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Exploring the Networks of Relationships Between the 5Cs of Positive Youth Development Through Sport

Exploración de las redes de relaciones entre las 5C del desarrollo positivo de los jóvenes a través del deporte

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Abstract

The theoretical 5Cs model (character, confidence, competence, connection and caring) is a promising theory for evaluating Positive Youth Development (PYD) through sport. Given the scarcity of studies evaluating the inter-relationship between the 5Cs of PYD through sport in the Brazilian context, the aim of the present study was to explore the 5C relationship networks. The sample comprised 308 athletes aged between 14 and 24 ($M=18, 5\pm 2.35$, 54.9% females), who responded to a battery of 5Cs measures in sport. Network analysis was employed, producing six clusters of items. The network graph results suggested that the items Character (2 – leader in the group; 5 – I am better than other) and Competence (32 – ability to be a leader) are central nodes, while the measures of centrality identified the coach-athlete Connection (42 – with my coach, I am ready to do my best; 43 – with my coach, I adopt a friendly stance) as having greater impact than the clusters. The results corroborated the theoretical grounding, which stresses the role of the coach-athlete relationship in PYD through sport. The practical application of these practices is presented here.

Keywords

Sport Psychology; Psychometry; Psychological Assessment.

Resumen

El modelo teórico de las 5C (carácter, confianza, competencia, conexión y cariño) es una teoría prometedora para evaluar el desarrollo positivo de los jóvenes (DPJ) a través del deporte. Dada la escasez de estudios que evalúen esta interrelación en el contexto brasileño, el objetivo del presente estudio fue explorar las redes de relación de las 5C que se constituyen. La muestra estuvo compuesta por 308 deportistas de entre 14 y 24 años ($M=18$, 5 ± 2.35 , 54.9% mujeres), que respondieron a una batería de medidas de las 5C en el deporte. Se empleó el análisis de red, produciendo seis grupos de ítems. Los resultados del gráfico de red sugirieron que los ítems *carácter* (2: Líder en el grupo; 5: Soy mejor que otros) y *competencia* (32: habilidad para ser un líder) son nodos centrales, mientras que las medidas de centralidad identificaron la *conexión* entrenador-atleta (42: Con mi entrenador, estoy dispuesto a dar lo mejor de mí; 43: Con mi entrenador, adopto una postura amistosa) como de mayor impacto que los clústeres. Los resultados corroboraron la fundamentación teórica, que destaca el papel de la relación entrenador-atleta en el DPJ a través del deporte. La aplicación de estas prácticas se presenta en este artículo.

Palabras clave

Psicología del deporte; psicometría; evaluación psicológica.

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Introduction

With proper guidance, engaging in sports can aid the development of cognitive and social-emotional skills, as well as strategic, tactical, and technical competencies (Galatti et al., 2017; Reverdito et al., 2017a; Reverdito et al., 2017b). In this sense, the proposition of positive youth development (PYD) in sports training, which takes the form of a field of investigation and intervention, is that the training environment should promote the development of personal characteristics (e.g., self-esteem, confidence), social characteristics (interpersonal relationships) and contextual characteristics (the climate of the environment), based on a variety of propositions outlined in theoretical models (Côté et al., 2010; Lerner et al., 2005). One PYD model outlined in the literature is the 5Cs model, which is represented by five characteristics: character, confidence, connection, competence, and caring (Lerner et al., 2005). This model has been used in sports programs and theoretical studies (Esperança et al., 2018; Harwood, 2008; Harwood et al., 2015; Holt et al., 2020), however, there has been scant effort to understand the interrelationships between the characteristics that form the model, especially in the context of sport (Holt et al., 2020; Vierimaa et al., 2012).

Diverse studies (e.g., Côté et al., 2016; Fraser-Thomas et al., 2005; Price & Weiss, 2011; Turnidge et al., 2012) have argued that the characteristics of the 5Cs model could influence positive development and adaptive behavior (e.g., leadership, empathy, interpersonal relationships). In this scenario, each characteristic has a fundamental role to play and might facilitate the manifestation and enhancement of other “Cs” (Côté et al., 2016; Lerner et al., 2005; Lerner & Lerner, 2011).

Character is the first C and is related to the development of moral values and sporting spirit, for instance, healthy competition, solidarity, and socialization (Côté et al., 2016; Lerner et al., 2005). The study conducted by Sanches and Rubio (2011) found that the athletes who took part in the study described competitiveness as one of the main characteristics that they experienced. Despite this, they understood that this competitiveness may be considered helpful in stimulating other positive behaviors, such as cooperation, camaraderie, and respect. These findings indicate that when there is fair play and healthy competition, where behaviors associated with character are emphasized, athletes tend to work together as a team (C - connection) and display more respect towards one another (C - caring).

