

## Cross-cultural adaptation and psychometric properties of the Portuguese version of the Youth Sport Environment Questionnaire (P-YSEQ)

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### Abstract:

This study investigated adaptation and the psychometric properties of the Portuguese version of the Youth Sport Environment Questionnaire (P-YSEQ). Translators, professors and athletes participated. Athletes between 13 and 17 years were recruited for the adaptation and validation of the P-YSEQ. Validity evidence based on test content was estimated by coefficients of content and kappa. Exploratory Structural Equation Modeling (ESEM) was conducted to assess the dimensionality of the instrument and the invariance of factorial model between boys and girls. Cronbach's alpha, McDonald's omega and Composite Reliability were used for internal consistency analysis. The results revealed a two-factor structure ( $\chi^2 = 259.858$ ;  $df = 87$ ;  $\chi^2/df = 2.98$ ;  $p < .001$ ; CFI = .971; TLI = .959; RMSEA = .068 CI [.059, .078]), corroborating the theoretical hypothesis, with desirable consistency indices ( $.86 \leq \alpha \leq .89$ ;  $.87 \leq \Omega \leq .89$ ). In addition, it was observed the measurement model equivalence to assess boys and girls ( $\Delta CFI = .00$ ). The set of results suggest adequacy of the Brazilian version of the P-YSEQ for assessment of the youth sport environment.

**Keywords:** sport, team cohesion, adolescents, psychometric.

### Introduction

The existence of groups is one of the oldest phenomena in society and constitutes a fundamental construct in the social life of individuals (Torres & Camino, 2013). Carron & Brawley (2012) argue that understanding the nature of groups is linked to understanding the nature of cohesion, because if there is a group, there is cohesion in some aspect (Pieri, Pires, Figueiras, & Oliva, 2016).

Historically, cohesion has been considered the most important aspect in groups (Martin, Paradis, Eys, & Evans, 2013). Among the several areas in which it has been investigated, team cohesion in the sport context stands out because it is closely integrated with better levels of competitive performance (Eys et al., 2015), satisfaction of basic psychological needs (Taylor & Bruner, 2012), collective efficacy (Edson Filho, Tenenbaum, & Yang, 2015) and intrinsic motivation (Vieira et al., 2018), for example.

Cohesion is a changeable process that explains a group's willingness to unite and remain united to achieve task-oriented goals and/or to meet the affective needs of the members (Carron, Brawley, & Widmeyer, 1998). The conceptual model of team cohesion (Carron, Widmeyer, & Brawley, 1985) addresses cohesion through the task (collective performance, goals and objectives) and social (group relationship) perspective, as well as perceptions of individual attraction to the group (individual motivations and feelings) and integration (group proximity and unification).

Consequently, according to such model (Carron, Widmeyer, & Brawley, 1985), cohesion comprises four interrelated dimensions: a) Group Integration-Task: perception of the degree of unity for team tasks; b) Group Integration-Social: perception of the degree of unity for social aspects; c) Attraction to Group-Task: perception of personal involvement for the group's goals and; d) Attraction to Group-Social: perception of personal involvement in social life (Carron, Widmeyer, & Brawley 1985; Martin et al., 2013).

However, some factors may play an important role in the ability of athletes to interpret interpersonal relationships in the sporting context, such as age (Kleinert et al., 2012). A study by Eys, Loughead, Bray and Carron (2009a) revealed through focus group interviews that although young athletes understand the importance of cohesion in their groups, they have perceptions only of social and task orientations. On the other hand, adults

perceive cohesion in a more delineated way, including social and task orientation, as well as their individual attractions and perceptions of the group integration (Martin et al., 2013).

For cohesion to be assessed in the sporting context, there are three instruments widely known in the theoretical perspective of the conceptual model of group cohesion: the Group Environment Questionnaire (GEQ) (Carron, Widmeyer & Brawley, 1985), the Child Sport Cohesion Questionnaire (CSCQ) (Martin et al., 2013), used for assessing cohesion among children aged 9 to 12 years, and the Youth Sport Environment Questionnaire (ESE) (Eys, Loughead, Bray, & Carron, 2009b), which evaluates team cohesion among young athletes between 13 to 17 years.

