Original Article

PSYCHOMETRIC PROPERTIES OF THE ATHLETE BURNOUT QUESTIONNAIRE FOR YOUNG BRAZILIAN ATHLETES

PROPRIEDADES PSICOMÉTRICAS DO *ATHLETE BURNOUT QUESTIONNAIRE* PARA USO EM ATLETAS JOVENS BRASILEIROS

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RESUMO

O objetivo do estudo foi identificar propriedades psicométricas para atletas jovens brasileiros do *Athlete Burnout Questionnaire* (ABQ). O inventário foi administrado em amostra de 1217 atletas jovens (410 moças e 807 rapazes) com idades entre 12 e 17 anos. Para identificar as propriedades psicométricas iniciais foi realizada análise fatorial exploratória e, na sequência, análise fatorial confirmatória. Para análise da consistência interna de cada fator associado ao *burnout* foi empregado coeficiente alfa de *Cronbach*. Os resultados confirmaram estrutura de três fatores originalmente proposta (exaustão física/emocional, reduzido senso de realização pessoal e desvalorização esportiva), mediante indicadores estatísticos equivalentes à $\chi^2/gl = 2,89$, CFI = 0,930, GFI = 0,928, AGFI = 0,937 e RMSR = 0,068 [$IC_{90\%}$: 0,065 – 0,072]. O alfa de *Cronbach* apresentou coeficientes entre 0,80 e 0,87. Concluindo, as qualidades psicométricas do *ABQ* foram satisfatórias para atletas jovens brasileiros, o que viabiliza sua aplicação em futuros estudos no Brasil.
Palavras-chave: Questionário. Psicometria. Educação física e treinamento.

ABSTRACT

The objective of this study was to identify the psychometric properties of the Athlete Burnout Questionnaire (ABQ) for young Brazilian athletes. The questionnaire was administered to a sample of 1,217 young athletes (410 girls and 807 boys) aged 12 to 17 years. Exploratory factor analysis, followed by confirmatory factor analysis, was performed to identify the initial psychometric properties. Cronbach's alpha coefficient was used to assess the internal consistency of each factor of the ABQ associated with burnout. The results confirmed the structure of the three originally proposed factors (physical/emotional exhaustion, reduced sense of personal accomplishment, and sport devaluation) based on the following statistical measures: $\chi^2/d.f. = 2.89$, CFI = 0.930, GFI = 0.928, AGFI = 0.937, and RMSR = 0.068 [$CI_{90\%}$: 0.065 – 0.072]. Cronbach's alpha ranged from 0.80 to 0.87. In conclusion, the psychometric qualities of the ABQ were satisfactory for young Brazilian athletes, thus permitting the application of the questionnaire in future studies in Brazil.
Keywords: Questionnaire. Psychometrics. Physical education and training.

Introduction

Burnout is a topic of growing interest in the sports-related literature. Athletes may be affected by this syndrome as a result of the complex interaction between multiple factors of stress, inadequate recovery and frustration due to unmet expectations and goals[1]. In view of the increasingly stringent demands of training and competition, associated with the pressure for better results imposed by the media, sports organization and coaches, burnout has become a real problem in the sport context[2].

Specifically in the case of young athletes, self-imposed demands beyond their possibilities may lead to a performance that does not meet the targets established for the sport[3]. The fear of not meeting the expectations of coaches, relatives and friends is an additional source of stress, especially if the young athlete sees the sport as an important means of personal fulfillment[4].

Studies have shown that burnout in young athletes is related to the lack of pleasure and motivation for sport participation[5], to the dissatisfaction with basic psychological needs

(autonomy, competence and relatedness)[6], and to maladaptive perfectionism, i.e., self-criticism and exaggerated concern regarding possible errors, insecurity and high personal standards[7]. In this respect, monitoring any changes in the presence of burnout arising from training and sports competitions should be one of the most important tasks in youth sport, promoting the adherence to sport and preventing the abandonment of the practice of sport at young ages.

However, until approximately three decades ago, safe investigations about burnout in athletes were largely hampered by the lack of valid measurement instruments for use in sport[8]. The first proposal to measure and organize burnout components in athletes was an adaptation of the Maslach Burnout Inventory (MBI). This scale was originally proposed for specific use in the workplace with employees performing duties in service areas, as is the case of professionals of services characterized by intense and prolonged attention to their recipients, such as healthcare workers, teachers and security guards[9].

