

This article was downloaded by: [University of Helsinki]

On: 28 November 2014, At: 00:11

Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



European Journal of Sport Science

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/tejs20>

Selection, de-selection and progression in German football talent promotion

Arne Güllich^a

^a Department of Sport Science, University of Kaiserslautern, Kaiserslautern, Germany

Published online: 19 Nov 2013.

To cite this article: Arne Güllich (2014) Selection, de-selection and progression in German football talent promotion, European Journal of Sport Science, 14:6, 530-537, DOI: [10.1080/17461391.2013.858371](https://doi.org/10.1080/17461391.2013.858371)

To link to this article: <http://dx.doi.org/10.1080/17461391.2013.858371>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

ORIGINAL ARTICLE

Selection, de-selection and progression in German football talent promotion

ARNE GÜLLICH

Department of Sport Science, University of Kaiserslautern, Kaiserslautern, Germany

Abstract

This study explored to which extent the development of German professional football players is based on early talent identification (TID) and long-term nurture in talent promotion (TP) programmes or on their emergence in the course of repeated procedures of player selection and de-selection in these programmes through childhood and youth. The annual turnover of squad members in national junior teams (2001–2013) and youth elite academies was calculated; national U-team members were followed up with regard to nominations through subsequent seasons and to their success level eventually achieved at senior age; and all current Bundesliga players were analysed retrospectively regarding their earlier involvement in TID/TP programmes. Analyses revealed that the mean annual turnover of squad members was 24.5% (youth academies) and 41.0% (national U-teams), respectively. At any age, the probability of persisting in the programme three years later was <50%. Among current Bundesliga players, the age of recruitment into the TID/TP programme was widely evenly distributed across childhood and youth, respectively. Accordingly, the number of (future) Bundesliga players who were involved in TID/TP was built up continuously through all age categories. The observations suggest that the collective of professional players emerged from repeated procedures of selection and de-selection through childhood and youth rather than from early selection and long-term continuous nurture in TID/TP programmes. The findings are discussed with regard to the uncertainty of TID and of interventions applied to the selected players, and they are related to the individualistic and collectivistic approach in TP.

Keywords: *Football, elite, talent identification, talent development, youth academy, national team*

Introduction

Talent identification (TID) and talent promotion (TP) in football is an issue that keeps attracting practitioners' and scholars' attention alike. Many clubs and associations go to considerable lengths to operate organised TID/TP programmes. The central idea is to identify and select the most promising young talents (TID) and involve them in a programme that facilitates their long-term performance progress (TP) and leads to an increased (later) probability of becoming a successful professional senior player. The German football association [Deutscher Fußball-Bund (DFB)] together with the association of professional clubs (DFL) launched a common concept in 2001 in which they agreed to expand their TID/TP programme and structure it in two stages (DFB, 2009):

- 'Elite promotion' includes the association's national junior teams (under-age teams U15, U16, etc.) and the clubs' youth elite academies. DFB extended their full-time coaches from 60 to 100 (Schott, 2010) and also enlarged their staff for individual athletic training, medical and scientific support for the representative U15 to U21 players. There are currently 49 youth academies accredited by DFB and DFL, including the 36 clubs playing in the first and second Bundesliga and some additional clubs from lower leagues. Prescriptions for accreditation include infrastructural conditions, cooperation with schools, medical, paramedical and scientific staff and full-time coaches. From 2001 to 2011, these clubs increased their full-time youth coaches from 50 to 271 within a total of 650 coaches currently training 7896 footballers in 414 junior teams U10 to U19 (Schott, 2010).
- The 'talent promotion' stage involves 29 full-time coordinators and ~1000 part-time

coaches who scout ~600,000 young footballers annually and select ~14,000 players aged 11–14 years who are considered talented but have not been selected into a youth academy. These are involved in one weekly session provided in addition to their club practices at 366 bases nationwide (Schott, 2010).

The primary objective is to reinforce professional clubs' future senior teams (club's academies) and the senior Germany team (DFB) through the promotion of player development at young ages. From a theoretical perspective, this concept can be assigned to an individualistic approach as opposed to a collectivistic approach (Güllich & Emrich, 2012):

1. The *individualistic* approach: The interventions applied to the selected players at the individual athlete level in a continuous nurturing process expedite their individual long-term performance progress, which leads to an increased eventual senior performance and increased probability for these players to reinforce a professional team.
2. The *collectivistic* approach: The collective of successful professional senior players emerges through recurrent procedures of selection and de-selection of players in the TP programme across all age periods through childhood and youth. This implies repeated replacements of current players with new players who have previously been educated outside this TP programme and who are deemed greater potential by this time.