The second C, Confidence, relates to how much athletes believe in their ability to be successful in their sport, in other words, how much it is linked with self-confidence (Côté et al., 2016; Lerner et al., 2005). In the study by Gencer & Öztürk (2018), the authors found an association between self-confidence and coach-athlete connection. The results showed a moderate relationship between self-confidence and the factors of connection with the coach (complementarity $r=.38$; commitment $r=.37$; closeness $r=.30$). Moreover, the results reveal the predictive role of self-confidence on the coach-athlete relationship ($\beta = 0.39$). Based on these findings, the study suggested there is a relationship between two “Cs” – Confidence and Connection – in the sporting context.

The third C, or Competence, is related to the ability that individuals demonstrate and execute in the practice of their sport (Côté et al., 2016; Lerner et al., 2005). The literature argues that athletes’ performance and development are influenced by the quality of relationships in this environment with their coaches and their peers (Jowett & Cockerill, 2003). Relationships can promote not only competencies aimed at performance, but also the abilities of these athletes in terms of satisfaction, dignity, and self-confidence (Deci & Ryan, 2012; Jowett & Cockerill, 2003). Competence also depends on the perception that the athlete has about these relationships and the positive results of these interactions, enabling them to create goals and objectives to be surpassed and to acquire greater confidence and effectiveness in the practice of their sport (Deci & Ryan, 2012; Jowett & Cockerill, 2003).

The fourth C, Caring, is related to prosocial behaviors: sense of responsibility, integrity, respect, and empathy, as well as to feelings of compassion that may be directed towards another and oneself (self-compassion) (Côté et al., 2016; Lerner et al., 2005). Several studies (e.g., Garaigordobil & Galdeano, 2006; Lorimer & Jowett, 2010; Sevdalis & Raab, 2014) identified empathy to be an important variable in facilitating sporting relations and the development of character, seeing that empathetic individuals tend to present prosocial behavior and fewer aggressive attitudes in their interactions with others (athletes, coach, and family). The studies also explain that the sporting context is seen to be an essential factor in facilitating empathy, as the environment enables interpersonal relationships (Garaigordobil & Galdeano, 2006; Lorimer & Jowett, 2010; Sevdalis & Raab, 2014).

As far as athletes' self-care is concerned, self-compassion is understood to be favorable in sporting contexts, as these contexts stimulate competitive climates, internal and external pressures, as well as the fear of failure and emotional difficulties (Crozier et al., 2019). Athletes with high levels of self-compassion have greater self-reliance, personal growth, life purpose, responsibility, and perseverance. Consequently, they tend to minimize negative thoughts and behavior, thereby gaining greater self-confidence (Ferguson et al., 2014; 2015).

Lastly, the fifth C, Connection, concerns the quality of the relationships of individuals placed in the same scenario such as their coaches, other athletes, referees, and so on (Côté et al., 2016; Lerner et al., 2005). Sport plays an indispensable role in the development of social and interpersonal skills as it makes it possible to build relationships that provide the athlete with self-awareness, responsibility, and self-control (Sanches & Rubio, 2011), given that the athletes are always interacting with their coaches, with teammates or even other athletes (Goldenberg et al., 2016). Moreover, relationships established through sport can help to promote morality (Kavussanu & Stanger, 2017; Shields & Bredmeier, 2007).

Of these relationships, the athletes establish and sustain with their coach has an important role to play as it is responsible for facilitating the quality of athletes' interpersonal relations, specifically with other athletes, family, institutions, and opponents (Tavares et al., 2021). When these relationships are positive, the coach enables the athletes to experience positive emotions as well as incentivizing greater engagement, satisfaction with practicing the sport and promoting essential aspects for the development of the athlete (Compton, 2005; MacDonald et al., 2010; Tavares et al., 2021; Weiss & Stuntz, 2004).

Understanding the importance of the theoretical model for the development of positive results in the sporting environment, Silva et al. (in press) proposed a battery of measures to estimate the 5Cs of positive development with young adults. Different measurement models were evaluated for evidence of validity and accuracy of results, indicating that the correlated model produced better results than other models (hierarchical and bifactor), which allows each of the Cs to be investigated independently of one another. The author also reports that the results of her research make it possible for future studies to explore the specific features of each characteristic in the theoretical model, focusing on the Cs. Moreover, exploring the interrelationship between the 5Cs makes it possible for sports professionals to better understand positive development, making it a useful tool for planning strategies and interventions that help to promote and enhance positive behaviors associated with character, confidence, connection, competence and caring (Borrueco et al., 2020; Harwood, 2008; Harwood et al., 2015; Lerner et al., 2015). Despite the significance of examining the connections between the Cs and the evidence supporting it, the literature has made little effort to analyze these characteristics.

