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Proposal and validation of a battery of the 5Cs of Positive Youth Development through sport

Proposta e validação de uma bateria dos 5Cs do Desenvolvimento Positivo de Jovens no esporte

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Abstract

Objective
This article aimed to propose a battery to measure the theoretical model of the 5Cs of the positive development of young people in sport and investigate its psychometric properties.

Method
The sample consisted of 305 athletes, between 14 and 24 years old (M = 18.4±2.38, 58.9% female). The analyzes used were confirmatory factor analysis, internal consistency and structural equation modeling.

Results
The results regarding the factorial structure demonstrated the adequacy of the five oblique factor model (χ^2/gl = 1.61, TLI = 0.95, CFI = 0.95, RMSEA = 0.05), with factor loadings varying from 0.32 to 0.84. Structural Equation Modeling suggested a positive effect of harmonious passion and task-oriented climate on the 5Cs.

Conclusion
These results corroborate the literature by demonstrating the facilitating role of individual (harmonious passion) and contextual (task-oriented climate) variables on the positive development of young people in sport.

Keywords: Factor Analysis; Positive Psychology; Psychometrics; Sport Psychology; Test Validity.

Resumo

Objetivo
Este artigo teve como objetivo propor uma bateria para mensurar o modelo teórico dos 5Cs do desenvolvimento positivo de jovens no esporte e investigar suas propriedades psicométricas.

Método
A amostra foi composta por 305 atletas, entre 14 e 24 anos (M = 18,4±2,38, 58,9% sexo feminino). As análises empregadas foram análise fatorial confirmatória, consistência interna e modelagem de equações estruturais.

Resultados

Os resultados referentes a estrutura fatorial demonstraram a adequação do modelo de cinco fatores oblíquos (χ^2/gl = 1,61, TLI = 0,95, CFI = 0,95, RMSEA = 0,05), com cargas fatoriais variando de 0,32 a 0,84. A Modelagem de Equações Estruturais sugeriu efeito positivo da paixão harmoniosa e do clima orientado à tarefa sobre os 5Cs.

Conclusão

Tais resultados corroboram a literatura ao demonstrar o papel facilitador de variáveis individuais (paixão harmoniosa) e contextuais (clima orientado à tarefa) sobre desenvolvimento positivo de jovens no esporte.

Palavras-chave: *Psicometria; Psicologia do Esporte; Análise Fatorial; Validade do Teste; Psicologia Positiva.*

Positive Youth Development (PYD) is as a theoretical perspective that emerged in the 1990s, which understands that young people can learn and improve adaptive skills (e.g., leadership, responsibility) (Lerner et al., 2005). Studies have identified that PYD can provide positive outcomes and reduce maladaptive behaviors such as low self-esteem, truancy, and drug use (Holt et al., 2020; Lerner et al., 2015; Shek et al., 2019). The PYD was conceptualized as theoretical structures with the aim of facilitating the work of those promoting programs for youngsters, whether be it in schools, sports contexts, or in communities (Holt et al., 2020; Wiium & Dimitrova, 2019). One of the most common structure found in the literature is the 5Cs model, which evaluates PYD through five characteristics: character, confidence, competence, connection, and caring (Lerner et al., 2005). Although it has been tested in different contexts (Chen et al., 2018; Dimitrova et al., 2021; Dvorsky et al., 2019), in sports there are few studies showing evidence to support the measurement of the five dimensions. Therefore, the present study proposes a set of instruments to measure the 5Cs of the PYD in the sports context.

It is well known that the focus of positive youth development is the appreciation of strong points (e.g., leadership and character formation), creating and encouraging an environment of support (Qi et al., 2020; Shek et al., 2019; Waid & Uhrich, 2020; Zhou et al., 2020). In sport, this takes place in a unique way by stimulating characteristics that are important for the promotion of PYD, like leadership, teamwork, responsibility, and empathy (Vierimaa et al., 2017), as well as being an activity in which children and youngsters have a high level of interest and engagement (Harwood, 2008; Harwood et al., 2015; Romano et al., 2022). In spite of this, the promotion of PYD in this context is not automatic, it being necessary to start by creating an organization that considers the following issues: interpersonal relationships, sporting category, competitive environment, and other aspects inherent to the context of sport that may influence the process (Rigoni et al., 2017). Moreover, it is necessary to understand that the coach plays a fundamental role in development, as his responsibility is to promote an environment of learning, using either implicit or explicit approaches. The former approach refers to working PYD topics within sport (for example, leadership and teamwork). The explicit approach relates to issues outside the sporting environment, involving experiences outside this context (e.g., relational issues associated with confidence), based on references like family relationships and performance at school (Bean & Forneris, 2016; Romano et al., 2022).