It is important to note that in the individualistic approach it is expected that the successful senior players will come exactly from the ranks of the footballers involved in TP since an early age. In the collectivistic approach, it is, instead, essentially irrelevant exactly who will become the players in the senior teams. This is significant in so far as the interventions of the TP programme can only be applied to future high performers who are already involved in the programme during early stages of their career, but not to future high performers who remain unspotted at a young age.

The clubs' and association's programmes start within childhood (youth academies) or youth (national U-teams) which indicates that they purpose to select talents already at a young age in order to enable a long period of nurture until the expected senior high-performance age (Güllich & Emrich, 2012). DFB (2009, p. 2, 11) states that the 'systematic screening and promotion of the talents starts not just during older age categories, but with a variable and playful training process already of our youngest

players' and 'promotion of each individual child and youth player must be priority through all stages of the training process' (translation by the author). The concept is clearly driven by an individualistic approach. On the other hand, the squads are nominated annually within each age category in both programmes, which goes along with de-selection of some members and their replacement with new 'side-enterers'.

Problem-related research has indicated that the collectivistic approach may play a significant role. First, studies consistently demonstrate that early TID in football is fraught with considerable uncertainty due to the confluence of a number of characteristics (e.g. Unnithan, White, Georgiou, Iga, & Drust, 2012; Williams & Reilly, 2000). Footballers with different compositions of qualities (physical, physiological attributes, technical and tactical skills) can excel, and performance factors are mutually compensable. In addition, the future development of these qualities is difficult to predict because they are highly amenable to practice and training, and they may also be biased within an age category by inter-individual differences in players' relative age, biological maturation and rate of physical growth (e.g. Helsen, Van Winckel, & Williams, 2005; Malina, 2003). These characteristics are combined with great strength in depth of competition in football due to massive youth participation. Second, an empirical demonstration of positive effects of the interventions applied to the selected players on their long-term performance development is still pending in football. A number of longitudinal studies comparing the development of members in TID/TP programmes and non-members at the individual level in other sports failed, however, to demonstrate according consistent effects (Güllich & Emrich, 2012, for a review). Third, longitudinal observations of TID/TP programmes at the collective level revealed considerable fluctuation of the members with the annual turnover ranging up to 40 or 60% in some studies (Güllich & Emrich, 2012). Thereby, the higher the success level reached, the later the recruitment age. One study conducted in football by Anderson and Miller (2011) showed consistent findings. They examined 1228 players holding full-time academy contracts at 16–18 years in 23 Premier League clubs over 15 seasons. Some 38.8% made a Premier League appearance in their club subsequently, 46.4% of these playing ≤ 10 matches. Over these 15 seasons, about 90% of all Premier League debutants had not been involved in an academy. Data on earlier TID/TP were, however, not available in that study.

In view of the state of research, the empirical research question arises to which extent the German football TID/TP programme exhibits correspondence

to the individualistic or the collectivistic approach. Respective research in football is lacking to date. This study addresses an empirical exploration with a focus on the 'elite promotion' stage.

The above said leads to the following empirical expectations; assuming that the selected footballers are those with the greatest potential for future success and the programme expedites their performance progress effectively (*individualistic* approach), it is expected that they enlarge their lead in performance over time compared to non-selected players. Under this hypothesis, it is expected that most of the players selected at a young age remain in the programme for long periods, the composition of the squad members is very stable over time, replacements with non-members and side-entries at later ages are infrequent and consequently successful senior players were already involved in TP at very early age periods. According to the *collectivistic* approach it is, instead, expected that many initially selected players are de-selected and replaced by frequent 'side-enterers' in the course of subsequent seasons, there is considerable turnover among the members across all age categories, and the distribution of successful senior players' entry age is either widely even across childhood and youth age or skewed towards the older ages.