Accordingly, our objective was to explore how the dimensions of the 5Cs theoretical model are related to one another within the context of sport. Based on the literature presented, our hypothesis was that Connection was likely to be the core relationship variable, interconnecting all the other Cs, seeing that the social relationships established in the environment are considered fundamental to the development of other social, emotional, and cognitive skills (Goldenberg et al., 2016; Reverdito et al., 2017b; Tavares et al., 2021).

Method

Study Type

This is an empirical study with associative strategy, since the its objective is to explore how the characteristics (C's) relate to each other. The associative strategy can be used in different circumstances, based on the research objective, and will be used here to explore the existing relationship between the variables and test the theoretical model (Ato et al., 2013).

Participants

The sample comprised 308 young athletes of both sexes (54.9% female, 45.1% male), aged between 14 and 24 (mean 18.5 ± 2.35). The athletes come from various regions in Brazil: Southeast (53.9%), South (17.2%), Northeast (13.3%), Midwest (6.8%), North (1.9%). Meanwhile some Brazilian athletes reported being residents of the USA (6.9%). Most participants

practice team sports (64.3%) and have been doing so for at least three years (83.4%), competing nationally (37.7%), internationally (37%), at the federal state level (14.6%) and regionally (10.7%). Participants were recruited based following two inclusion criteria: firstly, being an athlete aged between 14 and 24 years of age. Secondly, having experience equal to or greater than 6 months in sports practice.

Instruments

5Cs battery of measures for PYD

The battery was devised by Silva et al. (in press), based on the theoretical model of Lerner et al. (2005), for a sample of young Brazilian athletes, consisting of seven instruments in the Brazilian Portuguese language, namely: 1) The Youth Sport Values Questionnaire-2 (YSVQ-2), whose objective is to evaluate Character through two factors (moral values and status) (e.g., "I show that I am better than others"), moral values $\alpha = .79$, and status values $\alpha = .82$ (CFI = 0.97; RMSEA = 0.05) (Lee et al., 2008); 2) Sport Confidence Inventory, a unidimensional model which evaluates confidence in sport (e.g., "I'm confident I can meet this challenge"), with an internal consistency of .81 and good fit indices (CFI = 0.95, RMSEA = 0.04) (Cox et al., 2003); 3) Sport Competence Inventory, which evaluates Competence in sport through three unidimensional items, (e.g., Tactical skills - decision-making, reading the play, strategy, etc.), the model showed good fit and reliability indices (CFI = 1; RMSEA 0.00, $\alpha = 0.64$) (Dunn et al., 2007); 4) Physical Self-Inventory, which evaluates Competence using the factor of sporting competence (e.g., "I do well in sports"), which presents good fit and reliability indices (CFI = 0.99; RMSEA = 0.06; $\omega = 0.78$) (Fox & Corbin, 1989); 5) A 10-item scale concerning teamwork for youngsters, which measures peer-to-peer Connection (e.g., "I make an effort to include other members of my group"), presenting good fit and reliability indices (CFI = 0.98; RMSEA = 0.04; $\alpha = 0.88$) (Anderson-Butcher et al., 2014); 6) Questionnaire on the coach-athlete relationship, which evaluates athletes' Connection with coaches with 11 items (e.g., "I feel that my sport career is promising with my athlete/coach athlete") (CFI = 0.96; RMSEA = 0.08; $\alpha = .7$ and CC = 0.7) (Jowett

& Ntoumanis, 2004); and 7) Self-compassion scale that uses a three factors model to measure Caring: self-kindness (e.g., "I try to be loving towards myself when I'm feeling emotional pain"). The instrument presented good fit indices, $\alpha = .78$), sense of humanity ("When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am", $\alpha = .8$) and mindfulness ("When something upsets me I try to keep my emotions in balance", $\alpha = .75$) (CFI = 0.94; TLI = 0.93; RMSEA = 0.07) (Neff, 2003). That is, the grouping of the presented instruments provided a battery to measure the positive youth development through sport, elaborated by Silva et al. (in press). The battery is answered in a five-point Likert scale. A study of the internal structure of the battery indicated the adequacy of the instrument to measure the complete model (CFI = 0.95, RMSEA = 0.05), as well as good levels of internal consistency over .70 for Cronbach's alpha and McDonald's omega.