The 5Cs model proposed by Lerner et al. (2005) groups the indicators of cognitive, social, relational, psychological, and contextual aspects, in a way that each C representing these aspects have a role in PYD. Thus, *Character* refers to the degree to which the youngster follows social and cultural rules, either through morality or through integrity. *Competence* is related to a positive vision directed toward actions in specific settings, for example, at the social level (problem resolution), cognitive level (decision-making), and academic level (academic performance and attendance).

Confidence is related to young people's internal feelings, in other words, how they determine their self-value, self-efficacy and to what extent they can manage a given situation to obtain positive results. As for *Connection*, this is the relationship built between people or attachment to an institution (school, sports club) which offers a two-way exchange, i.e., both parties contribute to the relationship. Lastly, *Caring* is associated with sympathy and empathy that the youngster has with another and with himself.

The model suggests that PYD occurs as a result of interventions seeking to stimulate positive characteristics (self-esteem, altruism, and empathy), consequently, facilitating the development of Cs (Esperança et al., 2018). When the youngster attains all the Cs, PYD levels are high and the chances of becoming involved in maladaptive behavior are diminished and the possibility of engaging in positive behaviors increases (social and personal contributions). *Contribution* is associated with the youngster's collaboration, with the family, society, or even with his own life. *Contribution* is a consequence of the Cs, developing when the individuals possess the five indicators, and thus said to be the sixth C (Holt et al., 2020; Lerner et al., 2015).

In Brazil, the literature has not yet established measures to evaluate the 5Cs in a sporting setting, nor theoretical proposals that would underpin empirical research. Internationally, the overall structure of the 5Cs of PYD, with five first-order factors loading on the general PYD factor as second-order, has been endorsed in different studies (Jeličić et al., 2007; Lerner et al., 2005). The model has also been used in a variety of contexts (Dimitrova et al., 2021; Dvorsky et al., 2019; Holt et al., 2020; Mercier et al. 2019), primarily in schools (Chen et al., 2018; Dvorsky et al., 2019).

In the study conducted by Chen et al. (2018), the model was evaluating through on a Confirmatory Factor Analysis (CFA) and on Structural Equation Modeling (SEM), suggesting the adequacy of the structure of five factor (CFI and TLI > 0.9 and RMSEA < 0.08). The analysis also suggested that each of the Cs was defined with its respective indicators. In the study by Dvorsky et al. (2019), CFA was performed to estimate the following models: with one factor; with five correlated factors; second order; second order with correlated residuals; and the bifactor model. The results indicated the bifactor model produced a satisfactory result (χ^2 [gl = 80] = 533.59; RMSEA = 0.04; CFI = 0.96; TLI = 0.94; SRMR = 0.03) with factor loadings above 0.3, except for two items that had loadings of 0.23 and 0.22 for the general factor. These results indicated that the PYD factor was suggested by all C items.

In the sporting setting, the reproduction of the five-dimension model has not yet met with any success (Holt et al., 2020). Vierimaa et al. (2012) proposed a set of psychological measures to evaluate the model based on the theoretical proposal developed by Côté et al. (2010). To this end, Vierimaa et al. (2012) suggest using the following instruments: Sport Competence Inventory (*competence*), Sport Confidence Inventory (*confidence*), Prosocial and Antisocial Behavior in Sport Scale (*character* + *caring*), Coach-Athlete Relationship Questionnaire (coach-athlete *connection*) and Peer Connection Inventory (athlete-athlete *connection*). Based on this proposal, it can be seen that the authors grouped the characteristics of *caring* and *character* into one C group. Although this study has produced important findings in terms of the development of PYD measures in sport, the presented model has not yet been tested by means of psychometrics research studies. In addition, it possesses some limitations that could make it difficult to conduct studies with large samples involving participants from different sporting programs, as they propose the use of a sociometric measure (Peer Connection Inventory) to evaluate the relationship between athletes as an expression of *Connection*. Another important feature of this proposition is the authors' understanding that the factors *character* and *caring* should be grouped into a single dimension and be measured via prosocial and antisocial behavior in sport (Prosocial and Antisocial Behavior in Sport Scale).

