Talent loss in professional football by relative age: an analysis of the national teams in the FIFA World Cup 2026

Héctor García-Rodicio, [1] **Gonzalo Silió** [2]

[1]Deparment of Education, Universidad de Cantabria, Santander, Spain
[2]Developmental Football, Real Racing Club, Santander, Spain

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Headline

Relative age effects (RAE) refer to the consequences of having been born in the first versus the second semester within the same year (S1, S2) and are relevant for talent identification and development in sport. The consequences operate in short- and long-term. A short-term consequence is that, because children and adolescents born in S1 are relatively older than their S2 peers, they tend to exhibit more athleticism: they are bigger, stronger, faster, fitter, and more coordinated (Peña et al., 2025). A long-term consequence is that, because of the higher athleticism they exhibit early, there is an increased likelihood of being selected by their coaches, thus having more opportunities to practice and improve, and eventually becoming an elite, professional athlete (Morganti et al., 2022).

These RAE are well documented across all sports, including football (Yagüe et al., 2018). In fact, there is an overrepresentation of S1 players even in the senior teams of the main football leagues. For instance, the percentage of S1 players in La Liga, Ligue 1, or Bundesliga are 71, 55, and 57, respectively (Yagüe et al., 2018). The S1:S2 ratio is calculated as an index of this overrepresentation. Positive ratios (>1.00) indicate a bias towars S1 players, negative ratios (<1.00) indicate the opposite, and neutral ratios (1.00) indicate no bias. The S1:S2 ratio in the top-five european football leagues is 1.44 on average, thus indicating an overrepresentation of S1 players.

An implication of RAE is that many potentially talented players can and do become overshadowed by their relatively older, more athletic peers and lose opportunities to practice and improve. For these overlooked players, this eventually results in dropping out from football or having to play in minor leagues (Brustio et al., 2024).

RAE can be a problem for elite football clubs in two ways: what we call the *developmental bias* and the *marketing bias*. The developmental bias means that, if the clubs do not apply any correction to RAE in their academies, they could be wasting resources in developing players that seem to be talented today but may be just relatively older and more athletic. The marketing bias means that, when having to recruit players for their first teams, if their scouting systems are not exhaustive enough, clubs could be selecting players from a very constrained pool: the one formed only by those players who managed to play in the main major leagues. However, this would leave less appealing but equally talented players off the selection, simply because they are not playing in the major leagues.

So, in the end, RAE is a question of return of investment. If RAE are not taken into account and corrected in some way in their academies, elite clubs are at risk of investing in the "wrong" players (developmental bias). If RAE are not taken into account and corrected in some way in their scouting systems, elite clubs are at risk of recruiting the most appealing -but more expensive and not necessarily most talented- players of the main leagues in the world and leaving off the selection process those less appealing but equally talented -and cheaper- players that now play in marginal leagues (marketing bias).

Aim

To examine the proportion of players from S1 and S2 in the national teams playing in the current FIFA World Cup 2026 and to calculate the S1:S2 ratio. Then, to quantify how many teams have a positive, negative, and neutral ratio. Then, in the teams with a negative ratio, to identify in what professional league their players born in S2 are playing. Ultimately, these calculations would demonstrate that (a) there is a bias towards players born in S1 even at a senior World Cup level, (b) teams with a negative S1:S2 ratio are a minority, (c) most of the S2 players in these teams play in marginal leagues, and (d) there are players talented enough to play in a World Cup but who exist outside of the conventional outlets. Findings (a) and (b) would be consistent with the developmental bias hypothesis, whereas findings (c) and (d) would be consistent with the marketing bias hypothesis.

Methods

We downloaded the complete list of players in the FIFA World Cup 2026, including their first and second names, their dates of birth, and their current clubs, from the FIFA website (see `https://fdp.fifa.org/assetspublic/ce281/pdf/SquadLists-English.pdf`). Then we calculate the number of S1 and S2 players in each squad and the S1:S2 ratio. From the squads having a negative ratio and which are still competing after the group stage, we identified in what leagues S2 players are playing. We distinguished between top (La Liga, Ligue 1, Bundesliga, Premier League, Serie A) and secondary leagues (any other league). We calculated the percentage of S2 players playing at each of those two levels.

Results

The average S1:S2 ratio for the whole sample of 48 squads was 1.39, which means that S1 players are 39% more likely to be selected at a World Cup level than S2 players. Table 1 shows the squads out of 48 with positive, neutral, and negative ratios: 32 (66.6%), 2 (4.2%), and 14 (29.2%), respectively. Table 2 includes the six squads with negative ratio that are still competing after the group stage. Table 2 shows the number and percentage of S2 players in those squads that are playing in either top or secondary professional leagues. On average, 41.4% of those S2 players play in secondary leagues.