Procedure

The study was approved by the Research Ethics Committee of the University São Francisco [CAAE: 36510320.0.0000.5514]. Participants were afforded confidentiality regarding the data collected as well as the option to withdraw at any time, complying with Brazilian National Health Council resolution 466/2012. In addition, the participants were informed about the procedures and objectives of the study prior to receiving the link to the form on *Google Forms*. Contact was made with the participants through sporting institutions, i.e., training centers, social projects, schools, etc. In addition, it was also publicized on our social networks. Only the athletes who signed the informed consent form or assent (for those under 18 and over 18 years of age, respectively) and whose parents or legal guardians signed the informed consent form (for those under 18 years of age) participated in the research. On average, the participants took 20 minutes to complete the survey.

Data analysis

A network analysis was performed, specifically the Exploratory Graph Analysis (Golino & Christensen, 2021). The networks consist of two components, namely nodes and edges: nodes are the elements in

a system and edges connect the nodes to one another, representing the interactions (Costantini et al., 2019). To limit the number of spurious relationships, the statistical regression analysis method known as Least Absolute Shrinkage and Selection Operator (LASSO) will be employed (Friedman et al., 2008).

LASSO considers the model's complexity and performs well in the estimation of partial correlation networks (Fan et al., 2019), as it can constrain the network and exhibit the connections most relevant to the data structure, in which the Extended Bayesian Information Criterion (EBIC) is normally minimized (Chen & Chen, 2008). EBIC has been widely used in networks in the field of psychology as it improves the accuracy and interpretability of the networks produced (Hevey, 2018). The analysis was carried out using the RStudio application 4.2.2 version, employing the "EGAnet, 1.2.3 version" (Golino & Christensen, 2021) and "qgraph, 1.9.2 version" (Csardi & Nepusz, 2006) packages.

To evaluate the network, the centrality parameters were ascertained as these indicate the nodes or variables deemed to be the most important within the network, depending on the type of connection. Betweenness centrality (connectivity) relates to the frequency with which a node takes a shorter route between all the connected nodes in the network, while closeness centrality may be defined as the reciprocal of the sum of the length of the shortest paths between the node and all the other nodes. When there is a high level of closeness, it is interpreted as having a high power of prediction with the other nodes. Strength centrality refers to the number of direct connections between the nodes (Fonseca-Pedrero, 2018; Machado et al., 2015). Expected influence is a measure that considers the positive and negative values of the edges when calculating strength centrality (Robinaugh et al., 2016).

