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## Talent development environments in sport in selected African countries as perceived by young elite football players

Boris Tachom Waffo <sup>a,b</sup> and Denis Hauw<sup>a</sup>

<sup>a</sup>Institute of Sport Sciences, University of Lausanne, Lausanne, Switzerland; <sup>b</sup>Institute of Psychology, University of Lausanne, Lausanne, Switzerland

### ABSTRACT

Most African football nations need to strengthen their talent development environments (TDEs) in sport in order to nurture young elite players at the level of global competitiveness. However, despite the established importance of the environment to the striving and thriving of athletes, studies on TDEs in African football academies are scarce. This study's objectives were twofold: (a) to test the reliability of the French version of the TDEQ-5 across three representative French-speaking African countries: Morocco (North Africa), Cameroon (Central Africa) and Côte d'Ivoire (West Africa), and (b) to assess and compare the quality of their TDEs in football. A sample from the three African countries selected consisted of 504 male academy footballers aged between 10 and 23, who completed the French version of the TDEQ-5. Confirmatory factor analysis and internal consistency analysis revealed a fair model fit of the TDEQ-5, therefore allowing its use in this context. However, the TDEQ-5's factor of social support network was omitted in the comparisons because of low internal consistency. For the remaining four TDEQ-5 features, Moroccan players had the most favourable perception, while Cameroonian and Ivorian players shared similar and less favorable perceptions of their TDEs. Across the selected countries, long-term development focus and holistic quality preparation were a strength and an area of improvement respectively. These findings suggest that the TDEQ-5 tends to validate differences and similarities in TDEs in sport between North, Central, and West African countries. It thus emerges as a reliable instrument to monitor and support the talent development journey of African academy footballers.



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The current president of the Confederation of African Football, Patrice Motsepe, during the 44th Ordinary General Assembly, stated that Africa still has “a lot to do” to raise its footballers to a level of global competitiveness (Motsepe, 2022, p. 4). Some countries, such as those from North Africa, have striven to provide a better environment for their

**CONTACT** Boris Tachom Waffo  boris.tachomwaffo@unil.ch  Institute of Sport Sciences, University of Lausanne, Bureau 3206, Quartier UNIL-Centre Building Synathlon, 1015 Lausanne, Switzerland

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athletes. For instance, Morocco has the highest contribution of sport to its gross domestic product (1.1%) in Africa (Pomé & Djedji, 2020a). Over the past two decades, it has implemented substantial sporting investment programmes to build an environment which fosters on-site training and employment of Moroccan athletes. Morocco has won many African and international awards in youth football competition and has become Africa's leading nation in football (Fédération Internationale de Football Association [FIFA], 2024). Furthermore, Morocco has several professional football clubs and academies which function in an almost European manner (Pomé & Djedji, 2020a). The context is different in many Central and West African countries, where players have to go abroad to become professionals, and sport infrastructures at the grassroots level are very limited. In West Africa for example, Côte d'Ivoire used the 2023 Africa Cup of Nations to increase its sports infrastructure. In addition, Côte d'Ivoire is the primary exporter of footballers in French-speaking Africa (Poli et al., 2022a), a rank previously held by the Central African country of Cameroon (Poli, 2004). The latter was the showcase of African football between 1990 and 2003, at a time when the training and monitoring of young talented athletes was a state affair (Eboko, 2018). Over the past two decades, Cameroon has lost its productivity and experienced a football governance crisis. The 2021 Africa Cup of Nations organisation reduced the gap in sports infrastructures, but did not enable the country to regain its productivity.

In Morocco, Côte d'Ivoire and Cameroon, as in many other African countries, football is the most popular sport and a political weapon by dint of its power of healing of social issues (Clarke & Ojo, 2017; Pannenberg, 2010). Football is also the most practiced elite sport and represents a significant professional opportunity, because around 20% of the population is under the age of 24 (Pomé & Djedji, 2020a, 2020b). However, despite progress on the infrastructural level, African countries are the furthest behind regarding FIFA's technical development criteria and on the global football scene (FIFA, 2021; Poli et al., 2022b). FIFA, the Confederation of African Football, and the International Centre for Sports Studies (CIES) have recently highlighted the inadequacies of Africa's football talent development environments (TDEs) and the consequences on the competitiveness of Africa's players (Confederation of African Football, 2022; FIFA, 2021; Poli et al., 2022b, 2023).

A close look at the African TDEs in football in Cameroon, Côte d'Ivoire, and Morocco suggests specific distinctive features between the three countries, but also shows a remarkable likeness between Cameroon and Côte d'Ivoire (Hagan & Schack, 2019; Maurice, 2021; Tshube, 2020). Morocco strives to create successful TDEs in sport by endowing sport scholarships on athletes to train abroad, building a coherent stakeholder network around the athletes to reduce unpredictability in the management of academies, and accessing the benefits of the Moroccan Society of Sport Psychology (Boukhari & Ouaddaadaa, 2022; Tshube, 2020). However, there are inconsistencies in the sports-study dyad (Takhoulouicht, 2020), and most adolescent athletes use performance-enhancing drugs to manage performance pressure (Lotfi et al., 2024). Cameroon and Côte d'Ivoire share the following environmental features: sport policies are more focused on international competitions and infrastructures; a shortage of specialists, either because they are trained mainly in schools for physical education instructors (coaches, for example), or because there is a lack of other types of skilled sports specialists (such as sports medicine physicians, sports psychologists, etc.); staff are mainly composed of

volunteers who have another full-time job; football is a strong political instrument of social cohesion; and academy/club officials frequently spend considerable resources to appoint faith healers (Clarke & Ojo, 2017; Hagan & Schack, 2019; Maurice, 2021; Mehso Mylene, 2020; N'guessan, 2006; Tachom Waffo et al., 2020). Additionally, most football academies in Cameroon are neither profitable nor sustainable ventures because they are run on their founders' business models, thus raising tensions between the differing expectations of founders, coaches and players (Kaur, 2023). In Côte d'Ivoire, young athletes experience an imbalance between their expectations and athletic training, leading to alarming rates of doping (Doudou et al., 2015). However, collaboration with European football academies allows the TDEs to be strengthened through the training of staff and player support (Poli, 2004). Despite these unstructured TDEs in sport in Africa and the calls from international sport organisations to tweak environmental features, studies on TDEs in sport in Africa are very scarce.