In the present study, the proposal of a measure to evaluate the theoretical model followed the theoretical rationale of Vierimaa et al. (2012), i.e., some instruments were maintained, namely: Sport confidence inventory; Sport competence inventory; the Coach-athlete relationship questionnaire. However, some changes were suggested as a result of the stated limitations: 1) It was decided to use the Teamwork Scale for Youth, a self-report instrument to evaluate the relationship between athletes, comprising 10 items, the purpose of which is to evaluate the perceived ability of youngsters to work and cooperate with other people (Lower et al., 2015). 2) To evaluate *competence*, it was decided to include a further three items corresponding to the sporting competence factor in the physical self-inventory, since the sport competence inventory presented with a reduced number of items (three), as well as dealing with very specific content such as technical ability (e.g., shooting, throwing, and blocking), tactical ability (decision-making, reading the game, and game strategy), and physical ability (strength, speed, and agility) (Dunn et al., 2007). In this way, items with content of a more general nature could increase access to the *competence* construct with the following items: I think I'm good at all sports; I do well in all sports; I am good at sport (Morin et al., 2017). 3) Lastly, considering that the model proposed in this study is composed of five characteristics, it was necessary to conceive a specific instrument for *character* and *caring*. Therefore, for *character*, it was decided to go with the youth values questionnaire, as it includes items related to moral values, ethical conduct, as well as attitudes of fair play (Gonçalves et al., 2017). For *caring*, the chosen scale was self-compassion, as it provides an assessment of the care taken by the athlete, with himself and with other athletes (Souza & Hutz, 2016).

The basis for the selection of variables with the potential to promote the 5Cs was the theoretical understanding that, to promote PYD, there is a need for aspects of individual involvement (passion) in the activity, aligned with contextual resources (motivational climate) (Lerner et al., 2015). In this way, passion, as proposed by the Dualistic Model of Passion (Vallerand et al., 2003), is defined as the level of propensity towards an activity that is valued by the individual, based on his investment in time and energy. This relationship with the activity can materialize in two different ways: Harmonious Passion (HP) and Obsessive Passion (OP). HP makes the youngster commit to the activity in a flexible, independent way, providing pleasure and other positive results like wellbeing and satisfaction with the practice of the sport (Kovacsik et al., 2018; Vallerand et al., 2003). On the other hand, OP promotes integration of the activity with the identity of the subject in a controlled fashion, raising internal and external pressures and, consequently, stimulating feelings such as exhaustion, anxiety, unhappiness, and frustration (Vallerand et al., 2003; Vallerand, 2015).

There are two types of motivational climate: ego-oriented and task-oriented. The group of athletes driven by ego is motivated to avoid failure and encourage competitive behavior, which leads to comparisons between youngsters in the group. In this regard, the individuals have more chance of developing negative sentiments like egotism and dependence (Duda, 1993; Hirota, 2017). However, when athletes are task-oriented, they are motivated by winning, using adaptive strategies, in other words, all of them focus on achieving a common goal, therefore, each participant exercises an important role within the team. Additionally, athletes who receive this form of motivation develop positive sentiments (e.g., satisfaction with life, competence). Accordingly, task-orientation has been associated with positive behavior, reducing the likelihood of quitting the sport (Hirota, 2017).

The main objective of the present study was to propose a battery to evaluate the 5Cs model in sport and to estimate its evidence of validity. Thus, this study evaluated the adequacy of the internal structure and internal consistency of the battery to evaluate the 5Cs of PYD in sport, comparing models with multidimensional, hierarchical and bifactorial structures. It was also

estimated evidence of validity based on external variables, to verify the relationships between the theoretical model, passion for sport and motivational climate, as well as to investigate the predictive role of passion for sport and motivational climate in PYD. It was assumed that the multidimensional internal structure of the correlated factors in the 5Cs model would fit the resulting sample data and indicate a satisfactory level of reliability for factors with alpha and omega coefficients above 0.7.