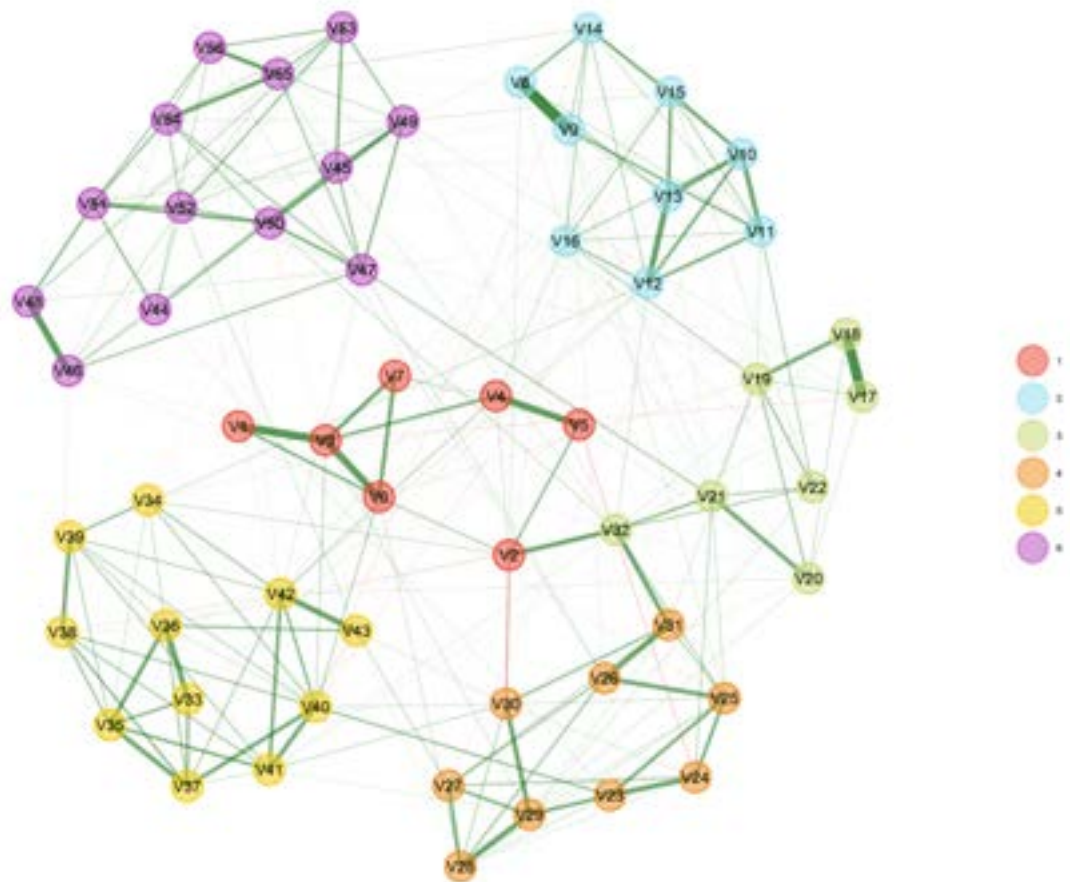
Results

The results of the network analysis are indicative of a cluster divided into six groups. As displayed in Figure 1, cluster 1 (red) consisted of items related to Character, aimed at evaluating sporting spirit (i.e., fair play), as well as the principles and integrity of athletes in the sporting environment. Cluster 2 (light blue) brought together items related to Confidence, evaluating self-confidence in the sporting environment. Cluster 3 (green) links items related to Competence, which sought to evaluate the perception of athletes in terms of sporting abilities and competencies, such as strength, speed, decision-making, development of strategies, among others. Additionally, within this cluster, item 32 "I am confident in my ability to be a leader" was included in the group despite it being expected, theoretically, to have a greater association with the athlete-athlete Connection cluster. Cluster 4 (orange) brought together athlete-athlete Connection items, the purpose of which is to investigate the quality of relationships between athletes. Cluster 5 (yellow) comprised items that evaluate the

coach-athlete Connection, more specifically closeness, complementarity, and commitment. Lastly, cluster 6 (purple) pools items whose aim is to measure Caring, such as feelings of compassion, empathy, kindness, and generosity.

It is important to mention that it was expected that Connection would form just one cluster, but the analysis suggested a division into two groups, namely coach-athlete (cluster 5) and athlete-athlete (cluster 4). Additionally, it was noted that items 2 "I am a leader in the group", 5 "I beat or defeat others" and 32 were centrally positioned, helping to link one group to another. For instance, item 2 connects cluster 1 (Character) with other clusters (coach-athlete Connection and Caring); item 5 produced a relationship between Caring and Competence, while item 32 exhibited a link between Character, Confidence, and athlete-athlete Connection. In addition, the items in Character revealed negative relationships with the items in the other groups (Figure 1).

Figure 1. Network analysis of the 5C model of Positive Youth Development



Note. The node numbers represent the items in the model. 1 – Character; 2 – Confidence; 3 – Competence; 4 – athlete-athlete Connection; 5 – coach-athlete Connection; 6 – Caring.

The centrality analyses are shown in Figure 2 and demonstrated that not all the nodes are equally important to the network structure. The indices of centrality, strength, closeness, betweenness and expected influence are based on the pattern of connections, in other words, how the nodes perform their role and how they may be used to tailor the connections, for example, through the amount of flow between the nodes (Borgatti, 2005). The centrality parameters present information about the importance of a node in relation to the others in the network. The overall results of the measure of centrality indicate that item 42 “When I