Methods

Study design

The study was composed by three steps of analysis. At the collective level, (1) the annual frequencies of new admissions, de-selections and side-entries were calculated. At the individual player level, (2) selected players were followed up through subsequent seasons with regard to the persistence of their membership and to the success level eventually attained at a senior age. (3) Current professional senior players were analysed retrospectively with regard to their earlier involvement in the TP programme through childhood and youth.

Samples

The study is based on three data sets:

1. All players who played in the national U15 team in 2006–2013 ($n = 189$) and in a U16 to U19 team in 2001–2013 ($n = 870$; total $n = 1059$) were retrieved from the official DFB squad directory (U15 squad files from 2001 to 2005 were not available) and followed up in longitudinal design through subsequent seasons. These included a total of 3075 season-to-season transitions of the squad

status. The recording period included all age categories from U15 through to U19 for $n = 273$ players. The senior success level eventually reached until age 24 years was analysed for birth years 1986–89 (birth year 1986 until season 2009/2010, birth year 1989 until 2012/2013; $n = 283$); this age range included the maximal number of cases with data for membership in U16 to U19 national teams and the age of making their debut in first Bundesliga of 89% of all players in this league and in the second Bundesliga for 88% (according to data set 3 as described below).

2. Complete data of the annual squads of the youth elite academies in the various age categories were not available from recent seasons. However, 13 youth academies have not only published their current players in each age category, but also indicated when each player had entered this club ($n = 1420$). These data allowed the calculation how many players had entered one of these youth academies in which season at which age. Underlying the assumption that the total number of these clubs' players in an age category was stable from season to season (for example, 11 players in U10, 18 in U14 and 23 players in U19), these data allowed for the calculation of the annual turnover of members from U10 to U19. Although we are aware that this assumption may imply a slight error because there may be minor season-to-season variation of one or two players in a team, we considered the assumption acceptable for an estimation of the player fluctuation at the collective level of 1420 cases from 13 youth elite academies.
3. All German players who played in the first or second Bundesliga during the last three seasons 2009/2010 to 2011/2012 (cut-off dates 1 July 2009 and 30 June 2012; first Bundesliga $n = 385$; second Bundesliga $n = 239$; total $n = 624$) were traced back with regard to their earlier involvement in the TP programme.

It is important to note that the number of places in youth academies and national U-teams is almost evenly distributed over the various age categories (DFB, 2010) and does – unlike many other TID/TP systems – not have the typical 'pyramidal' structure.

Data collection

All data used in this study are in the public domain. The athlete's date of birth and squad memberships in a youth elite academy, national U-team or a Bundesliga team were recorded from the squad directories of the Bundesliga clubs and DFB.

Current professional players' earlier involvement and their recruitment age in youth academies were retrieved from two online sources, namely the players' profiles in the databases on www.transfermarkt.de and www.wikipedia.de. These data were highly consistent ($r_{tt} = 0.99$). In cases of missing data in one of these sources ($n = 48$), we considered the player's personal homepage and/or his club's homepage.

Statistical analyses

Analyses were performed using SPSS 21.0. Descriptive data calculated for the samples included frequency distribution, mean value and standard deviation ($M \pm SD$). The annual turnover of squad members was calculated for each respective season according to Güllich and Emrich (2012) as:

$$\frac{(\text{number of entering players} + \text{number of leaving players})/2}{\text{total number of squad members}}$$

Results

The mean turnover rate across all players in the youth elite academies' U10 to U19 squads was 24.5% annually (transition U10/11: 17.2%; U11/12: 27.4%; U12/13: 18.1%; U13/14: 23.5%; U14/15: 26.1%; U15/16: 32.6%; U16/17: 18.2%; U17/18: 31.7%; U18/19: 33.0% annually).

Among all national U-team players observed from U15 to U19, 44.3% played in a U-team in only one season, 23.4% in two, 15.0% in three, 11.4% for four seasons and only 5.9% played in national U-teams continuously over the five age categories. The mean annual turnover of members was 41.0% in the total population of national U-teams (U15/16: 49.8%; U16/17: 34.8%; U17/18: 46.0%; U18/19: 37.7% annually). The according proportions of members in youth elite academies and national U-teams at each respective age who remained members in the subsequent seasons are shown in Table I. Irrespective of the age category, the probability of *not* being in the programme anymore three years later was >50% and after five years >70%.

