

An investigation of basic needs satisfaction as a mediator of the associations between coach autonomy support and participant's life skills development in sport

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Past self-determination theory-based studies in English-speaking countries have investigated life skills development in youth sport. The purpose of the present study was to investigate the role of basic needs satisfaction in mediating the potential associations between coach autonomy support and participant's life skills development in Brazilian youth sport. A total of 817 participants (572 boys, 245 girls, Mage = 14.10, SD = 1.37) took part in the study. These participants completed measures assessing their perceptions of coach autonomy support, basic need satisfaction (autonomy, competence, and relatedness satisfaction), and life skill development (teamwork, goal setting, interpersonal communication, problem solving and decision making, time management, emotional skills, leadership, and social skills). Mediation analyses revealed that satisfaction of the three basic needs combined (i.e., total need satisfaction) and autonomy, competence, and relatedness satisfaction individually mediated the positive associations between coach autonomy support and participant's total life skills development (i.e., all eight life skills combined). In practice, these findings indicate that when trying to promote participant's total life skills development through sport, coaches should seek to satisfy participant's three basic psychological needs by displaying autonomy-supportive behaviors.

KEY WORDS: Positive youth development; Self-determination theory; P skills.

Sport is one of the most popular activities around the world, where the personal development of participants is seen as a key objective (Hansen & Larson, 2007; Santos & Pereira, 2021). This personal development can be conceptualized in terms of how young people learn and develop their life skills through sport

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(Goudas, 2010). Examples of life skills include teamwork, social skills, leadership, and emotional skills. Several researchers (e.g., Mossman et al., 2021; Kendellen & Camiré, 2019) have highlighted that life skills are important for young people as they are transferable to a variety of settings such school, home life, the workplace, personal relationships, and the community. Recently, life skills have been defined by Williams et al. (2020) as “functional skills that individuals develop in one context (such as the home, school, sport, community, workplace) and that are also used effectively in other contexts beyond that in which they were learnt” (p. 5). Moreover, Steptoe and Wardle (2017) highlighted that young people’s life skills are associated with the important outcomes of academic achievement, occupational success, and health.

Sport is one setting of note where young people develop a wide range of life skills. For instance, several review articles have illustrated that an extensive list of life skills are purported to be learned through sports participation (Johnston et al., 2013; Holt et al., 2017; Whitley et al., 2019; Williams et al., 2020). According to a content analysis performed by Johnston et al. (2013), the most frequently reported life skills developed through sport include teamwork, goal setting, time management, emotional self-regulation, communication, social skills, leadership, problem solving, decision making, planning, personal responsibility, motivation/effort, and self-esteem. Similarly, a later review of 63 articles by Holt et al. (2017) highlighted that sports participation is important for the development of positive self-perceptions, perseverance, work ethic, respect, independence, personal responsibility, good decision making, problem solving, stress management, goal setting, teamwork, leadership, and communication skills.

Following on from research identifying what life skills are learned through sport, numerous models have sought to explain how life skills can be developed through sport. For example, several models have explained that young people develop life skills implicitly when coaches, parents and peers create a positive and well-structured sporting climate; whereas participants develop life skills explicitly when life skills are discussed and practiced in the sport (Bean et al., 2018; Holt et al., 2017; Turnnidge et al., 2014). It is thought that an explicit approach leads to greater life skills development in participants as compared to an implicit approach (Bean et al., 2018). Further factors that play a part in participant’s life skills development include the inherent demands of the sport, experiential learning, participant and coach characteristics, the utility of life skills in other settings, and the wider socio-cultural environment (Gould & Carson, 2008, Pierce et al., 2017; Newman et al., 2017). Over the recent decade, greater insights (e.g. sport context, school, coaches, parent) have been provided into how young people develop

their life skills through sport (e.g., Bean et al., 2020; Cronin et al., 2022; Mossman et al., 2021a). However, a critique of the literature is that most life skills development through sport research has been conducted in English speaking countries such as the United States, Canada, and the United Kingdom (Santos et al., 2016). Since this point was made, research on life skills development through sport has begun to flourish in places such as Brazil (Nascimento Junior et al., 2021a; Freire et al., 2021).

Within Brazil, several studies have investigated life skills development through sport. To begin with, Nascimento Junior et al. (2019) took the important step of developing and validating a measure to assess life skills development through sport with Portuguese speakers. This study involved translating the Life Skills Scale for Sport (Cronin & Allen, 2017) from English to Portuguese and providing evidence for its validity and reliability. Following this, another Brazilian study with futsal (indoor soccer) participants found that variables such as age and length of participation affected the extent to which young people developed their life skills through sport (Freire et al., 2021). In the same sport, Nascimento Junior et al. (2021a) demonstrated that players development of life skills through sport helped to prevent antisocial behavior towards teammates and, in general, to promote participant's moral values, status and competence. Despite this progress in the Brazilian sports context, further theoretical studies are needed to provide evidence-based guidance on how coaches and practitioners can ensure that young people develop their life skills through sport (Whitley et al., 2020).