In the Brazilian context, the GEQ (Nascimento Júnior, Vieira, Rosado & Serpa, 2012) has been adapted and validated, with its specific version for high-performance futsal and football (Nascimento Júnior, Contreira, Moreira, Pizzo, Ribeiro & Vieira, 2016) and as well as the CSCQ (Pieri et al., 2016). Both instruments demonstrated satisfactory psychometric properties for the Brazilian context. However, until to this date, no instruments have not been found that can be used in the evaluation of young athletes.

Given the importance of team cohesion for the development of young athletes (Bruner, Eys, Wilson & Cotê, 2014), it is necessary their evaluation be made by valid instruments. Thus, it can contribute to the work of professionals involved with young athletes (coaches, psychologists) with the evaluation and intervention for any deficiencies. Therefore, the purpose of this study was to investigate the cross-cultural adaptation of the YSEQ for the Portuguese (P-YSEQ) speaking community. More specifically, the purpose was to develop an instrument with good content validity, internal reliability, construct validity (exploratory-EFA and confirmatory factor-CFA) and factor invariance.

## Material & methods

### Step one – Test content

#### *Participants and data collection*

A translation and cross-cultural adaptation expert group was assembled and consisted of nine professionals (four translators; five academics) to oversee the translation, adaptation, and content validation process of the P-YSEQ. The four translators were professionals in translation of scientific texts and part of their academic training was in English-speaking countries. The five professors were PhDs in Physical Education, with an emphasis on Sports Psychology.

#### *Instrument and procedures*

As mentioned above, the YSEQ (Eys et al., 2009) was used in this study. It is an inventory that assesses cohesion in youth between the ages of 13 to 17 years. The YSEQ contains 16 items that assess task and social cohesion, and 2 spurious items that do not enter in the analysis, totaling 18 items. Task cohesion contains eight items and a sample item is “We all share the same commitment to our team’s goals”. Social cohesion contains eight items and a sample item is “I spend time with my teammates”. All items are scored on a 9-point Likert-type scale anchored at the extremes of 1 (strongly disagree) and 9 (strongly agree). Therefore, higher scores reflect stronger perceptions of cohesion. Summary of subscales, along with number of items and sample items are presented in Table 1.

Table 1. Items and meanings of the dimensions of the YSEQ.

Dimensions	Items	Meaning
Task Cohesion	1, 3, 5, 8, 10, 14, 16 and 18	It refers to the union of the team related to training and competitions. It is an integration of the group members for the tasks to be performed.
Social Cohesion	2, 4, 7, 9, 11, 13, 15 and 17	It refers to the interpersonal involvement of the team for the sporting context. It is an integration of the group members regarding the friendship and feeling of closeness.
Spurious negative	6 and 12	Negative items added to the questionnaire to aid in the detection of invalidating response sets.

The first step in validating the instrument was to translate the YSEQ from English to Portuguese language. Using a five-point Likert scale (1 = not at all, 5 = very much), each member of the expert group was asked to evaluate the theoretical relevance and language clarity of each translated item (content validity). Experts were also asked to rate each item in terms of its clarity (easy to understand) and pertinence (if they should be included in the test), and to classify the subscale the item would relate to. Following initial translation, a back translation to English language was performed. Across translations, vocabulary issues were discussed and minor adjustments were made by the expert group. A pilot study was conducted with a group of 15 male and female athletes aged between 13 and 15 years. The athletes completed the translated instrument

and asked about the quality and coherence of language and content (Marôco, 2010). All participants provided informed consent to participate in the study. These modifications resulted in P-YSEQ.

Theoretical analysis of the 16 items of the P-YSEQ was performed through content validity (Hernández-Nieto, 2002). This technique checks experts' agreement regarding items classification in their dimension. Analysis of language clarity and practical relevance was calculated by a coefficient for each instrument item (CCVi) and for the questionnaire as a whole (CCVt).

#### *Data analysis*

For content validity coefficient calculation, the cutoff of .80 was used (Hernández-Nieto, 2002). To analyze the concordance between judges, the Kappa coefficient was used. Values of .70 or higher were deemed as acceptable for this measure.

### **Step two – Internal structure and reliability**

#### *Participants and data collection*

After adapting the instrument, the internal structure and reliability of the P-YSEQ were assessed. The sample consisted of 460 athletes; however, 30 were excluded of the study because they did not respond all the items of the questionnaire. Thus, final sample consisted of 430 male ( $n = 242$ ) and female ( $n = 188$ ) athletes aged between 13 and 17 years old ( $M_{age} = 16.1$  years;  $SD = .9$  years), participating in the final phase of Pernambuco Scholar Games in the year of 2017. Participants represented the following sports: basketball (69); handball (136); indoor soccer (93) and volleyball (132).

