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ORIGINAL RESEARCH

A preliminary validation of the Arabic version of the "Profile of Emotional Competence" questionnaire among Tunisian adolescent athletes and nonathletes: insights and implications for sports psychology

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Background: Emotional intelligence refers to how individuals deal with intrapersonal or interpersonal emotional information and how a subject identifies, expresses, understands, regulates, and uses his/her own emotions or those of others. The purpose of the present study was to validate the Arabic version of the "Profile of Emotional Competence" (PEC) questionnaire.
Methods: A sample of 285 Tunisian participants (153 men and 132 women) was recruited, age range: 12–18 years (15.2±2.4 years). The participants were prospectively classified into the following two groups: athletes (n=101) and nonathletes (n=184).
Results: Findings of the present study indicated that the Arabic version of the PEC questionnaire has good psychometric properties. The Cronbach's α suggested that all subscales had adequate internal consistency. Test–retest reliability was excellent. The correlations between interpersonal and intrapersonal subscales were low to moderate (from 0.37 to 0.59), except for the regulation interpersonal, utilization interpersonal, and utilization intrapersonal subscales, which showed negligible correlations with the other subscales. The two-factor solution (interpersonal and intrapersonal competence models) accounted for 62.1% of variance. All subscales loaded on the expected factor, except for the utilization intrapersonal and regulation interpersonal subscales, which did not yield a satisfactory loading. Age and athletes' status impacted on all the PEC dimensions, except for some subscales.
Conclusion: Finally, psychologists and practitioners in the Arab world could use the PEC questionnaire as a valid and reliable instrument for planning ad hoc interventions.
Keywords: emotion, gender, age, sport exercise, validation

Introduction

In the last 2 decades, emotional intelligence (EI) has attracted considerable interest among psychologists and sports scientists. This concept refers to how individuals deal with intrapersonal or interpersonal emotional data[1] and how a subject identifies, expresses, understands, regulates, and/or uses his/her own emotions or those of others.[2,3] Theoretical paradigms subdivide EI into the following three perspectives: 1) ability, 2) trait, and 3) mixed model. In this article, we decided to focus on EI mainly as a trait.

More in detail, the ability perspective takes as a starting point the working hypothesis that EI is a cognitive ability, which is not measured by standard intelligence tests and which relates to reasoning and problem solving within the emotional domain. EI,

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as an ability, is defined as "the ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth".[2] Mayer et al[4] further defined this concept as "the ability to process and reason about emotional information". EI, as trait, can be defined as "a constellation of emotion-related dispositions capturing the extent to which people attend to, identify, understand, regulate, and utilize their emotions and those of others".[3]

Demographic variables such as age and gender have been widely studied with respect to EI,[5] leading sometimes to conflicting results, with some studies reporting higher EI scores among females and other investigations finding no clear differences between males and females.[6] Concerning age, the "Six Seconds' Emotional Intelligence Assessment" (SEI) study, which has recruited a sample of 405 American people, has shown that EI tends to increase slightly but significantly with age.[7]

Several psychometric tools have been developed to assess EI. For instance, different questionnaires measure EI as ability, such as the "Multi Factor Emotional Intelligence Scale" (MEIS) and the "Mayer-Salovey-Caruso Emotional Intelligence Test" (MSCEIT).[8,9] There are some other questionnaires, namely the "Trait Emotional Intelligence Questionnaire" (TEIQue),[10] the TEIQue-short form (TEIQue-SF),[11] and the TEIQue-child form,[12] that measure EI as a trait. However, when the objective is to obtain a global picture, the "Profile of Emotional Competence" (PEC)[13] represents an added value.

Brasseur et al[13] have developed the PEC because the other inventories were not deemed able to measure the different competences, separately in terms of self and others (intrapersonal vs interpersonal skills). Brasseur et al[13] argued that the PEC is more theoretically aligned with its item content, overall briefer, and more effective to administer than the other tools. As such, authors encouraged researchers or practitioners to use the PEC as an alternative to the other existing inventories and questionnaires. They also suggested that future research is warranted to further examine or confirm the reliability and validity of the PEC among diverse populations from different countries and settings. Of note, the PEC was administered to either healthy individuals or patients. However, its reliability for athletic and Arabic populations has not been assessed yet. This information would help sports practitioners to use the PEC also for these populations.

Various studies have explored the viability of the EI construct in predicting different outcomes, and for example, EI has been linked with performance under stress.[14] It is worth noting that practicing sport requires the effective management of stress, tolerance of frustration, regulation of mood, and exercise of emotional restraint, within public purview and scrutiny.[15] As such, sports psychologist and scientists could benefit from adopting an easy and comprehensive questionnaire to assess the level of EI among athlete populations.

Generally, EI has been found to be associated with positive performance and outcomes, in a variety of environments, including the academic setting.[14] In the field of sports science, the construct of EI has been linked with sports performance. For instance, Perlini and Halverson[15] evaluated the level of EI in a sample of 79 National Hockey League (NHL) players across 24 teams. They found that EI intrapersonal competence and general mood were good predictors of hockey performance (in terms of NHL points and games played). Zizzi et al[16] explored the relationships between EI and global measures of baseball performance in a sample of 61 college baseball players recruited across 10 teams. Significant correlation between EI and pitching and hitting statistics was detected. Crombie et al[17] studied team EI in cricketers and found it positively associated with sports performance of the cricket teams. Furthermore, team EI was shown to be a significant predictor of sports performance. Also, Ghezelsefloo et al[18] reported that, in a sample of 95 handball players recruited across nine teams, EI was associated with performance. Mohammad et al[19] found that EI varied significantly between state and national volleyball players and was influenced by practice and expertise. Ghazili et al[20] reported a positive association between EI and goal orientation among male athletes, whereas Gáspár et al[21] described a correlation between exercise volume, defined as weekly hours of exercise, and EI. Vaughan et al[22] investigated a sample of 269 participants aged between 18 and 26 years with a range of athletic experience and found that trait EI was positively associated with the quality of decision making and negatively associated with deliberation time and risk taking.