Figure 1 displays the proportions of squad members in national U-teams who attained playing in the first or second Bundesliga or below subsequently. Roughly every fourth junior representative player achieved playing in either of the first (26.9%) or the second Bundesliga (22.3%), respectively. This rate strongly depended on the age at which the athletes were first nominated: The younger their debut in a representative U-team, the lower was their probability to reach the first Bundesliga and the more likely were they to play below the second Bundesliga at a senior age. Conversely, the older they made their debut in a national U-team, the

Table I. Proportions (in %) of the members in Youth Elite Academies and National Junior Teams in defined age categories who remained members in the programmes during the subsequent years

	Transition to age category								
	U11	U12	U13	U14	U15	U16	U17	U18	U19
<i>Youth elite academies</i>									
U10	82.8	60.1	49.2	37.6	27.8	18.7	15.3	10.5	7.0
U11		72.6	59.4	45.5	33.6	22.6	18.5	12.6	8.5
U12			81.8	62.6	46.3	31.2	25.5	17.4	11.7
U13				76.5	56.5	38.1	31.2	21.3	14.3
U14					73.9	49.8	40.7	27.8	18.6
U15						67.4	55.1	37.6	25.2
U16							81.8	55.8	37.4
U17								68.3	45.8
U18									67.0
<i>National junior teams</i>									
U15						68.6	54.2	38.6	35.6
U16							62.9	43.6	37.7
U17								59.1	49.8
U18									59.6

Note: Percentage figures are row-wise and refer to all players having played in the respective age category indicated in the pre-column. The data for the National Junior teams (bottom) include 64 cases who displayed interruptions in their squad career, i.e. who played in a national team before and after one or two years without a nomination [interruptions U16: $n = 4$; U16 and U17 $n = 2$ (2% and 1% of all U15 players), U17 $n = 19$, U17 and U18 $n = 11$ (4% and 2% of all U16 players), U18 $n = 28$ (4% of all U17 players)].

more likely were they to play in the first Bundesliga later and the lower was their probability to play below the second Bundesliga.

Some 88.7% of all current Bundesliga players had been involved in a youth elite academy for at least one season until age category U19 (first Bundesliga 87.9%; second Bundesliga 91.3%), and 30.6% played at least one match in a national U-team (first Bundesliga 35.6%; second Bundesliga 22.7%). Figure 2 presents the distribution of the first and second Bundesliga players' age of first entering a youth academy or a U-team. It also illustrates the accumulation of professional players who have been involved in these programmes with growing age. The recruitment age is widely evenly distributed across all juvenile age categories in both programmes. Only a minority of the current Bundesliga players were already involved in these programmes during the earlier age categories. Accordingly, the number of professional players who were involved in a youth academy and/or national U-team is built up gradually across all age categories through childhood and youth age.

The players of the second Bundesliga were recruited into a youth elite academy at 13.6 ± 3.9 years and those of first Bundesliga at 14.3 ± 3.8 years. Among players of the second Bundesliga who were involved in a national representative team

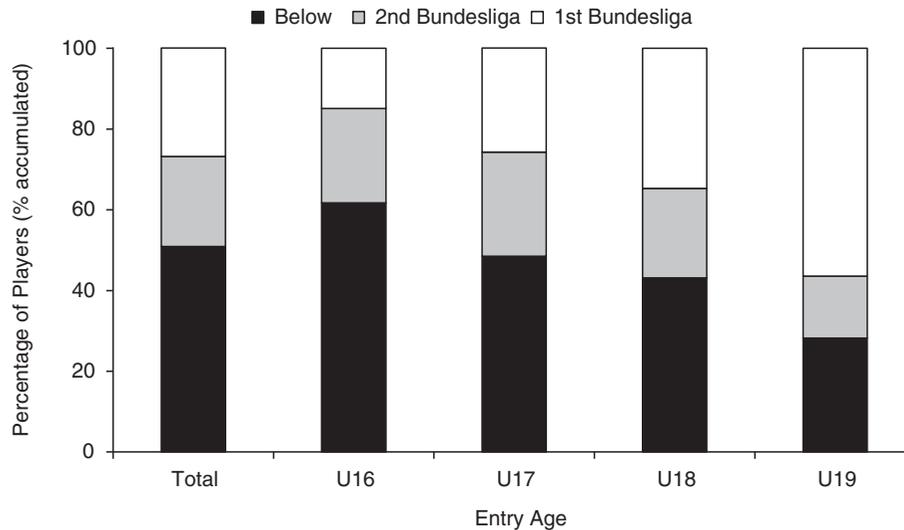


Figure 1. Highest senior league attained until age 24 years among national junior team players making their debut (entry age) at different ages. The category 'below' includes seven players who had retired before age 24 years.