The sample selection was conducted out with non-probabilistic, adopting convenience method and the inclusion criteria were as follows: 1) have participated in local/state competitions during the 2016-2017 seasons; and 2) have participated of the final phase of the School games in Pernambuco in 2017.

#### *Instrument and procedures*

The translated P- YSEQ described above was used. Local sport organizations were contacted to obtain approval for data collection with athletes involved in their programs. Following consent, athletes were asked to complete the translated P- YSEQ. Data collection occurred at athletes' training facilities at a time agreed upon by the researchers and participants.

#### *Data analysis*

Since this is the first study to assess the psychometric properties of the P-YSEQ, internal structure was initially investigated using different methods of factor retention. A critical decision in this type of analyses concerns the number of factors to retain. Many researchers have relied on the 'eigenvalues greater than one rule' (O'Connor, 2000). However, the method has been shown to overestimate the number of factors to retain (Hair et al., 2014; Zwick & Velicer, 1986). As outlined by Zwick and Velicer (1986), the parallel analysis procedure seems to be a more reliable method of deciding the number of factors to retain. Considering the strengths and limitations of the aforementioned methods, both were employed in the present study (Golino & Sacha, 2016).

In order to evaluate the internal structure of the P-YSEQ, the Exploratory Structural Equation Modeling (ESEM) was conducted and Weighted Least Squares Mean- and Variance-adjusted (WLSMV) as an appropriate estimation method at the ordinal measurement level. According to Marsh et al. (2013) this method brings together the main aspects of Exploratory (EFA) and Confirmatory Factorial Analysis (CFA). Based on prior information, theoretical or empirical, the researcher establishes the number of factors, and a complex structure where all items may correlate with all factors is estimated. In this perspective, ESEM is characterized as an important alternative to CFA where items are intentionally arranged to correlate with only one factor, resulting in highly restrictive and unrealistic models. Further, ESEM can be considered as an alternative to EFA, since it allows the evaluation of the invariance of factor models, the modification of models through the modification indexes estimation, as well as the calculation of adjustment indices commonly observed in traditional CFA models (Heiserman & Maydeu-Olivares, 2017).

Theoretical model was evaluated using the indexes recommended by Muthén and Muthén (2012), which are: WLSMV  $\chi^2$ ,  $df$ ,  $\chi^2/df$ , RMSEA, CFI e TLI and following as parameter the values commonly adopted in the specialized literature:  $\chi^2/df < 5.0$ , RMSEA  $< .08$ , CFI and TLI  $> .90$ . The analyzes concerning the internal structure evaluation of the P-YSEQ were carried out with the support of Factor 10.3 and Mplus 7.4 (Muthén & Muthén, 2012). Internal reliability was assessed through the Cronbach's alpha ( $\alpha > .70$ )

Convergent validity was assessed through the Average Variance Extracted (AVE) and values higher or close to .50 were considered acceptable indicators of convergent validity (Hair et al., 2014). Discriminant validity was assessed by comparing the AVE with the squared correlation between factors (Marôco, 2010). Composite Reliability (CR) was calculated using ESEM results, given that this measure provides the index of

internal consistency of the instrument dimensions through the factor loadings of the respective items. Values greater than .70 were considered indicators of suitable composite reliability (Nunnally & Berstein, 1994).

For the factorial invariance analysis, a suitable adequacy model for each sex was initially defined. After obtaining the factors, they were simultaneously submitted to a multi-group analysis (with Emulisrel correction) that aimed to conduct a progressive set of constraints (factor loads, variances and covariances), in order to analyze the equivalence of the instrument for different subgroups (boys vs girls).

## Results

### *Test content*

Results of the content validity analysis demonstrated that the P-YSEQ dimensions obtained clarity of language and practical theoretical relevance coefficients above .80 (range = .86 to .94). This finding suggests that the translated and adapted P-YSEQ presents clear language to Portuguese speaking athletes while being relevant and pertinent to the sporting context.

P-YSEQ item classification agreement among experts (Kappa coefficient) for Task Cohesion and Social Cohesion dimensions was 0.83, indicating that the evaluators found that P-YSEQ items corresponded to the underlying dimensions.