Method

Participants

The convenience sample comprised 305 athletes, aged between 14 and 24 (M = 18.5±2.36), of whom 55.4% were female. The participants described living in different regions of Brazil: Southeast (54.4%), South (17.4%), Northeast (13.4%), Midwest (6.9%), and North (2%), in addition to these regions, some Brazilian participants were resident in the USA (5.9%). Regarding the level of competition, the athletes indicated that they participated at the following levels: national (37.7%); international (36.7%); state (14.8%); and regional (10.8%) and, in addition, they stated they had over three years' experience practicing the sports (84%). In terms of the respective sports practiced, the athletes indicated they took part in team sports (64.3%).

Instruments

Battery 5Cs of Positive development through sport – As proposed by Vieremaa et al. (2012), *confidence* was assessed through the factor self-confidence from the Competitive State Anxiety-2 (CSAI-2R), that is composed of nine items (e.g., I'm confident I can meet the challenged). Instrument adaptation studies for the Brazilian context demonstrated satisfactory internal consistency of this, with values above 0.81 (Fernandes et al., 2012). To evaluate the *competence* two instruments were used, the Sport Competence Inventory put together by Dunn et al. (2007), composed for three items that share the same structure, namely: Technical skills, Tactical skills, and Physical Skills the present acceptable level of internal consistence 0.64 for alpha and 0.67 for omega. The second instrument is the Physical self-inventory developed by Fox and Corbin (1989), three items from the sport competence subscale were employed (ω = 0.78) (Morin et al., 2017).

The *connection* was assessed from two perspectives: coach-athlete and athlete-athlete relationship. Was used the Teamwork Scale for Youth composed of 10 items (e.g., I make an effort to include other members of my group) which are answered using a 5-point Likert scale ranging from "not at all true" to "really true", which are organized in a one-dimensional structure (α = 0.88) (Lower et al., 2015). In relation to the coach-athlete connection the coach-athlete relationship questionnaire was used, developed by Jowett and Ntoumanis (2004), it is composed of 11 items divided into three subscales: closeness (α = 0.82), commitment (α = 0.87), and complementarity (α = 0.88) (Jowett & Ntoumanis, 2004).

Character was assessed through two factors form the Youth Sport Values Questionnaire (YSV-Q, Lee et al., 2008), moral values (α = 0.79) and status values (α = 0.82). The adaptation to the Brazilian Portuguese was conducted by Gonçalves et al. (2017) and the results confirmed the instrument's psychometrics properties. Finally, *Caring* was through three factors from the Self-Compassion Scale (Neff, 2003): self-kindness (α = 0.78), common humanity (α = 0.8), and mindfulness (α = 0.79). In Brazil, the adaptation and validity evidence study were conducted by Souza and Hutz (2016).

The results suggest adequacy of the structural model and good level of reliability (α = 0.81, α = 0.66 and α = 0.77 respectively). To standardize the answer options of the battery items a 5-point Likert-type scale ranging from "not even a little" to "extremely" was employed.

Passion Scale in Sport – Developed by Vallerand et al. (2003), the aim of this instrument is to evaluate different dimensions of passion, namely: Harmonious Passion (6 items) and Obsessive Passion (6 items), answered by means of a 7-point Likert-type scale ranging from "I disagree" to "I totally agree". The results of the original study regarding reliability, using Cronbach's alpha, were found to be adequate with values above 0.7. In the study of the instrument's adaptation to Brazilian Portuguese, conducted by Peixoto et al. (2019), the results suggested adequacy of the two-dimensional internal structure and reliability.

Perceived Motivational Climate in Sport Questionnaire (PMCSQ-Abridged version) – Originally devised by Newton et al. (2000) is composed of 33 items, separated into two factors: ego-orientation (16 items) and task-orientation (17 items), which presented Cronbach's alpha of 0.87 and 0.87, respectively. The questions are answered via a 5-point Likert scale ranging from "I completely disagree" to "I totally agree". The most recent study into evidence of validity was developed by Saldanha et al. (in press), indicated the retention of two factors consistent with the theoretical dimensions. Moreover, internal consistency remained above 0.8 for both factors.