($n = 75$), their age of debut in a U-team was 18.0 ± 1.7 years while it was 19.1 ± 2.3 years among the first Bundesliga professionals ($n = 273$). Among the players of the second Bundesliga with appearance in a national team 76.4% debuted until U19; this proportion was 52.7% among the first Bundesliga footballers, and extracting those who attained playing in the senior Germany team ($n = 81$), only a minority of 48.2% made their debut until U19.

Discussion

The central finding of this study is that the TID/TP system in German football is characterised by sizeable annual turnover of its members at all stages. This does not imply that the long-term involvement in the TP programme was not possible or did not occur; however, most young players selected at a particularly early age were replaced within short time by others who had developed more prosperously outside the youth academies and national U-teams. Most young members did not reach adolescence within the programme, let alone become professional senior players. At the same time, despite massive expansion of the programme most professional senior players were not involved in TP at a particularly young age. Combining these observations leads to the conclusion that the collective of successful senior players clearly emerges from frequently repeated procedures of selection and de-selection across all age stages (*collectivistic* approach) rather than from early TID and selection and a long-term continuous nurturing process within the TP programme (*individualistic* approach). That is, potential individualistic effects are 'overwritten' by collectivistic effects.

We are not aware of published analyses of this kind in football TID/TP to date. The findings are, however, consistent with those of Anderson and Miller (2011) from Premier League academies and with observations from various other sports (Güllich & Emrich, 2012). They may reflect imperfection either in TID or in TP or both. The difficulty for an individualistic approach lies in the confluence of (1) the 'problem' of massive youth participation in football with (2) uncertain assessment of a player's long-term performance potential and (3) uncertain superiority of effects of interventions applied to the selected players compared to their non-selected peers.

The TID/TP programme involves sizeable numbers of players, but these are still very few compared to the total number of young organised footballers (1). For example, the players nominated for the national U-teams amount to 0.06% of all registered players within the respective age categories. The places in the youth academies correspond to 0.3–0.8% of all German players in the respective age categories, but the 'talent pool' the clubs recruit from is globalised since the 'Bosman Ruling' of 1995 (e.g. Littlewood, Mullen, & Richardson, 2011). This was also followed by the ensuing explosion of professional players' salaries (e.g. Deloitte, 2012) and presumably stimulated more young footballers within Germany and worldwide to invest higher efforts in their aspiration to attain a professional football career. Youth academies have subsequently been built up not only across Europe but worldwide, aiming to condition young footballers to attain playing in clubs of the 'big' European professional leagues (e.g. Darby, Akindes, & Kirwin, 2007; Walters & Rossi, 2009). That is, the competition