### *Internal structure and reliability*

Before submitting the data to the PA assessment, the adequacy of the factorability indicators of the available variables was verified, which showed adequate Kaiser-Meyer-Olkin (KMO) (.87) and significant Bartlett test ( $p = .001$ ) and, therefore, ensured that the proposed analyzes were carried out. Corroborating the theoretical hypothesis that supported the construction of P-YSEQ, both methods of retention indicated the adequacy of the solution composed of 2 factors. According to results presented in Table 2, only factors 1 and 2 presented Eigenvalue values higher than 1.0, and explained variance percentage higher than the mean of variance percentages estimated through random matrices (500 polycory correlation matrices), and higher than percentage value of variance allocated in the 95th percentile between the random matrices. Thus, the structure composed of two factors explains 59.7% of the total variance of the data.

Table 2 - Methods of factor retention.

N Factor	Eigenvalue	Real-data % of varianve	Mean of random % of variance	95 percentile of random % of variance
1	<b>6.286</b>	<b>45.8</b>	<b>12.6</b>	<b>14.5</b>
2	<b>1.595</b>	<b>13.9</b>	<b>11.6</b>	<b>13.1</b>
3	.457	6.6	10.7	12.0
4	.283	6.0	9.9	10.9
5	.168	5.1	9.0	10.0
7	.107	4.2	8.2	8.9
8	.069	3.5	7.4	8.1
9	.033	3.2	6.6	7.3
10	-.008	2.4	5.8	6.7
11	-.061	2.2	5.1	6.0
13	-.085	2.1	4.3	5.3
14	-.132	1.9	3.5	4.5
15	-.144	1.5	2.6	3.7
16	-.202	1.2	1.8	2.8
17	-.229	.4	1.0	1.8
18	-.255	.0	.0	.0

Subsequently, the set of items is submitted to the evaluation through the ESEM, forcing the solution in two factors, which presented indexes of adjustment considered acceptable for the solution [ $\chi^2 = 358.038$ ;  $df = 89$ ;  $\chi^2/df = 4.02$ .  $p < .001$ ;  $CFI = .954$ ;  $TLI = .938$ ;  $RMSEA = .084$  (CI = .075, .093)]. However, the Modification Indexes suggested 2 covariances between measure errors (items 9 and 15, and 9 and 17, all from factor 2). Thus, a second model (M2) was tested using the suggested covariances, and presented the following adjustment indices:  $\chi^2 = 259.858$ ;  $df = 87$ ;  $\chi^2/df = 2.98$ .  $p < .001$ ;  $CFI = .971$ ;  $TLI = .959$ ;  $RMSEA = .068$  (CI = .059, .078). Factor model is presented in Table 3, which shows the standardized factor loadings presented by the items, correlation between the factors, correlation between measurement errors added to the model and precision indicators (Cronbach's alpha and McDonald's omega coefficient).

Table 3 – P-YSEQ factor model estimated using ESEM.

Items	Factor 1	Factor 2
i1. We all share the same commitment to our team's goals.	<b>.701</b>	-.024
i2. I invite my teammates to do things with me.	.025	<b>.619</b>
i3. As a team, we are all on the same page.	<b>.771</b>	-.003
i4. Some of my best friends are on this team.	-.023	<b>.650</b>
i5. I like the way we work together as a team.	<b>.858</b>	-.069
i7. We hang out with one another whenever possible.	.005	<b>.714</b>
i8. As a team, we are united.	<b>.801</b>	.003
i9. I contact my teammates often (phone, text message, internet).	.058	<b>.641</b>
i10. This team gives me enough opportunities to improve my own performance.	<b>.616</b>	.068
i11. I spend time with my teammates.	-.191	<b>.567</b>
i13. I am going to keep in contact with my teammates after the season ends.	.230	<b>.586</b>
i14. I am happy with my team's level of desire to win.	<b>.710</b>	.084
i15. We stick together outside of practice.	-.039	<b>.836</b>
i16. My approach to playing is the same as my teammates.	<b>.339</b>	.216
i17. We contact each other often (phone, text message, internet).	.183	<b>.623</b>
i18. We like the way we work together as a team.	<b>.755</b>	.053
<i>R</i>	.537	
	i15	i17
i9	-.455	.345
<i>A</i>	.888	.864
<i>α total</i>	.904	
<i>Ω</i>	.892	.867
<i>Ω total</i>	.905	