From a trans-cultural standpoint, psychometric properties of the English version of PEC have been so far examined in Belgian,[13] Tunisian,[23] and Japanese[24] populations.

However, concerning the point of view of applied sports psychology, very few studies have explored the theoretical differences between athletes and nonathletes regarding emotional competences, reporting conflicting or mixed evidence. Pasand,[25] for example, was not able to find any difference between athletes and nonathletes in terms of EI, whereas

Sohrabi et al[26] found statistically significant differences. Therefore, the aims of the present study were 1) to validate the Arabic version of the PEC and 2) to investigate potential EI-related differences between athletes and nonathletes.

Participants and methods

Participants

Participants were asked to provide demographic information, such as age, gender, if they practiced any sport, and in which sports discipline they were primarily involved. A sample of 285 Tunisian participants (153 men and 132 women, 53.7 and 46.3% of the sample, respectively) was recruited. Age was from 12 to 18 years (15.2±2.4 years) and was categorized in the following two ranges: 12–15 and 16–18 years. Participants were prospectively classified into the following two groups: athletes (n=101, 35.4% of the sample; they participated in a variety of sports, such as taekwondo, kickboxing, athletics, soccer, and trained about three times per week) and nonathletes (n=184, 64.6% of the sample; they were students with no sports background).

Procedure

Participants attended a total of three data collection sessions, separated by 1 week. During the control session (week 1), participants were familiarized with the psychological inventory. This session was devised as a control day in which the psychological inventory used in the present study was presented and explained to the participants (no data were collected from measurement point 1). The questionnaires of emotional competence were distributed to the participants through their teachers. On measurement point 2, participants completed the questionnaire during class time with a member of the research team available to respond to enquiries. A total of 20–30 minutes were given for each participant to properly answer the questionnaire in a comfortable environment. On measurement point 3, participants completed the questionnaire for the second time, in order to verify their comprehension of items (test–retest reliability analysis).

The present study was carried out according to the 1964 Declaration of Helsinki and its subsequent amendments. Participants were informed of their rights during the study, and anonymity of results was ensured. No information about the purposes of the study was provided to the participants until they had completed the protocol, which was approved by the Ethics Committee of the "High Institute of Sport and Physical Education" of Ksar Said, Manouba University, Tunisia, before the commencement of the assessment.

Each participant (or if the subject was under age, his/her parent/guardian) signed a written, informed consent before taking part in the study.

Psychometric tool: the PEC questionnaire

In the present investigation, the PEC[13] was used to assess EI. Participants responded to the 50 items using a 5-point Likert scale (ranging from "strongly disagree" to "strongly agree"). The inventory was designed to evaluate the five core competences of EI – namely, identification (I), comprehension (C), expression (E), regulation (R), and utilization (U) of emotions – separately, distinctly for one's own and others' emotions. More in detail, the assessing tool was devised in order to quantitatively investigate intrapersonal emotional competence (that is, competence related to one's own emotions) and interpersonal emotional competence (or competence related to other people's emotions) separately. Furthermore, the PEC produces a global score related to the overall emotional competence level. The PEC has displayed satisfactory discriminant and convergent validity.[13]

Translation and validation of the questionnaire

From a methodological standpoint, the linguistic validation of the instrument included all the steps proposed by Vallerand.[27] The first step concerned the development of a preliminary version of the inventory, which consisted in a draft approved by an expert evaluation committee. Moreover, a pretest assessment of the clarity of items was performed on a target population (a small sample of 20–30 subjects). During the next step, two translators worked independently to compose a consensus version of the PEC from English to the Arabic language (forward/backward translation). The last step was the back-translation from Arabic to English. The Arabic version of the PEC is reported in Table S1.

The second phase of the validation of the PEC involved assessing the accuracy, reliability, and validity of the instrument. More in detail, this phase consisted of the factor structure analysis known as "exploratory" (exploratory factor analysis [EFA]) and the comprehensive evaluation of the internal consistency.

As a first step, descriptive statistics was performed in order to characterize the collected data, which, before any statistical handling and processing, were visually inspected for potential outliers. More in detail, continuous data were computed as mean and SD, while categorical data were expressed as percentage, where appropriate. Asymmetry/skewness and kurtosis were also computed for each item

score. In particular, asymmetry/skewness and kurtosis values were deemed acceptable if they ranged from –2 to +2, in case of normal univariate data distribution.[28]

Previous validation studies of the PEC provided evidence that a two-correlated factor structure adequately fits the observed data. As such, we could have tested the factor structure of the Arabic PEC through confirmatory factor analysis (CFA). However, the psychometric properties of psychological measures are not automatically warranted when the measures are adapted in other languages.[29] Therefore, we chose to use an exploratory approach, rather than a confirmatory one. CFA requires each indicator to load on only one factor, but, as shown by recent studies,[30] this assumption might be too restrictive for questionnaires related to the field of personality research, because indicators may have secondary loadings significantly different from zero. The presence of these secondary loadings is, indeed, a critical and crucial issue: it would imply that the items have a weak discriminant validity, since an item that is considered as an indicator of a specific construct can also be an indicator of another construct. In CFA, the more the secondary loadings departs from zero, the more the correlations among the factors will be inflated to account for nonzero secondary loadings restricted to zero, thus yielding biased loadings, overestimated factor correlations, distorted structural relations, and lack of fit, among others.[30]

For these reasons, the factor structure of the Arabic PEC was tested using EFA. More in detail, different EFA runs were conducted. First, an exploratory run was performed to control for the factorability of the correlation matrix using the Bartlett's test of sphericity. In case of statistical significance, this test enables scholars to reject the null hypothesis (that is, all the correlations in the correlation matrix are zero and the matrix is an identity matrix).

The Kaiser-Meyer-Olkin (KMO) measure was calculated in order to quantitatively assess the sampling adequacy. Ideally, the KMO should be greater than 0.60 and is considered excellent if greater than 0.90. The likely number of factors was determined both 1) by computing the number of factors with eigenvalues greater than 1 and 2) by visually inspecting the scree plot. The optimal number of factors to extract was confirmed through parallel analysis (PA).[31,32] PA compares the observed eigenvalues of factors (if factor analysis is performed) or components (if principal component analysis is performed) extracted from the correlation matrix to be analyzed with those obtained from the simulation of independent correlation matrices of normal pseudo-random samples (in this case, 1,000),[32] having the same sample size and number of variables. We retained those factors whose observed eigenvalues were larger than the 95th percentile of the distribution of the corresponding simulated eigenvalues.

