**The Associations between Talent Development Environments and Psychological Skills in Iranian Youth Athletes: A Variable and Person-centred Approach**

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**Abstract**

The environment plays a significant role in the development of talent athletes. A big part of this is preparing athletes with the psychological skills to cope and thrive through the challenges of their sporting journey. Understanding which features of the Talent Development Environment (TDE) best facilitate psychological skill use would be extremely useful for coaches to understand. As such, the main aim of this research was to investigate the relationships between TDE factors and psychological skills through a variable and person-centred approach (i.e., use both regression and cluster analyses). A second aim was to examine the psychometric properties of the Persian TDEQ-5 providing an initial validation for its use in Persian speaking cultures. To this end, the TDEQ-5 and Psychological Skills Inventory for Sports**–**Youth version**–**Short Form were administered to 371 Iranian athletes. The results showed that higher quality TDEs predicted higher psychological skill use. Specifically, Holistic Quality Preparation predicted all five psychological skills, while Long Term Development predicted anxiety control and Alignment of Expectations predicted self-confidence. The Persian TDEQ-5 was found to be a valid and reliable tool. Implications for coaches and those in charge of TDEs are discussed.

Keywords: talent development, environment, psychological skills, TDEQ, validity

**Introduction**

During the last decade, there has been an ever-increasing interest in the nature of the talent development environments (TDEs) and their influence on talented individuals. TDEs are a cornerstone in the talent development (TD) process and can influence athletes at multiple levels. Most of the TD research, however, has focused on the mechanisms and characteristics of elite successful TDEs (e.g., Flatgård et al., 2020; Larsen et al., 2020; Ryom et al., 2020) without examining the potential impact of, or relationships that TDEs may have with the psychological development of youth athletes. Yet the most influential research in this area has highlighted that a holistic approach is vital (Henriksen et al., 2010; Martindale et al., 2007). As such, given the clear suggestion within current research that psychological skills are crucial for successful development and overcoming multiple challenges along a sport career (Collins et al., 2016), it seems important to further investigate the potential links between the TDEs and the psychological development of talented athletes. Of course, the coach has a vital role to play within the TDE (Martindale et al., 2005), and may have significant influence over the philosophy that is employed, the structures that are in place and the nature of day-to-day interactions with athletes and significant others. As such, evidence which shines a light on how the environment may be related to psychological skills development would be important for coaches to understand. Indeed, attempts to impact athlete psychology are often reduced to psychological skills training, however it has been shown that the environment and interactions with coaches more broadly could facilitate such development (e.g., Collins & MacNamara, 2019). Understanding this, and subsequently being able to adopt a more evidence based and multi-layered approach to psychological skills development could be powerful for coaches.

**Talent Development Environments**

The development of talent is multifaceted and dynamic in nature with multiple factors influencing athletes, however a key aspect of this process is the TDE. A TDE can be defined as an organised system which influences the progression of players consisting of the elements within the micro-level (e.g., family, peers, coaches, club) and the macro-level (e.g., sport federation, sport culture, education system; Henriksen et al., 2010). In one of the most influential studies in this area, Martindale et al. (2005) identified four key characteristics of effective TDEs: (1) long-term aims and methods, (2) wide-ranging coherent support and messages, (3) emphasis on appropriate development rather than early selection, and (4) individualized and ongoing development. These features have since been broadly supported by ongoing work by Martindale and colleagues and by other researchers in this area (e.g., Martindale et al., 2010; Henriksen & Stambulova, 2017).

With these findings as a basis and to facilitate the examination and evaluation of TDEs, Martindale et al. (2010) developed the Talent Development Environment Questionnaire (TDEQ) enabling researchers to examine the athletes’ perceptions of their TDEs. The TDEQ has been further developed and revised since its original conception leading to the creation of the TDEQ-5 measuring five key TDE factors: long-term development focus, alignment of expectations, communication, holistic quality preparation, and support network (Li, Martindale, Wu, & Si, 2018; Li, Wang, Pyun, & Martindale, 2015). Due to its uniqueness, potential usefulness and impact, this questionnaire has been translated into various languages and contexts. Research has revealed robust psychometric properties of these translations which has allowed researchers and practitioners to explore the nature of TDEs in different countries and cultures such as the Caribbean, China, Singapore, Spain, and Poland (Brazo-Sayavera et al., 2017; Li et al., 2015, 2017; Siekanska & Wojtowicz, 2017; Thomas et al., 2020).

More recently, the TDEQ has been adopted by researchers across the globe in an attempt to examine TDEs in various sports. For instance, researchers have used the TDEQ to investigate the strengths and weaknesses of various TDEs, for example quality of football academies in the UK (Mills et al., 2014; Mitchell et al., 2021). Hall et al. (2019) took this a step further and used the TDEQ not only to evaluate an elite rugby TDE but also to design and implement an evidence-based intervention based on its evaluation. Additionally, other work has focused on investigating the relationship between different features of the TDE and important athlete outcomes. For example, several studies have utilised a combination of questionnaires to examine the relationship between TDE quality and well-being (e.g., Ivarsson et al., 2014; Thomas et al., 2021). Other work has focused on other outcomes such as progression, goal orientation, burnout, and mental toughness (e.g., Li et al., 2019; Martindale et al., 2013; Wang et al., 2011). Li et al. (2019), for example, conducted a study in a Chinese TD context and examined the relationships between TDE, basic psychological needs satisfaction and mental toughness. Interestingly, the findings highlighted that key features of the environment, specifically long-term development focus, holistic quality preparation and communication were positively related to needs satisfaction and mental toughness (Li et al., 2019). However, research that has explored the relationship between the TDE and psychological skills has perhaps surprisingly revealed ambiguous results (Andronikos, Souglis, et al., 2021; Mehrshad & Rokhshareh, 2018).