The process of adaptation of the MBI for use in athletes, known as the Sport Adaptation of the Maslach Burnout Inventory, occurred solely by adjusting the expressions of the original items to meet sport situations. To evaluate its psychometric properties, the adapted version of the MBI was applied experimentally to a sample of North American university athletes. However, analysis of the data indicated the internal consistency indices to be fragile and several items of the adapted instrument did not present significant saturation to compose the factorial model[10]. In view of these findings, the pioneering attempt to develop an instrument to measure burnout in athletes did not achieve the expected result, frustrating the purpose of using the adapted version of the MBI in the sport context.

The Eades Athlete Burnout Inventory (EABI) was the first instrument developed specifically to measures burnout in athletes[11]. The EABI was proposed based on the work of Maslach and Jackson[9], interviews held with athletes supposedly affected by burnout, and reports of experiences from sport psychologists. Although the psychometric validation of the instrument originally showed some shortcomings that were confirmed in subsequent studies[12], based on its proposal, the EABI became the only option available for the analysis of burnout in athletes.

Subsequently, because of the psychometric limitations identified in the EABI, a new instrument was suggested to measures burnout in athletes, which was called the Athlete Burnout Questionnaire (ABQ)[8,13,14]. A preliminary version of the ABQ was aimed specifically at swimmers and was developed based on the EABI so much so that, first, 11 of the 21 items of this version were identical in the two instruments; however, this version was more closely related to the original concepts and theoretical models of burnout[13]. The most recent version of the ABQ has been adapted for use in athletes of different sport disciplines and consists of 15 items, five for each of the three burnout-related components: physical/emotional exhaustion, sport devaluation and reduced sense of personal accomplishment[8]. The results of psychometric studies on the ABQ demonstrated highly satisfactory measurement precision[8,13,14]. With respect to different validity measures, the data produced originally when the instrument was proposed have been confirmed in other studies[15,16], thus indicating its potential to assess burnout in athletes.

The ABQ was originally developed in English, but has been translated, adapted and validated for use in several other languages, including German[17], Arabic[18], Chinese[19], Spanish[20], French[6], Norwegian[21], European Portuguese[22], and Swedish[23], a fact permitting the expansion of its use to other cultures. The Brazilian version of the ABQ was proposed in a study involving adult elite athletes with a mean age of approximately 23 years, who participated in national and international competitions in 12 disciplines, seven individual and

five team sports[24]. The translation process of the instrument was conducted according to an internationally suggested protocol and the procedures of factorial validation confirmed the presence of the 15 items and extraction of the three originally proposed components. However, in contrast to the findings reported in other studies on the factorial validation of the ABQ in different languages, the 15 items comprising the instrument were regrouped in their respective components using an arrangement that differed markedly from the original version. The physical/emotional exhaustion component was represented by seven items, while the reduced sense of personal accomplishment component was represented by six items and the sport devaluation components by only two. Thus, three items that referred to the sport devaluation component in the original version of the ABQ became part of other components. Two of these items were associated with the physical/emotional exhaustion component and the other was attributed to the reduced sense of accomplishment component.

In this case, methodological limitations identified in the factorial validation study of the Brazilian version of the ABQ may compromise the application of the questionnaire. Regarding the sample used in the study, 200 subjects (77 women and 123 men) were selected, i.e., in view of the heterogenous profile of the selected subjects, the number was probably insufficient to adequately fit the factorial model with 15 items[25]. In addition, the ABQ was applied during different seasons of training/competition. Some of the athletes selected for the sample were in the competition period at the time when they answered the questionnaire, while others were at the beginning of the preparation period for the competition season and some were in transition from one season to the other. Furthermore, no possible re-specifications were performed in the factorial analysis in order to better adapt the items and components; thus, compromised statistical findings were chosen over solid conceptual criteria associated with burnout in athletes.

Therefore, in view of the need to provide an assessment instrument that can be used to measure and organize burnout components appropriate for the Brazilian culture, the objective of this study was to identify the psychometric properties of the ABQ for young Brazilian athletes.