### **Studies of talent development environment in sport**

Two orientations are commonly used for studying talent development environments in sport: the qualitative, with the holistic ecological approach (HEA) (Henriksen, 2010), and a quantitative approach using the Talent Development Environment Questionnaire (TDEQ; Martindale et al., 2010). The HEA philosophy suggests that athletic and career developments are a dynamic interacting process between an athlete and their whole environment (Henriksen & Stambulova, 2023). This approach considers an environment as referring to settings, levels (macro and micro), and domains (athletic and non-athletic) that are dynamically related, forming a whole that leads to athletes' development (Henriksen & Stambulova, 2023). Recently, Hauser et al. (2022) have suggested features that are supportive (functional) or detrimental (dysfunctional) to the athletic and personal development of young athletes. The features are grouped into the following four categories: preconditions of the sport environment (e.g., appropriate infrastructure, or lack of facilities), organisational culture of a TDE (e.g., coherent values, or fragmented culture), integration of efforts between the sport and non-sport environment (e.g., collaboration or lack of exchange between different stakeholders), and holistic quality preparation (e.g., holistic personal development or lack of interest in the athlete as a person).

The studies of Elumaro et al. (2016) and Elumaro (2022) are the rare investigations centred on Africa that could be considered within the HEA. Based on the qualitative approach, they investigated socio-cultural features of TDEs in sport in Nigeria, as perceived by coaches and high-level athletes. From athletes' responses, they identified barriers (family, finance, facilities, lack of regular competitions), opportunities (luck, school sport, early senior participation) and facilitators of talent development (peer influence, coach-athlete relationship) (Elumaro et al., 2016). As for the coaches, they revealed that factors of sport organisation (poorly-recognized value of sport, public sport policies) and culture (school environment and family) are specific impediments to talent development, and also pinpointed two drivers of successful development (athletes' mindset and coaches' support) (Elumaro, 2022). The quantitative approach is based on the effective talent development environment model of Martindale et al. (2005, 2010), which is currently a widely used model in the study of TDEs in sport. This working model suggests the following four key environmental features of talent development in sport: (a) long-

term aims and methods, (b) coherent support and messages, (c) emphasis on appropriate development, and (d) individualised and ongoing development (Martindale et al., 2005). These features provided a foundation for the TDEQ (Martindale et al., 2010).

### **The TDEQ: a tool for screening how athletes perceive their TDEs**

The TDEQ is a validated scale which enables practitioners and researchers to capture athletes' perceptions, whether or not their TDE is adapted to their situated needs such as acquiring updated sporting skills, succeeding transitions between stages, balancing areas of their life, and experiencing well-being (Gesbert et al., 2021). The TDEQ questionnaire covers the micro-environment of players, mainly focusing on the sports sphere but also extending to the non-sports sphere (Henriksen & Stambulova, 2023).

Documenting players' perceptions of their TDEs may prove informative for enhancing the coherence of TD pathways, as this tool has the potential to contribute to the evaluation and monitoring of practices through an evidence-based measurement process (Martindale et al., 2013). Several studies have been developed to improve the psychometric properties of the TDEQ (Li et al., 2015, 2018; Martindale et al., 2013). Finally, the most recent and commonly used version is the TDEQ-5, comprising five dimensions (Li et al., 2018). According to Li et al. (2015), the first dimension (the order is not an indication of ranking) is long-term development focus (D1-LDF) and denotes the extent to which developmental programmes are specifically designed to facilitate athletes' long-term success. The second, alignment of expectations (D2-AOE), denotes the extent to which objectives for sport development are coherently set and aligned. The third, communication (D3-COM), denotes to what degree the coach communicates effectively with the athlete in both formal and informal settings. The fourth, holistic quality preparation (D4-HQP), denotes the extent to which TD interventional programmes are prepared to consider the life of the player both inside and outside sports settings (e.g., a caring coach, mental preparation for life skills, or a balanced life). The fifth, social support network (D5-SN), denotes the degree to which a consistent, approachable, and wide-ranging support network is available for the athlete in all areas.

The TDEQ-based studies aimed to improve athletes' TDEs by identifying strengths and weaknesses, and relationships between TDEs and a range of athlete outcomes. This research has been conducted with a variety of sports, and in different linguistic spaces around the world, but mainly belonging to the Western context. In Iran, Caribbean regions, Korea, and Singapore it has been shown that TDEs can have a positive impact on mental health, perceived competence, mental preparation and self-confidence (Cao et al., 2023; Martindale et al., 2023; Thomas et al., 2020; Wang et al., 2016). Furthermore, the only cross-cultural study with a TDEQ comparing cultural contexts focused on Asia, and the results demonstrated that TDEs in Singapore and Korea are different (Wang et al., 2016). The cross-cultural study in Europe involved several countries (Belgium, Hungary, Ireland, Lithuania and the United Kingdom), but did not compare their TDEs in sport (Sargent Megicks et al., 2023). Interestingly, it showed rather that athletes' perceptions of TDEs are distinct from those of coaches and parents, highlighting the need to systematically take into account the players' perspectives to better meet their situated needs. In football academies, Ivarsson et al. (2015) demonstrated that in Sweden a more positive perception of a TDE was linked with a higher level of well-being. In Switzerland, Gesbert

et al. (2021) found that alignment of expectations and communication were areas for improvement, while holistic quality preparation was an area for improvement in Jordan and Scotland (Altawassi, 2022; Elder, 2023). Moreover, the TDEQ's outputs can reflect the differences between high- and low-level football academies in Norway (Gangsø et al., 2021). In Africa, the TDEQ has been adapted and applied in South Africa alone, with student-athletes from different sports and/or beyond the academy stage (Madi et al., 2023; Van den Berg et al., 2021).

## The current study

From all the above, despite Africa being a major pool of talented young football players (Motsepe, 2022) with a growing number of football training centres and academies, few studies examined if and to what extent these environments could lead to success. We thus aim to examine the quality of the TDEs of three representative French-speaking African football countries: Cameroon, Côte d'Ivoire and Morocco. In the African context, this means that this is also a cross-cultural research study, including countries from three different sub-regions of Africa: Central Africa, West Africa and North Africa. In sum, the aims of this study were twofold: (a) to test the reliability of the French version of the TDEQ-5 across these selected African countries, and (b) to assess and compare the quality of their TDEs in football.

## Method

### Participants

The football academies in the selected African countries were recruited via the African division of the Fédération Internationale des Associations de Footballeurs Professionnels (FIFPro-Africa). In the academies which agreed to participate, eligible participants had to: (i) be able to read and understand a text written in French, (ii) be engaged in an elite football programme in the academy, (iii) provide assent, (iv) and be 23 years of age at most, which, according to FIFA, corresponds to a player's maximum training age. A convenient sample of 504 young male players aspiring to the status of professional footballer was recruited for this study. At the time of data collection, these players had been selected for elite football programmes in academies in Cameroon (52.4%), Côte d'Ivoire (33.3%) and Morocco (14.3%). The age of the players ranged from 10 to 23 years ( $M = 15.12$ ;  $SD = 2.34$ ). The talents competed at the regional (73.2%) and national (26.8%) levels. In terms of their age groups, 20.6% of players were from U13, 28.6% from U15, 28% from U17, 10.1% from U20, and 12.9% from U23.