**Psychological Skills**

Research findings within the literature have shown that psychological skills play a pivotal role in TD. More specifically, studies have identified that psychological skills (e.g., problem-solving, self-control, acceptance of responsibility, self-reflection, determination, commitment, motivation) can facilitate successful progression towards elite level (Andronikos, Westbury, et al., 2021; MacNamara et al., 2010a, 2010b). In line with this, there is a consensus that psychological skills can differentiate between successful athletes and those do not ‘make it’ to elite level. Not only are athletes with more advanced psychological skills better prepared to cope with the inevitable challenges that they will face, they are also more likely to develop more effectively through those challenges (Collins et al., 2016; Savage et al., 2017).

Therefore, given the aims of arguably all TDEs (should be) is to successfully develop athletes (preparing them for both sport and life) and given the strong support for the crucial role of psychological skills in this process, it would make sense for environments to explicitly develop and facilitate the growth of psychological skills as part of the TD experience (Andronikos et al., 2019; Henriksen & Stambulova, 2017; Li et al., 2015; Martindale et al., 2007). However, understanding which features of the TD experience can predict psychological skills (if any) would be useful in helping provide guidance to coaches and those in charge of operationalizing TDEs. As such, the aims of the current study were to a) examine the psychometric properties of the Persian TDEQ-5; b) investigate the relationships between TDE factors and psychological skills through a variable and person-centred approach (i.e., use both regression and cluster analyses).

**Methods**

**Context**

While research has shown there to be generic principles of effective practice (Martindale et al., 2007; 2010), the exact nature of effective TDEs is likely to be sport and context specific (e.g., Henriksen & Stambulova, 2017; Gledhill et al., 2017). As such, the context of this research is important. Furthermore, Iran is a country where there is relatively little research in talent development, particularly as compared to Western cultures (e.g., Mehrshad, & Rokhshareh, 2018).

Like many countries, Iran values sport success and makes attempts to identify and develop talented athletes using scientific principles where possible. Sport science fields such as psychology, motor behaviour, physiology, biomechanics, injury, and management are common research themes within an Iranian context. However, many sport organizations only sporadically implement sport development programmes and there is generally a lack of coherent and integrated pathways for talent identification and development. As apparent in many other developing countries, financial problems and lack of facilities are a significant barrier to sport development (Elumaro, 2016).

**Participants**

The research sample consisted of 371 Iranian youth athletes (males = 200, females = 171). They had a mean age of 15.14 years (*SD* = 2.10) and were from 20 different sports such as badminton, basketball, gymnastics, handball, soccer, swimming, track and field, and volleyball. Over half of the participants had a training experience for 1-5 years (*n* = 196) and the rest had been trained for over 5 years. Additionally, they were currently elected members of regional talent programs and representative squads, and compete at club (*n* = 262), national (*n* = 94) and international levels (*n* = 15).

**Measures**

**Talent Development** **Environment Questionnaire-5 (TDEQ-5).** The original TDEQ-5 was translated into Persian for use in the present study (Li et al., 2015). The questionnaire was forward and backward translated, and culturally adapted based on a recommended methodology (Forsyth & Lessler, 1991; Herdman et al., 1997). First, two native Persian translators, who were knowledgeable about the research area, forward translated the English version of the TDEQ into Persian in an independent way. The two translators then discussed their translations to change untranslatable words or concepts and, finally, agreed upon a single version. Second, a native English speaker who was also fluent in Persian then prepared the backward translation of the TDEQ. A comparison was made between the backward translated questionnaire and the original version to avoid any misunderstandings or inaccuracies. Finally, to confirm the acceptability and clarity of the translated items, instructions and responses options and to see whether they are easy to understand, the translated questionnaire was run to a sample of respondents. This was tested through face to face cognitive interviews conducted by a native Persian speaker and the respondents were provided with feedback in case of any error or misunderstanding caused by the process of translation. Each item was then rephrased to verify the respondents' understanding.

 In line with the original TDEQ-5 (see Appendix), the Persian TDEQ-5 includes 25 items measuring five subscales: support network (four items; e.g., “I can pop over to see my coach or other support staff whenever I need to”); long-term development focus (five items; e.g., “My training is specifically designed to help me develop effectively in the long term”); holistic quality preparations (seven items; e.g., “My coach rarely talks to me about my well-being”; communication (four items; “My coach and I often try to identify what my next big test will be before it happens”); and alignment of expectations (five items; e.g., “I regularly set goals with my coach that are specific to my development”. Items were scored on a 6-point Likert scale ranging from 1 to 6 (“strongly disagree” to “strongly agree”).

**Psychological Skills Inventory for Sports–Youth version–Short Form** **(PSIS-Y-SF).** The Persian version of the PSIS-Y-SF was used to measure six dimensions of psychological skills (Mahoney et al., 1987; Milavic et al., 2019). The scale consists of six 3-item subscales: mental preparation (e.g. “I often rehearse my performance in my head before I perform”), motivation (e.g., “I am very motivated to do well in my sport”), concentration (e.g., “I often have trouble concentrating during my performance”), self-confidence (e.g., “I have faith in myself”), team emphasis (e.g., “I think team spirt is very important”), and anxiety control (e.g., “Before a meet, I worry if I will do well”). Items were scored using a five-point Likert scale that ranges from 1 to 5 (“almost never” to “almost always”).