Methods

Participants

The study was approved by the Ethics Committee on Research Involving Humans of Universidade Norte do Paraná – Plataforma Brasil (Protocol 208.975/2013). A sample of young athletes participating in the Paraná Youth Games in 2013 was selected for identification of the psychometric properties of the ABQ. About 3,600 young athletes participated in this competition in different disciplines: basketball, handball, volleyball, futsal, soccer, athletics, swimming, cycling, gymnastics, judo, karate, taekwondo, and tennis. Convenience sampling was used for selection of the subjects. For this purpose, prior to the beginning of the competitions, all coaches and executives participating in the Games were contacted and informed about the nature and objectives of the study and the principle of confidentiality. Authorization to contact and invite the athletes to participate in the study was then obtained. A total of 1,217 young athletes (410 girls and 807 boys), aged 12 to 17 years, agreed to participate in the stud by signing the free informed consent form. This number corresponded to about 30% of all athletes participating in the competition. Table 1 shows the characteristics (sex, age and training characteristics) of the sample of young athletes selected for the study.

Table 1. Sex, age and training characteristics of the sample of young athletes analyzed in the study.

	Girls (n = 410)	Boys (n = 807)	Total (n = 1,217)
Age			
≤ 14 years	130 (31.7%)	192 (23.8%)	322 (26.5%)
15 – 16 years	201 (49.0%)	364 (45.1%)	565 (46.4%)
17 years	79 (19.3%)	251 (31.1%)	330 (27.1%)
Age at onset of training			
≤ 9 years	125 (30.5%)	237 (29.4%)	362 (29.7%)
10 – 11 years	116 (28.3%)	212 (26.2%)	328 (27.0%)
12 – 13 years	103 (25.1%)	188 (23.3%)	291 (23.9%)
≥ 14 years	66 (16.1%)	170 (21.1%)	236 (19.4%)
Training time			
≤ 2 years	128 (31.2%)	131 (16.1%)	259 (21.3%)
3 – 4 years	101 (24.7%)	167 (20.7%)	268 (22.0%)
5 – 6 years	94 (22.9%)	212 (26.3%)	306 (25.1%)
≥ 7 years	87 (21.2%)	297 (36.9%)	384 (31.6%)
Training volume			
≤ 4 hours/week	38 (9.3%)	75 (9.3%)	113 (9.3%)
5 – 9 hours/week	184 (44.9%)	360 (44.6%)	544 (44.8%)
≥ 10 hours/week	188 (45.8%)	372 (47.2%)	560 (46.0%)
Sport modality			
Individual	163 (39.8%)	300 (37.2%)	463 (38.0%)
Team	247 (60.2%)	507 (62.8%)	754 (62.0%)
Level of competition			
International	31 (7.6%)	82 (10.2%)	113 (9.3%)
National	114 (27.8%)	148 (18.3%)	262 (21.5%)
State	180 (43.9%)	372 (46.1%)	552 (45.4%)
Regional	85 (20.7%)	205 (25.4%)	290 (23.9%)

Source: The authors.

Instrument

The ABQ assigns burnout scores to the frequency at which personal feelings and attitudes of the athletes towards the practice of sport are experienced. The questionnaire consists of 15 items equally divided into three components (physical/emotional exhaustion, reduce sense of personal accomplishment and sport devaluation) and preceded by the question "How often do you feel this way?". The items are scored on a 5-point Likert scale from 1 to 5, where 1 = almost never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = almost always.

The scores of each component are calculated as the arithmetic mean of the points attributed to the five items of the component studied. In the case of the items of the physical/emotional component, the athlete indicates how often he feels physically and emotionally worn out and exhausted as a result of the demands of training and competition (e.g., "I am exhausted by the physical and mental demands of the sport").

The items corresponding to the reduced sense of personal accomplishment component refer to dissatisfaction with skills and abilities needed for sport practice (e.g., "I am not meeting my personal interests with the sport"). Two of the five items giving origin to this component are reverse scored (item 1: "I am performing many worthwhile things in the sport", and item 14: "I feel successful in the sport"). Thus, the lower the magnitude of the score, the more reduced is the sense of personal accomplishment.

The items that measure the sport devaluation component are aimed at indicating negative and indifferent attitudes towards sport participation (e.g., "I have negative feelings towards the sport"). It is also possible to attribute a global burnout index by calculating the arithmetic mean from the set of the 15 items that compose the ABQ.