After checking the factor loadings, items were deleted in cases of unsatisfactory loading (that is, values less than 0.45) or loading conflicting with a sound and clear theoretical explanation. Different runs were, therefore, carried out iteratively until convergence was attained and a satisfactory, clearly interpretable solution was finally achieved.

Furthermore, cases of cross-loading were interpreted according to the criteria of salience and total amount of explained variance, with theoretical considerations also being taken into account.[31]

Reliability analysis of the questionnaire

Reliability of the questionnaire administered was computed by calculating the Cronbach's α (both unadjusted and adjusted according to the number of items). The following rule of thumb[33,34] was used for interpreting the coefficient: excellent psychometric properties with α equal to or greater than 0.9, good with α in the range of 0.8–0.9, acceptable with α in the range of 0.7–0.8, questionable with α in the range of 0.6–0.7, poor with α in the range of 0.5–0.6, and unacceptable with α less than 0.5.

Test–retest reliability analysis of the questionnaire

Test–retest reliability analysis was computed calculating the intraclass correlation coefficient (ICC) (ICC(3,k) according to the Shrout and Fleiss[35] convention, two-way mixed model, average measure, consistency, according to the McGraw and Wong[36] convention), computed together with its 95% CI.[37,38] The following rule of thumb was used to interpret the reliability coefficient: perfect reliability with coefficient equal to 1, excellent if greater than or equal to 0.9, good reliability in the range of 0.8–0.9, acceptable reliability in the range of 0.7–0.8, questionable reliability in the range of 0.6–0.7, poor reliability in the range 0.5–0.6, unacceptable reliability with coefficient less than 0.5, and no reliability with coefficient equal to 0.

Statistical analyses

Student's *t*-test was performed to explore gender-related differences. Multivariate ANOVA (MANOVA)[39] and multivariate regression analyses were carried out in order to investigate the impact of athlete status, age, and gender on the questionnaire scores. Pearson's correlations were conducted to determine the relationship between EI

dimensions. The strength of correlation was measured using the rule of thumb proposed by Hinkle and collaborators[40]: the correlation was deemed negligible with *r* coefficient in the range of 0.00–0.30, low with *r* in the range of 0.30–0.50, moderate with *r* in the range of 0.50–0.70, high with *r* in the range of 0.70–0.90, and very high with *r* in the range of 0.90–1.00.

All statistical analyses were performed using the commercial software "Statistical Package for Social Sciences" (SPSS for Windows, Version 24.0, released in 2016; IBM Corporation, Armonk, NY, USA). PA was performed with Factor software (which is freely available at http://psico.fcep.urv.es/utilitats/factor/Download.html).

For all analyses, statistical significance was set at $P<0.05$.

Results

Internal consistency of study items

We tested the dataset for a preliminary assessment, searching for potential multivariate outliers, that is, participants with unusual patterns of answers on questionnaire items. Skewness and kurtosis values were acceptable (Table 1). Then, we computed the reliability statistics for the questionnaire. The Cronbach's α coefficient for all the questionnaires yielded a value of 0.859 (adjusted 0.858). The Cronbach's α coefficient for the interpersonal competence dimension resulted 0.688 (adjusted 0.686), while the coefficient for intrapersonal competence dimension was 0.750 (adjusted 0.752). Further details are shown in Table 2.

Test–retest reliability analysis

ICCs ranged from 0.94 (R interpersonal competence) to 0.99 (E interpersonal competence), demonstrating excellent test–retest reliability, with all coefficients greater than 0.9. ICC for the interpersonal domain was 0.9823 (95% CI 0.9776–0.9860), whereas for the intrapersonal domain was 0.9843 (95% CI 0.9802–0.9876). ICC for the overall questionnaire resulted in 0.9866 (95% CI 0.9830–0.9893). Further details are reported in Table 3.

Factor structure of the questionnaire

The KMO measure resulted good (0.868), and the Bartlett's test statistically was statistically significant.

PA and the preliminary EFAs with visual inspection of the scree plot and the computation of factors with eigenvalues greater than 1 suggested that the optimal number of factors was two. We, thus, performed EFAs, setting the predefined number of factors to be extracted. The two-factor solution accounted for 62.1% of variance. The best loading factors are shown in Table 4. All subscales loaded on the expected factor, except for U intrapersonal and R interpersonal subscales, which did not yield a satisfactory loading, and therefore, could not be retained.

Correlation between all EI dimensions

Inter-item correlations were moderate to high, and corrected item-total correlation was higher than 0.20 for most items.[41,42] Further details are reported in Table 5.

Correlations between the subscales and I interpersonal were all low, except for the moderate correlation with E interpersonal and the negligible correlations with R interpersonal and U intrapersonal. Similarly, correlations between the subscales and I intrapersonal were low, apart from the moderate correlations with E intrapersonal and C intrapersonal and the negligible correlations with R interpersonal, U interpersonal, and U intrapersonal. Correlations with C interpersonal resulted low, except for those with R interpersonal, R intrapersonal, and U interpersonal, which resulted negligible. The correlation with U intrapersonal was not significant. Correlations between C intrapersonal, E interpersonal, and E intrapersonal resulted moderate, whereas the correlation with R intrapersonal was low and the correlations with R interpersonal and U interpersonal were negligible. Finally, the correlation between C intrapersonal and U intrapersonal was not significant. Correlations between the subscales and E interpersonal were in part low and in part negligible. Correlations between E intrapersonal and R interpersonal and U interpersonal resulted negligible, whereas the correlation with R intrapersonal was low. The correlation with U intrapersonal was not significant. Correlations between the subscales and R interpersonal subscale were negligible, except for the correlation with U interpersonal (not significant). Correlations between the subscales and R intrapersonal subscale were low. Finally, correlation between U interpersonal and U intrapersonal resulted negligible.