**Procedure**

Ethical approval for this study was granted by the ethics committee at Isfahan (Khorasgan) branch, Islamic Azad University. We sent invitation letters to more than 15 sport schools and institutes located in Isfahan province, Iran. The survey consisting of the two scales and several demographic items were then distributed to the relevant schools and institutes. After consent was given by participants, and parents where necessary, the survey was administered in quiet classroom conditions under the supervision of a researcher. The surveytook about 15-30 minutes to complete. Before distributing the survey, participants were informed that there were no right, or wrong answers and they were assured that their response would be kept confidential. Indeed, no names were collected as the questionnaires were completed together in a single survey. This ensured confidentiality. Honesty was encouraged and the respondents were told they could ask any questions, at any time, as necessary.

**Data analyses**

Negatively worded items were reversely coded before data cleaning. The data cleaning involved detections of missing values and outliers. There were no missing values from the dataset. Data were screened for univariate outliers based on Z scores (*z* = ± 3.29) and multivariate outliers based on Mahalanobis distance (*p* < .001). All univariate outliers were transformed to a nearest valid value while 28 multivariate outliers were removed (Tabachnick & Fidell, 2013). As a result, a sample of 343 youth athletes was used further analysis.

A series of confirmatory factor analysis was conducted to examine the factorial validity of the Persian TDEQ-5 and PSIS-Y-SF in *M*plus 8 (Muthén & Muthén, 2017). A robust maximum likelihood estimation approach was used. Several fit indices were used to assess model fit, including comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Considering the cut-off values of CFI and TLI, an index value of over 0.90 and 0.95 indicates adequate fit and good fit, respectively. For RMSEA and SRMR, a cut-off value smaller than 0.08 shows adequate fit and a cut-off value smaller than 0.06 represents good fit, respectively (Hair et al., 2010; Hu & Bentler, 1999). Composite reliability (CR) was used on the top of Cronbach’s alpha (α) to evaluate scale reliability. The CR and α values of 0.70 or greater represent adequate reliability (Hair et al., 2010). A 95% confidence interval (CI) of latent factor correlation that does not include 1.00 confirms discriminant validity between the two calculated factors (Anderson & Gerbing, 1988).

Next, hierarchical regression analyses wereconducted to examine the predicting effects of TDE on psychological skills with IBM SPSS Statistics 25. To control for effects of age, gender, training experience, and competitive levels, these demographic variables were entered into theregression equations in the first step. In the second step, the five TDE factors were entered to predict each of the five psychological skills. For the diagnosis of multicollinearity, the variance inflation factor (VIF) was used. Multicollinearity was not present as all VIF values were below 5 (Brien, 2007).

Finally, a person-centred analytic approach, i.e., cluster analysis, was employed to identify groups of athletes based on their experiences of TDE in IBM SPSS Statistics 25. According to the two-step process recommended by Hair et al. (2010), a hierarchical cluster analysis was firstly conducted and followed by a nonhierarchical cluster analysis in order to increase the stability of the cluster solution. The first step involved a hierarchical cluster analysis using the Ward’s method and squared Euclidean distance to determine the potential number of clusters existed within the data. The agglomeration schedules and dendrogram were employed to identify the potential number of clusters. The second step involved a nonhierarchical cluster analysis (i.e., k-means) by specifying the most appropriate cluster solution identified from step 1. To ease the interpretation of what constitutes low or high TDE values from the identified clusters, Z-scores of TDE factors were calculated. Values of − 0.5 to 0.5 SD were classified as slightly below/above average, ± 0.5 to 1 SD as high/low, ± 1 SD as very high/low (Gustafsson et al., 2018). To examine how the TDE clusters differ in terms of psychological skills, a one-way ANOVA was conducted using cluster as the independent variable and the psychological skills as dependent variables. If the main test is significant, a post hoc test was followed using Tukey’s HSD to control for type I errors.

**Results**

**Validity and Reliability**

Data exhibited adequate fit to the original 5-factor measurement model of TDEQ-5:$ $MLMχ2 (265) = 567.32, CFI = 0.922, TLI = 0.911, RMSEA= 0.058, 90% CI (0.051, 0.064), SRMR = 0.059. Investigation of modification indices showed that error terms for items HQP1 and HQP5 (MLMχ2 = 47.67, expected parameter change = 0.93), as well as items HQP6 and HQP7 (MLMχ2 = 77.39, estimated parameter change = 0.83) had relatively large modification indices in comparison to the rest. The measurement model was thus re-specified by considering the correlation between the above-mentioned pairs of error terms. The model fit of the re-specified model was improved: MLMχ2 (263) = 471.53, CFI = .946, TLI = 0.938, RMSEA = 0.048, 90% CI (.041, .055), SRMR = 0.058. Latent factor correlations between the five factors ranged from -0.02 to 0.96, and none of their 95%CI correlation coefficients contained 1.00, confirming the scale discriminant validity (see Table 1). All the five subscales demonstrated adequate reliability (CR = .79 to .88; α = .79 to .88). Taken together, factorial validity, discriminant validity, and internal reliability of the 25-item Persian TDEQ-5 were supported.

\*\*\* [Table 1 About Here] \*\*\*

The data also fit the six-factor measurement model of PSIS-Y-SF adequately: MLMχ2 (265) = 246.79, CFI = 0.950, TLI = 0.936, RMSEA= 0.056, 90% CI (0.051, 0.064), SRMR = 0.059. The scale discriminant validity was also supported as latent factor correlations between the six factors ranged from -0.12 to 0.83, and none of the 95%CI correlation coefficients contained 1.00. The team emphasis subscale had inadequate reliability, and was thus excluded for subsequent analyses (CR = .41; α = .50). The rest five PSIS-Y-SF subscales had adequate reliability (CR = .77 to .84; α = .76 to .84).