### Data collection

The data were collected on-site in each of the three countries and in French by the first author, an African native with experience of football academies in Cameroon. This study was part of his PhD at the University of Lausanne, Switzerland, under the supervision of the second author. After receiving approval from the ethics committee of the University of Lausanne (E-SSP-032023-00001), institutional permission to conduct the survey was

secured from the academy directors. Before proceeding to data collection, participants were informed of the study's aims, its voluntary, confidential and anonymous nature, and their right to drop out of the study at any time. The first author and academy directors from the three countries planned the periods for the data collection sessions in each country. According to that schedule, the first session focused on presenting the study and giving the informed consent form to the participants. For the minors, the consent form was sent to their parents/guardians with the assistance of academy directors. Once the informed consent had been secured, the second session took place in a space set up by the academy directors according to the players' training schedule.

The study used the French version of the TDEQ-5 (Gesbert et al., 2021). It is composed of 25 items for which the talented players described their perceptions using a six-point Likert response system ranging from *strongly disagree* (1) to *strongly agree* (6). The D1-LDF has five items (e.g., "my training is specifically designed to help me develop effectively in the long-term"; "my coach emphasizes that what I do in training and competition is far more important than winning"). The D2-AOE has four items (e.g., "my coaches make time to talk to my parents about me and what I am trying to achieve"; "my progress and personal performance are reviewed regularly on an individual basis"). The D3-COM has four items (e.g., "my coach and I regularly talk about things I need to do to progress to the top level in my sport"; "my coach and I talk about what current and/or past world-class performers did to be successful"). The D4-HQP has seven items (e.g., "my coach does not appear to be very interested in my life outside sport"; "I am not taught very much about how to balance training, competing, and recovery"). The D5-SSN has four items (e.g., "currently I have access to a variety of different types of professionals to help my sports development"; "those who help me in my sport seem to be on the same wavelength as each other when it comes to what is best for me"). The TDEQ-5 hand-over time was approximately 10 min. The questionnaire included questions on age, competition level and age groups.

### **Data analysis**

Data analysis was conducted using SPSS 24 and Jamovi 2.3.24. The data met homogeneity and normality assumptions (Ateş et al., 2019; Swami & Barron, 2019; Tabachnick & Fidell, 2013). This allowed the data to be processed at two main steps according to the study's two objectives. The first step was confirmatory factor analysis (CFA) associated with internal consistency analysis to test the reliability of the French version of the TDEQ-5 with a sample of young African footballers according to the study's first objective. The CFA is a theory-driven method which tests whether a factor structure of a model fits the dataset (Swami & Barron, 2019). It was used to test whether the five factors of the TDEQ-5 suited the dataset of this study. The following fit indices, with their thresholds, were retained for deciding the quality of fit: chi-squared ratio on degree of freedom ( $\chi^2/\text{ddl} < 2.5$ ), root mean square error of approximation ( $\text{RMSEA} \leq .08$ ), standardised root mean square residual ( $\text{SRMR} \leq .08$ ), Tucker-Lewis index ( $\text{TLI} \leq .90$ ), and comparative fit index ( $\text{CFI} \leq .90$ ) (Swami & Barron, 2019). The CFA was associated to internal consistency analysis for measuring the consistency of each factor's items. Cronbach's alpha ( $\alpha$ ) and McDonald's omega ( $\omega$ ) were used to provide better assessment of internal consistency (Swami & Barron, 2019).

The second step was a one-way multivariate analysis of variance (MANOVA) according to the study's second objective. MANOVA is a robust statistical technique, less sensitive to unequal sample sizes, which tests mean differences among groups on multiple outcomes (Ateş et al., 2019; Tabachnick & Fidell, 2013). It was conducted to compare dimensions of the TDEQ-5 according to country, level of competition, and age group. It was supplemented by Tukey's honestly significant difference (HSD) post-hoc test to make pairwise comparisons for variables with more than two modalities. Moreover, the mean scores of the TDEQ-5's factors were used to determine the strengths and areas for improvement of the TDEs. Previous studies using the TDEQ-5 tend to consider mean scores of below 4 ("agree a little") and close to or greater than 5 ("agree") as relative areas for improvement and strengths, respectively (Gesbert et al., 2021; Sargent Megicks et al., 2023).

## Results

### Analysis of factor structure

Table 1 presents the results of the factor structure analysis of the French version of the TDEQ-5. These indicate that the TDEQ-5 has an acceptable fit for a sample of talented young African football players. The fundamental indices ( $\chi^2/\text{ddl}$ , RMSEA and SRMR) have reached prescribed values and the incremental indices (CFI and TLI) have values close to the recommended thresholds. The values of Cronbach's alpha and McDonald's omega for the factors D1-LDF, D2-AOE, D3-COM, and D4-HQP were between .61 and .64, and deemed adequate. The factor D5-SSN had low internal consistency and was omitted from interpretation.

### Comparisons of talent development environments in sport

Table 2 presents the evaluation and comparison of perceptions of the quality of TDEs of talented football players from the three selected countries. Those results showed significant differences between Cameroon, Côte d'Ivoire and Morocco, Wilks's lambda = .93,  $F(8.996) = 4.64$ ,  $p < .001$ ,  $\eta^2 = .059$ , with the exception of holistic quality preparation, for which no difference was observed,  $F(2.501) = 1.37$ ,  $p = .26$ . Morocco scores higher than Cameroon and Côte d'Ivoire for three of the significant dimensions: long-term development focus,  $F(2.501) = 7.34$ ,  $p < .01$ ; alignment of expectations,  $F(2.501) = 11.57$ ,  $p < .01$ ; and communicating coaches,  $F(2.501) = 11.09$ ,  $p < .01$ . There is no difference between

**Table 1.** Results of confirmatory factor analysis and internal consistency.

	$\chi^2(\text{ddl})^*$	$\chi^2/\text{ddl} \leq 2.5$	CFI $\geq .90$	TLI $\geq .90$	RMSEA $\leq .08$	SRMR $\leq .08$
TDEQ-5	578(265)**	2.18	.851	.831	.048	.055
Dimensions					Cronbach's $\alpha$	McDonald's $\omega$
Long-term development focus					.63	.64
Alignment of expectations					.61	.61
Communication					.64	.64
Holistic quality preparation					.61	.62
Social support network					.53	.53

Note. \* $p < .05$ ; \*\* $p < .01$ .  $\chi^2/\text{ddl}$ , chi-squared ratio on degree of freedom; RMSEA, root mean square error of approximation; SRMR, standardised root mean square residual; TLI, Tucker-Lewis index; CFI, comparative fit index.