The correlation between the two factors individuated by EFA yielded a value of 0.737 ($P<0.001$). Correlations between the subscales and the overall score were low to high and ranged from 0.36 ($P<0.001$) for U intrapersonal to 0.75 ($P<0.001$) for C intrapersonal. Correlation between the interpersonal domain and the overall score was very high (0.91, $P<0.001$) as well as between the overall score and the intrapersonal domain (0.92, $P<0.001$).

Table 1 Descriptive statistics for each item of the Arabic version of the PEC questionnaire

Item	Skewness	Kurtosis	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's α if item deleted
Item 1	0.163	−1.452	160.414	707.596	0.302	0.359	0.857
Item 2	0.201	−1.610	160.442	693.832	0.436	0.461	0.854
Item 3	0.412	−1.538	160.695	732.762	−0.009	0.394	0.863
Item 4	−0.728	−0.783	159.537	727.052	0.077	0.329	0.861
Item 5	−0.069	−1.540	160.179	692.507	0.478	0.525	0.853
Item 6	−1.512	0.947	159.021	705.718	0.407	0.380	0.855
Item 7	−1.048	−0.206	159.344	709.311	0.321	0.439	0.857
Item 8	−0.322	−1.317	159.930	717.256	0.192	0.344	0.859
Item 9	0.062	−1.553	160.284	693.521	0.460	0.471	0.854
Item 10	−0.502	−1.200	159.832	742.979	−0.127	0.315	0.865
Item 11	−0.518	−0.999	159.758	720.818	0.160	0.308	0.859
Item 12	−0.289	−1.492	159.975	727.080	0.060	0.346	0.861
Item 13	−0.766	−0.848	159.400	710.790	0.308	0.472	0.857
Item 14	−0.245	−1.338	159.975	726.827	0.074	0.324	0.861
Item 15	−0.103	−1.673	160.091	721.569	0.117	0.305	0.861
Item 16	−0.695	−0.944	159.611	711.189	0.272	0.473	0.857
Item 17	−0.210	−1.613	160.018	710.531	0.246	0.402	0.858
Item 18	0.192	−1.584	160.411	687.968	0.513	0.579	0.853
Item 19	−1.067	−0.175	159.375	709.425	0.319	0.328	0.857
Item 20	−0.003	−1.742	160.204	691.001	0.449	0.459	0.854
Item 21	−0.422	−1.414	159.821	716.612	0.183	0.415	0.859
Item 22	−1.084	−0.015	159.337	721.302	0.165	0.290	0.859
Item 23	−0.751	−0.785	159.439	708.923	0.334	0.369	0.856
Item 24	−0.672	−0.944	159.744	721.142	0.144	0.337	0.860
Item 25	0.623	−1.172	160.811	694.992	0.457	0.556	0.854
Item 26	0.052	−1.643	160.274	689.777	0.486	0.541	0.853
Item 27	−0.274	−1.628	159.947	687.057	0.514	0.535	0.853
Item 28	0.053	−1.610	160.319	698.176	0.393	0.474	0.855
Item 29	0.193	−1.399	160.498	698.814	0.417	0.564	0.855
Item 30	−0.610	−0.926	159.740	705.763	0.355	0.433	0.856
Item 31	−0.302	−1.500	159.965	691.034	0.491	0.535	0.853
Item 32	−0.776	−0.873	159.614	696.456	0.457	0.459	0.854
Item 33	−0.688	−0.933	159.607	704.394	0.369	0.414	0.856
Item 34	0.299	−1.292	160.523	699.286	0.420	0.595	0.855
Item 35	−0.385	−1.034	159.804	715.799	0.236	0.354	0.858
Item 36	−0.143	−1.497	160.144	725.807	0.078	0.307	0.861
Item 37	0.479	−1.252	160.681	699.993	0.401	0.420	0.855
Item 38	−0.148	−1.521	160.067	687.161	0.546	0.523	0.852
Item 39	−0.131	−1.524	160.102	729.057	0.039	0.373	0.862
Item 40	0.513	−1.122	160.779	711.391	0.274	0.499	0.857
Item 41	−0.632	−1.048	159.730	715.078	0.216	0.350	0.858
Item 42	−0.198	−1.490	160.035	688.189	0.529	0.535	0.852
Item 43	0.259	−1.482	160.463	701.658	0.366	0.430	0.856
Item 44	0.129	−1.483	160.319	693.690	0.473	0.487	0.854
Item 45	−1.158	−0.003	159.267	703.189	0.413	0.366	0.855
Item 46	0.316	−1.469	160.597	710.002	0.264	0.420	0.858
Item 47	−0.444	−1.349	159.825	697.694	0.423	0.452	0.855
Item 48	−0.531	−0.889	159.670	724.701	0.115	0.316	0.860
Item 49	−0.053	−1.556	160.183	694.171	0.453	0.520	0.854
Item 50	−0.559	−1.171	159.754	715.235	0.210	0.339	0.859

Abbreviation: PEC, Profile of Emotional Competence.

Table 2 Descriptive statistics for each subscale of the Arabic version of the PEC questionnaire

Subscale	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's α if item deleted
Intrapersonal					
I intrapersonal	13.349	6.116	0.599	0.413	0.675
C intrapersonal	13.310	6.196	0.608	0.443	0.673
E intrapersonal	13.130	6.018	0.594	0.474	0.676
R intrapersonal	12.924	5.984	0.630	0.401	0.663
U intrapersonal	13.162	7.692	0.195	0.130	0.815
Interpersonal					
I interpersonal	12.664	5.426	0.595	0.400	0.574
C interpersonal	13.211	5.556	0.460	0.249	0.630
E interpersonal	13.098	4.937	0.628	0.453	0.548
R interpersonal	13.047	6.751	0.206	0.065	0.731
U interpersonal	12.710	6.185	0.358	0.179	0.673

Abbreviations: C, comprehension; E, expression; I, identification; PEC, Profile of Emotional Competence; R, regulation; U, utilization.