Procedures

The ABQ was applied individually to each young athlete on a single occasion by two researchers experienced in the instrument and previously trained in its procedures. Application of the questionnaire in situations in which the athletes would be immersed in pre- or post-competition stress was avoided. In this case, occasions when the athletes were not in a competition environment or were only spectators of the competitions were chosen. The athletes received the questionnaire with instructions and recommendations on how to fill it out and no time limit was established for its completion. Any doubts expressed by the respondents were promptly clarified by the researchers who accompanied the data collection.

Statistical Analysis

First, involving the whole sample, means and standard deviations were calculated, as well as symmetry and kurtosis indices of each item of the questionnaire to determine whether the values showed a univariate normal distribution. Multivariate normality was analyzed by Mardia's test using a bootstrap procedure. Next, to specifically identify the psychometric properties of the ABQ, the sample was divided randomly into two independent subsets of equal size, ensuring proportional representativeness regarding the distribution of the participants in terms of sex and age.

In the first subset (n_1 = 608), exploratory factor analysis (EFA) was performed by principal component analysis with orthogonal rotation (varimax). Adequacy of the data subset for the EFA procedures was verified by the Kaiser-Meyer-Olkin (KMO) test and sphericity by the Bartlett test. The factorial matrix of the scores derived from the 15 items was observed by analysis of item-factor saturation. Bivariate correlations using Pearson's correlation coefficient were estimated for this purpose. In this case, the exclusion criterion adopted were items with a factor saturation less than 0.40 or those represented in more than one factor with saturation ≥ 0.40. Cronbach's alpha coefficients were calculated for the analysis of internal consistence, as well as means, standard deviations and bivariate inter-factor correlations.

Confirmatory factor analysis (CFA) by the maximum likelihood method was conducted with the data of the second subset (n_2 = 609) in order to identify validity indices equivalent to the factorial structure extracted by EFA. Regarding construct validity, the fit between the theoretical model proposed and the matrix was tested using multiple criteria: ratio of chi-square to degrees of freedom (χ^2/d.f.), comparative fit index (CFI), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and root mean square residual (RMSR). In this case, it was assumed that a χ^2/d.f. ratio < 3, CFI, GFI and AGFI ≥ 0.9 and RMSR ≤ 0.08 indicate a good fit of the model[26]. Convergent validity was evaluated by estimating the average variance extracted (AVE) and composite reliability (CR), with AVE ≥ 0.50 and CR ≥ 0.70 indicating adequate validity[25]. Additionally, multigroup analysis was performed to estimate the factorial invariance of the fitted model for use of the ABQ in young athletes of both genders and of different ages, establishing factor loadings, variance/covariances and residuals. To identify eventual significant differences between submodels extracted separately by sex (girls versus boys) and age (≤ 14 years versus 15-16 years versus 17 years), differences between chi-square values ($\Delta\chi^2$), respective degrees of freedom (Δd.f.) and CFI (ΔCFI) were

computed. P values of > 0.05 for $\Delta\chi^2$ and of ≤ 0.01 for ΔCFI were assumed as criteria to define factorial invariance[27]. The data were analyzed using the SPSSv20 and AMOSv20 statistical packages.

Results

Table 2 shows the mean, standard deviation and asymmetry and kurtosis indices for each item in the sample selected (n = 1,217). The scores obtained for the 15 items showed a normal distribution (asymmetry and kurtosis within the interval ± 1). Mean scores ranged from 1.65 to 2.8 (standard deviation: 0.67 to 1.16). Multivariate normality of the data was confirmed by a Mardia index of 3.97.

Table 2. Descriptive statistics of the items of the Athlete Burnout Questionnaire applied to young athletes of both genders from the State of Paraná, 2013 (n = 1,217).

