How it started
winners of elevator pitch 2020
Turning the relative age effect around
Karlijn van Harten, Leda Maffei and Sofía Serna

Have you ever thought about what would have happened if world-class striker Luis Suárez was born in December instead of January? This question might sound odd but maybe Luis Suárez would have never reached the elite level in soccer if this was the case. The same applies for other athletes, like the alpine skiers Beat Feuz or Daniel Yule, both born in February. Being born late in the year can lead to big changes regarding talent selection and sports performance. Studies have shown that elite athletes, including alpine skiers, are more likely to become successful in their sporting career if they are born during one of the first months of the selection year compared to athletes who are born later in the year (1).

Relative age effect
Competition categories in sports are often based on the chronological age of athletes. The cut-off date for these age categories in alpine skiing is the 1st of January, like in many other sports. The phenomenon mentioned in the introduction is defined as the relative age effect (RAE). The RAE is represented by a typical distribution over the age quarters, which shows an over representation of relatively older athletes, born in the first quarter of the year (2). The RAE has been extensively researched and demonstrated in many different sports (3). A study about the RAE in alpine skiing showed that participation at national final races for youth was almost 4.7 times more likely for children born in the first age quarter, than for children born in the last quarter. Besides, approximately 35% of the children placed in the top three positions were born in the first three months of the year and only 13% of these children were born in the last quarter of the year (1). These numbers show the presence of the RAE in the participation as well as in the performance of skiing. Other studies have also found the RAE at the national and the international level for both males and females (3,4). The existence of the RAE can be explained by the fact that multiple cognitive and physical characteristics, such as height, muscular strength, experience and social skills are more developed in athletes born in the first months of the year. Anthropometric characteristics and strength parameters are important determinants for performance in alpine skiing. Therefore, the relatively older, and possibly more matured athletes can have an advantage compared to relatively younger athletes. These maturational advantages can result in a favourable selection for relatively older athletes, who are born in the first few months of the year (3). However, differences in maturation are only partly caused by differences in chronological age (5). The biological age also influences the maturity status. Early maturing athletes, with an early growth spurt, have an advantage compared to average or late maturing athletes. This means that relatively younger athletes might be disadvantaged with their chronological age but they can counteract this with a lower age at peak height velocity. Accordingly, athletes from the first age quarter do not always experience the advantages of being relatively older since they might be late maturers. Talent selection programmes are often struggling to differentiate between maturation and talent (3). Commonly, relatively older and/or early maturing athletes are perceived to be more talented and the younger and/or late maturing athletes are more easily overlooked in the selection process (6).
the selection process (6). This problem in selection processes results in lower success rates and higher drop-out rates among younger and less mature athletes (3). Selection of young skiers in Switzerland is based on multiple criteria such as the FIS-ranking (International Skiing Federation), technical skills, psychological and physiological skills as well as the development potential. Although these criteria cover different aspects of performance, the RAE in alpine skiing is still present.

Differences in disciplines
According to the Groningen Sport Talent Model (7), a certain combination of environmental and person-related characteristics is necessary to reach a high level of performance in a sport-specific task, like skiing. The person-related characteristics can be divided into psychological, physiological, technical, tactical and anthropometric factors. In skiing, all disciplines require a high level of physical fitness. This includes aerobic capacity, muscular strength in the lower limbs and neuromuscular skills like speed, balance and agility. Anthropometric characteristics, skiing technique and multiple psychological qualities, such as motivation and concentration, might also affect the level of performance in young athletes (2). However, not all disciplines require the same characteristics to reach the highest level (1). This also implies that the magnitude of the RAE in different disciplines can vary, since some characteristics depend more on maturational development than others (8). For example, Slalom and Giant Slalom require a higher amount of technical skills and coordination. Therefore, the performance on these disciplines might be less influenced by maturational development. On the other hand, the two other disciplines, SuperG and Downhill, are less technical and for instance more demanding in terms of anthropometric characteristics. Thus, performance in these less technical disciplines might depend more on maturational development and a larger RAE has been found (8).