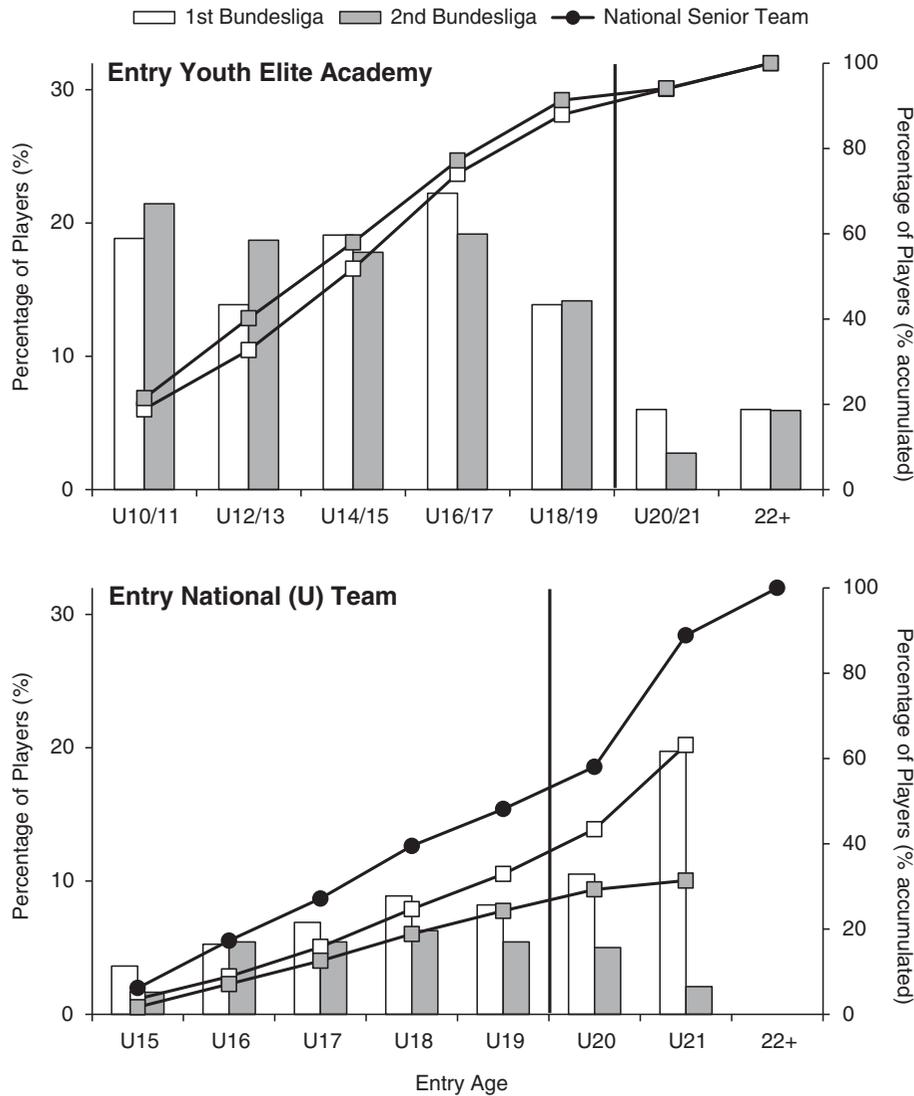


Figure 2. Age of first entry into a Youth Elite Academy (top) and a National representative Junior or Senior Team (bottom) among current players of the first and second Bundesliga. The bars represent the frequency distribution of the age of first entry into the respective programme (left ordinate). The lines represent the accumulated proportion of players having been involved in the programme until the respective age (right ordinate). The black circles in the bottom figure plot the extracted figures from players who have played in the National Senior Team. In the top figure two age categories are pooled, respectively, for clarity. The dashed vertical lines mark the end of the junior age category.

for the places in the youth academies – including Germany – has intensified and is principally global.

Attempting to substantiate the early identification of the most promising players (2), empirical research has identified relevant multidisciplinary selection criteria through group comparisons in follow-up and prospective design (e.g. Gonaus & Müller, 2012; Hirose, 2011; Hulse, 2010; Le Gall, Carling, Williams, & Reilly, 2010; Van Yperen, 2009). Coaches report to actually base TID on multidimensional concepts (Christensen, 2009). In addition, objectivised techniques in terms of multidimensional testing schemes have been proposed (e.g. Reilly, Williams, Nevill, & Franks, 2000; Vaeyens et al., 2006; Williams & Reilly, 2000). In practice,

however, the expectation according to the individualistic approach is that the (ascribed) performance potential together with the interventions applied to the selected players ensure that they continue remaining the most promising players through subsequent years not only in lead of selected samples of opponents but among *all* competitors – i.e. ~120,000–160,000 footballers in an age year within Germany plus, in the case of the youth academies, an unknown number of worldwide competitors. In particular within the top margin of the scope (for example, the top 2% include as many as ~2400–3600 players in an age year only within Germany) there are presumably only minimal – if any measurable – differences in early indicators of future long-

term performance potential, and they may not be distinguishable with procedures currently available. That is, the expectation described above is very unlikely from the outset. Consequently, the insufficient discriminative power of available tests and of the integrative ‘coach’s eye’ need not be regarded as their flaw; rather, an accurate early distinction of future high potentials from their peers may simply not be possible in German football.