Item	Mean	SD	Asymmetry	Kurtosis
1. I am performing many worthwhile things in the sport.	2.08	0.88	-0.89	0.82
2. I feel so tired from the training that I do not find the energy to do other things.	2.80	1.01	0.92	0.11
3. The effort I need to put into sport would be better used in another activity.	1.88	0.74	0.80	0.79
4. I feel extremely tired from the sport participation.	2.76	1.16	0.84	-0.06
5. I am not meeting my personal interests with the sport.	2.01	0.94	0.94	0.91
6. I am not concerned about my sport performance as I used to.	1.91	0.79	0.91	0.18
7. I am not performing up to my ability in the sport.	2.17	0.95	0.70	-0.73
8. I feel "destroyed" by the sport.	2.34	0.74	0.89	0.94
9. I am not as interested in the sport as I used to be.	1.79	0.67	0.81	0.91
10. I feel physically exhausted from the sport.	2.59	0.84	0.78	0.58
11. I feel less concerned about being successful in the sport than I used to.	2.13	1.01	0.85	-0.77
12. I am exhausted by the physical and mental demands of the sport.	2.48	1.06	0.90	0.96
13. No matter what I do in sport, I do not perform as well as I should.	2.16	0.80	0.64	-0.55
14. I feel successful in the sport.	2.19	0.98	-0.65	-0.63
15. I have negative feelings towards the sport.	1.65	0.71	0.89	0.78

Source: The authors.

With respect to the adequacy of the first data subset used for the EFA procedures, the KMO index was 0.911 and the value of Bartlett's sphericity test was $\chi^2_{(348)} = 6,376.3$ (p < 0.001), indicating that factorial analysis is legitimate. The results of EFA are shown in Table 3. Detailed analysis of the factorial matrix showed significant r values for all factor loadings (p < 0.001) and there were no items with a factor saturation ≥ 0.40 in more than one factor or with insufficient saturation. Factorial solution of the matrix defined three factors with an eigenvalue higher than 1, with each factor being composed equally by five items that together explained about 61% of total variance, with a commonality higher than 0.43. The definition of three factors containing an equal number of items confirms the original proposal of the ABQ, thus recommending the use of the same denominations: physical/emotional exhaustion (factor 1), reduced sense of accomplishment (factor 2), and sport devaluation (factor 3).

Table 3. Exploratory factor analysis of the Athlete Burnout Questionnaire applied to young athletes from the State of Paraná, Brazil.

Item	Factor 1: Physical/emotional exhaustion	Factor 2: Reduced sense of accomplishment	Factor 3: Sport devaluation
Item 2	0.72		
Item 4	0.81		
Item 8	0.78		
Item 10	0.80		
Item 12	0.80		
Item 1		0.71	
Item 5		0.79	
Item 7		0.86	
Item 13		0.82	
Item 14		0.72	
Item 3			0.71
Item 6			0.79
Item 9			0.68
Item 11			0.74
Item 15			0.76
Eigen value	9.876	4.249	2.971
% Individual variance	41.27	12.48	7.30
% Cumulative variance	41.27	53.75	61.05

Source: The authors.

With respect to the magnitude of the internal consistency measures of the three factors identified by factorial structure analysis, prior to the calculation of Cronbach's alpha (α) coefficients, preliminary statistical analyses were performed on which the estimates were based (Table 4). The mean values found ranged from 1.89 to 2.63, with standard deviations of 0.59 to 0.80. In principle, these values can be interpreted as satisfactory considering that the mean value of any of the factors corresponding to the burnout components approached possible extreme scores (1 or 5). Noteworthy, the variability of individual scores was limited, thus indicating some homogeneity in their dispersion, regardless of the burnout component considered.

Table 4. Descriptive statistics, Cronbach's alpha coefficient and bivariate correlations between the components of the Athlete Burnout Questionnaire applied to young athletes from the State of Paraná, Brazil.

	Mean	Standard deviation	Cronbach alpha	1	2
1. Physical/emotional exhaustion	2.63	0.80	0.87		
2. Reduced sense of personal accomplishment	2.15	0.74	0.80	0.54	
3. Sport devaluation	1.89	0.59	0.85	0.50	0.62

Source: The authors.

Higher Cronbach's alpha coefficients were identified for the physical/emotional exhaustion and sport devaluation components (α = 0.87 and α = 0.85, respectively) compared to the reduced sense of personal accomplishment component (α = 0.80). However, the three α values found indicate desirable internal consistency and are similar to those obtained on the occasion when the original version of the ABQ was proposed. The bivariate inter-factor correlations ranged from 0.50 to 0.62.

Once the factorial structure was defined by EFA, validity indices of the model proposed were analyzed. For this purposes, the second subset of the sample was submitted to procedures of CFA. First, using a Whiskers plot, the absence of outliers was demonstrated, thus meeting an important prerequisite of CFA.

