also be included, but these factors are much more difficult to measure and evaluate. Putting it simply – and all other factors being equal – then those will be chosen who are taller, broader, heavier and have better co-ordination. According to this logic, the physically mature will have an advantage in the selection process.

This is scarcely suprising. Every educational system, whether within sport, schools or working life, is at the same time a ranking system, and frequently also a selection system (selection systems are always ranking systems, but there are ranking systems that do not select out the ranked individuals). Those that best take advantage of an educational system are also those who have the best forecast for advancement within the system. In this respect physical development is no different than other selection mechanisms. Nor is Swedish football alone in using this criterion. As we have shown it is the same for Swedish ice hockey, and it is also reported for a number of sports in other countries⁶. This is also a well known phenomena in scholastic education, in relation to the ability of pupils to absorb factual knowledge, and the same is true for grades awarded in physical education. In a report from 1993 Allan Svensson drew attention to the differences that could be found in Sweden between factors such as seasonal date of birth, sex and social class for the marks awarded to ninth-graders⁷. He noted considerable differences between all three factors in the area of physical education. His most important finding was a notable interaction in physical education grades between sex and seasonal date of birth. Differences between age groups were insignificant for girls of diverse ages, but rather strong for boys. Furthermore the differences between the seasonal date of birth expressed on a quarterly basis was stronger for boys than for girls in all social classes.

In a follow-up study to the work of Allan Svensson⁸, I have examined the marks awarded for physical education to ninth-graders in 1997 (a cohort that is not identical

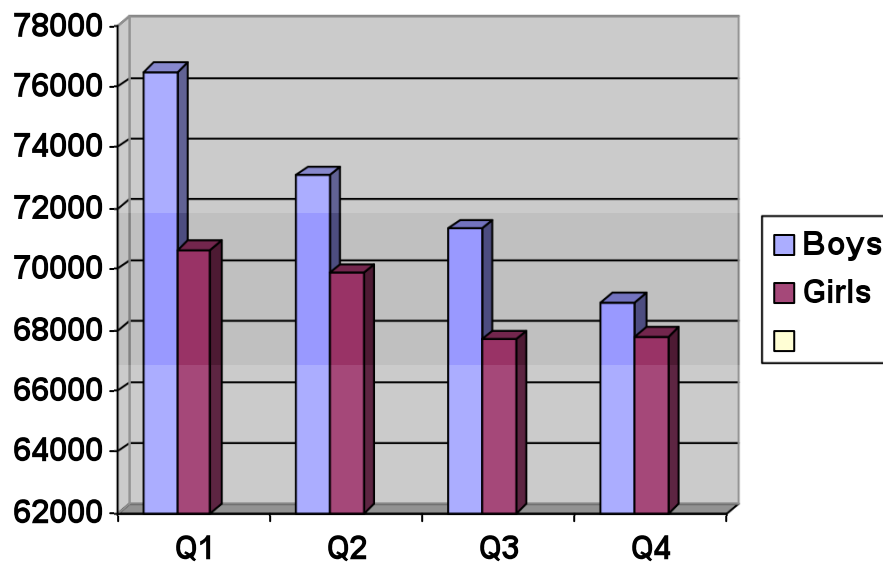
⁶ Musch, Jochen & Hay, Roy “The relative age effect in soccer: cross-cultural evidence for a systematic discrimination against children born late in the competition year”, and Musch, Jochen & Grondin, Simon “Unequal Competition As A Impediment to Personal Development: A Review of the Relative Age Effect in Sport”.

⁷ Svensson, Allan Har åldern någon betydelse? Skolanpassning och skolframgång bland elever födda i början respektive slutet av året. Report nr 1993:04, Inst. För pedagogik, Göteborgs Universitet

⁸ I am very grateful to Allan Svensson for permission to work with his material from 1997.

with the one in our study, but comparable). It is apparent from Figure 9 below that the conclusions have not changed since 1993, and they can be summarised as follows:

- There is a systematic difference in the average marks awarded in physical education, such that the earlier in the year that an individual is born, the greater is the probability that he or she will have been awarded an above-average score.
- While this holds for boys and girls, the correlation is stronger for boys. For girls the correlation holds only for the first three quarters. Girls born in the fourth quarter have slightly higher average marks than those born in the third quarter.
- Boys have systematically higher average marks than girls. It is interesting that Sport and Health is one of the few, indeed perhaps the only, subject in which boys at this



age have a higher average score than girls.