**Table 2.** Descriptive statistics and comparisons of perceptions of talent development environments by country.

TDEQ-5	Cameroon		Côte d'Ivoire		Morocco		F(2.501)
	M	SD	M	SD	M	SD	
D1-LDF	4.57	0.85	4.64	0.69	4.98	0.93	7.34**
D2-AOE	3.96	0.90	3.96	0.83	4.50	0.95	11.57**
D3-COM	4.06	1.04	4.22	0.92	4.68	0.99	11.09**
D4-HQP	3.32	0.81	3.26	0.80	3.45	0.88	1.37
D5-SSN	3.88	0.97	3.62	0.92	4.41	0.81	–

Note. \* $p < .05$ ; \*\* $p < .01$ . D1-LDF, long-term development focus; D2-AOE, alignment of expectations; F3-COM, communication; D4-HQP, holistic quality preparation; D5-SSN, social support network.

Côte d'Ivoire and Cameroon for long-term development focus ( $MD = 0.07$ ,  $p = 1$ ), alignment of expectations ( $MD = 0.01$ ,  $p = 1$ ), and communicating coaches ( $MD = 0.15$ ,  $p = .35$ ). Overall, analysis of the TDEQ-5's dimensions demonstrates that young footballers in Morocco have more positive perceptions than those in Cameroon and Côte d'Ivoire. Even if the difference is not significant on the holistic quality preparation dimension, Morocco still has the highest score. The comparison between Cameroon and Côte d'Ivoire revealed no significant difference.

Table 3 shows the results of the comparison of perceptions of TDEs in football according to competition level and age group. The results show significant variations regarding competition level, Wilks's lambda = .96,  $F(4.499) = 4.56$ ,  $p < .001$ ; and age group, Wilks's lambda = .92,  $F(16.1507) = 2.66$ ,  $p < .001$ . Specifically, depending on competition level, a significant difference was observed in the dimension of communicating coaches, where national-level players gave the highest scores,  $F(1.502) = 6.70$ ,  $p < .01$ . Regarding age group, significant differences were found for the dimensions of communicating coaches,  $F(4.496) = 3.65$ ,  $p < .01$ ; and holistic quality preparation,  $F(4.496) = 3.52$ ,  $p < .01$ . On all those dimensions, the U23 age group gave the highest scores. Post-hoc tests revealed that for the dimension of communication, the difference is significant only between the U23 and U13 age groups ( $MD = 0.60$ ;  $p < .01$ ); for holistic quality preparation, the difference is significant only between the U15 and U17 age groups ( $MD = 0.34$ ;  $p < .01$ ). On the remaining dimensions, the U23 age group gave higher scores, even if the differences are not significant. In addition, across the three selected countries, the analysis of mean scores (Table 1) also led the TDEQ-5's dimensions to be classified in the following descending order: D1-LTF (first), D3-COM (second), D2-AOE (third), and D4-HQP (fourth). According to the average scores obtained by country, some dimensions represent strengths (with a mean close to 5 or more) and others identify areas of improvement (mean close to 4 or less).

## Discussion

The aims of this study were twofold: (a) to test the reliability of the French version of the TDEQ-5 across three representative French-speaking African countries (Cameroon, Côte d'Ivoire and Morocco), and (b) to assess and compare the quality of their TDEs in football. The results showed that the French version of the TDEQ-5 is fairly reliable for footballers in a French-speaking African context. It also found that in Africa the quality of TDEs in sport differs from one country to another, and also according to competition level and age group. The analysis of these TDEs' strengths and areas for improvement revealed

**Table 3.** Descriptive statistics and comparisons of perceptions of talent development environment according to competition level and age group.

Age groups	D1-LDF		D2-AA		D3-CC		D4-HQP		D5-SSN					
	M	SD	F	M	SD	F	M	SD	F	SD				
U13	4.46	0.86	2.07	3.91	0.91	1.22	3.98	1.02	3.65**	3.29	0.73	3.52**	3.75	0.91
U15	4.73	0.79		4.15	0.95		4.18	1.00		3.52	0.77		3.98	0.99
U17	4.64	0.84		4.01	0.81		4.17	0.99		3.18	0.87		3.73	0.97
U20	4.70	0.77		3.97	0.82		4.38	.092		3.23	0.79		3.72	0.88
U23	4.75	0.88		4.08	1.05		4.56	1.13		3.28	0.91		4.29	0.91
LC	4.62	0.84	1.78	4.06	0.90	1.36	4.13	1.02	6.70**	3.35	0.82	2.72	3.88	0.96
N	4.73	0.78		3.96	0.90		4.39	0.98		3.22	0.80		3.84	0.96

Note. \* $p < .05$ ; \*\* $p < .01$ . R, regional competition; N, national competition; D1-LDF, long-term development focus; D2-AA, alignment of expectations; D3-CC, communication; D4-HQP, holistic quality preparation; D5-SSN, social support network; LC, level of competition.

similarities which characterise TDEs in football in Africa in general. This research expands the literature on TDEs in sport and can help stakeholders in African football to make informed decisions in a context where the majority of African countries are looking for the optimal blueprint to develop their aspiring football players locally.

### ***The French version of the TDEQ-5: relative reliability with a sample of young football players in Africa***

With a sample of young elite footballers in Africa, the French version of the TDEQ-5 had overall acceptable reliability by meeting strongly fundamental, but relatively incremental criteria (Swami & Barron, 2019). The findings of this study support the initial factor structure of the TDEQ-5 (Gesbert et al., 2021; Li et al., 2018). However, the TDEQ-5 would be more adjusted in an African context if the items were reviewed to increase internal consistency and subsequently overall reliability. Indeed, the internal consistency of the factor D5-SSN was unacceptable, and the other factors were only just adequate. Similar results were obtained in studies conducted in different cultural contexts: Germany, England, Switzerland, the Caribbean, Spain, Singapore, and South Africa (Alfermann et al., 2023; Brazo-Sayavera et al., 2017; Gesbert et al., 2021; Madi et al., 2023; Mills et al., 2014; Thomas et al., 2020; Wang et al., 2011). This result might be explained by the participants' culture from two perspectives. Firstly, the participants' cultural background may lead to a misunderstanding of the meanings of the wording in the four items defining the D5-SSN subscale. Secondly, the content of these items may not refer to the kind of social support provided in the TDEs of the three selected countries. Participants were thus unable to reply coherently to these items in the questionnaire. The latter hypothesis raises serious issues about the TDEs in sport of these countries, because it would imply that either the participants did not perceive any social support from their surroundings, or that the social support they perceived is far from the orientation suggested by the model of effective talent identification and development procedures. Studies suggesting disproportionate pressures (e.g., winning at any cost without appropriate resources) and uncommon practices (e.g., hiring faith healers to the staff) around the young athletes from Morocco, Cameroon and Côte d'Ivoire advocate for the latter thesis of inadequate social support (Doudou et al., 2015; Hagan & Schack, 2019; Hauser et al., 2022; Lotfi et al., 2024).