**Relationships Between TDE and Psychological Skills: Regression Analyses**

 Table 2 presents the results of hierarchical regression analysis. Holistic quality preparation was a significant predictor of motivation, self-confidence, anxiety control, mental preparation, and concentration (β = .13 to .41, *p*s < .05). Alignment of expectation was found to significantly predict self-confidence (β = .19, *p* = .04), and long-term development was a significant predictor of anxiety control (β = .18, *p* = .03). All the demographic and TDE predictors accounted for a total of 12-20% variance in the five psychological skills.

\*\*\* [Table 2 About Here] \*\*\*

**Relationships Between TDE and Psychological Skills: Cluster Analysis**

By inspection of the agglomeration schedules and dendrogram, a three-cluster solution was considered suitable for classifying TDE scores. The three-cluster solution was also supported based on the result of a one-way MANOVA, which showed that the three clusters differed in levels of TDE subscale scores, *Pillai’s Trace* = .91, *F* (10, 674) = 99.17, *p* < .001, *ηp*2 = .46. To cross-validate the three-cluster solution, a split-half sample was randomly selected (*n* = 170) and subject to the recommended two-step process (Hair et al., 2010). It was found that 97.6% of the sample maintained their cluster membership, confirming the stability of the three-cluster solution.

Table 3 presents descriptive statistics of the three identified clusters. According to Z scores, the three identified clusters were: cluster 1 — “Average TDE” (*n* = 142), cluster 2 — “Very Low TDE” (*n* = 47), cluster 3 — “High TDE” (*n* = 154). The three clusters were significantly differed in levels of three out of five psychological skills, including motivation, self-confidence, and mental preparation (*p*s < 0.01). Specifically, cluster 3 had the highest levels of motivation, self-confidence, and mental preparation than the other two clusters (*p*s < .05). Meanwhile, cluster 2 reported the lowest levels of motivation and self-confidence among the three clusters (*p*s < .05). There was no statistical difference in mental preparation between cluster 2 and cluster 3.

\*\*\* [Table 3 About Here] \*\*\*

**Discussion**

This study aimed to translate and validate a Persian TDEQ-5, before examining the relationships between TDE factors and psychological skills through a variable and person-centered approach. The TDEQ and TDEQ-5 have been increasingly used to investigate the TDE both from an applied perspective, in order to gain an understanding of strengths and weaknesses of different talent environments, and a more research focused perspective to increase our understanding of the relationships between the environmental experiences of athletes and important outcomes (e.g., progression, goal orientation, mental toughness, wellbeing; Li et al., 2019; Ivarsson et al., 2015; Martindale et al., 2013; Thomas et al., 2020; Wang et al., 2011).

Between these two questionnaires to-date, they have been translated, psychometrically tested and used in a number of different languages. Published versions include the use of the TDEQ and/or TDEQ-5 in Chinese, English, Persian, French, Spanish, Portuguese, Swedish, Korean, Polish and Norwegian (Brazo-Sayavera et al., 2017; Costa et al., 2017; Gangso et al., 2021; Gesbert et al., 2021; Ivarsson et al., 2015; Lee et al., 2012; Li et al., 2017; Martindale et al., 2010; Mehrshad, & Rokhshareh, 2018; Siekanska & Wojtowicz, 2017). However, to date there is no psychometrically robust TDEQ-5 in the Persian language. This is important because a short version Persian TDEQ-5 is valuable way to increase the ability of Persian speaking countries to engage more easily with TDE research from a quantitative perspective. This is particularly important given the sparsity of research in this culture. Furthermore, it has been shown to have stronger psychometric properties than the original TDEQ in some other research contexts (e.g., Li et al., 2017).

The results revealed that the 25-item Persian TDEQ-5 was a valid and reliable tool, due to the demonstration of strong factorial validity, discriminant validity, and internal reliability. In fact, the factor structure and internal reliability of the Persian TDEQ-5 were stronger than other published TDEQ-5 translations (i.e., Spanish, French and Chinese). More specifically, the Persian TDEQ-5 demonstrated a CFI score of .946, with Cronbach’s α values ranging between .79 and .88, as compared to a CFI range of .90 to .934 and Cronbach’s α values ranging from .66 to .89 for the other versions (Brazo-Sayavera et al., 2017; Gesbert et al., 2021; Li et al., 2017). As such, the tool can certainly be used with confidence in Persian speaking contexts.

Previous work that has utilised the TDEQ or TDEQ-5 has highlighted strong relationships between features of the TDE and different athlete characteristics. For example, the nature of their motivation and goal orientation (Lee et al., 2012; Wang et al., 2011, 2016), well-being and stress (Ivarsson et al., 2015; Thomas et al., 2020), burnout and mental toughness (Li et al., 2017; 2019). However, the two studies to date that have investigated the relationship between the TDE and psychological skills through a variable-based analytic approach have not shown consistent relationships. For example, Andronikos et al. (2021) found a relationship between the environment and athlete commitment, but not confidence. Furthermore, Mehrshad and Rokhshareh (2018) found the relationships between the environment and psychological skills to be generally poor.

This is perhaps surprising given that a large body of qualitative research highlights the important role the environment plays in helping develop and nurture psychological characteristics (e.g., Anthony et al., 2016). Indeed, many coaches explicitly identify psychological development as a key aim (e.g., Cote et al., 2014), with research demonstrating the malleable nature of psychological skills through coach-led development interventions (e.g., Harwood, 2008). However, research does also highlight the individualised way in which people may respond to the same experience in terms of psychological outcomes. For example, post traumatic psychological growth does not occur in all people in all situations (Linley & Joseph, 2004). Within a sport context, similar experiences and challenge has been shown to have differential psychological impact across a range of different athletes (Collins & MacNamara, 2019; Savage et al., 2017).