Table 3 ICCs for each subscale

Subscale	ICC	95% CI
I interpersonal	0.9593	0.9486–0.9678
I intrapersonal	0.9713	0.9637–0.9772
C interpersonal	0.9664	0.9576–0.9734
C intrapersonal	0.9745	0.9679–0.9798
E interpersonal	0.9863	0.9827–0.9891
E intrapersonal	0.9773	0.9714–0.9820
R interpersonal	0.9417	0.9264–0.9538
R intrapersonal	0.9823	0.9777–0.9860
U interpersonal	0.9848	0.9808–0.9879
U intrapersonal	0.9637	0.9541–0.9712

Abbreviations: C, comprehension; E, expression; I, identification; ICCs, intraclass correlation coefficients; R, regulation; U, utilization; CI, confidence interval.

Table 4 Factor loadings for each subscale of the Arabic version of the PEC questionnaire

Subscale	Factor	
	1	2
I interpersonal		0.769
I intrapersonal	0.711	
C interpersonal		0.472
C intrapersonal	0.786	
E interpersonal		0.743
E intrapersonal	0.784	
U interpersonal		0.515
R intrapersonal	0.591	

Abbreviations: C, comprehension; E, expression; I, identification; PEC, Profile of Emotional Competence; R, regulation; U, utilization.

ET between athletes and nonathletes, genders, and age group

At the MANOVA, gender had a statistically significant impact on C intrapersonal (F=10.33, P=0.002) and E intrapersonal (F=7.88, P=0.005) and had a borderline effect on I interpersonal (F=3.18, P=0.076). Being an athlete had an impact on I intrapersonal (F=9.34, P=0.003) and E intrapersonal (F=9.37, P=0.002) and had a borderline effect on intrapersonal (F=3.33, P=0.070). Age had an effect on I interpersonal (F=5.89, P=0.016), C interpersonal (F=11.01, P=0.001), E interpersonal (F=11.24, P=0.001), E intrapersonal (F=7.29, P=0.007), U intrapersonal (F=7.14, P=0.008), interpersonal (F=11.62, P=0.001), and global (F=7.38, P=0.007). No other statistically significant effects could be detected.

At the multivariate regression analysis, age impacted on all subscales, except for R interpersonal (P=0.667). Similarly, athlete status influenced all the subscales apart from R interpersonal (P=0.529) and U intrapersonal (P=0.328). Gender did not impact significantly on any of the PEC subscales. The interaction age × athlete status did not yield statistical significance for C interpersonal (P=0.715), E interpersonal (P=0.255), E intrapersonal (P=0.152), and R interpersonal (P=0.841), whereas the interaction age × gender did not impact on I interpersonal (P=0.190), I intrapersonal (P=0.083), E interpersonal (P=0.359), R interpersonal (P=0.490), R intrapersonal (P=0.672), and U interpersonal (P=0.988). The interaction athlete status × gender did not influence the scores of R interpersonal (P=0.056), R intrapersonal (P=0.668), U interpersonal (P=0.917), and U intrapersonal (P=0.947). Finally, the interaction age × athlete status × gender impacted only on E intrapersonal (P=0.027). For further details, the reader is referred to Tables 6–8.

Discussion

This study effectively validated the metrological qualities of our Arabic translation of the PEC, which can henceforth be

Table 5 Correlation between the different subscales of the Arabic version of the PEC questionnaire

Correlation	I interpersonal	I intrapersonal	C interpersonal	C intrapersonal	E interpersonal	E intrapersonal	R interpersonal	R intrapersonal	U interpersonal
I intrapersonal	0.422***								
C interpersonal	0.370***	0.428***							
C intrapersonal	0.462***	0.528***	0.489***						
E interpersonal	0.596***	0.428***	0.482***	0.548***					
E intrapersonal	0.426***	0.579***	0.445***	0.597***	0.487***				
R interpersonal	0.225***	0.151*	0.165***	0.199***	0.188***	0.152*			
R intrapersonal	0.481***	0.470***	0.240***	0.498***	0.438***	0.475***	0.245***		
U interpersonal	0.369***	0.294***	0.239***	0.221***	0.372***	0.264***	0.033	0.358***	
U intrapersonal	0.132*	0.132*	−0.078	0.104	0.135*	0.053	0.222***	0.337***	0.130*

Notes: *Statistically significant with *P*-value <0.05. ***Statistically significant with *P*-value <0.001.
Abbreviations: C, comprehension; E, expression; I, identification; PEC, Profile of Emotional Competence; R, regulation; U, utilization.

Table 6 Mean ± SD of the PEC subscales and factors for male and female participants

Subscale	Male	Female	Statistical significance (*P*-value)
I interpersonal	3.48±0.81	3.60±0.85	0.235
I intrapersonal	3.16±0.85	3.09±0.87	0.529
C interpersonal	3.05±0.90	2.91±0.98	0.222
C intrapersonal	3.10±0.78	3.25±0.91	0.131
E interpersonal	3.12±0.88	3.08±1.00	0.742
E intrapersonal	3.31±0.86	3.38±0.97	0.493
R interpersonal	3.18±0.81	3.11±0.90	0.509
R intrapersonal	3.51±0.83	3.57±0.94	0.594
U interpersonal	3.48±0.84	3.46±0.86	0.862
U intrapersonal	3.38±0.77	3.20±1.03	0.109
Interpersonal	16.31±2.73	16.17±3.18	0.689
Intrapersonal	16.46±2.84	16.50±3.43	0.902
Global	32.77±5.05	32.67±6.05	0.886

Abbreviations: C, comprehension; E, expression; I, identification; PEC, Profile of Emotional Competence; R, regulation; U, utilization.