Sociodemographic Questionnaire – The sociodemographic questionnaire was specifically developed for the present study, with the aim of characterizing the sample. This tool mined information concerning age, sex, schooling, sport practiced (also noting if it is a team or individual sport), length of time in the sport, if it is the primary sport practiced, if they have used another coach for training.

Procedures

The project was approved by the Human Research Ethics Committee at the University *(*CAAE 36510320.0.0000.5514). Initially, the authors contacted sports institutions which gave their initial authorization to request the contact details of the parents and/or guardians responsible for the youngsters. Contact was made to explain the aims of the study and once the parents or guardians agreed to participation, they received an email with a link to the form to be answered by the adolescents, created using the Google Forms tool. The participation of the youngsters was conditional upon the formal consent of the parents and that of the adolescents themselves.

Data Analysis

Firstly, evidence based on the internal structure was estimated. To evaluate different 5Cs models, Confirmatory Factor Analysis was employed with the Weighted Least Squares Mean and Variance-adjusted estimation method. The proposed theoretical models were evaluated based on the following fit indices χ^2, df, $\chi^2/df \leq 3$, Root-Mean-Square Error of Approximation (RMSEA) ≤ 0.08, Comparative Fit Index (CFI) ≥ 0.9 and Tucker-Lewis Index (TLI) ≥ 0.9 (Brown, 2015). These analyses were carried out using the R software via the Lavaan package. To check the internal consistency of the battery, Cronbach's alpha and McDonald's omega coefficients were used, considering values greater than or equal to 0.7 as satisfactory (Cunha et al., 2016).

For an estimate of evidence based on relationships with external variables, Pearson's correlation coefficient was used to estimate the relationship of the 5Cs (character, confidence, competence, connection, and caring) with the external variables (passion for sport and motivational

climate), considering statistical significance indicators of $p < 0.05$. The hypothetical model was estimated using the Structural Equation Modeling (SEM) method by way of Path Analysis and a robust maximum likelihood estimation (MLE).

Results

The results of the confirmatory factor analysis indicate that the five correlated factor (oblique model) demonstrated good adjustment indices χ^2 (*df* = 1474) = 2374.51; χ^2/df = 1.61; CFI = 0.950; TLI = 0.948; RMSEA = 0.045 (90% CI 0.042–0.048); as well as the bifactor model indices χ^2 (*df* = 1428) = 1819.00; χ^2/df = 1.27; CFI = 0.978; TLI = 0.977; RMSEA = 0.30 (90% CI 0.026–0.034). On the other hand, the hierarchical model showed adequate adjustment indices χ^2 (*df* = 1479) = 2564.82; χ^2/df = 1.73; CFI = 0.940; TLI = 0.938; RMSEA = 0.49 (90% CI 0.046–0.052).

It was also observed that the bifactor model values: χ^2/df, CFI, TLI, and RMSEA were slightly higher than the oblique factors model. However, the specific indices of the bifactor structure demonstrated that the common variance explained by the general factor presented with a lower value (ECV-GF = 0.332; PUC = 0.766) compared to the specific factors (ECV-*Character* = 0.853; ECV-*Confidence* = 0.704; ECV-*Competence* = 0.558; ECV-*Connection* = 0.560; ECV-*Caring* = 0.771). Based on the results, it is possible to understand that the items are more heavily influenced by the specific factors than by the general factor and, therefore, demonstrate greater adequacy of the measurement model with five oblique factors (Rodriguez et al., 2016).

Additionally, as far as the reliability indices are concerned (omega – ω and hierarchical omega – ωh), the specific factors presented with the following values: *Character*: ω = 0.44 and ωh = 0.43; *Confidence*: ω = 0.926 and ωh = 0.65; *Competence*: ω = 0.78 and ωh = 0.37; *Connection*: ω = 0.92 and ωh = 0.44; *Caring*: ω = 0.9 and ωh = 0.7, compared to the general factor: ω = 0.94 and ωh = 0.64. Thus, by obtaining values of PUC < 0.8, ECV < 0.6, associated with ωh > 0.7 for the general factor, different indicators of adequacy of a multidimensional structure are employed for the proposed instrument (Rodriguez et al., 2016). The correlated results of the five-factor model are shown in Table 1.