Supporting this, previous work utilising the TDEQ has shown that athletes’ perceived competence mediated the relationship between the TDE experience and motivational orientation in young elite athletes attending sports schools in Singapore and Korea (Wang et al., 2016). However, given that psychological skills have been shown to be a fundamental and crucial driver of successful development journeys (e.g., Collins & MacNamara, 2019), helping athletes to manage and thrive through challenges both within and outwith sport (Savage et al., 2017), it is important to investigate further which elements of the environment, if any, are associated with higher levels of these psychological skills.

With this context in mind, it was interesting to find that both the hierarchical regression analysis and cluster analysis in this study revealed a number of positive relationships between the environment and psychological skills. Extending previous research through utilization of a person-centred approach, our cluster analysis revealed three levels of development environment overall – ‘High’, ‘Average’ and ‘Very low’, whereby the athletes experiencing the highest quality environment had significantly higher levels of motivation, self-confidence, and mental preparation than the other two clusters. Parallel to the findings of cluster analysis, the regression analysis revealed some relationships between different features of the environment and psychological skills. For example, Holistic Quality Preparation was a significant predictor of all of the psychological skills including motivation, self-confidence, anxiety control, mental preparation and concentration. Alignment of Expectations significantly predicted self-confidence, and Long-Term Development Focus significantly predicted anxiety control. Whereas Communication and Support Network did not significantly predict any psychological variable.

When looking more closely at what Holistic Quality Preparation entails within the TDEQ, it is perhaps unsurprising that it was the most wide-ranging significant predictor of various psychological outcomes. Holistic Quality Preparation concerns itself with a coach focus on understanding the athletes, both within and outwith sport. The factor focusses on the extent to which coaches focus on wellbeing and mental preparation, as well as providing clear guidance and transition planning and maintaining an appropriate balance. Given that the results seem to highlight a particularly important role in terms of psychological skills development for this feature of the environment, it is perhaps worrying that a number of previous research studies, including the results from this study, found that ‘Holistic Quality Preparation’ related features are often a relatively low scoring feature of athletes’ experiences (e.g., Mills et al., 2014; Thomas et al 2021).

Alignment of Expectations predicted self-confidence, which once this factor is unpacked, again is perhaps unsurprising. Research has shown that self-confidence is developed through three broad domains including mastery and demonstration of achievement, self-regulation, and social climate and support (Vealey, 2001). Alignment of Expectations within the TDEQ is defined as the extent to which individual goals for sport development are coherently set and aligned, including goal setting, goal review, individualised goals, and parents and athlete involvement. It is well known that goal setting and feedback, particularly on an individualised basis is a useful tool for developing mastery and skills (Beaumont et al., 2015). The development of parental, athlete and coach involvement and coherence helps provide social support and helps provide a consistency of message. This facilitates unambiguous direction for development and growth, which of course would also likely facilitate confidence building. The inclusion of the athlete in these discussions is also likely to facilitate self-regulation.

Last, Long-Term Development Focus predicted anxiety control, which in the context of sport development is interesting. Research has shown that much anxiety in youth athletes comes from uncertainty and pressure to perform at high levels consistently throughout age group stages (Taylor & Collins, 2021), even though age group performance is not strongly associated with long- term development and success (Roman et al., 2018). It is likely that a focus and reinforcement on development processes that clearly prioritise and support long-term outcomes enables athletes to better manage any worries they may have about their development in terms of inevitable maturational or performance fluctuations (Martindale et al., 2007).

As with other work in this area, there is rarely a single feature of the environment that is the only predictor of useful athlete outcomes (Ivarsson et al., 2015; Li et al., 2019; Martindale et al., 2013; Thomas et al., 2020; Wang et al., 2011). This is supported in this study’s results as well, with three features of the environment showing significant prediction of psychological skills, albeit with Holistic Quality Preparation being predictive across multiple skills. As such, it is clear that all features of the environment that have been identified in the literature to date (e.g., Martindale et al., 2010; Henriksen & Stambulova, 2017) are important and are likely to work in tandem with each other, rather than in isolation, to maximise positive outcomes of developing athletes.

On reflection, there are clear implications for coaches. The environment seems to impact on psychological development of athletes in a multi-faceted manner. As such it would be useful for coaches to regularly assess and monitor their environment in a holistic fashion and develop interventions based on identified weaknesses, while at the same time ensuring positive features are maintained is a useful process moving forward (e.g., Hall et al., 2019). It is important to recognise that this is not an easy task for coaches, clubs or national governing bodies, however the TDEQ may be able to facilitate this process as a mechanism for gaining feedback and monitoring (e.g., Mills et al., 2014). Holistic quality preparation was the most significant predictor of a broad range of psychological skills. As such, this is an important element of the environment for coaches to focus on. While an explicit focus on mental preparation is part of this process, this factor within the TDEQ also highlights the importance for coaches to take the time to get to know their athletes both inside and outside of sport to enable them to support athlete wellbeing, help provide a balanced approach, and provide clear guidance and transition planning.

Alignment of expectation was associated with athlete confidence. The implications for coaches that comes from understanding this TDEQ factor include the need for carrying out regular goal setting and review processes with athletes on an individual basis. Additionally, this factor also highlights the importance of working coherently with parents and other coaches. As such, while it is important to recognise that coaches often have busy roles with significant time constraints, communication with significant others may be an important mechanism for helping to develop and maintain athlete confidence. This may be due to the increased likelihood of receiving clear, consistent messages and appropriate support from various key stakeholders in their lives.

Long term development focus was shown to predict anxiety control. Again, this has implications for coaches. Within the sporting context there is often a lot of conflicting messaging about the importance and relevance of short-term success verses long term development (Ivarsson et al., 2015). The way in which coaches guide, reinforce and allow athletes to discover how they can best progress in the long term is likely to provide the clarity, focus and skills that are required for athletes to understand what their priorities are, and how their day-to-day efforts fit with their longer-term progress. Taking away uncertainty and providing clear expectations grounded in a long term vision may well be an important factor that allows athlete’s to better control their anxieties about sport and development.