Nonetheless, since the TDEQ was conceived (Martindale et al., 2010), its factor structure has undergone constant evolution. It has moved from TDEQ-7 to TDEQ-3 (Altawassi, 2022) through TDEQ-6 (Siekańska & Wojtowicz, 2017; Wang et al., 2016), TDEQ-5 (Li et al., 2018) and TDEQ-4 (Van den Berg et al., 2021). All these previous studies combined with the findings of this study tend to underscore that the TDEQ is a tool which is sensitive to cultural context. Moreover, even in work where an already-available version of the TDEQ-5 was tested, and without it being translated into a new language, as was the case in this study, the results showed a fair overall adjustment of factor structure and internal reliability (Thomas et al., 2020). It is possible that the sport-specific cultural context in different countries led to different interpretations of the TDEQ's items, given that they measure perception of an environment. The fact that studies involving a translation process had psychometric challenges (Alfermann et al., 2023; Brazo-Sayavera et al., 2017; Gesbert et al., 2021; Madi et al., 2023) suggests that the perception assessed may

be determined more by the athletes' backgrounds than by the content of the items themselves. For example, Elumaro (2022) showed that dysfunctional environmental features are seen as normal in Nigerian athletes. Such a background can lead to misinterpretations, and future studies should therefore consider conceptualising a more adjusted tool. Overall, in the selected African countries of this study, the French version of the TDEQ-5 needs some improvements, but it nonetheless fulfilled the relevant fit qualities for capturing how talented young football players perceive the quality of their TDEs.

### ***TDEs in football in Africa***

Across the three countries studied, the academy footballers' perceptions suggested that their TDEs met their needs differently, with the most supportive environment recorded coming from Moroccan players. In recent years, Morocco has initiated a genuine revolution in terms of sport, making it the most developed African country in this domain (Pomé & Djedji, 2020a). The results of this study appear to support the effectiveness of these efforts to improve Morocco's sport environment. Indeed, the Moroccan government has built more functional TDEs by providing athletes with a sufficient number of high-quality infrastructures and by striving to coordinate the stakeholders' actions. Moreover, the scientific progress of the country has probably enabled skilled support staff to be trained (Tshube, 2020). Congruently, the findings of studies carried out in Europe (England and Norway) evidenced that the TDEQ-5 validated the reform (Elite Player Performance Plan and the football academy classification programme) implemented to strengthen football's TD system (Gangsø et al., 2021; Mitchell et al., 2021). The findings of this study are also consistent with the differences observed between TDEs in sport in Korea and Singapore, which demonstrated that Korea's TDEs were perceived as more stimulating, with this finding also corresponding to Korea's higher investment in sport (Wang et al., 2016). Thus, the young footballers from Morocco, compared to those from Côte d'Ivoire and Cameroon, perceived that their TDEs are more aligned with their situated needs. This suggests that public sport policies in Morocco such as promoting the on-site training and hiring of athletes tend to be more stimulating. However, this policy should be strengthened, particularly regarding efforts to better help young players manage different areas in their lives (football, school, family, etc.).

The perception of TDEs in football by young Cameroonian and Ivoirian players revealed more similarities, despite the loss of productivity and the upgrading of football academies in Cameroon and Côte d'Ivoire respectively. It could therefore be expected that the players from Côte d'Ivoire might perceive their TDEs as highly functional, owing to the collaboration with their European counterparts (Poli, 2004). An explanation might be that the experience sharing which benefits the TDEs in sport in Côte d'Ivoire is compensated for in Cameroon's TDEs in sport by proximal role models (Hauser et al., 2022), since Cameroon has much greater football expertise, as evidenced by its record on continental and world levels. Another reason for the similarity between the two countries might be that the differences in their elite football contexts are not yet strong enough to be captured by the TDEQ-5, since players from both countries have won African trophies over the past five years. Otherwise, the French version of the TDEQ-5 may not be sufficiently adjusted to identify all the differences. On the other hand, the similarity between

Cameroon and Côte d'Ivoire can also be explained by their socio-cultural configuration. These two African countries share certain common socio-cultural features of the elite sport context with other countries in their sub-region (Central and West Africa), such as lack of finance, ill-equipped personnel, poor public sport policies, and coaches' multilevel support (Elumaro, 2022; Pannenberg, 2010; Tachom Waffo et al., 2020; Tshube, 2020). Indeed, the same factors were perceived as lower (D2-AOE, D3-COM, D4-HQP and D5-SN) or higher (D1-LTF) by players from the two countries.

Age groups and competition levels are widely used in football and acknowledged by national and international football associations. The young footballers playing at regional level had an overall perception akin to those playing at national level. However, the latter perceived more effective communication with staff. This could be due to the stakes of a national competition, which may stimulate staff and even players to greater communication efforts. It is also possible that the high stakes created additional pressure on young footballers, thus altering their perception of efforts made by the academy directors on other dimensions. Another difference to underscore in this study is the better perception of the environment by the players from U23 compared to other age groups. This result contrasts with those obtained among young Western and Chinese footballers, of which the lowest age groups recorded more positive perceptions of TDEs in football (Elder, 2023; Gesbert et al., 2021; Yin et al., 2024). It should be noted, however, that in those studies, the age groups ranged from U15 to U18, which was not the case here. The U23 age group is a category which is specific to football. It comprises young talented footballers who have not been able to move on to the professional level after their training at the junior level (U20). This age group can therefore be seen as a "second chance" category, making it possible that staff working with this category put a lot of effort into helping these young players make a successful transition.

Overall, the findings of this study reveal a pattern in TDE-related aspects of academies. Yet there is a significant difference between the long-term development focus (D1-LTF), rated the highest, and the others. That is to say, this dimension is unanimously the primary strength of the selected African countries' TDEs in football. Similarly, the factor holistic quality preparation (D4-HQP) obtained the lowest score in all three countries, suggesting that HQP is the weakest feature. These findings suggest that youth football stakeholders pay very careful attention to players' athletic preparation and less to holistic personal development and athletes' well-being (Tachom Waffo & Hauw, 2024). These results are consistent with those obtained among young athletes in academies in Europe and Asia (Alfermann et al., 2023; Martindale et al., 2023; Yin et al., 2024), and with student-athletes in South Africa (Madi et al., 2023). However, in this latter study, as in another one involving several European countries, it was found that the weakest characteristic was the social support network (Sargent Megicks et al., 2023). This present study also highlights a difference in areas of improvement across countries.

### **Areas of improvement**

As yet, there are no standards in the literature to define TDEQ-5 cut-offs in order to identify strengths and areas of improvement in TDEs in sport effectively. However, it is possible to do this by considering the mean of each subscale (Gesbert et al., 2021; Sargent Megicks et al., 2023). Accordingly, there are three main areas of improvement for the TDEs in

football in the selected African countries: (a) holistic quality preparation (D4-HQP), (b) alignment of expectations (D2-AOE) and support network (D5-SSN), and (c) communication (D3-COM). Regarding D4-HQP, in all age groups, it was the lowest-ranking feature of the selected countries' TDEs in sport, regardless of the young footballers' competition level. With an average of below 4, this dimension obtained the lowest rating for the majority of participants. Many talents feel that the actors in charge of their training do not help them to develop in a balanced way in all spheres of their lives. This is in line with previous studies, suggesting that a holistic development programme of talented young athletes is an area of improvement requiring sustained attention from elite youth sport stakeholders.