As shown in Table 1, the factor loadings were satisfactory for all the factors, varying between: 0.32 and 0.75 (character), 0.66 and 0.84 (confidence), 0.43 and 0.76 (competence), 0.44 and 0.69 (connection*), 0.48 and 0.78 (caring).* The correlations between the factors were moderate to strong, ranging from 0.33 to 0.51, except for character with confidence, competence, and caring (0.17, 0.21 and 0.09 respectively). The indicators of reliability suggested satisfactory internal consistency, with values above 0.7. Based on these results, the theoretical 5C model was positively validated for the initial properties regarding sport in Brazil.

After estimating the first evidence based on the internal structure, the association of Cs with external variables was evaluated. It is possible to observe from Table 2 that the five factors obtained a moderate association with harmonious passion, where the connection factor showed the highest correlation (r = 0.49). Meanwhile, with obsessive passion, the results indicated a weak association for the model. The variable task-oriented climate indicated moderate association only with connection, while the other factors indicated a weak correlation (caring) and null correlation (character, confidence, competence). Regarding the variable ego-oriented climate, the associations were null and weak.

Table 1
Confirmatory factor loadings and reliability

Items	Factors			Items	Factors	
	Character	Confidence	Competence		Connection	Caring
Item1	0.59			Item23	0.53	
Item2	-0.39			Item24	0.46	
Item3	0.76			Item25	0.62	
Item4	-0.58			Item26	0.57	
Item5	-0.32			Item27	0.43	
Item6	0.75			Item28	0.50	
Item7	0.64			Item29	0.63	
Item8		0.73		Item30	0.61	
Item9		0.75		Item31	0.59	
Item10		0.82		Item32	0.65	
Item11		0.84		Item33	0.49	
Item12		0.78		Item34	0.34	
Item13		0.78		Item35	0.46	
Item14		0.69		Item36	0.52	
Item15		0.75		Item37	0.51	
Item16		0.66		Item38	0.46	
Item17			0.43	Item39	0.55	
Item18			0.44	Item40	0.48	
Item19			0.57	Item41	0.56	
Item20			0.57	Item42	0.67	
Item21			0.75	Item43	0.59	
Item22			0.56	Item44		0.49
Item23				Item45		0.60
Item24				Item46		0.49
Item25				Item47		0.77
Item26				Item48		0.48
Item27				Item49		0.78
Item28				Item50		0.73
Item29				Item51		0.66
Item30				Item52		0.64
Item31				Item53		0.61
Item32				Item54		0.68
Item33				Item55		0.65
Item34				Item56		0.58
Omega	0.83	0.80	0.79	Omega	0.80	0.81
Alpha	0.78	0.73	0.72	Alpha	0.73	0.76