In conclusion, this study has produced a valid and reliable Persian TDEQ-5, which can be used with confidence in Persian speaking contexts. Furthermore, it is clear from this data that the TDE is likely to be an important factor in the facilitation of psychological skills development. Coaches with the philosophy, time and inclination to focus on understanding and developing their athletes in a holistic way, providing guidance for transition preparation with a clear long-term agenda, and providing individualised and coherent goal setting and review process (including athletes, coaches and parents), are more likely to see positive psychological skills development outcomes for their athletes.

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Table 1

*Descriptive Statistics, Reliability, and Correlations among Studied Variables (n = 343)*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1. LTF | 2. AOE | 3. COM | 4. HQP | 5. SN | 6. MT | 7. SC | 8. AC | 9. MP | 10. TE | 11. C |
| 1. LTF |  ⁠— | .93\* | .91\*\* | .21\*\* | .51\*\* |  ⁠— | — | — | — | — | — |
| 2. AOE | .74\*\* |  ⁠— | .96\*\* | .23\*\* | .63\*\* |  ⁠— | — | — | — | — | — |
| 3. COM | .76\*\* | .80\*\* |  ⁠— | .18\*\* | .56\*\* |  ⁠— | — | — | — | — | — |
| 4. HQP | .15\*\* | .17\*\* | .12\* |  ⁠— | -.02 |  ⁠— | — | — | — | — | — |
| 5. SN | .43\*\* | .51\*\* | .49\*\* | -.05 |  ⁠— |  ⁠— | — | — | — | — | — |
| 6. MT | .23\*\* | .28\*\* | .25\*\* | .17\*\* | .13\*\* |  ⁠— | .83\*\* | .12 | .69\*\* | .78\*\* | .24\*\* |
| 7. SC | .20\*\* | .29\*\* | .27\*\* | .16\*\* | .14\*\* | .66\*\* |  ⁠— | .23\*\* | .66\*\* | .71\*\* | .30\*\* |
| 8. AC | .07 | .02 | -.01 | .29\*\* | -.04 | .09 | .19\*\* |  ⁠— | -.12\* | -.12 | .82\*\* |
| 9. MP | .25\*\* | .30\*\* | .30\*\* | .14\*\* | .21\*\* | .57\*\* | .54\*\* | -.11\* |  ⁠— | .70\*\* | .10 |
| 10. TE | .06 | .04 | .07 | -.01 | .04 | .25\*\* | .29\*\* | -.19\*\* | .33\*\* |  ⁠— | .05 |
| 11. C | .12\* | .11\* | .05 | .41\*\* | .03 | .20\*\* | .23\*\* | .65\*\* | .09 | -.15\*\* |  ⁠— |
| α | .79 | .80 | .88 | .86 | .88 | .81 | .83 | .82 | .84 | .50 | .76 |
| CR | .79 | .80 | .88 | .85 | .88 | .81 | .83 | .82 | .84 | .41 | .77 |
| *M* | 5.46 | 5.15 | 5.20 | 3.62 | 4.30 | 4.74 | 4.25 | 3.31 | 4.11 | 3.64 | 3.86 |
| *SD* | 0.54 | 0.77 | 0.86 | 1.32 | 1.36 | 0.44 | 0.79 | 1.11 | 0.88 | 0.73 | 0.95 |
| Range | 1-6 | 1-6 | 1-6 | 1-6 | 1-6 | 1-5 | 1-5 | 1-5 | 1-5 | 1-5 | 1-5 |

Note. LTF = long-term development focus, AOE = alignment of expectations, COM = communication, HQP = holistic quality preparation, SN = support network, MT = motivation, SC = self-confidence, AC = anxiety control, MP = mental preparation, TE = team emphasis, C = concentration, CR = composite reliability. The latent factor correlations are shown above the diagonal, and the zero-order correlations are shown below the diagonal.

\*\* *p* < .01, \* *p* < .05.

Table 2

*Regression Analyses of Predictors of Psychological Skills (n = 343)*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | Predictor | Motivation |  | Self-Confidence |  | Anxiety Control  |  | Mental Preparation |  | Concentration |
| β | *p* |  | β | *p* |  | β | *p* |  | β | *p* |  | β | *p* |
| Step 1 | Gender | .05 |  .34  |  | -.06 |  .29  |  | **-.12** |  **.04**  |  | .04 | .53 |  | -.003 |  .96 |
|  | Training experience | .04 |  .49 |  | **.14** |  **.01** |  | .06 |  .32 |  | .01 | .82 |  | .01 |  .85 |
|  | Age | **-.21** | **<.001** |  | **-.18** |  **.001** |  | -.04 |  .47 |  | -.11 | .06 |  | -.11 |  .06 |
|  | Competitive level | **.12** |  **.03** |  | **.12** |  **.03** |  | .06 |  .25 |  | .08 | .14 |  | **.15** |  **.01** |
| Step 2 | Gender | .01 |  .80 |  | -.10 |  .06 |  | **-.17** |  **.001** |  | .01 | .93 |  | -.07 |  .17 |
|  | Training experience | .07 |  .24 |  | **.17** |  **.003** |  | .10 |  .08 |  | .04 | .47 |  | .05 |  .34 |
|  | Age | **-.16** |  **.01** |  | **-.13** |  **.02** |  | -.03 |  .63 |  | -.05 | .34 |  | -.09 |  .11 |
|  | Competitive level | .06 |  .28 |  | .06 |  .29 |  | .02 |  .69 |  | .001 | .98 |  | .08 |  .15 |
|  | LTF | -.01 |  .89 |  | -.07 |  .44 |  | **.18** |  **.03** |  | -.01 | .90 |  | .11 |  .17 |
|  | AOE | .14 |  .14 |  | **.19** |  **.04** |  | -.04 |  .71 |  | .10 | .29 |  | .02 |  .83 |
|  | COM | .12 |  .20 |  | .15 |  .10 |  | -.13 |  .16 |  | .18 | .06 |  | -.13 |  .17 |
|  | HQP | **.13** |  **.02** |  | **.14** |  **.01** |  | **.31** | **<.001** |  | **.11** | **.04** |  | **.41** | **<.001** |
|  | SN | -.02 |  .74 |  | -.04 |  .56 |  | -.04 |  .51 |  | .07 | .28 |  | .02 |  .80 |
|  | ∆*R2* | .07 |  | .09 |  | .11 |  |  .10 |  |  .17 |
|  | *R2* | .12 |  | .14 |  | .14 |  |  .12 |  |  .20 |