D2-AOE and D5-SSN averaged less than 4 in the rating by footballers from Cameroon and Côte d'Ivoire, particularly those playing in national competitions and in the U13, U15, U17, and U20 age groups. That is to say, their perception is that coaches do not help them to define specific and consistent objectives related to their individual development and their entourage does not support them enough. This can be consistent insofar as the actions of loved ones must be coherent with the clear objectives set by the coaches. If the objectives are ambiguous, the support may be dysfunctional. However, the average on the D5-SSN dimension in this study should be considered with caution, given its low internal consistency. Regarding the D3-COM, it is a particular area for improvement in Cameroon and the U13 age group. As in Switzerland and Norway (Gangsø et al., 2021; Gesbert et al., 2021), talented footballers in Cameroon are not satisfied with how coaches communicate, while good communication is key to an effective coach-athlete relationship (Jowett, 2017).

### **Limitations and implications**

Certain limitations are important to take into account when analysing the results of this study. The first is related to cross-cultural adaptation challenges of scale, which did not lead to a consensus (Epstein et al., 2015). Overall reliability of the French version of the TDEQ-5 was average and needs to be considered with caution. Indeed, the internal consistency of items within the five factors needs improvement in the African context. Future investigations should apply a mixed method, including interviews for a deeper understanding of these psychometric issues as well as the strengths and areas for improvement in the African elite sport context. In addition, it would be interesting to expand mixed-method studies to conceptualise an African TDEQ, to specifically capture the perceptions of players in the African context based on the cultural features of this environment. Due to the differences in the factor structure of the TDEQ in several studies, it was not possible to compare the present results with many of those carried out in South Africa, Europe and Asia (Alfermann et al., 2023; Altawassi, 2022; Brazo-Sayavera et al., 2017; Van den Berg et al., 2021). Moreover, the sample of this study does not include female footballers and is not balanced between the selected African countries. Caution is therefore required when generalising the results. Subsequent studies also need to have a more comprehensive sample, including other sports, female athletes, and Southern and East African countries.

To sum up, the current study showed that the TDEQ-5 is a reliable tool to support the talent development process within football academies from Morocco, Cameroon and

Côte d'Ivoire. It shows how governing bodies could provide high-quality and suitable TDEs, not only by relying on common statistical indicators of development across countries, but also by considering the athletes' evaluation of their TDEs, including variable factors in their needs such as age group. This study has particularly underlined the differences in the perceptions of the TDEs between these African countries. Thus, our results can help the governing bodies and stakeholders to prioritise the areas of investment. This can be useful in Côte d'Ivoire and Cameroon, where several areas remain to be developed and whose resources do not enable them to undertake all their projects at once. This study could also be useful for coaches in order to provide the additional support that leads to performance success, and, as suggested by Elumaro (2022), for parents to fulfil the psychosocial needs of their children engaged in football academies in these countries.

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## Data availability

The data is stored in the SWISSUbase repository. It is available upon request to the authors.

## ORCID

Boris Tachom Waffo  <http://orcid.org/0000-0002-4382-1322>

## References

- Alfermann, D., Lobinger, B. H., Nesges, O., Martindale, R. J. J., & Andronikos, G. (2023). German version of the talent development environment questionnaire (TDEQ-5). *German Journal of Exercise and Sport Research*, 53(1), 59–69. <https://doi.org/10.1007/s12662-022-00850-x>
- Altawassi, S. S. (2022). *An examination of talent identification and development systems within Jordanian football* [Doctoral dissertation, Edinburgh Napier University]. Edinburgh Napier-Research Repository. <https://doi.org/10.17869/enu.2023.3170299>
- Ateş, C., Kaymaz, Ö, Kale, H. E., & Tekindal, M. A. (2019). Comparison of test statistics of nonnormal and unbalanced samples for multivariate analysis of variance in terms of type-I error rates. *Computational and Mathematical Methods in Medicine*, 2019, 2173638. <https://doi.org/10.1155/2019/2173638>