The fact that selection in football education is so strongly related to physical development raises a number of problems. The biggest single strategic difficulty facing Swedish football after the Bosman judgement and the latest rule changes within the EU (2001) is related to the regeneration of talent. In order to *preserve* the current quality of the elite clubs, it is necessary to generate more good players, and if one aims to *raise* the quality then an even greater number of good players must be brought forward. Today even players of only average Premier League quality are being recruited abroad, and youths of increasingly younger ages try for success in other countries. This means that Swedish football today faces a strategic challenge at least as great as that at the end of the 40ies and early 50ies, when sufficient players to make up three national teams disappeared abroad.

We have seen that the dominant feature of the current youth training program, at both elite club and national Football Association levels, is a pyramid-shaped selection system that “makes toothpicks from tree trunks”. The rationale for this appears to be the point of view that considers the available material for selection to far exceed the number of available places at elite club and national team levels. Many clubs begin to select out children already as 10-year olds, either in “first” and “second” teams, or else by selecting “the best” and forcing the others out of the training program. This

behaviour is obviously perceived by the clubs as meeting their needs, but for Swedish football in general such a stringent selection process is likely to be counter-productive. On the contrary, as many children as possible should be encouraged to continue with football for as long as possible.

It should be emphasised that no open encouragement to select according to physical development can be found in the goals of the youth education program of the Swedish Football Association. Other characteristics are mentioned, of which the most common is "talent". Talent can be defined in many ways but physical development is seldom one of them. Whether or not a person can be born with talent is a common subject for discussion. Most authorities are, however, in agreement that talent alone is not enough to become a good football player and we find a strong emphasis on training in the goals of the Football Association. In other words, there is a strong official belief that the individual can and should improve his skill by regular training activities. It is therefore paradoxical that physical development should be given such weight in the selection process, since it is probably the only parameter that *cannot be influenced by training*.

It is well recognised that during the process of children's growth and maturation, the time at which puberty and the growth spurt occur affects many of the organs that determine performance. In turn, this means that individuals having an early development will have obvious advantages compared to those with a later development⁹. One should also recognise that an individual that shows good early development will not necessarily be a strong performer as an adult. Indeed the opposite is often the case. This means that individuals with an early development are favoured in youth sports, yet there is no guarantee that they will be the best in the future. There is therefore an obvious risk that late-developing individuals, with the potential for a strong performance as adults, lose their enthusiasm and drop out when they continually experience discrimination in favour of their more developed peers.

There is a converse risk connected with the early developer. This type grows accustomed to winning merely because his physical development is greater than that of his competitors and he thus becomes psychologically unprepared to lose. At some point in puberty the late developers catch up in physical development, and the early developer now has to exert himself harder in order to win. In fact he may now achieve this only occasionally. From this we can conclude that youth competitions are more a way of favouring those with an early development rather than a test of talent and ability in the sport under consideration. Thus there are sports in which an early puberty is advantageous, as well as sports in which a late physical development has its advantages (e.g. gymnastics).

According to Carlson¹⁰, early physical development has no indicative value for the physical capacity that the individual will attain as an adult. Differences in the rate of development exclude this. It is therefore not particularly rational to use a system for selection that favours early physical development, even if one is only interested in physical capacity. As a result, children with a late physical development will be

⁹ The following results are taken from Forsberg (ed.) Barn, ungdom och idrott. CIF, Malmö 1990

¹⁰ Carlson, R Vägen till landslaget. En retrospektiv studie av framgångsrika ungdomar i sju idrotter, Inst. för pedagogik och GIH, Högskolan för lärarutbildning i Stockholm 1991

ignored. From the point of view of co-ordination, it is an advantage to start early but make a late entry into competitive sport. The future national team players in Carlson's material could not be distinguished from a large group of children with high sports ability. The reverse was rather the case, with the other children, including members of the reference group, being more successful on the playing field.