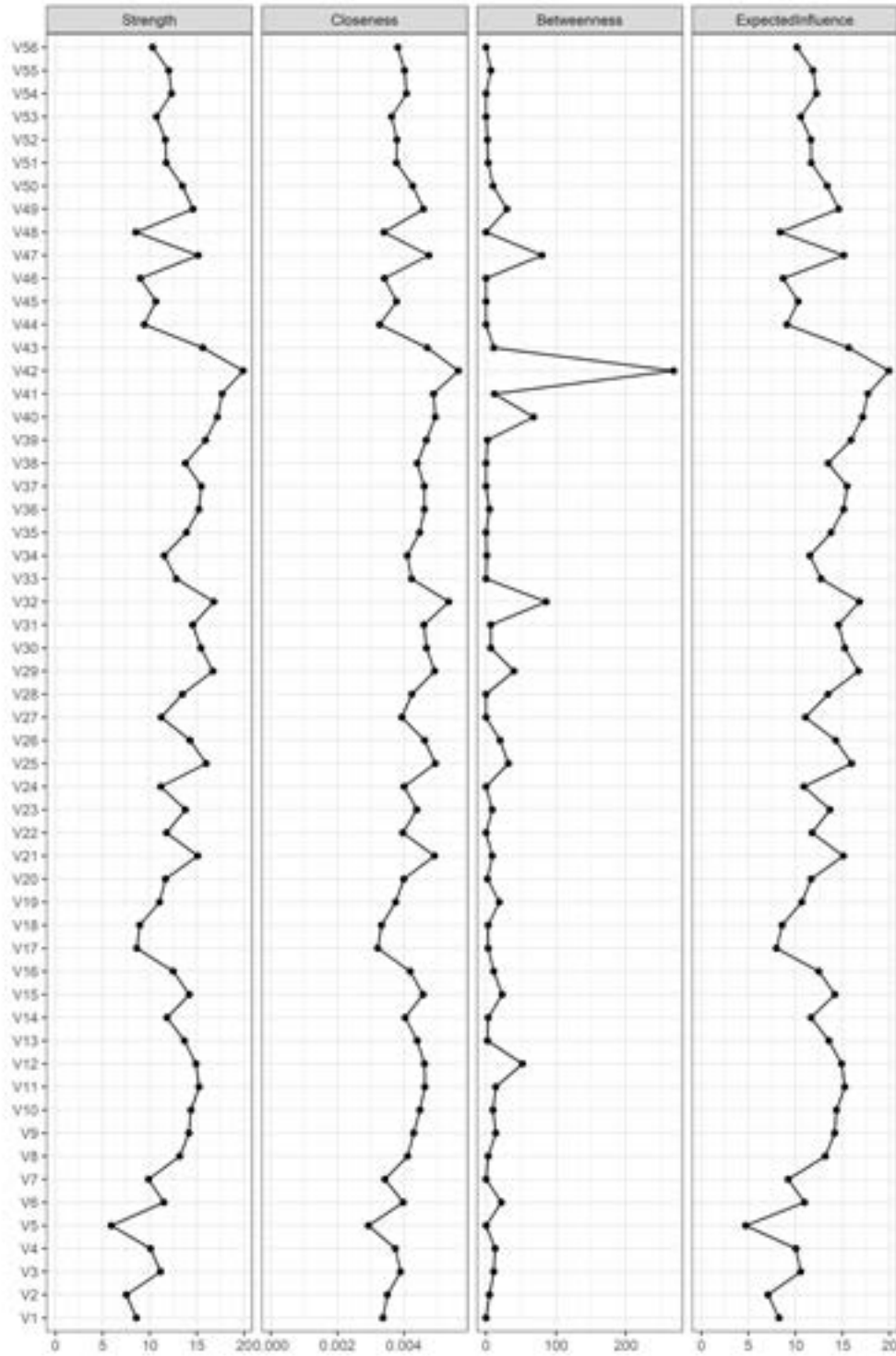
am trained by my coach, I am prepared to do my best” and item 43 “When I am trained by my coach, I adopt a friendly attitude” (coach-athlete Connection) have a large number of connections and that their activities may influence the entire network.

Different centrality indices furnish diverse perceptions, and within these indices, it is still necessary to verify two aspects: degree, and strength. Degree relates to the number of connections that occur with a node (Freeman, 1978; Hevey, 2018). Strength relates to the level at which one node is connected to the others. A node with a lot of

weak connections may not be as central to the network as those with a few strong connections, which might explain why items 2 and 5 were so centrally positioned in Figure

1, though understood to be items with low impact in the network for the parameters betweenness, closeness and expected influence, as illustrated in Figure 2.

Figure 2. Centrality measures of the items in the model



The betweenness suggests that items 2 and 5 exhibit longer paths between all the pairs of nodes connected to the network (Saramäki et al., 2007). The closeness suggests that the items are more distant and have a lesser

predictive impact for the clusters, and fewer associations (Hevey et al., 2018; Saramäki et al., 2007). Lastly, expected influence shows that the items are negatively related to the network (Robinaugh et al., 2016).

Discussion

The aim of the present study was to examine the relationship networks of the 5Cs model within the context of sport. In general, the graphical representations of the network showed Character and Competence to be the central items. The measures of centrality suggested the items in the coach-athlete Connection had the greatest impact on the network, partially corroborating the study's initial hypothesis. It was also possible to observe the division of Connection into two clusters, coach-athlete, and athlete-athlete.

Similarly, to the results obtained by Silva et al. (in press), it is possible to observe in the findings of the present study, based on the graphical representation of the network, that two centrally positioned items in Character and one in Competence promote connections between a cluster of items corresponding to other characteristics in the model. The results of the study by Silva et al. (in press), meanwhile, using confirmatory factorial analysis to estimate the latent variable, observed that the item Competence demonstrated a greater closeness to the two Connection groups (coach-athlete and athlete-athlete). As for the items within Character, it was observed that their strongest interactions occurred with Competence and athlete-athlete Connection.