Table 7 Multivariate regression analysis for each variable

Source	Dependent variable	*F*	Significance	Partial eta squared
Intercept	I interpersonal	5606.344	0.000	0.953
	I intrapersonal	3869.809	0.000	0.933
	C interpersonal	3032.549	0.000	0.916
	C intrapersonal	3979.523	0.000	0.935
	E interpersonal	3283.752	0.000	0.922
	E intrapersonal	4389.073	0.000	0.941
	R interpersonal	3350.299	0.000	0.924
	R intrapersonal	4832.077	0.000	0.946
	U interpersonal	4912.829	0.000	0.947
	U intrapersonal	3649.237	0.000	0.929
Age	I interpersonal	60.119	0.000	0.178
	I intrapersonal	14.180	0.000	0.049
	C interpersonal	35.897	0.000	0.115
	C intrapersonal	22.043	0.000	0.074
	E interpersonal	55.645	0.000	0.167
	E intrapersonal	41.677	0.000	0.131
	R interpersonal	0.185	0.667	0.001
	R intrapersonal	25.961	0.000	0.086
	U interpersonal	27.985	0.000	0.092
	U intrapersonal	5.128	0.024	0.018
Athlete	I interpersonal	5.304	0.022	0.019
	I intrapersonal	38.792	0.000	0.123
	C interpersonal	5.473	0.020	0.019
	C intrapersonal	6.610	0.011	0.023
	E interpersonal	9.695	0.002	0.034
	E intrapersonal	36.304	0.000	0.116
	R interpersonal	0.397	0.529	0.001
	R intrapersonal	26.297	0.000	0.087
	U interpersonal	14.708	0.000	0.050
	U intrapersonal	0.960	0.328	0.003

(*Continued*)

Table 7 (*Continued*)

Source	Dependent variable	*F*	Significance	Partial eta squared
Gender	I interpersonal	1.043	0.308	0.004
	I intrapersonal	0.705	0.402	0.003
	C interpersonal	1.879	0.172	0.007
	C intrapersonal	2.245	0.135	0.008
	E interpersonal	0.002	0.966	0.000
	E intrapersonal	0.000	0.995	0.000
	R interpersonal	0.096	0.756	0.000
	R intrapersonal	0.019	0.891	0.000
	U interpersonal	2.612	0.107	0.009
	U intrapersonal	3.365	0.068	0.012
Age × athlete	I interpersonal	8.697	0.003	0.030
	I intrapersonal	6.645	0.010	0.023
	C interpersonal	0.134	0.715	0.000
	C intrapersonal	3.932	0.048	0.014
	E interpersonal	1.302	0.255	0.005
	E intrapersonal	2.062	0.152	0.007
	R interpersonal	0.040	0.841	0.000
	R intrapersonal	10.904	0.001	0.038
	U interpersonal	12.107	0.001	0.042
	U intrapersonal	12.204	0.001	0.042
Age × gender	I interpersonal	1.726	0.190	0.006
	I intrapersonal	3.018	0.083	0.011
	C interpersonal	20.699	0.000	0.070
	C intrapersonal	6.557	0.011	0.023
	E interpersonal	0.844	0.359	0.003
	E intrapersonal	16.570	0.000	0.056
	R interpersonal	0.478	0.490	0.002
	R intrapersonal	0.179	0.672	0.001
	U interpersonal	0.000	0.988	0.000
	U intrapersonal	4.000	0.046	0.014
Athlete × gender	I interpersonal	10.036	0.002	0.035
	I intrapersonal	16.356	0.000	0.056
	C interpersonal	19.525	0.000	0.066
	C intrapersonal	20.091	0.000	0.068
	E interpersonal	16.896	0.000	0.057
	E intrapersonal	11.779	0.001	0.041
	R interpersonal	3.670	0.056	0.013
	R intrapersonal	0.185	0.668	0.001
	U interpersonal	0.011	0.917	0.000
	U intrapersonal	0.004	0.947	0.000
Age × athlete × gender	I interpersonal	2.773	0.097	0.010
	I intrapersonal	2.739	0.099	0.010
	C interpersonal	1.358	0.245	0.005
	C intrapersonal	2.715	0.101	0.010
	E interpersonal	1.413	0.236	0.005
	E intrapersonal	4.943	0.027	0.018
	R interpersonal	0.011	0.915	0.000
	R intrapersonal	1.077	0.300	0.004
	U interpersonal	3.664	0.057	0.013
	U intrapersonal	3.447	0.064	0.012

Abbreviations: C, comprehension; E, expression; I, identification; R, regulation; U, utilization.

proposed to an Arabic-speaking public. Indeed, the reliability of this version, which was assessed in terms of internal consistency and repeatability, has been deemed good. The questionnaire's Cronbach's α coefficient was equal to 0.68 and 0.75 for interpersonal and intrapersonal dimensions, respectively, whereas the coefficient for the global questionnaire was 0.86.

According to the English version of the PEC,[13] the internal consistency of the Arabic version of PEC subscales was generally good. The Cronbach's α for the interpersonal and intrapersonal dimensions of Arabic version of PEC was questionable and acceptable, respectively. Moreover, the range of the Cronbach's α coefficients for the 10 subscales was lower than the original English version (ranging from 0.72 to 0.83). On the basis of the current reliability results, the Arabic PEC showed sufficient reliability.

The construct validity was examined through a series of correlations between different subscales and different determinants and expected outcomes. For instance, the correlations between interpersonal and intrapersonal subscales were low to moderate (from 0.37 to 0.59), except for the R interpersonal, U interpersonal, and U intrapersonal, which showed negligible correlations with other scales. More specifically, there were no significant correlations between U intrapersonal and C interpersonal, U intrapersonal and C intrapersonal, and U intrapersonal and E intrapersonal. At the theoretical level, these results confirm both the relationship between the intrapersonal and interpersonal dimensions of EI, as well as their relative independence. Data, indeed, supported the relevance of assessing both dimensions, separately. This also suggests that participants who have difficulties in identifying and utilization their emotions were not particularly good at comprehension and expression of their and others' emotions. Overall, the findings of present study provide good support for the validity and the reliability of the questionnaire and they suggest that the psychometric properties of the Arabic PEC are similar to the psychometric properties of the original English version.