Analysis of the correlation patterns among items within their theoretical dimensions suggested a consistency within the P-YSEQ's structure, since no correlation higher than 0.34 was presented between Task Cohesion and Social Cohesion items. General index of internal reliability of the translated P-YSEQ was  $\alpha = .904$  e  $\Omega = .905$ . However, as it is a multidimensional scale, it is more important to calculate the reliability of each dimension separately. Cronbach's alpha for each dimension was satisfactory (Task Cohesion = .888; Social Cohesion = .864), as well as MacDonald's Omega coefficient (Task Cohesion = .892; Social Cohesion = .867). Item-scale correlations between factors was .537, indicating moderate correlation between dimensions of the P-YSEQ's.

In order to assess the convergent validity, AVE was computed. The AVE values were as follows: Task Cohesion = .504; Social Cohesion = .434 and demonstrate that only the Social Cohesion factor was below the acceptable value of .50. The AVE values were compared with the squared correlations (SC) between the factors in order to evaluate the discriminant validity. We observed that both factors are discriminant to each other (AVE > SC). The values of CR for internal consistency were as follows: Task Cohesion = .886; Social Cohesion = .858. All factors showed a satisfactory CR (values higher than .70).

Thus, the numbering of the items by the two dimensions of the P-YSEQ is the same of the original YSEQ (APPENDIX A): Task Cohesion (items 1, 3, 5, 8, 10, 14, 16, 18) and Social Cohesion (items 2, 4, 7, 9, 11, 13, 15, 17); Spurious negative (items 6 and 12).

#### Analysis of factor invariance

We investigated the factor invariance as a function of participants' sex, using multigroup analysis. By means of this technique, we could confirm that the designed instrument functions similarly for each group. That is, this analysis allows us to confirm that the psychometric properties of the questionnaire do not vary for either sex. When analyzing the configurational invariance of the P-YSEQ model (Model 2) between men and women [ $\chi^2 = 410.668$ ;  $df = 174$ ;  $\chi^2/df = 2.36$ .  $p < .001$ ;  $CFI = .963$ ;  $TLI = .949$ ;  $RMSEA = .080$  (CI = .070, .090)], it was observed that the model presented an acceptable fit between male and female athletes, indicating that the proposed structure remains stable in both groups. It was also verified the scalar invariance indicators of the proposed measurement model of P-YSEQ [ $\chi^2 = 550.555$ ;  $df = 312$ ;  $\chi^2/df = 1.76$ .  $p < .0001$ ;  $CFI = .963$ ;  $TLI = .972$ ;  $RMSEA = .060$  (CI = .051, .068)]. It can be inferred from the  $\Delta CFI$  between the configural and scalar models equal to 0 the equivalence of the intercept of the items between the groups (Wang, Chen, Dai & Richardson, 2017).

#### Discussion

The purpose of this study was to validate a scale to assess team cohesion among young Portuguese speaking community of athletes. This is the first study of its sort to investigate the cross-cultural adaptation and

validation of this measure in Brazil. The Portuguese version of the P-YSEQ showed results that support the first validity evidences: 1) evidence based on test content; 2) evidence based on internal structure (AERA, APA, NCME, 2014). It is important to mention that the P-YSEQ maintained the same structure of the original YSEQ (Eys et al., 2009). However, it is important to highlight that P-YSEQ had some limitations regarding the values obtained through AVE.

Although the results of the present study lend initial support to the instrument, it is understood that instrument adaptation and psychometric analysis of psychological measures such as this one is an ongoing process, which requires multiple methods (Nunnally & Beirstein, 1994). As such, we used different methods and alternate approaches to examine the different facets of the instrument. Each analysis used corroborated the results of the previous one, thus strengthening the case for the cross-cultural adaptation and validation of P-YSEQ. This study advances the literature on group dynamics research and extends the fields ability to measure the construct across different contexts.

#### *Evidence based on test content*

The goal of the content analysis was to analyze the cross-cultural adaptation and content validity of the P-YSEQ as a tool for assessing team cohesion among young athletes. The final structure of the content analysis resulted in two factors (Task Cohesion and Social Cohesion); a result similar to the original scale (Eys et al., 2009). This consistency with the original scale allowed team cohesion to be assessed in the Portuguese-speaking athlete context. Our findings showed that the adaptation obtained agreement and relevance to young athletes in the pilot study, corroborating the results of the content validity analysis. This result also adds evidence for the content validity of the 2-factor P-YSEQ with a Portuguese-speaking sample of athletes.