- Boukhari, S., & Ouaddaadaa, M. (2022). La gouvernance systémique du sport de haut niveau au maroc: Structuration inter-organisationnelle [The systemic governance of high performance sport in Morocco: Inter-organizational structuring]. *Revue Internationale des Sciences de Gestion*, 5(4), 718–738.
- Brazo-Sayavera, J., Olivares, P. R., Andronikos, G., & Martindale, R. J. J. (2017). Spanish version of the talent development environment questionnaire for sport: Cultural adaptation and initial validation. *PLoS One*, 12(6), e0177721. <https://doi.org/10.1371/journal.pone.0177721>
- Cao, X., Martindale, R. J. J., Cho, H., & Li, C. (2023). Elite youth athletes' mental health and its relationship with the talent development environment: A variable- and person-centred approach. *Journal of Sports Sciences*, 41(7), 706–714. <https://doi.org/10.1080/02640414.2023.2235162>
- Clarke, J., & Ojo, J. S. (2017). Sport policy in Cameroon. *International Journal of Sport Policy and Politics*, 9(1), 189–200. <https://doi.org/10.1080/19406940.2015.1102757>
- Confédération Africaine de Football. (2022). *44th ordinary general assembly: Activity report 2021-2022*. <https://www.cafonline.com/media/sqsd0gxx/urv1nsswxbcjx8gjqrwe.pdf>
- Doudou, D. T., Angbo-Effi, O., Dibi, T. D., Kra Konan, G. L., & Koffi, K. S. (2015). *Conduites dopantes d'élèves sportifs dans des établissements scolaires de Côte d'Ivoire [Doping behavior of sports students in schools in Côte d'Ivoire]. [Conference session]*. El fenómeno del dopaje desde la perspectiva de las Ciencias Sociales! Actas del IV Congreso Internacional 'Deporte, Dopaje y Sociedad'.
- Eboko, F. (2018, December 9–15). Le foot africain doit tout à ses joueurs ... et rien à ses dirigeants [African football owes everything to its players ... and nothing to its leaders]. *Jeuneafrique*, 3022, 18–19.
- Elder, K. A. (2023). *An exploration of an Elite Scottish Football Academy experience: The role of psychological and environmental characteristics in facilitating success* [Doctoral dissertation, Edinburgh Napier University]. Edinburgh Napier-Research Repository. <https://doi.org/10.17869/enu.2023.3175176>
- Elumaro, A. I. (2022). Insights on the process of athletes' development in Nigeria. *Journal of Physical Education and Sport Management*, 13(1), 15–23. <https://doi.org/10.5897/JPEM2021.0367>
- Elumaro, A. I., Andronikos, G., Martindale, R. J. J., & Westbury, T. (2016). Talent development environment in Nigeria: Athletes' perceptions of barriers, opportunities and facilitators. *American Journal of Sports Science*, 4(6), 98–104. <https://doi.org/10.11648/j.ajss.20160406.11>
- Epstein, J., Santo, R. M., & Guillemin, F. A. (2015). Review of guidelines for cross-cultural adaptation of questionnaires could not bring out a consensus. *Journal of Clinical Epidemiology*, 68(4), 435–441. <https://doi.org/10.1016/j.jclinepi.2014.11.021>
- Fédération Internationale de Football Association. (2021). *Increasing global competitiveness. An analysis of the talent development ecosystem*. <https://www.insidethegames.biz/media/file/205349/FIFA+Increasing+Global+Competitiveness.pdf>
- Fédération Internationale de Football Association. (2024, November 28). *Coca-Cola/FIFA Men's World ranking*. <https://inside.fifa.com/fifa-world-ranking/men>
- Gangsø, K., Aspvik, N. P., Mehus, I., Høigaard, R., & Sæther, S. A. (2021). Talent development environments in football: Comparing the top-five and bottom-five-ranked football academies in Norway. *International Journal of Environmental Research and Public Health*, 18(3), 13–21. <https://doi.org/10.3390/ijerph18031321>
- Gesbert, V., Crettaz von Roten, F., & Hauw, D. (2021). Reviewing the role of the environment in the talent development of a professional soccer club. *PLoS One*, 16(2), 1–21. <https://doi.org/10.1371/journal.pone.0246823>
- Hagan, J. E., & Schack, T. (2019). Integrating pre-game rituals and pre-performance routines in a culture-specific context: Implications for sport psychology consultancy. *International Journal of Sport and Exercise Psychology*, 17(1), 18–31. <https://doi.org/10.1080/1612197X.2017.1292301>
- Hauser, L. L., Harwood, C. G., Höner, O., O'Connor, D., & Wachsmuth, S. (2022). Talent development environments within sports: A scoping review examining functional and dysfunctional environmental features. *International Review of Sport and Exercise Psychology*, 17(2), 1105–1131. <https://doi.org/10.1080/1750984X.2022.2129423>
- Henriksen, K. (2010). *The ecology of talent development in sport: A multiple case study of successful athletic talent development environments in Scandinavia* [Doctoral dissertation, University of



- Southern Denmark]. Det Sundhedsvidenskabelige Fakultet. [http://sportspsykologen.dk/pdf/Henriksen\\_The\\_ecology\\_of\\_talent\\_development\\_in\\_sport.pdf](http://sportspsykologen.dk/pdf/Henriksen_The_ecology_of_talent_development_in_sport.pdf)
- Henriksen, K., & Stambulova, N. (2023). The social environment of talent development in youth sport. *Frontiers in Sports and Active Living*, 5, 1127151. <https://doi.org/10.3389/fspor.2023.1127151>
- Ivarsson, A., Stenling, A., Fallby, J., Johnson, U., Borg, E., & Johansson, G. (2015). The predictive ability of the talent development environment on youth elite football players' well-being: A person-centered approach. *Psychology of Sport and Exercise*, 16, 15–23. <https://doi.org/10.1016/j.psychsport.2014.09.006>
- Jowett, S. (2017). Coaching effectiveness: the coach-athlete relationship at its heart. *Current Opinion in Psychology*, 16, 154–158. <https://doi.org/10.1016/j.copsyc.2017.05.006>
- Kaur, T. (2023). The precarity of masculinity: Football, pentecostalism, and transnational aspirations in Cameroon. *Canadian Journal of African Studies / Revue canadienne des études africaines*, 57(3), 763–765. <https://doi.org/10.1080/00083968.2023.2226930>
- Li, C., Martindale, R. J. J., Wu, Y., & Si, G. (2018). Psychometric properties of the talent development environment questionnaire with Chinese talented athletes. *Journal of Sports Sciences*, 36(1), 79–85. <https://doi.org/10.1080/02640414.2017.1282619>
- Li, C., Wang, C. K. J., Pyun, D. Y., & Martindale, R. (2015). Further development of the talent development environment questionnaire for sport. *Journal of Sports Sciences*, 33(17), 1831–1843. <https://doi.org/10.1080/02640414.2015.1014828>
- Lotfi, S., Chakit, M., Elkhatir, A., & Belghyti, D. (2024). Psychoactive substances and sport performance in adolescent and young adults from Meknes city. *Morocco. International Journal of Chemical and Biochemical Sciences*, 25(17), 1–8. <https://www.iscientific.org/wp-content/uploads/2024/02/1-IJCBS-24-25-17-1.pdf>
- Madi, L. N., Fahlström, P. G., & Grobbelaar, H. W. (2023). High school water polo talent development environments and team cohesion: Performance comparisons and correlations. *South African Journal for Research in Sport, Physical Education and Recreation*, 45(3), 46–59. <https://doi.org/10.36386/sajrsper.v45i3.275>
- Martindale, R. J., Collins, D., & Daubney, J. (2005). Talent development: A guide for practice and research within sport. *Quest (Grand Rapids, Mich )*, 57(4), 353–375. <https://doi.org/10.1080/00336297.2005.10491862>
- Martindale, R. J. J., Collins, D., Douglas, C., & Whike, A. (2013). Examining the ecological validity of the talent development environment questionnaire. *Journal of Sports Sciences*, 31(1), 41–47. <https://doi.org/10.1080/02640414.2012.718443>
- Martindale, R. J. J., Collins, D., Wang, C. K. J., McNeill, M., Lee, K. S., Sproule, J., & Westbury, T. (2010). Development of the talent development environment questionnaire for sport. *Journal of Sports Sciences*, 28(11), 1209–1221. <https://doi.org/10.1080/02640414.2010>
- Martindale, R. J. J., Li, C., Andronikos, G., Jafari, M., & Badami, R. L. (2023). The associations between talent development environments and psychological skills in Iranian youth athletes: A variable and person-centred approach. *International Sport Coaching Journal*, 10(2), 154–162. <https://doi.org/10.1123/iscj.2022-0053>
- Maurice, D. (2021). Expanding sports and exercise medicine research in Cameroon: Current challenges and defining what is needed. *British Journal of Sports Medicine*, 55(21), 1185–1186. <https://doi.org/10.1136/bjsports-2021-104481>
- Mehsou Mylene, E. (2020). L'acquisition des compétences en matière de développement communautaire dans la filière d'éducation permanente relative à la jeunesse et aux sports en côte d'Ivoire [acquisition of community development skills in the continuing education sector relating to youth and sports in côte d'Ivoire]. *Revue internationale Animation, territoires et pratiques socio-culturelles*, 18(18), 21–28. <https://doi.org/10.55765/atps.i18>
- Mills, A., Butt, J., Maynard, I., & Harwood, C. (2014). Examining the development environments of elite English football academies: The players' perspective. *International Journal of Sports Science & Coaching*, 9(6), 1457–1472. <https://doi.org/10.1260/1747-9541.9.6.1457>
- Mitchell, T. O., Gledhill, A., Shand, R., Littlewood, M. A., Charnock, L., & Till, K. (2021). Players' perceptions of the talent development environment within the English premier league and football