However, some differences between our and the original questionnaires should be discussed. For instance, it has already been demonstrated that there was a significant difference between men and women in regard to emotional abilities[43–45] and this finding was not replicated in our sample. It would nonetheless appear that women's EI abilities tend to be greater than men's;[43–45] unfortunately, the different ages and populations sampled in our study do not allow us to offer further interpretation of this tendency, which would require targeted analysis in a dedicated study. Furthermore, there was significant difference in all the subscales of the PEC apart from R interpersonal and U intrapersonal according to the athletes' status. In this respect, however, it is interesting

Table 8 Predictors for each subscale

Subscale	Parameter	*B*	SD	*T*	Significance	95% CI		Partial eta squared	Observed power
						Lower bound	Upper bound		
I interpersonal	Intercept	3.119	0.139	22.512	0.000	2.846	3.391	0.647	1.000
	12–15 years	0.474	0.196	2.420	0.016	0.088	0.860	0.021	0.674
	Nonathlete vs athlete	–0.039	0.179	–0.215	0.830	–0.391	0.314	0.000	0.055
	Female vs male	0.417	0.200	2.090	0.038	0.024	0.811	0.016	0.549
	12–15 years × nonathlete	0.236	0.245	0.965	0.335	–0.245	0.718	0.003	0.161
	12–15 years × female	–0.065	0.287	–0.225	0.822	–0.631	0.501	0.000	0.056
	Nonathlete × female	–0.889	0.275	–3.237	0.001	–1.429	–0.348	0.036	0.897
	12–15 years × nonathlete × female	0.612	0.368	1.665	0.097	–0.112	1.336	0.010	0.382
I intrapersonal	Intercept	3.222	0.151	21.281	0.000	2.924	3.520	0.620	1.000
	12–15 years	0.111	0.214	0.519	0.604	–0.310	0.533	0.001	0.081
	Nonathlete vs athlete	–0.312	0.196	–1.593	0.112	–0.698	0.074	0.009	0.355
	Female vs male	0.314	0.218	1.437	0.152	–0.116	0.744	0.007	0.299
	12–15 years × nonathlete	0.185	0.267	0.694	0.488	–0.341	0.712	0.002	0.106
	12–15 years × female	0.017	0.314	0.053	0.958	–0.602	0.635	0.000	0.050
	Nonathlete × female	–1.146	0.300	–3.817	0.000	–1.736	–0.555	0.050	0.967
	12–15 years × nonathlete × female	0.665	0.402	1.655	0.099	–0.126	1.457	0.010	0.378
C interpersonal	Intercept	2.756	0.159	17.297	0.000	2.442	3.069	0.519	1.000
	12–15 years	0.237	0.225	1.052	0.294	–0.206	0.681	0.004	0.182
	Nonathlete vs athlete	0.304	0.206	1.477	0.141	–0.101	0.710	0.008	0.313
	Female vs male	–0.036	0.230	–0.155	0.877	–0.488	0.417	0.000	0.053
	12–15 years × nonathlete	–0.169	0.281	–0.601	0.548	–0.723	0.385	0.001	0.092
	12–15 years × female	0.716	0.331	2.165	0.031	0.065	1.367	0.017	0.578
	Nonathlete × female	–1.181	0.316	–3.740	0.000	–1.803	–0.559	0.048	0.961
	12–15 years × nonathlete × female	0.493	0.423	1.165	0.245	–0.340	1.326	0.005	0.213
C intrapersonal	Intercept	2.859	0.149	19.207	0.000	2.566	3.152	0.571	1.000
	12–15 years	0.178	0.211	0.844	0.399	–0.237	0.592	0.003	0.134
	Nonathlete vs athlete	0.156	0.193	0.808	0.420	–0.224	0.535	0.002	0.127
	Female vs male	0.501	0.215	2.332	0.020	0.078	0.923	0.019	0.642
	12–15 years × nonathlete	0.066	0.263	0.252	0.801	–0.451	0.584	0.000	0.057
	12–15 years × female	0.180	0.309	0.584	0.560	–0.428	0.789	0.001	0.090
	Nonathlete × female	–1.211	0.295	–4.105	0.000	–1.792	–0.631	0.057	0.983
	12–15 years × nonathlete × female	0.651	0.395	1.648	0.101	–0.127	1.429	0.010	0.375
E interpersonal	Intercept	2.630	0.159	16.515	0.000	2.316	2.943	0.496	1.000
	12–15 years	0.696	0.225	3.092	0.002	0.253	1.140	0.033	0.869
	Nonathlete vs athlete	0.110	0.206	0.536	0.593	–0.295	0.516	0.001	0.083
	Female vs male	0.458	0.230	1.996	0.047	0.006	0.910	0.014	0.512
	12–15 years × nonathlete	–0.010	0.281	–0.036	0.971	–0.564	0.543	0.000	0.050
	12–15 years × female	–0.057	0.330	–0.173	0.863	–0.708	0.594	0.000	0.053
	Nonathlete × female	–1.120	0.316	–3.549	0.000	–1.741	–0.499	0.043	0.943
	12–15 years × nonathlete × female	0.503	0.423	1.189	0.236	–0.330	1.335	0.005	0.220
E intrapersonal	Intercept	3.296	0.151	21.792	0.000	2.999	3.594	0.632	1.000
	12–15 years	0.319	0.214	1.489	0.138	–0.103	0.740	0.008	0.317
	Nonathlete vs athlete	–0.181	0.196	–0.926	0.355	–0.567	0.204	0.003	0.152
	Female vs male	0.160	0.218	0.732	0.465	–0.270	0.589	0.002	0.113
	12–15 years × nonathlete	–0.158	0.267	–0.592	0.554	–0.684	0.368	0.001	0.091
	12–15 years × female	0.371	0.314	1.182	0.238	–0.247	0.989	0.005	0.218
	Nonathlete × female	–1.136	0.300	–3.788	0.000	–1.726	–0.545	0.049	0.965
	12–15 years × nonathlete × female	0.893	0.402	2.223	0.027	0.102	1.683	0.018	0.601
R interpersonal	Intercept	3.030	0.163	18.602	0.000	2.709	3.350	0.555	1.000
	12–15 years	–0.111	0.230	–0.482	0.630	–0.565	0.342	0.001	0.077
	Nonathlete vs athlete	0.285	0.211	1.354	0.177	–0.130	0.700	0.007	0.271
	Female vs male	0.154	0.235	0.657	0.512	–0.308	0.617	0.002	0.100
	12–15 years × nonathlete	–0.020	0.288	–0.071	0.944	–0.586	0.546	0.000	0.051