Table 1. Players born in S1 and S2 by squad and S1:S2 ratios

Squad	S1	S2	S1:S2 ratio
Egypt	21	5	4,200
Jordan	19	7	2,714
Croatia	18	8	2,250
Senegal	18	8	2,250
Netherlands	18	8	2,250
Germany	18	8	2,250
Panama	18	8	2,250
Algeria	18	8	2,250
Paraguay	17	9	1,889
Czechia	17	9	1,889
Austria	17	9	1,889
Argentina	17	9	1,889
Cabo Verde	17	9	1,889
Uzbekistan	16	10	1,600
Tunisia	16	10	1,600
Mexico	16	10	1,600
Spain	15	11	1,364
Bosnia And Herzgv	15	11	1,364
Ecuador	15	11	1,364
Belgium	15	11	1,364
Türkiye	15	11	1,364
France	15	11	1,364
Colombia	14	12	1,167
New Zealand	14	12	1,167
South Africa	14	12	1,167
USA	14	12	1,167
Haiti	14	12	1,167
Iraq	14	12	1,167
England	14	12	1,167
Sweden	14	12	1,167
Uruguay	14	12	1,167
Morocco	14	12	1,167
Portugal	13	13	1,000
Canada	13	13	1,000
Brazil	12	14	0,857
Côte D'Ivoire	12	14	0,857
Australia	12	14	0,857
Ghana	12	14	0,857
Norway	12	14	0,857
Japan	11	15	0,733
Curaçao	11	15	0,733
Switzerland	11	15	0,733
Congo DR	11	15	0,733
Scotland	11	15	0,733
Qatar	10	16	0,625
IR Iran	10	16	0,625
Korea Republic	9	17	0,529
Saudi Arabia	9	17	0,529

Table 2. Negative S1:S2 ratio squads with S2 players at top or secondary leagues

Squad	Players in a top league	Percentage	Players in a secondary league	Percentage
Australia	5	35.7	9	64.3
Côte D'Ivoire	7	50.0	7	50.0
Ghana	7	50.0	7	50.0
Brazil	8	57.1	6	42.9
Congo DR	9	60.0	6	40.0
Norway	10	71.4	4	28.6
Switzerland	12	85.7	2	14.3

Discussion and conclusion

We hypothesized a developmental bias, by which S1 players playing at youth levels, given their more developed athletic abilities, would have more opportunities to practice and improve, thus achieving a professional position in the main major leagues more easily than S2 players. Prior studies indeed found an overrepresentation of S1 even at the senior level in top european football leagues (Yagüe et al., 2018). Here we found confirmation of the developmental bias by analyzing the composition of the national squads playing in the FIFA World Cup 2026. Specifically, the S1:S2 ratio was 1.39 on average, meaning that players born in S1 have 39% more probabilities of integrating those squads than S2 players. Moreover, only 29.2% of the national squads presented a negative S1:S2 ratio, meaning that most of the squads in the World Cup present a bias towards S1 players.

Also, we hypothesized a marketing bias, by which S2 players have more difficulty to play in top leagues than S1 players, because they are less visible yet equally talented. By analyzing the level at which S2 players from the squads with negative S1:S2 ratio are currently playing, we partially confirmed the marketing bias hypothesis. Only 59.6% of these S2 players are currently competing at the top european football leagues, namely, La Liga, Ligue 1, Bundesliga, Premier League, and Serie A. This means that almost half of the S2 players, who have a performance level high enough to compete at a world-class tournament, they nevertheless play in clubs and leagues that are not so prestigious.

One possible explanation of why these "underdog" players finally reach an elite level is because World Cups require national teams to build their squads based on nationality. Such criteria imposes the need to search for players far beyond the top-five european leagues. As a result, high-performance but less appealing players can emerge.

In conclusion, relative age have two effects. Firstly, it provides S1 players with more athleticism in the early years, which makes coaches select them and make them practice and develop; eventually, this results in an easier transition to the senior elite level. The present study has shown that S1 players have 39% more probabilities to play in the World Cup than S2 players. Secondly, once players play in the world-class leagues, they become more visible, which in turn increases the likelihood of being selected for the national team. Here we have found that only 29.2% of the national squads have a majority of S2 players, with an overrepresentation of S1 players being predominant across squads. However, there are also high-performance players beyond the major leagues that can be identified when there is a need to fulfill the nationality criteria.

Practical implications

- The academies of elite clubs would benefit from establishing the relative age of their developing players and apply some form of bio-banding (Han et al., 2026). Otherwise, they could be investing in developing the "wrong" players.
- Scouting systems for the first team of elite clubs would benefit from expanding the search as much as possible. Otherwise, talented players, who are now playing in clubs and leagues below their true potential, could be overlooked.

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