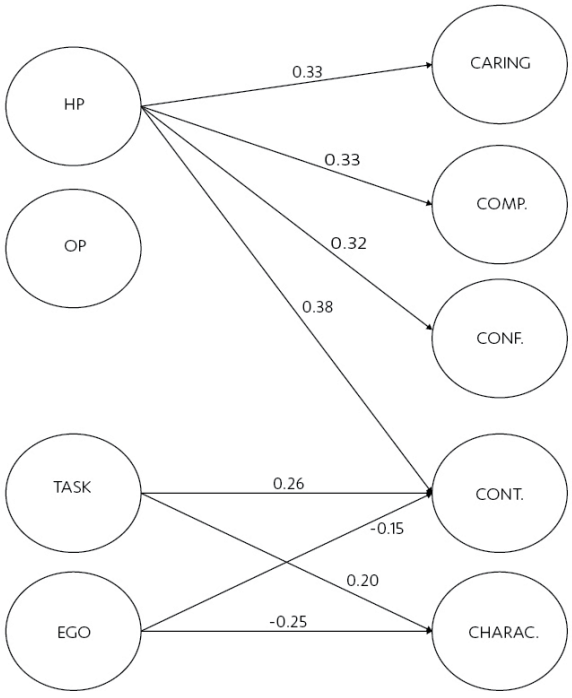
Table 2
Correlation between variables

Factors	*M*	*SD*	F1	F2	F3	F4	F5	HP	OP	Task	Ego
F1	4.09	0.57	–								
F2	3.05	0.69	0.17**	–							
F3	3.53	0.67	0.21*	0.51***	–						
F4	4.32	0.53	0.42***	0.35***	0.51***	–					
F5	3.21	0.74	0.09	0.33**	0.39***	0.33***	–				
HP	6.13	1.01	0.18**	0.32***	0.32***	0.49***	0.31***	–			
OP	4.32	1.59	0.17**	0.15**	0.17**	0.23***	0.10	0.44***	–		
Task	4.54	0.62	0.04	0.084	0.06	0.39***	0.11	0.3***	0.06	–	
Ego	2.58	0.88	-0.02**	-0.049	0.05	-0.14*	0.02	-0.004	0.23***	-0.06	–

Note: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. F1: Character, F2: Confidence, F3: Competence, F4: Connection, F5: Caring, Ego: Ego-oriented climate, HP: Harmonious Passion, OP: Obsessive Passion, Task: Task-oriented climate.

With the use of path analysis, the model exhibited in Figure 1 obtained fit indices considered satisfactory (χ^2 = 0.00; *df* = 0.00; RMSEA 90% CI [0.000-0.000] = 0.000; CFI = 1.000; TLI = 1.000). As observed in Figure 1, the results of the path analysis indicated HP's predictive role with caring (β = 0.33, *p* < 0.001), competence (β = 0.33, *p* <0.001), confidence (β = 0.32, *p* < 0.001) and connection (β = 0.38, *p* < 0.001), the predictive power of task with character (β = 0.20, *p* < 0.001) and connection (β = 0.26, *p* < 0.001), and also a negative association of ego with character (β = -0.25, *p* < 0.001) and connection (β = -0.15, *p* < 0.002). The integrative model was able to explain 11% of the variance for the variable character, 11% for confidence, 12% for competence, 33% for connection, and 10% for caring.

Figure 1
Path Analysis



Note: HP: Harmonious Passion, OP: Obsessive Passion, Task: Task-Oriented Climate, Ego: Ego-Oriented Climate, Comp.: Competence, Conf.: Confidence, Cont.: Connection, Charac.: Character.

Discussion

The primary objective of the present study was to propose a measurement battery to evaluate the theoretical 5Cs model (character, competence, connection, confidence and caring) of PYD in the sporting context, and to estimate internal structure validity evidence. Based on the results, the model showed itself to be acceptable for application in the Brazilian sporting context, producing psychometric data considered adequate, thereby corroborating the theoretical proposal of Lerner et al. (2005). The CFA identified superior fit indices for the bifactor model, but despite this, factor loadings loaded on the five correlated factors explained most of the item variance, thus considered to be the most apposite model.

Staying with the internal structure, the internal consistency of the specific factors was observed through the Cronbach's alpha and McDonald's omega coefficients, indicating satisfactory values and low levels of error related to the proposed model (Cunha et al., 2016). In this regard,

the results are promising, offering contributions to researchers and professionals in sport, since it operationalized a battery capable of evaluating PYD-associated characteristics, providing the area with an instrument with the potential for application in studies that seek to establish an association between the 5Cs of PYD in sport and other variables of interest to researchers (Eccles & Gootman, 2002; Lerner et al., 2015).

Different studies (e.g., Harwood, 2008; Harwood et al., 2015) have explained the use of the 5Cs model to substantiate the interventions of coaches and administrators in sports programs. Such studies sought to establish the efficacy of the programs via the structure of the 5Cs of PYD with coaches. In general, the results suggest that coaches consider themselves respownsible for the development of their players, stimulating a task-based climate, consequently helping with motivation, perception of athlete skills and the promotion of other abilities like moral values, confidence, and empathy. Moreover, the studies also described the importance of relationships with peers since sporting relations influence the behavior of the athlete through an environment of learning and support. In this way, a measure for evaluating 5Cs in sport may contribute by providing information to be incorporated into programs that seek positive results for athletes, as it may be considered an evaluation indicator for these results.