(*Continued*)

Table 8 (*Continued*)

Subscale	Parameter	*B*	SD	*T*	Significance	95% CI		Partial eta squared	Observed power
						Lower bound	Upper bound		
	12–15 years × female	0.173	0.338	0.511	0.610	–0.493	0.838	0.001	0.080
	Nonathlete × female	–0.391	0.323	–1.212	0.227	–1.027	0.244	0.005	0.227
	12–15 years × nonathlete × female	–0.046	0.432	–0.107	0.915	–0.897	0.805	0.000	0.051
R intrapersonal	Intercept	3.652	0.153	23.875	0.000	3.351	3.953	0.673	1.000
	12–15 years	0.244	0.216	1.130	0.259	–0.181	0.670	0.005	0.203
	Nonathlete vs athlete	–0.707	0.198	–3.571	0.000	–1.097	–0.317	0.044	0.945
	Female vs male	0.092	0.221	0.418	0.676	–0.342	0.526	0.001	0.070
	12–15 years × nonathlete	0.460	0.270	1.702	0.090	–0.072	0.991	0.010	0.396
	12–15 years × female	–0.125	0.317	–0.393	0.695	–0.750	0.500	0.001	0.068
	Nonathlete × female	–0.298	0.303	–0.983	0.326	–0.895	0.299	0.003	0.165
	12–15 years × nonathlete × female	0.421	0.406	1.038	0.300	–0.378	1.221	0.004	0.179
U interpersonal	Intercept	3.519	0.147	23.874	0.000	3.228	3.809	0.673	1.000
	12–15 years	0.363	0.208	1.741	0.083	–0.047	0.773	0.011	0.411
	Nonathlete vs athlete	–0.539	0.191	–2.823	0.005	–0.914	–0.163	0.028	0.803
	Female vs male	0.017	0.213	0.082	0.935	–0.401	0.436	0.000	0.051
	12–15 years × nonathlete	0.306	0.260	1.177	0.240	–0.206	0.818	0.005	0.216
	12–15 years × female	–0.372	0.306	–1.215	0.225	–0.974	0.230	0.005	0.228
	Nonathlete × female	–0.354	0.292	–1.212	0.227	–0.929	0.221	0.005	0.227
	12–15 years × nonathlete × female	0.749	0.391	1.914	0.057	–0.021	1.519	0.013	0.479
U intrapersonal	Intercept	3.548	0.164	21.591	0.000	3.225	3.872	0.627	1.000
	12–15 years	–0.207	0.232	–0.892	0.373	–0.665	0.250	0.003	0.144
	Nonathlete vs athlete	–0.278	0.213	–1.308	0.192	–0.697	0.141	0.006	0.256
	Female vs male	0.228	0.237	0.961	0.337	–0.239	0.694	0.003	0.160
	12–15 years × nonathlete	0.357	0.290	1.231	0.220	–0.214	0.928	0.005	0.232
	12–15 years × female	–0.841	0.341	–2.467	0.014	–1.513	–0.170	0.021	0.691
	Nonathlete × female	–0.420	0.326	–1.288	0.199	–1.061	0.222	0.006	0.250
	12–15 years × nonathlete × female	0.810	0.436	1.857	0.064	–0.049	1.669	0.012	0.456

Abbreviations: C, comprehension; E, expression; I, identification; R, regulation; U, utilization.

to note that Li et al[46] found that university students whose time involvement in exercise reached the recommended level needed for health and well-being were found to have better total EI score and composite subscale scores for intrapersonal, interpersonal, stress management, general mood, and adaptability, compared to the students in the insufficient physical activity and inactive groups. This suggests that regular sports practice and experience in practicing seem to constitute elements favoring enhanced emotional abilities. In addition, the current study showed significant age differences on all of EC subscales, except for R interpersonal. Similar results have been reported in previous studies.[47–50]

Implications of the findings

Our findings confirm the importance of assessing EI among athletes. These results have practical implications in that EI training can improve EI level among athletes and, therefore, enhance and optimize their performance. For instance, Campo et al[51] have demonstrated the effectiveness of an EI training intervention (four face-to-face sessions over a 5-month period, with homework and follow-up procedures) to improve EI at the trait level in a sample of 67 rugby players.

Strengths and limitations

To the best of our knowledge, the current study is the first validation of the PEC in Arabic language. Aouani et al[23] administered the PEC in a Tunisian sample but utilized the French version of the inventory.

The present study is not without limitations, which should be properly acknowledged. The major limitation is given by the fact that the Arabic version of the PEC did not undergo a cross-validation with other scales/questionnaires investigating other psychological parameters and constructs. As such, further research in the field is warranted: future studies should explore the correlation/association of the translated version of the PEC with other questionnaires (for instance, investigating happiness, quality of life, or mental and physical health, as well as other psychological measures

of emotional competences) and with variables related to sports performance. Another shortcoming is represented by the cross-sectional study design and the sample size selection/recruitment (convenience sample). As such, further investigations should be conducted, utilizing randomized samples and exploiting a longitudinal study design. Furthermore, all of the study participants were adolescents aged 15.2±2.4 years (range 12–18 years), whereas Brasseur et al[13] only tested gifted adolescents who were on average older (mean age 16.5±1.3 years). As such, to the best of our knowledge, this is a first article evaluating the PEC in an average teen population and, therefore, warrants further replication of our findings.

Conclusion

This study investigated the psychometric properties of the PEC in Arabic. Despite the abovementioned limitations, this study represents the first attempt of validating the PEC in Arabic language. However, further studies should overcome the shortcomings of the present study and should test the factorial structure of the questionnaire using randomized samples and CFA. Sports psychologists and practitioners in the Arab world could use the PEC as a valid and reliable instrument for planning ad hoc interventions.

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Disclosure

The authors report no conflicts of interest in this work.

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