The findings relating to coach-athlete Connection, by suggesting items that may make connections with other characteristics, corroborate the theoretical grounding by understanding the connections as facilitating other characteristics. The literature indicates that the variables which should be handled by coaches, such that the sporting environment favors PYD, include the fostering of healthy relationships, cultivating prosocial values and positive leadership styles (Lam, 2012; Turnnidge & Côté, 2018). In this environment, the chances of building interpersonal relationships and developing strategies to deal with emotions and promoting positive behaviors are higher and, consequently, socioemotional skills such as responsibility, morality, empathy, leadership, etc., are enhanced. (Goldenberg et al., 2016; Kavussanu & Stanger, 2017; Sanches & Rubio, 2011).

Indeed Davis et al. (2021) observed that athletes prospered when they realized that the relationship with their coaches was based on affection, confidence, support, and perceived positive expectations about the behavior of coaches and a positive self-image, unlike those athletes who perceived that the relationship with the coach was based on uncertainty and fear of rejection. In addition, the relationship with the coach helps to develop other quality relationships (e.g., family, athletes, opponents) (Holt et al., 2017; Tavares et al., 2021). So, this study corroborates the importance of this relationship in the positive, personal development of athletes.

No studies have been found in the literature which have performed network analysis of the 5Cs model, however, studies have shown that PYD and the sporting environment can contribute to the development and strengthening of character and that this characteristic is associated with adaptive behaviors (Park, 2004; Sanches & Rubio, 2011; Silva et al., in press). Specifically in the case of the study conducted by Silva et al. (In press), relationships were found between the Cs, particularly between Character and all the other characteristics, with a higher degree of magnitude for Connection ($r=.42$), and a significant relationship for Competence with other Cs, there being a stronger relationship with Connection and Confidence ($r=.51$ in both cases). These results may be explained by the importance of the expression of caring, solidarity and moral values in the development and preservation of positive relations with teammates, coaches, and opponents. Also, the expectation that, as the athletes feel more competent in their responses to the tactical, technical, physical, and psychological challenges of their sport, they gain confidence, with the potential to transfer this confidence into other spheres of life (Bean et al., 2018; Weiss et al., 2013; Weiss et al., 2014).

In addition, these results suggest that it is not a question of an overlapping of constructs, although a modicum of shared variance between the variables can be observed, as a very significant proportion of specific

variance is maintained. As for the empirical model dividing Connection into two groups, despite the absence of a similar proposition in the literature, a theoretical division can be observed when explaining the importance of these relationships, suggesting independent, albeit complementary contributions. For example, Holt et al. (2017) submits that the characteristics of a sporting environment appropriate for PYD should include relations with adults, relations between peers and family involvement, which could facilitate experiences that help athletes to attain the goals of PYD.

Several considerations were raised about the structure of the 5Cs model. For example, a 6Cs theoretical model has been proposed, which refers to the development of a new C once the individual has succeeded in attaining the 5Cs (character, confidence, competence, connection and caring). This new C would be Contribution, which takes place when the youngster starts contributing to the community, expressing his/her potential to transform the environment in which he/she lives (Holt et al., 2020; Lerner & Lerner, 2011; Lerner et al., 2005). A second consideration was discussed in the study of Vierimaa et al. (2012), who proposed a 4Cs model, combining Character and Caring into just one C, which was attributed to their understanding that, in that culture (Canadian), Character and Caring are not understood as sufficiently different to merit separation.

Nevertheless, we may wish to reflect on this different perspective. A model consisting of 6Cs would be more effective than a model with 5Cs if we consider that coach-athlete and athlete-athlete relations could be included as separate characteristics. Even though the relationships appear to be different, they do tend to occur in the same environment, each being influenced by the other. In other words, the coach's relationship with the athletes will have an influence on the relationship of athletes with other athletes. To put it another way, the quality of the relationships may be independently understood (Goldenberg et al., 2016; Sanches & Rubio, 2011; Tavares et al., 2021), however, there are no theoretical or empirical grounds yet for separating Connection, as per the proposal of Lerner et al. (2005) and other studies (Campos, 2022; Dvorsky et al., 2019; Vierimaa et al., 2012).

Moreover, we may wish to contemplate if this division was the result of the evaluation being performed using different instruments. The proposal for the measurement of the model is an incipient idea in the

sporting context, with a few limitations. For instance, the instruments that make up the battery were not necessarily developed initially for the sporting context, like the Teamwork Scale for Youth, adapted to evaluate athlete-athlete Connection (Silva et al., in press). In this sense, the construction of a specific instrument to measure the 5Cs model is suggested, as well as the use of a new network analysis, focusing on network stability.