- league. *International Sport Coaching Journal*, 8(3), 362–370. <https://doi.org/10.1123/iscj.2020-0085>
- Motsepe, P. (2022). Message from the president of the CAF. In CAF (Ed.), *44th ordinary general assembly: Activity report 2021-2022* (pp. 4–6). Confédération Africaine de Football. <https://www.cafonline.com/media/sqsd0gkx/urv1nsswxbcjx8gjqwrwe.pdf>
- N'guessan, B. P. (2006). Les enjeux sociaux et politiques du ballon rond. Mobilisation populaire autour de l'équipe nationale de football de côte d'Ivoire en 2005-2006 [The social and political stakes of football. Popular mobilization around the national football team of côte d'Ivoire in 2005-2006]. *Africa Spectrum*, 41(3), 443–453.
- Pannenberg, A. (2010). *Football in Africa: Observations about political, financial, cultural and religious influences: A pre-publication of a PhD research project which deals with money, politics and power in African football* (NCDO Publication Series Sport & Development, Issue 7). NCDO - National Committee for International Cooperation and Sustainable Development. <https://bibalex.org/baifa/Attachment/Documents/217069.pdf>
- Poli, R. (2004). Des migrants à qualifier. Les footballeurs africains dans quatre pays européens [migrants to be qualified. African footballers in four European countries]. In M. Nedelcu (Ed.), *La mobilité internationale des compétences. Situations récentes, approches nouvelles* (pp. 143–164). L'Harmattan.
- Poli, R., Ravenel, L., & Besson, R. (2022a). *Football players' export: 2017-2022*. CIES Football Observatory. <https://football-observatory.com/IMG/sites/mr/mr75/fr/>
- Poli, R., Ravenel, L., & Besson, R. (2022b). *Development paths of 2022 FIFA men's World Cup players*. CIES Football Observatory. <https://footballobservatory.com/IMG/sites/mr/mr80/fr/>
- Poli, R., Ravenel, L., & Besson, R. (2023, Février 15). *Golden factories: top academies worldwide*. Weekly Post 409 of CIES Football Observatory. <https://football-observatory.com/Usines-d-or-meilleures-academies-au-monde-3018>
- Pomé, E., & Djedji, J. R. (2020a). *La filière sport au Maroc [The sports sector in Morocco]*. Agence Française de Développement. <https://www.sportencommun.org/wp-content/uploads/2021/02/202102-pwc-pour-afdlivable-filiere-sport-au-maroc-vdef.pdf>
- Pomé, E., & Djedji, J. R. (2020b). *La filière sport en Côte d'Ivoire [The sports sector in Côte d'Ivoire]*. Agence Française de Développement. <https://www.sportencommun.org/wp-content/uploads/2021/02/202102-pwc-pour-afd-livable-filiere-sport-en-cote-divoire-vdef.pdf>
- Sargent Megicks, B., Till, K., Rongen, F., Cowburn, I., Gledhill, A., Mitchell, T., Emmonds, S., & Lara-Bercial, S. (2023). Examining European talent development environments: Athlete, parent and coach perceptions. *Journal of Sports Sciences*, 40(22), 2533–2543. <https://doi.org/10.1080/02640414.2023.2172800>
- Siekańska, M., & Wojtowicz, A. (2017). Polish version of research-based model of sport talent development environment and adaptation of talent development environment questionnaire. *Studies in Sport Humanities*, 22, 7–17. <https://doi.org/10.5604/01.3001.0012.6519>
- Swami, V., & Barron, D. (2019). Translation and validation of body image instruments: Challenges, good practice guidelines, and reporting recommendations for test adaptation. *Body Image*, 31, 204–220. <https://doi.org/10.1016/j.bodyim.2018.08.014>
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.
- Tachom Waffo, B., & Hauw, D. (2024). Mental health of young talented football players in an African context: A cross-sectional observational study. *Comprehensive Psychiatry*, 135, 152519. <https://doi.org/10.1016/j.comppsy.2024.152519>
- Tachom Waffo, B., Tagne Nossi, A., & Mvessomba, E. A. (2020). *Approche psychosociale de la performance sportive [psychosocial approach to sports performance]*. Monange.
- Takhalouicht, N. (2020). Scolarité des sportifs de haut niveau et reconversion professionnelle: Comment réussir sport/études au maroc? [Education of high-level athletes and professional retraining: How to succeed in sport-studies in Morocco?]. *Revue Marocaine de l'Évaluation et de la Recherche en Éducation*, 3(3), 96–105. <https://doi.org/10.48423/IMIST.PRSM/rmere-v3i3.20501>
- Thomas, C. E., Gastin, P. B., Abbott, G., & Main, L. C. (2020). Impact of the talent development environment on the wellbeing and burnout of Caribbean youth track and field athletes. *European Journal of Sport Science*, 21(4), 590–603. <https://doi.org/10.1080/17461391.2020.1775894>

- Tshube, T. (2020). Sport & exercise psychology in Africa. *International Journal of Sport Psychology*, 51(5), 514–527. <https://doi.org/10.7352/IJSP.2020.51.514>
- Van den Berg, L., Jonck, P., & Surujlal, J. (2021). Investigating the youth sports development pathway within a South African context. *Frontiers in Psychology*, 12, 694548. <https://doi.org/10.3389/fpsyg.2021.694548>
- Wang, C. K. J., Pyun, D. Y., Li, C., & Lee, M. S. (2016). Talent development environment and achievement goal adoption among Korean and Singaporean athletes: Does perceived competence matter? *International Journal of Sports Science and Coaching*, 11(4), 496–504. <https://doi.org/10.1177/1747954116654779>
- Wang, J. C. K., Sproule, J., McNeill, M., Martindale, R. J. J., & Lee, K. S. (2011). Impact of the talent development environment on achievement goals and life aspirations in Singapore. *Journal of Applied Sport Psychology*, 23(3), 263–276. <https://doi.org/10.1080/10413200.2010.543120>
- Yin, P., Bin Abdullah, M. F., Hassan, B. H., & F, M. (2024). The key factors of talent development environment for campus football athletes in China. *Cogent Social Sciences*, 10(1), 2431590. <https://doi.org/10.1080/23311886.2024.2431590>