Figure 1 shows the factorial structure of the model proposed. It can be seen immediately that CFA supports the hypothesis of the presence of three factors, with five items per factor, as demonstrated by the goodness-of-fit indices: χ^2 = 251.43, d.f. = 87, χ^2/d.f. = 2.89, CFI = 0.932, GFI = 0.928, AGFI = 0.937, and RMSR = 0.068 [CI$_{90\%}$: 0.065 − 0.072]. Additionally, the factor loadings ranged from 0.67 to 0.87 and were accompanied by satisfactory residual variances, which permit to assume, by the bias of CFA, construct validity of the ABQ for use in young athletes.

The AEV of first-order factors of the model proposed was 0.61 for physical/emotional exhaustion, 0.58 for reduced sense of accomplishment and 0.56 for sport devaluation. Composite reliability was 0.81, 0.77 and 0.73, respectively. The values found strongly support the convergent validity of the adjusted factorial solution for the ABQ.
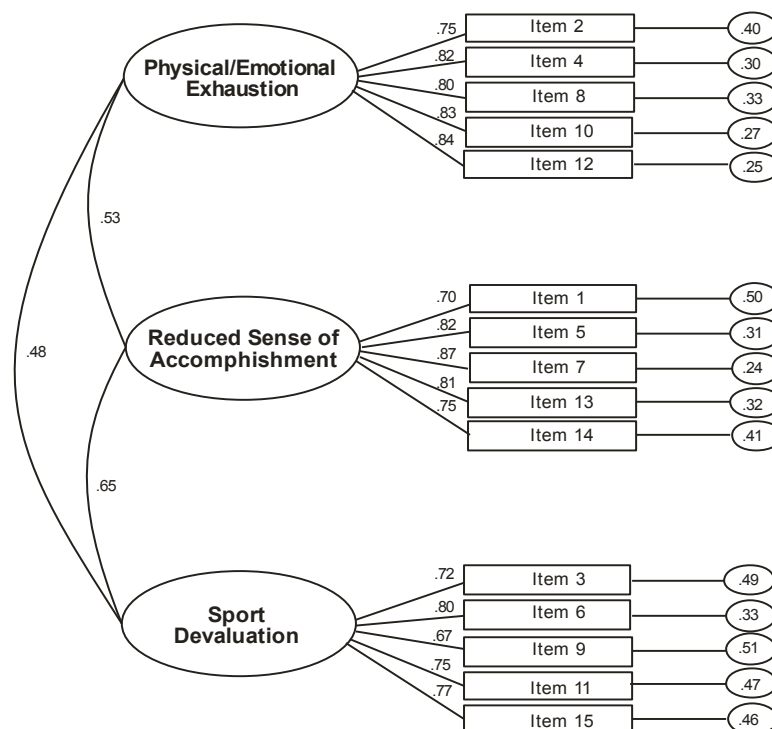

Figure 1. Factorial structure of the Athlete Burnout Questionnaire applied to young athletes from the State of Paraná, Brazil. The ellipses represent the components and rectangles the items of the questionnaire. Residual variances are shown in small circles.

Source: The authors.

Table 5 shows the indices related to the factorial invariance tests between different sex and age strata. Multigroup analysis according to sex revealed $\Delta\chi^2$ and ΔCFI values that indicate the existence of invariance between girls and boys in the factorial structure of the model. Similarly, indices suggesting good fit of the models that established factor loadings, variance/covariances and residuals in the three age groups ($\leq$ 14 years, 15-16 years and 17 years) were found. However, although adequate, better fits were obtained when the sex strata rather than the age strata were compared.

Table 5. Indices produced by multigroup confirmatory factor analysis to test for factorial invariance between different sex and age strata.

	χ^2	d.f.	$\Delta\chi^2$	Δd.f.	p value	CFI	ΔCFI
Sex							
Model 1	264.62	174	-	-		0.926	-
Model 2	273.63	188	9.01	14	> 0.05	0.926	0.000
Model 3	279.03	190	14.41	16	> 0.05	0.924	0.002
Model 4	287.30	202	22.68	28	> 0.05	0.921	0.005
Age							
Model 1	269.27	174	-	-		0.921	-
Model 2	280.12	188	10.85	14	> 0.05	0.915	0.006
Model 3	286.90	190	17.63	16	> 0.05	0.914	0.007
Model 4	296.44	202	27.17	28	> 0.05	0.909	0.012

Model 1: configuration model (all parameters are free to be estimated); Model 2: model in which factor loadings are contrasted; Model 3: model in which variance/covariances are contrasted; Model 4: model in which residuals are contrasted. Source: The authors.