Possible solutions given in scientific papers
Multiple solutions to minimize the RAE have been described by sport scientists like Steidl-Müller and colleagues in multiple of their articles. The most suitable solution for the RAE problem in alpine skiing appears to be the change of classification in the competition categories based on a rotating cut-off date. This model was first introduced in ice hockey in Canada and presented by Hurley (9) as the “Relative age fair cycle system” (4,6,9). Fundamentally, this system would change the cut off-date by three months every year. During the eight years of development, each participant in alpine skiing would therefore have the opportunity to run through the age quarter twice and consequently have the same age advantages (4). This concept was evaluated by experts in the field, such as coaches and talent schools before it could be applied into practice. The general opinion was positive and the concept was evaluated as a good tool for fairer talent selection processes. Advantages of this system would be increased fairness and a balanced classification. This could lead to an increase in motivation due to higher success rates and consequently result in a lower drop-out rate. As a result, the RAE would be reduced and variety in competition categories increased (4,6,10). Nevertheless, some disadvantages of this system are worth mentioning as they mostly concern the implementation of the rotating cut-off date. In fact, the application of such a concept would require the international support of the FIS. Moreover, experts in the skiing field are concerned that changing this system is complicated and very difficult to organize. An easier implementation would be applying the concept of the rotating cut-off date in the competition groups who do not compete at an international level (4).
However, this solution does not appear to be the most appropriate, especially because the rotating cut-off date system seems to forget the biological maturation level of the athletes. Therefore, it could be argued that the same RAE problems present now in the skiing context would arise. In fact, early matured athletes would still have advantages in terms of physical characteristics over the other athletes (11). Because of the disadvantages stated above, the authors of this applied scientific paper decided to interview a person of the target population to discuss another possible and more feasible solution to reduce the RAE problem in alpine skiing. Brian Kreuzer, trainer of one of the U16 teams of alpine skiing in Switzerland, was interviewed. During the interview, the authors and the trainer agreed that rotating the cut-off date seemed a good concept at first but after a more detailed analysis, the practicability decreased. Together with trainer Kreuzer, it was agreed upon that introducing and familiarizing the RAE problem to the target population during trainer educational courses or through webinars would be more feasible. This could be implemented easily without big expenses. By all means, everybody involved in talent selection processes should be aware of the problem and consequences of the RAE. Coaches and trainers should consider all the different aspects of the selection processes and should not be deceived by maturational advantages of the athletes (4). By raising awareness of trainers and coaches who are responsible for the selection of athletes, the trainers’ evaluations could become more influential in selection processes.

Product
Taken into consideration that the RAE is a big problem in alpine skiing, the researchers Leda Maffei, Karlijn van Harten and Sofía Serna have designed a new product introducing a possible solution to reduce the RAE problem. The product consists of a short informative video that has been created to reach the maximum number of trainers and coaches. As stated above, an effective way to introduce the RAE problem to the target population would be the inclusion of this video in webinars and educational and trainer courses (see figure 1). The video itself explains the scientific background behind the RAE and the problem caused in selection processes concerning alpine skiing. For 5 minutes, the viewers will be guided through the video by pictures and text that emphasize the scientific background. Also, the video will be sustained by interviews made to experts in the field such as Brian Kreuzer. Experts like him will give an insight into the RAE problem in alpine skiing by talking about how important the awareness of the RAE is or how do they think the problem can be solved, amongst other topics.

Figure 1. Schema of how the product will reach the target population
Until now, selection processes have not experienced any changes over the years. Even though this video may not elicit any changes in selection processes yet, the video aims to open a debate regarding some changes needed in these selection processes. Furthermore, the valuable information explained in the video could also be used by other sports federations and committees, since the RAE problem is also present in other sports. In pursuance of bridging the gap between science and practice, the main idea is to show the video in as many webinars and educational courses as possible. Therefore, the aim of the video is taking the first step to warn the target population about the actual problems in alpine skiing concerning selection processes. All in all, every small step can lead to positive changes in order to make selection processes more fair. Even though there is scientific literature concerning RAE in skiing, an informative video looks like a more accessible way to reach the desired audience.

In conclusion, with the diffusion of the informative video, the expectations are twofold. Firstly, it is expected that the awareness of the RAE problem in alpine skiing increases. Secondly, selection processes will be less biased, resulting in equal opportunities for young talents, regardless of their birth month and developmental maturation (1). Additional innovative ideas will be more than welcome in the field, as they could be helpful for further practical applications.

References