Therefore, the results represent a contribution as it promotes the approximation between research and practice since a tool is made available based on scientific principles with the potential to cooperate with development in the area. It should be noted that in Brazil it is still a challenge that needs to be overcome, as sports science professionals have little in the way of resources. Accordingly, the ability of the battery to measure PYD-related aspects facilitates the acquisition of initial resources to promote healthy characteristics and skills that can be transferred to other scenarios beyond sport (Esperança et al., 2018; Lerner et al., 2015). Lastly, by proposing a theoretical model devised by Lerner et al. (2005), with five correlated factors *(character, confidence, competence, connection, and caring),* the present study found evidence of a measurement battery supporting the literature and the practice of sports psychology, thereby providing the first scientific foundations for the interpretation of the scores for this battery of measures to assess young Brazilian athletes.

As for the external variables the results suggested that harmonious passion is a variable associated with positive development, as it is correlated and has a positive effect over all the factors except character. In this way, it is understood that the way the athlete relates to sport, whether harmoniously or obsessively, does not influence his character. However, where higher levels of HP are involved, the athlete tends to experience sport in a positive way. This the results are consistent with the proposal of Vallerand et al. (2003), which stated that HP leads to adaptive behavior by allowing the youngster to practice sport in a harmonious way, managing to reconcile sport with other areas in his life, thereby stimulating abilities such as responsibility, positive affectivity, motivation, and leadership (Vallerand, 2015). What may be considered characteristics of each of the factors: connection, competence, confidence, and caring.

These results are consistent with those observed by Lafrenière et al. (2008) which evaluated the predictive power of passion on the quality of athletes' relationships with their coaches, suggesting, based on analyses, HP as a positive predictor ($\beta = 0.47$). Similarly, Verner-Filion and Vallerand (2018) also sought to estimate the relationship between passion and affection, athletic satisfaction, and performance in soccer players. In general, the results indicated that HP is related to good performance, i.e., with athletes' preparation and output ($\beta = 0.18$), suggesting that athletes with significant levels of HP succeed in establishing better training strategies, consequently obtaining improved performance and a higher level of perception of competence.

The results also suggested the positive effect of the task-oriented motivational climate on character and connection. It is plausible to assume that the way in which the coach establishes motivation in the sporting environment affects character and the relationships established in this setting. These results corroborate the theory of Duda (1993), namely associations and positive effects of the task-oriented climate with character and connection as this type of climate is related to an environment of learning and cooperation, motivated by team triumphs, creating strategies for the group to attain a common goal, stimulating positive feelings and, consequently, producing athletes who value people and respect moral values and rules (Hirota, 2017). On the other hand, the ego-oriented climate presented negative values in relation to character and connection, validating the literature insofar as it is all about a competitive, comparative environment, causing athletes to develop fear, egotism, and dependence, negatively affecting their relationships, and encouraging the athlete to want to win at all costs, without regard to boundaries and consequences (Duda, 1993; Hirota, 2017).

Conclusion

The present study made it possible to estimate the initial validity evidence of a proposal for a battery to evaluate the theoretical 5Cs model, based on internal structure. The results suggested the adequacy of the battery, demonstrating the capacity for it to be applied to adolescents and young Brazilian athletes, validating the theoretical proposal by indicating the model with correlated factors as being the most suitable. However, some sample-related limitations of the present study should be highlighted as a limitation in the assessment of the dimension caring, since it has been attempted to cover expressions of care for the other through the common humanity and mindfulness factors that make up the Self-Compation Scale, it can be observed that most of the items are still intended for self-care assessment. In this sense, greater investments can be made to access the expression of care with other athletes (teammates and opponents), thus new items must be built to cover this extension of the construct.

Regarding the assessment of the C competence, the instruments used did not assess the total extension of the construct, that is, technical skills, tactical skills and physical skills were measured, but not psychological capacity (e.g., decision making, solving conflicts). It is suggested that in future studies on the theoretical model, researchers seek to develop or include an instrument capable of measuring all elements of competence.

In this study a convenience sample was accessed through self-report instruments made available via an online form. Therefore, they may be susceptible to the influence of response bias. In view of this, the production of further studies is suggested with data collected in person, thereby eliminating any shortcomings by controlling the effects of possible response bias such as acquiescence and social desirability. Finally, since the number of participants in this study residing in the United States of America was extremely lower than the number of participants residing in Brazil, it was not possible to compare cultural differences. Thus, it is recommended that researchers seek to increase the number of athletes in different countries to identify whether there is a significant difference in the evaluation of the 5Cs model, consequently, of the PYD between cultures.

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