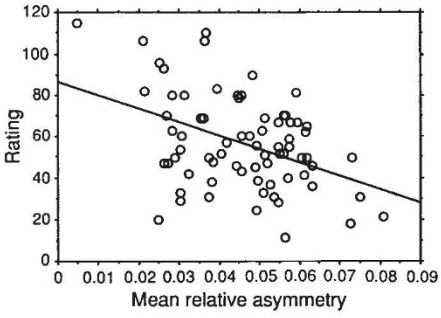

Relationship between the racing ability of 73 thoroughbred racehorses as measured by the ratings of the British Horseracing Board and overall mean FA per horse ($y = -653.49x + 86.87$, $r^2 = 0.18$, $r = 0.43$, $F = 15.75$, $P = 0.0002$).

and sire is the most reliable predictor of racing ability. Estimates of overall FA may provide an additional tool which could be used, with due correction for age, in the process of choosing future good performers on the track.

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Born too late to win?

SIR — Dudink reported[1] a skew in the distribution of birth dates of professional soccer players in England and Holland, suggesting that younger children in any age group participating in sporting activity may be disadvantaged. But from these data alone it is impossible to tell whether the sources of this bias are psychological in origin[2] or based on physical advantages.

To examine this question, I have collected birth dates and heights of county cricketers in the United Kingdom for the 1991 season[3]. Because the season starts in April, I analysed birth dates in six-month blocks (April–September and October–March). A birth-date effect was found for fast bowlers (57 early-year bowlers versus 36 late-year bowlers; $\chi^2(1)=4.30$, $P<0.05$) but not for spin bowlers (20 versus 17), batsmen (63 versus 64) or wicketkeepers (17 versus 18; in each case, $\chi^2(1)<1$, $P>0.05$). Because cognitive development is presumably equally advanced in all four categories of cricketers, it seems likely that physical rather than psychological factors may explain the uneven effect. However, as spin bowlers, batsmen and fast bowlers are significantly taller than the population mean of 1.78 m ($P<0.0001$ in each case), it is unlikely that height advantage alone can explain the birth-date effect in fast bowlers.

A closer analysis of the data concerning soccer players for the season 1990–91 (ref. 4) shows that the birth-date effect is true for goalkeepers, defenders, midfield players and forwards (at least $P<0.05$ in each case). But the average height of goalkeepers and defenders is significantly greater than that of the general population ($P<0.0001$ in each case); midfield players are significantly shorter ($P<0.0001$) and forwards conform to the average.

Thus, in cricket, only fast bowlers show a birth-date effect, even though spin bowlers and batsmen are also significantly taller than the average. In football, all categories of players show the birth-date effect, even though only goalkeepers and defenders are taller than average. Thus, height advantage alone cannot account for the birth-date effect in these sports. Because advantage in psychological development is presumably uniform across categories of players in the two sports, and because not all the categories of players show the birth-date effect, advantage in psychological development alone cannot account for the effect either. Thus, success in certain sports must be influenced by some other physical attribute, such as strength, or different sports may demand different combinations of psychological and physical attributes.

Whichever explanation is correct, these data suggest that one strategy to overcome the disadvantage conferred upon some individuals would be simply to encourage the appropriate individuals into the appropriate sports during childhood. Such a strategy might minimize the misery experienced by those forced to take part in inappropriate sports, while maximizing the chances of producing sporting excellence across a range of sports.

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■ Editor's note: J. Verhulst has written to point out that he published a paper reporting similar conclusions to ref. 1 in *Medical Hypotheses* **38**, 346–348; 1992.

SIR — Unfortunately, Dudink's concerns[1] about the influence of birth date on talent selection seem only too true. Young athletes in certain sports, whose birth dates fall during the early part of their sports selection year, are more likely to be identified as 'talented' than those born later[2,3]. This suggests that current talent identification is significantly influenced by a child's physical attributes rather than his or her sporting ability.

Our data come from a longitudinal study of the effects of intensive training on a child's psychological and physiological development[4] covering 1987 to 1992. In brief, 453 athletes aged 8–16 years (222 female athletes from gymnastics, swimming and tennis, and 231 male athletes from gymnastics, swimming, tennis and soccer) were drawn from a 300-mile radius of London. All athletes were 'élite' for their age according to criteria provided by each sport's governing body.

In most sports, 1 January is the start of the selection year. When we examined the distribution of birth dates of the athletes studied we found no differences between genders in any sport. But almost half the tennis players and swimmers were born within the first 3 months of the year, with a gradual decrease thereafter. Most soccer players were born in the last half of the year; this is the first half of this sport's selection year. As late physical development and sexual maturation appear to favour potential élite gymnasts[5], we were surprised to find a uniform distribution of birth dates throughout the year in this sport. (Detailed figures available from the authors on request.)

The relationship between date of birth and sporting success, particularly in sports where advanced physical development is advantageous, implies that the youngest children (biological and chronological) in any age grouping are at a considerable disadvantage. The fault lies in age-banded training and competition. If talent selection in sports such as tennis and soccer is indeed based on physical attributes, many talented individuals may be being overlooked simply because they are born late in the selection year.

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Scientific Correspondence

Scientific Correspondence is intended to provide a forum in which readers may raise points of a scientific character. Priority will be given to letters of fewer than 500 words and five references.