Regarding the *interventions* applied to the selected players (3), the question is not whether these interventions exert an effect on their performance progress, but whether they are *superior* in promoting performance development compared to non-selected players in many other clubs. Respective comparative longitudinal research is still lacking in football. However, in many other sports such differential effects of various athlete-related interventions could not be corroborated empirically over multiple years (Güllich & Emrich, 2012). It also warrants consideration that football is a sport with low ‘asset specificity’ (i.e. little specific geographic and/or technical requirements; Flatau & Emrich, 2011). In sports with high ‘asset specificity’ (e.g. ski-jump, track cycling, platform diving) developmental prospects may be particularly favourable for athletes selected into centralised organisations that provide such requirements widely exclusively. In contrast, football can be played and practised in any club (and beyond, cf. Salmela & Moraes, 2003), and the difference in beneficial conditions for performance development between the selected players in the TP programme and those in many other clubs may be relatively small.

In conclusion, in view of uncertain early identification of future high potentials as well as uncertain effects of interventions applied to selected players, the mass of total players and the plurality of different combinations of types of players, practice regimens, coaches, teams and social environments are obviously superior in yielding cases with particularly prosperous matching of these factors (for example, the current players of the 36 clubs of the first and second Bundesliga were educated in as many as 895 other clubs before).

The German TID/TP system in football has reacted by recruiting great numbers of players at each age and ‘trying them out’; those who prove themselves in the programme are retained, the others are released and replaced by new players. That is, it turns out as a selection programme rather than a promotion programme, whereas most talents are identified a posteriori rather than a priori. The programme is systematically expanded in terms of scouted players, places in the programme and in particular by enlarging the number of players tried out per place and time period. For example, the

documented annual turnover enables the use of 175 available places in national U-teams for testing ~460 players in the course of three years and ~740 players in six years. It also enables using ~7900 available places in youth elite academies for trying out ~15,000 young players in three years and ~22,300 players in six years. This strategy may be functional in terms of (1) raising the chance of including future high performers and thereby (2) minimising the frequency of successful senior players developing outside this system. This is functional to the TID/TP system in so far as successful players developing outside the programme are antithetical to the internal and external confidence in the programme’s effectiveness and thus compromise the basis of its legitimisation.

Yet, overall, the present findings need not necessarily imply that the TID/TP programme is ineffectual. It is conceivable that selecting under-age squads and labelling them as ‘youth elite’ signalise the types of players demanded and the level of performance other players have to exceed in order to supersede a player within the programme. In this sense, the programme may have a radiating effect on player development outside the programme which may raise the performance level within the ‘talent pool’ the clubs and DFB can select from. In other words, the (intended) individualistic approach may boost the (unintended but factual) collectivistic approach.

More accurate early TID may not only be hardly realisable, but would presumably also be unnecessary for this latter purpose. In addition, such a radiating effect would not require this immense size of the programme in terms of involved players; reducing it would, however, thwart the legitimising function described above.

Acknowledgements

I wish to express my sincere thanks to the anonymous reviewers for fruitful comments on an earlier version of this paper. I would also like to give my thanks to Kai Forell, Uwe Forell, Pascal Kopnarski and Michael Marxen, master students in physical education and members of the project team, for their support in the collection and preparation of the data.

References

- Anderson, G., & Miller, R. M. (2011). *The academy system in English professional football: Business value or “Following the Herd”?* Research Paper Series No. 2011/43. Liverpool: University of Liverpool Management School.
- Christensen, M. K. (2009). An eye for talent: Talent identification and practical sense of top-level soccer coaches. *Sociology of Sport Journal*, 26, 365–382.