Note. LTF = long-term development focus, AOE = alignment of expectations, COM = communication, HQP = holistic quality preparation, SN = support network. Significant standardized regression coefficients (*p* < .05) are in boldface. Gender (1 = male, 2 = female).

Table 3

*Descriptive Statistics for the Cluster Solution and Correlates (n = 343)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variables |  | Cluster 1 “Average TDE” (*n* = 142) |  | Cluster 2 “Very Low TDE” (*n* = 47) |  | Cluster 3 “High TDE” (*n* = 154) |  | *F*  | η*p*2 |
|  | *M (SD)* | *Z* |  | *M (SD)* | *Z* |  | *M (SD)* | *Z* |  |
| *Clustering variables* |  |  |  |  |  |  |  |  |  |  |
| LTF |  | 5.34 (0.35) a | -0.22 |  | 4.56 (0.49) b | -1.68 |  | 5.85 (0.22) c | 0.71 |  | 298.58\*\* | 0.64 |
| AOE |  | 4.96 (0.48) a | -0.24 |  | 3.82 (0.58) b | -1.72 |  | 5.73 (0.32) c | 0.75 |  | 377.04\*\* | 0.69 |
| COM |  | 5.07 (0.51) a | -0.14 |  | 3.65 (0.82) b | -1.80 |  | 5.78 (0.33) c | 0.68 |  | 336.97\*\* | 0.67 |
| HQP |  | 3.62 (1.03) a |  -0.002 |  | 3.21 (0.70) a, b | -0.31 |  | 3.75 (1.65) a, c | 0.10 |  | 3.08\* | 0.02 |
| SN |  | 3.73 (1.19) a | -0.41 |  | 2.84 (1.05) b | -1.07 |  | 5.26 (0.79) c | 0.71 |  | 141.30\*\* | 0.45 |
| *Correlates* |  |  |  |  |  |  |  |  |  |  |  |  |
| MT |  | 4.71 (0.42) a | — |  | 4.48 (0.59) b | — |  | 4.85 (0.44) c | — |  | 14.41\*\* | 0.08 |
| SC |  | 4.18 (0.82) a | — |  | 3.86 (0.90) b | — |  | 4.44 (0.74) c | — |  | 11.55\*\* | 0.06 |
| AC |  | 3.27 (1.06) a | — |  | 3.33 (0.95) a | — |  | 3.34 (1.20) a | — |  | 0.19 | 0.001 |
| MP |  | 3.94 (0.83) a | — |  | 3.73 (0.86) a, b | — |  | 4.39 (0.85) c | — |  | 15.91\*\* | 0.09 |
| C |  | 3.79 (0.88) a | — |  | 3.74 (0.63) a | — |  | 3.95 (1.07) a | — |  | 1.51 | 0.01 |

Note. TDE = talent development environment, LTF = long-term development focus, AOE = alignment of expectations, COM = communication, HQP = holistic quality preparation, SN = support network, MT = motivation, SC = self-confidence, AC = anxiety control, MP = mental preparation, TE = team emphasis, C = concentration. Means in the same row that do not share subscripts differed at *p* < .05 using Tukey’s HSD.

\**p* < .05, \*\**p* < .01.