#### *Evidence based on internal structure and Reliability;*

In a general sense, P-YSEQ showed satisfactory indicators of evidence based on internal structure. The ESEM did not identify inconsistencies within the P-YSEQ for the sports context. A two-factor extraction model was assessed for the scale, which identified a satisfactory explained variance percentage (59.7% %) for the model. Although our ESEM results support the model's convergent validity, we identified some correlations between errors among items of the same factors (as seen in Table 1). However, these correlation coefficients were weak (<.46) and, according to the literature, do not affect the factor structure (Byrne, 2010; Kline, 2012). Another aspect that supports the decision to correct the model after verifying the modification indexes concerns to the theoretical adequacy, that is, the proximity between the contents of items 9 ("I contact my teammates often (phone, text message, internet)") and 17 ("We contact each other often (phone, text message, internet)"). Although it is not a content overlap, it is theoretically acceptable (or even expected) a positive association between these items. The same argument can be used to understand the negative association between the content presented in item 9 and item 15. We stick together outside of practice ("We stick together outside of practice").

Further, Social Cohesion did not achieve the satisfactory convergent validity (AVE<.50). Even so, this limitation regarding the convergent validity of the first order factors must be explored in future studies. The results for the discriminant validity analysis showed that the Task Cohesion discriminated with the Social Cohesion subscale. Although these results were expected, they add further evidence of the scale being able to distinguish between social and task dimensions of team cohesion among young athletes.

The adequacy of the proposed model for the P-YSEQ was also evidenced in the invariance analysis considering the sex, whose results pointed to the configurational and metrical invariance between boys and girls (Marôco, 2010). This finding that the scale is versatile for use in groups of male and female athletes, indicating that the proposed structure - same items being explained by the same latent variables - the different sexes (Brown, 2012) and that intercept presented by items are equivalent for both groups (Marôco, 2010). The present study is the first to demonstrate these results and represents a novel finding for practioners interested in assessing team cohesion in Portuguese speaking youth.

## **Conclusions**

Overall, the present research resulted in an instrument capable of measuring team cohesion in Portuguese-speaking youth sport participants. Given the increase in research devoted to group dynamics (Beauchamp & Eys, 2014), this research fills an identified gap in the literature. The two dimensions proposed by the P-YSEQ cover a range of constructs consistent with existing frameworks within the group dynamics through sport literature (Gill, Williams, & Reifsteck, 2017). Psychological dynamics of sport and exercise and with the construct identified as outcomes of youth sport participation (Bruner et al., 2014). Through the adaptation of the YSEQ, researchers interested in features of group dynamics through sport can make use of this instrument to assess the team cohesion in Portuguese speaking contexts.

Reliability scores for each factor met the internal consistency criteria (Cronbach's alpha) of 0.70 or higher (Hair et al., 2014). Similar results for reliability were found for each of the instruments subscales confirming that the items are precise in their measures in relation to each dimension. Internal consistency

coefficients for the scale were similar to the original YSEQ (Eys et al., 2009) and the Farsi version (Eshghi et al., 2015). Values for item-dimension correlation ( $r > .50$ ) were satisfactory (Hair et al., 2014).

#### *Limitations and Practical Implications*

Findings hereby presented have limitations that require caution when being interpreted. The first one is referred to the sample's geographic distribution. Although the athletes were representing a single state, they were native from different regions of Brazil. Future studies must address the crossed validation with other samples in sport, since the present study only pioneered in verifying the P-YSEQ psychometric proprieties for Portuguese-speaking youth sport participants. P-YSEQ psychometric properties behaved similarly to the Canadian version tested with young athletes (Eys et al., 2009). Further, it is worth noting that the two factors identified from the factor structure account for 59% of the variance. It would be worthwhile further to investigate the structure and items in an attempt to explain a larger portion of the variance. Another limitation is related to the low AVE values had shown a possible weakened relationship that items might have while evaluating their dimensions. However, these values were close to the recommended by the literature and social and task cohesion were discriminant. A last limitation is related to the temporal stability, given that it was not assessed in this study and must be investigated for future studies.