Discussion

Analysis of the factorial structure of the ABQ applied to young Brazilian athletes revealed an arrangement similar to that found for the original version proposed by Raedeke and Smith[8,14], combining the same items in the same number of factors associated with burnout. Another important finding was the confirmation of factorial invariance, providing strong evidence that the questionnaire can equivalently identify the three burnout components in young people of both genders and aged $\leq$ 17 years. Furthermore, Cronbach's alpha coefficients higher than 0.80 obtained for the three components extracted from the factorial structure indicates acceptable internal consistency of the Portuguese version of the ABQ, demonstrating its reliability for the analysis of burnout in young Brazilian athletes. However, comparison with the original version showed that the internal consistency of each burnout component was slightly lower in the factorial structure of the ABQ applied in the present study.

One possible explanation for these findings is related to the characteristics of the samples selected in either study. Originally, the ABQ was applied to and validated in a sample of North American university athletes performing seven individual and team sports. The mean age of the subjects was around 20 years. In contrast, the present study included young athletes aged $\leq$ 17 years who participated in the final phase of the Paraná Youth Games, a state competition that brings together athletes with different training/competition experience. Consequently, the contexts in which the two studies were conducted may have led to differences in terms of personal feelings and attitudes of the two groups of athletes towards the demands and requirements of sports. However, the variation between the highest (0.87) and lowest (0.80) internal consistency indices observed in the present study was similar to

that of the original version of the ABQ (0.91 and 0.85, respectively), suggesting a similar equilibrium in the level of precision between burnout components when the questionnaire is applied to young Brazilian athletes.

Another option to analyze the construct validity of the ABQ applied in the present study is the use of inter-component correlations resulting from the factorial model found. In this case, it was observed that the r values between components (0.48 to 0.65) followed the same trend of the originally proposed ABQ (0.52 to 0.71). The highest value was observed between the reduced sense of personal accomplishment and sport devaluation components (0.65), followed by the correlation between the physical/emotional exhaustion and reduced sense of accomplishment components (0.53). These results agree with other studies[6,14,20,21], supporting the hypothesis that the set of components of the ABQ permits to calculate a burnout index.

Possible limitations arising from the use of the ABQ as a data collection instrument to identify burnout includes the accuracy of the frequency at which young athletes experience personal feelings and attitudes towards sport participation, considering that the data of the questionnaire are self-reported. However, self-report is the current procedure in surveys with these features and the most suitable tool to gather data in studies with this objective. Another limitation of the study is the fact that, although the sample comprised a large number of subjects (n=1,217), selection was not random and the sample may therefore not be truly representative of the population defined.

Conclusions

The ABQ showed good psychometric performance in the sample studied, providing satisfactory Cronbach's alpha coefficients for the three burnout components. The factorial solution generated by EFA and validated using indices produced by CFA was similar to that of the original version, with the confirmation of factorial invariance between sex and age. Thus, the Portuguese version of the ABQ applied in the present study was found to be promising for use in future interventions designed to identify burnout in young Brazilian athletes.

To continue the validation procedures of the ABQ and of its factorial structure, we suggest to conduct studies that can reproduce the results obtained here for young athletes that participate in other sport disciplines, athletes from other regions of Brazil and athletes with different training and competition histories. Despite satisfactory psychometric properties, the Portuguese version of the ABQ requires more consistent evidence of validity based on the relationship with other constructs, such as traces of depression and anxiety, stress, motivation, pleasure, coping strategies, commitment, perceived control, and identity. Studies establishing cut-off points for the classification of young athletes in the different phases of the burnout process may also provide useful information about the prevalence and incidence of this syndrome, thus permitting to design more effective intervention measures. Furthermore, longitudinal studies should be conducted to empirically analyze the cause-effect relationship of risk behaviors and attitudes in order to clarify the implications associated with the onset and development of burnout.

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