The results of this study provide empirical evidence for theoretical propositions that already suggested the importance of Character and Connection to PYD, as well as the role of positive relationships in this scenario. Using this study, sports psychologists and coaches can have access to data that may help them understand the behavior of the model's characteristics, and plan interventions focusing on the central characteristics. Such a focus may potentialize the activation of those characteristics which have been more difficult to penetrate.

Lastly, it is understood that the stronger the relationship of the Cs in the network, the greater the possibility of experiencing positive emotions, consequently diminishing negative sentiment and behavior (anxiety, negative affect, self-criticism) (Esperança et al., 2018; Franco & Rodrigues, 2018). In other words, when one characteristic is stimulated, others may be strengthened. To this end, it is necessary to analyze which characteristics are more present. Specifically, about the sample, Character is considered the central C in the network, thus, based on the results, it might be interesting to think about strategies and interventions which involve issues of integrity, fair play, and sporting spirit, with the aim of facilitating the enhancement of other abilities and skills.

The goals have been achieved, providing new empirical evidence for evaluating the 5Cs model. While the results are satisfactory and show advancements in understanding the model, this study has a few limitations. We only examined a relationship network with variables considered to be positive, so future studies may benefit from including negative variables such as depression, anxiety, and stress to explore how socio-emotional abilities impact maladaptive behavior. Additionally, sample size should be considered. Future studies may want to consider including a larger number of participants to evaluate the stability of the network between groups, such as different sports, competitive levels, gender, among others.

Therefore, the present study offers support for the use of the battery in evaluating positive phenomena among adolescent and young adult athletes. Furthermore, the implementation of the battery by psychologists, physical educators, or coaches in the sports context allows for measuring how each C can impact others,

to the point of stimulating positive development and providing better results in sports practice. Thus, we suggest implementing the battery in sports programs to promote social, emotional, and cognitive skills that can minimize risky behaviors and facilitate a greater understanding of positive development in this context.

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Supplementary material

Presentation of item content

Item Number	Item Content
1	... I try to be fair.
2	... I am a leader in the group.
3	... I show good sportsmanship
4	... I become a better player.
5	... I show that I am better than other.
6	... I help other people when they need it.
7	... I am able to define my own goals.
8	I feel at ease.
9	I feel comfortable.
10	I feel self-confident.
11	I feel secure.
12	I am confident I can meet challenges.
13	I am confident about performing well.
14	I feel mentally relaxed.
15	I am confident because I mentally picture myself reaching my goals.
16	I'm confident of coming through under pressure.
17	Technical skills.
18	Tactical skills
19	Physical skills
20	I find that I'm good in all sports.
21	I do well in sports.
22	I can find a way out of difficulties in all sports.
23	I think that teamwork is important.
24	People who work in teams can learn more than if they work by themselves.

Item Number	Item Content
25	I feel confident in my ability to work in a team.
26	I know how to give my team members feedback that will not hurt their feelings.
27	I ask others for feedback.
28	I make an effort to include other members of my group.
29	I value the contributions of my team members.
30	I treat my team members as equal members of the team.
31	I am good at communicating with my team members.
32	I feel confident in my ability to be a leader.
33	I feel close to my coach.
34	I feel committed to my coach.
35	I like my coach.
36	When I am coached by my coach, I feel at ease.
37	I trust my coach.
38	I feel that my sport career is promising with my coach.
39	When I am coached by my coach, I feel responsive to his/her efforts.
40	I respect my coach
41	I feel appreciate for the sacrifices my coach has experienced in order to improve his/her performance.
42	When I am coached by my coach, I am ready to do my best.
43	When I am coached by my coach, I adopt a friendly stance.
44	When things are going badly for me, I see the difficulties as part of life that everyone goes through.
45	I try to be loving towards myself when I'm feeling emotional pain.
46	When I'm down, I remind myself that there are lots of other people in the world feeling like I am.
47	When something upsets me, I try to keep my emotions in balance.
48	When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
49	When I'm going through a very hard time, I give myself the caring and tenderness I need.
50	When something painful happens, I try to take a balanced view of the situation.

Item Number	Item Content
51	I try to see my failings as part of the human condition.
52	When I fail at something important to me, I try to keep things in perspective.
53	I'm kind to myself when I'm experiencing suffering.
54	When I'm feeling down, I try to approach my feelings with curiosity and openness.
55	I'm tolerant of my own flaws and inadequacies.
56	I try to be understanding and patient towards those aspects of my personality I don't like.

Note. = Item number.

... = The response follows on from the phrase "When I take part in sport it is important to me that..."