These examples show that, when trying to identify talent, it is inadequate to only consider physical factors and co-ordination. It simply does not seem possible to make a reliable forecast in early puberty of adult sporting achievement. We may conclude that it is more important to find ways of developing talent, and to allow talent time to mature, rather than to try to uncover "mature" talent.

Motorway or mountain path?

The first major problem with the selection structure of youth football is that it searches for talent but finds physical development. The second problem is that the selection for physical development occurs at the worst possible time. As we have shown by following the cohort for 1984, the clear correlation between month of birth and participation in an elite camp does not start on the day of arrival at the camp. Rather, one sees on that day the end result of a selection process that began much earlier. All 53 of the boys and girls who are found both in our first sample group and in the elite group were also chosen for the first zone training camp. Thus the process of selection and rejection in the training sequence of the Association occurs already by the age of 13. At this time the difference between individuals is greater than at any other point in their lives – a thirteen year old can look like a seventeen year old or an nine-year old, and still be classified as "normal". The uncertainty as to how an individual will develop is thus *greatest at just this time*. The only certain fact is that by eighteen or nineteen all have stopped growing and have now approximately the same length, girth, weight and ability to co-ordinate.

The results of our investigation indicate that selection according to physical development at thirteen is based on an assumption (or an understanding) regarding the characteristics needed by a player to advance on the rungs of the Association's educational ladder. We see that club activities promote the same type of selection mechanism at even younger ages.

Forecasting how a child or teenager will perform as much as ten years ahead mainly favours characteristics connected with physical development. Training cannot change these factors, nor can one forecast how they will alter as an individual grows to adulthood. At the same time there is a tendency to miss "big talent hidden in a little body", or, for that matter, hidden in a "clumsy" or a "skinny" body. To be passed over or looked down upon, simply because an individual was born at the "wrong" time of year fits badly with the aim of sports culture to see that as many as possible participate for as long as possible. Nor does it fit with the ambition that each individual shall develop according to his/her own specific characteristics.

A selection according to talent (regardless of how we define this concept) should start from the fact that within every yearly cohort, talent is randomly distributed at birth. That is to say, there is the same likelihood that a talented individual will be born in

December as in January, just as he or she may be born in the North or South of the country, or in the country side or in a city. Talent is also randomly distributed with regard to the profession of the parents, as well as their level of education and ethnic roots. *Ideally, therefore, the seasonal age distribution of the group of players from which selection to senior activities is made, should, for every yearly cohort, be the same as in the year of birth (see Figure1). In Sweden, the selection is made at the age of 19.*

In my opinion, the present system, in which selection is made according to physical development, and at the period of development when this indicator has its lowest value as a tool for forecasting, results in the loss to football of much of the potential talent in each yearly cohort. Talented individuals born towards the end of each year are subject to a systematic negative discrimination. As a result, they are passed over and receive less encouragement. The consequence is that a large number of them will sooner or later stop playing football.

For those who are subjected to this discrimination but who choose not to give up, the forecast is brighter. These are the individuals who, having made progress “off the motorway”, become training addicts and who develop a remarkably strong competitive attitude. They “bite on the bullet” and refuse to accept the judgement of adults, they blaze their own trails, set their own long-term goals and stubbornly struggle to achieve these. Ten years later we will find that it is from this group that many of the elite team players have been recruited. *This is, however, not because of the Swedish Football Association training program, but rather in spite of it.* And for each individual that has persevered, there are all too many who have given up as a direct result of the existing selection system.

This may seem to be a drastic conclusion, considering that we have only material from a single cohort (born 1984). But by using cross-sectional data instead of longitudinal data, we can make some comparisons with cohorts from other years. The following report has been made by Johan Kristoffersson¹¹ for 2001 (2002 for the 18-year boys’ team). The data represent all male football national teams. In the boys’ teams the players were all born in the same calendar year, while the junior teams contained two calendar years and the Under-21 team four calendar years (born 1979-82).