- Darby, P., Akindes, G., & Kirwin, M. (2007). Football academies and the migration of African labor to Europe. *Journal of Sport & Social Issues*, 31(2), 143–161. doi:10.1177/0193723507300481
- Deloitte. (2012). *Annual review of football finances 2012*. London: Author.
- DFB (Deutscher Fußball-Bund). (2009). *Talente fordern und fördern! Konzepte und Strukturen vom Kinder- bis zum Spitzenfußball* [Challenge and promote talents. Concepts and structures in football from childhood to peak-performance]. Münster: Philippka.
- DFB (Deutscher Fußball-Bund). (2010). *Ergebnisse der Talentförderung* [Results of the talent promotion programme]. Frankfurt: Author.
- Flatau, J., & Emrich, E. (2011). Die Organisation sportlichen Erfolges. Zur Frage nach Markt oder Hierarchie im Spitzensport am Beispiel der Eliteschulen des Sports [The organisation of success in sports. On the question of market or hierarchy in high-performance sport exemplified by the elite sport schools]. *Sportwissenschaft*, 41(2), 100–111. doi:10.1007/s12662-011-0182-z
- Gonaus, C., & Müller, E. (2012). Using physiological data to predict future career progression in 14- to 17-year-old Austrian soccer academy players. *Journal of Sports Sciences*, 30, 1673–1682. doi:10.1080/02640414.2012.713980
- Güllich, A., & Emrich, E. (2012). Individualistic and collectivistic approach in athlete support programmes in the German high-performance sport system. *European Journal for Sport and Society*, 9, 243–268.
- Helsen, W., Van Winckel, J., & Williams, A. M. (2005). The relative age effect in youth soccer across Europe. *Journal of Sports Sciences*, 23, 629–636. doi:10.1080/02640410400021310
- Hirose, N. (2011). Prediction of talent in youth soccer players: Prospective study over 4–6 years. *Football Science*, 8, 1–7.
- Hulse, M. A. (2010). *Physical development, and progression to professional soccer, of elite child and adolescent academy players* (Doctoral dissertation). Loughborough University, Loughborough.
- Le Gall, F., Carling, C., Williams, M., & Reilly, T. (2010). Anthropometric and fitness characteristics of international, professional and amateur male graduate soccer players from an elite youth academy. *Journal of Science and Medicine in Sport*, 13, 92–95. doi:10.1016/j.jsams.2008.07.004
- Littlewood, M., Mullen, C., & Richardson, D. (2011). Football labour migration: An examination of the player recruitment strategies of the “big five” European football leagues 2004–5 to 2008–9. *Soccer & Society*, 12(6), 788–805. doi:10.1080/14660970.2011.609680
- Malina, R. M. (2003). Growth and maturity status of young soccer (football) players. In T. Reilly & A. M. Williams (Eds.), *Science and soccer* (2nd ed., pp. 287–306). London: Routledge.
- Reilly, T., Williams, A. M., Nevill, A., & Franks, A. (2000). A multidisciplinary approach to talent identification in soccer. *Journal of Sports Sciences*, 18, 695–702. doi:10.1080/02640410050120078
- Salmela, J. H., & Moraes, L. C. (2003). Development of expertise: The role of coaching, families and cultural contexts. In J. L. Starkes & K. A. Ericsson (Eds.), *Expert performance in sports: Advances in research on sport expertise* (pp. 275–293). Champaign, IL: Human Kinetics.
- Schott, U. (2010). Talentschmiede als Erfolgsfaktor: Auswertung der DFB-Nachwuchsförderung mit Blick auf die WM 2010 [Talent factory as a success factor: Analysis of the talent promotion programme of the DFB with view to the world cup 2010]. In Bund Deutscher Fußball-Lehrer (Ed.), *Internationaler Trainer-Kongress 2010* [International Coaches Congress 2010], (pp. 56–61). Frankfurt: Bund Deutscher Fußball-Lehrer.
- Unnithan, V., White, J., Georgiou, A., Iga, J., & Drust, B. (2012). Talent identification in youth soccer. *Journal of Sports Sciences*, 30, 1719–1726. doi:10.1080/02640414.2012.731515
- Vaeyens, R., Malina, R. M., Janssens, M., Van Renterghem, B., Bourgois, J., Vrijens, J., & Philippaerts, R. M. (2006). A multidisciplinary selection model for youth soccer: The Ghent Youth Soccer Project. *British Journal of Sports Medicine*, 40, 928–934. doi:10.1136/bjism.2006.029652
- Van Yperen, N. W. (2009). Why some make it and others do not: Identifying psychological factors that predict career success in professional adult soccer. *The Sport Psychologist*, 23, 317–329.
- Walters, G., & Rossi, G. (Eds.). (2009). Labour market migration in European football: Key issues and challenges. In *Birkbeck Sport Business Centre Research Papers Series 2* (Vol. 2). London: Birkbeck University of London.
- Williams, A. M., & Reilly, T. (2000). Talent identification and development in soccer. *Journal of Sports Sciences*, 18, 657–667. doi:10.1080/02640410050120041