Our results demonstrate that the P-YSEQ provides relevant information to help sport psychologists and coaches in better understanding the process of group dynamics in Portuguese speaking athletes, allowing practitioners to understand different dimensions of the sport environment. However, further studies should replicate the model proposed in the study to confirm the factor solution. Further, other psychometric properties such as responsiveness, or even item response theory could be considered in further developing the instrument.

Similarly, criterion validity should also further be tested to explore the quality of the scale as a predicting variable to sports related variables. Since this is the first instrument to be validated with Portuguese speaking athlete, more research is needed to establish evidence of proposed instrument in relation to team cohesion correlates (Eshghi et al., 2015; Eys et al., 2009). Specifically, it is relevant to suggest more studies to understand behaviors that could increase collective participation in young athletes. Given that the current findings suggest a valid instrument to measure team cohesion in Portuguese speaking athletes, it would be worthwhile to undertake such studies to better understand the role sports can have on Portuguese speaking athletes. We believe that the development of this instrument should be of interest to the field of group dynamics and will open the door to important research aimed at completing our understanding the role group environment on sports participation.

#### **Conflicts of interest**

The authors declared there was no conflict of interests.

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APPENDIX A: Youth Sport Environment Questionnaire – Portuguese version (P-YSEQ)

As questões a seguir fazem perguntas sobre seus sentimentos sobre o seu time. Por favor, circule um número de 1 a 9 que mostre o quanto você concorda com cada afirmação.

	Concordo totalmente					Discordo		totalmente	
	1	2	3	4	5	6	7	8	9
1. Todos nós compartilhamos o mesmo compromisso com os objetivos da equipe. <sup>1</sup>	1	2	3	4	5	6	7	8	9
2. Eu convido meus companheiros de equipe para realizar atividades de lazer comigo. <sup>2</sup>	1	2	3	4	5	6	7	8	9
3. Como um time, estamos todos em sintonia. <sup>1</sup>	1	2	3	4	5	6	7	8	9
4. Alguns dos meus melhores amigos estão nesta equipe. <sup>2</sup>	1	2	3	4	5	6	7	8	9
5. Eu gosto da forma como nós trabalhamos juntos como uma equipe. <sup>1</sup>	1	2	3	4	5	6	7	8	9
6. Eu <u>não</u> me relaciono muito bem com os companheiros da minha equipe. <sup>3</sup>	1	2	3	4	5	6	7	8	9
7. Nós passamos tempo uns com os outros sempre que possível quando não estamos treinando. <sup>2</sup>	1	2	3	4	5	6	7	8	9
8. Como uma equipe, nós somos unidos. <sup>1</sup>	1	2	3	4	5	6	7	8	9
9. Eu, frequentemente, entro em contato com meus colegas de equipe (telefone, SMS, internet). <sup>2</sup>	1	2	3	4	5	6	7	8	9
10. Esta equipe me fornece oportunidades suficientes para melhorar meu desempenho. <sup>1</sup>	1	2	3	4	5	6	7	8	9
11. Eu passo o tempo fora dos treinamentos e competições com meus companheiros de equipe. <sup>2</sup>	1	2	3	4	5	6	7	8	9
12. Nossa equipe <u>não</u> trabalha bem junta. <sup>3</sup>	1	2	3	4	5	6	7	8	9
13. Eu mantivei contato com meus companheiros de equipe após o final da temporada. <sup>2</sup>	1	2	3	4	5	6	7	8	9
14. Eu estou feliz com o nível de desejo de vencer da minha equipe. <sup>1</sup>	1	2	3	4	5	6	7	8	9
15. Nós permanecemos juntos em atividades fora do ambiente de treinamento. <sup>2</sup>	1	2	3	4	5	6	7	8	9
16. Minha forma de jogar é semelhante a dos meus companheiros de equipe. <sup>1</sup>	1	2	3	4	5	6	7	8	9
17. Nós entramos em contato uns com os outros com frequência (telefone, SMS, internet). <sup>2</sup>	1	2	3	4	5	6	7	8	9
18. Nós gostamos da forma como trabalhamos juntos como uma equipe. <sup>1</sup>	1	2	3	4	5	6	7	8	9

<sup>1</sup>Itens relacionados a coesão para tarefa

<sup>2</sup>Itens relacionados a coesão social.

<sup>3</sup>Itens negativos distratores.