**Appendix**

*The 5-Factor Talent Development Environment Questionnaire Factors and Items*

|  |  |
| --- | --- |
| Item content | Coding |
| 1. My training is specifically designed to help me develop effectively in the long term.1. آموزش من به طور خاص برای کمک در پیشرفت طولانی مدت طراحی شده است. | LTF1 |
| 2. My coach emphasises that what I do in training and competition is far more important than winning.2. مربی من تأکید می­کند کاری که من در تمرینات و مسابقات انجام می­دهم بسیار مهم­تر از پیروزی است.  | LTF 2 |
| 3. I spend most of my time developing skills and attributes that my coach tells me I will need if I am to compete successfully at the top/professional level.3. مربی به من می­گوید بیشتر وقت خود را صرف توسعه مهارت­ها و ویژگی­هایی کنم که در صورت موفقیت در رقابت در سطح بالا / حرفه­ای به آنها نیاز خواهم داشت. | LTF 3 |
| 4. My coach allows me to learn through making my own mistakes.4. مربی به من اجازه می­دهد تا از طریق اشتباهاتی که انجام می­دهم، بیاموزم. | LTF 4 |
| 5. I would be given good opportunities even if I experienced a dip in performance.5. به من فرصت­های خوبی داده می­شود حتی اگر افت عملکردی را تجربه کنم. | LTF 5 |
| 6. My coaches make time to talk to my parents about me and what I am trying to achieve.6. مربیانم درباره من و آنچه می­خواهم به آن دست یابم با والدینم صحبت می­کنند. | AOE1 |
| 7. The advice my parents give me fits well with the advice I get from my coaches.7. توصیه­هایی که والدینم به من می­دهند با توصیه­هایی که از مربیانم می­گیرم کاملاً متناسب است. | AOE2 |
| 8. My progress and personal performance is reviewed regularly on an individual basis.8. پیشرفت و عملکرد شخصی من به طور منظم به صورت فردی بررسی می­شود. | AOE3 |
| 9. I am involved in most decisions about my sport development.9. من در اکثر تصمیم گیری­های مربوط به توسعه ورزش خود شرکت دارم. | AOE4 |
| 10. I regularly set goals with my coach that are specific to my individual development.10. من مرتباً با مربی­ام اهدافی را تعیین می­کنم که مختص رشد فردی من باشد. | AOE5 |
| 11. My coach and I regularly talk about things I need to do to progress to the top level in my sport (e.g., training ethos, competition performances, physically, mentally, technically, tactically).11. من و مربی­ام به طور مرتب در مورد چیزهایی صحبت می­کنیم که من برای رسیدن به سطح بالای ورزشی­ام نیاز دارم (به عنوان مثال: اخلاقیات مربوط به تمرینات، اجرای مسابقات، از نظر جسمی، روحی، فنی، تاکتیکی). | COM1 |
| 12. My coach and I talk about what current and/or past world-class performers did to be successful. 12. من و مربی­ام درمورد آنچه که اجرا کنندگان فعلی و / یا گذشته در سطح جهانی برای موفقیت انجام داده­اند صحبت می­کنیم. | COM2 |
| 13. My coach and I often try to identify what my next big test will be before it happens.13. من و مربی­ام اغلب سعی می­کنیم آزمایش بزرگ بعدی­ام را قبل از آنکه اتفاق بیافتد، شناسایی کنیم. | COM3 |
| 14. My coach explains how my training and competition programme work together to help me develop.14. مربی من توضیح می­دهد که چگونه برنامه آموزش و رقابت من با هماهنگی هم به پیشرفت من کمک می­کنند. | COM4 |
|  15. My coach rarely talks to me about my well-being. (R)15. مربی من به ندرت در مورد سلامتی من صحبت می­کند. | HQP1 |
| 16. My coach doesn’t appear to be that interested in my life outside of sport. (R)16. به نظر نمی­رسد مربی من آنقدر علاقه­مند به زندگی من در خارج از ورزش باشد. | HQP2 |
| 17. My coach rarely takes the time to talk to other coaches who work with me. (R)17. مربی من بندرت با مربیان دیگری که با من کار می­کنند صحبت کند. | HQP3 |
| 18. I don’t get much help to develop my mental toughness in sport effectively.18. من برای توسعه ذهنی خود در ورزش به طور مؤثر کمک زیادی نمی­گیرم. | HQP4 |
| 19. I am rarely encouraged to plan for how I would deal with things that might go wrong. (R)19. من بندرت تشویق می­شوم برنامه­ریزی کنم راجع به نحوه برخورد با چیزهایی که ممکن است اشتباه انجام شود. | HQP5 |
| 20. The guidelines in my sport regarding what I need to do to progress are not very clear. (R)20. رهنمودهای موجود در ورزش من که مربوط به آنچه من برای پیشرفت کردن به آنها نیاز دارم خیلی واضح و روشن نیستند. | HQP6 |
| 21. I am not taught that much about how to balance training, competing, and recovery. (R)21. من چیز های زیادی راجع به متعادل کردن آموزش، رقابت و بازیابی یاد نگرفته­ام. | HQP7 |
| 22. Currently, I have access to a variety of different types of professionals to help my sports development (e.g., physiotherapist, sport psychologist, strength trainer, nutritionist, lifestyle advisor).22. در حال حاضر، من به افراد حرفه­ای برای کمک به پیشرفت ورزشی خود دسترسی دارم (به عنوان مثال: فیزیوتراپیست، روانشناس ورزشی، مربی بدنسازی، متخصص تغذیه، مشاور سبک زندگی). | SN1 |
| 23. I can pop in to see my coach or other support staff whenever I need to (e.g., physiotherapist, psychologist, strength trainer, nutritionist, lifestyle advisor).23. من می توانم درصورت لزوم به دیدن مربی یا سایر کارکنان پشتیبانی خود بروم (به عنوان مثال: فیزیوتراپیست، روانشناس، مربی بدنسازی، متخصص تغذیه، مشاور سبک زندگی). | SN2 |
| 24. My coaches talk regularly to the other people who support me in my sport about what I am trying to achieve (e.g., physiotherapist, sport psychologist, nutritionist, strength and conditioning coach, lifestyle advisor).24. مربیانم به طور منظم در مورد دستاوردهای من در ورزش با سایر حامیان من صحبت می کنند (به عنوان مثال ، فیزیوتراپیست، روانشناس ورزشی، متخصص تغذیه، مربیان بدنسازی (قدرتی و استقامتی)، مشاور سبک زندگی).  | SN3 |
| 25. 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 (e.g., coaches, physiotherapists, sport psychologists, strength trainers, nutritionists, lifestyle advisors).25. به نظر می رسد کسانی که در ورزش به من کمک می­کنند، در مورد آنچه که برای من بهتر است، درامتداد یکدیگر عمل می­کنند (به عنوان مثال مربیان، فیزیوتراپیست ها، روانشناسان ورزشی، مربیان بدنسازی، متخصصان تغذیه، مشاوران سبک زندگی). | SN4 |

Note. LTF = long-term development focus, AOE = alignment of expectations, COM = communication, HQP = holistic quality preparation, SN = support network, (R) = reversely coded item.