Table 1: Swedish Male national team players for 2001, categorised by quarterly age and born in the first half of their year of birth (results in %).

	Q 1	Q 2	Q 3	Q 4	First half-year
P 86	48	44	4	4	91
P 85	48	37	11	4	85
P 84	48	35	13	4	83
P 83	47	24	20	8	72
U 21	23	26	16	35	48
Herr	29	24	21	26	53

P = boys, 83-86 refers to year of birth, U = Youths, 21 = under 21 years old, Herr = Senior males.

¹¹ I would like to record my appreciation to Mr. Kristoffersson for permission to work with his data.

Table 1 shows conclusively that the pattern that we have previously found for the cohort of 1984 is also found in every national youth team for the season of 2001. Nearly half of the players were born in the first quarter, and between 72-91 percent were born during the first half of their calendar year of birth. The senior team, however, shows a quite different picture and, if they are pooled with the Under-21 national team, then more of the players are actually born in the last quarter. This dramatic change occurs mainly during the transfer from junior to senior status and it probably results from the ability of the late-born players, who have now grown to development, to compete on even terms. This poses the question as to whether those players born late in the year and now capable of competing successfully have been part of the educational system, or whether they have matured outside it – a matter on which I am currently working.

If we broaden the definition of elite football in Sweden then we can use the information on players in the Premiere League (Allsvenskan) and the First Division (Super Ettan) found in Kristofferson's material. Here we have two years for comparison, 1997 and 2002. The material is divided by half year instead of quarter. On this basis the percentage of the Premiere League players born during the first half of the year was 52% for 1997 and 58% for 2002. If we adjust for the bias which we have previously noted for seasonal date of birth (see Figure 1 and comments) then there is no striking difference between the Premiere League players and the normal population with regard to the half-year of birth. The same relationship can be found for 1997 in the Division 1 South and Division 1 North (54% for first half-year in both cases) and 55% for the combined First Division (Super Ettan) in 2002. To provide a randomly chosen comparison over time, Table 2 shows data on the Premiere League players for 1938-39, grouped according to seasonal birth date, on both a quarterly and half-yearly basis¹².

Table 2: Players in the "Allsvenskan" 1938-39 grouped according to quarter and those born in the first half of the year (%)

Q 1	Q 2	Q 3	Q 4	First half-year
31	25	23	20	56

From these results we may conclude that there are no major structural differences amongst senior elite players, grouped by seasonal age.

Conclusions

That today's youth sport is marked by a selection favouring those with an early seasonal age is not a new perception. Even the Swedish Football Association has long been aware of the bias in seasonal age as revealed at the elite camps. Attempts have been made to counteract the effects of this selection system, for example by changing the starting point for the yearly cohort from 1 January to 1 August. This allowed the autumn children to be compared with the spring children of the following year. This did not, however, change the selection system, it only advanced the starting date for those who were favoured or disfavoured by six months. The basic problem lies in a

¹² Ekman, Hans Allsvenskan i siffror

selection system which starts already at the age of 13, when the clubs predicate the material for a selection process that will continue at the district level. Why clubs choose players according to physical development is not known, but one may assume that there is a "silent agenda" dictating that these players will be the most successful in the forthcoming selection steps. The results of our investigation indicate that the same process is already at work at the club level with even younger groups.

From the results of our project we are able to conclude that the selection process starts much earlier than at the elite camp level for 15-year olds. Our material indicates that selection on the grounds of physical development is already at work in groups of 5-12 year olds, that its effects are clearly distinguishable by 13 year of age and that it continues ever more strongly at the club level until 16 years of age. It becomes even plainer at the level of the Football Association training camps and the national teams (from local zone camps to the youth national team). It is my opinion that this selection is counter-productive to develop all the football talent that exists within every yearly cohort of girls and boys. I also believe that it goes against the goals of both the sports movement and the community in general. These want to see as many individuals as possible active in sports for as long as possible, and that each person shall be able to develop according to the best of his or her ability.

(Translated by Tudor Barnard.)

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