One theory that holds great promise for exploring life skills development is SDT (Ryan & Deci, 2017; Hodge et al., 2012). Within their conceptual framework for life skills development, Hodge et al. (2012, 2016) proposed that two key aspects of SDT are thought to be related to young people's life skills development in sport: coach autonomy support and basic needs satisfaction (i.e., autonomy, competence, and relatedness satisfaction). Coach autonomy support refers to the coach providing sufficient freedom of choice for athletes, acknowledging their feelings and perspectives, creating opportunities for initiative and independence, and providing competency-based feedback (Mallett, 2005). Satisfaction of the three basic needs involves satisfying the need for autonomy (i.e., feeling in control of your actions), competence (i.e., feeling effective), and relatedness (i.e., feeling connected to others) (Ryan & Deci, 2017; Rigby & Ryan, 2018). In their conceptual framework, Hodge et al. (2013, 2016) proposed the following mediational model: coach autonomy support -> basic need satisfaction -> life skills development. Supporting aspects of this model, studies have shown that participant's perceptions of coach/teacher autonomy support are directly linked to their development of life skills in sport (Cronin & Allen, 2015, Bean et al., 2018;

Nascimento-Junior et al., 2021b) and physical education (Cronin et al., 2019; Cronin et al., 2020). Recently, Cronin et al. (2022) highlighted that basic need satisfaction mediates the associations between coach autonomy support and British participant's development of eight different life skills in youth sport.

The Present Study

The purpose of this study was to explore whether coach autonomy support was associated with participants' life skills development in sport via basic needs satisfaction. Based on past studies (Cronin & Allen, 2018; Nascimento-Junior et al., 2021b), the first hypothesis was that coach autonomy support would be positively related to Brazilian youth sports participants' life skills development. In line with past studies in PE and youth sport (Cronin et al., 2019, 2022), the second hypothesis was that total need satisfaction (autonomy, competence, and relatedness combined) would mediate the positive associations between coach autonomy support and participants' life skills development. Along with the above two hypotheses, we explored if each of the three basic needs mediated the associations between coach autonomy support and participants' life skills development in sport. Given the mixed findings for the three basic needs as mediators between coach autonomy support and participants' life skills development in sport (Cronin et al., 2022), no specific hypotheses were outlined for each basic need. Lastly, we explored any gender differences between males and females in terms of life skills development and the role of basic need satisfaction in mediating the potential associations between coach autonomy support and participants' life skills development. To the best of our knowledge, this is the first study to assess such gender differences with a large sample of youth sport participants.

Methods

PROCEDURES

To begin with, the study was approved by the Ethics Committee in Human Research at the lead author's university (Approval number = 2.700.718). Following this, authorization was requested to carry out the research with the organizing committee and coaches responsible for the sport teams and clubs involved. Coaches and athletes of the participating teams were then recruited for the study and data collection took place at the site of competition or practice after informed consent was obtained from all participants. In total, the data collection took approximately 40 minutes to complete. The presentation of the three questionnaires was randomized among the participants to prevent order effects (i.e., the three scales were completed in varying order).

PARTICIPANTS

The sample included 817 Brazilian youth athletes from all regions of Brazil who trained and participated with club and school sports teams on a weekly basis.

Participants included 572 boys and 245 girls aged between 10-17 years ($M_{age} = 14.10$, $SD = 1.37$). Participants represented the sports of futsal ($n = 55$), soccer ($n = 229$), handball ($n = 218$), basketball ($n = 38$), volleyball ($n = 57$), combat sports ($n = 38$), track and field ($n = 121$), and swimming ($n = 61$). Participants were selected via convenience sampling and the inclusion criteria was as follows: 1) to have practiced the sport for at least one year, and 2) to have been part of the team for at least three months. Only participants who had the informed consent form signed by their parents and coaches were allowed to participate in the study.

MEASURES

Coach Autonomy Support. Coach autonomy support was assessed using the Perceived Autonomy Support: Exercise Climate Questionnaire (PASECQ; Edmunds et al., 2006) which has been adapted for the Portuguese sports context (Moutão et al., 2012). This questionnaire consists of 6 items which evaluate perceptions of autonomy support provided by a coach/instructor. The item stem is “My coach/instructor” and an example item is “tries to understand my point of view before suggesting something new”. Participants respond to items on a scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Past research has supported the validity and reliability of this questionnaire with English speakers and Portuguese speakers (e.g., Edmunds et al., 2006; Moutão et al., 2012).

Basic needs satisfaction. To measure youth sport participants basic needs satisfaction, we used the Basic Needs Satisfaction in Sport Scale (BNSSS; Ng, Lonsdale, & Hodge, 2011) which has been adapted and validated for the Brazilian sports context (Nascimento Junior, Vissoci, & Vieira, 2018). This scale consists of 12 items divided into three subscales: competence (e.g., “I am skilled in my sport”), autonomy (e.g., “in my sport, I feel like I’m doing what I want to do”), and relatedness

(e.g., “there are people in my sport who care about me”). Participants respond to items on a scale ranging from 1 (*not entirely true*) to 7 (*totally true*). Past research has supported the validity and reliability of the scale with English and Portuguese speakers (e.g., Ng et al., 2011; Nascimento et al., 2018).

Life skills development. The Portuguese version (Nascimento-Junior et al., 2019) of the Life Skills Scale for Sport (Cronin & Allen, 2017) was used to measure participants’ life skills development in their sport. This 43-item scale uses the stem

“This sport has taught me to...” and is followed by items assessing: teamwork (7 items; “work with others for the good of the team/ group”), goal setting (7 items; “set specific goals.”), time management (4 items; “control how I use my time”), emotional skills (4 items; “understand that I behave differently when emotional”), interpersonal communication (4 items; “communicate well with others”), social skills (5 items; “maintain close friendships”), leadership (8 items; “know how to motivate others”), and problem solving and decision making (4 items; “evaluate a solution to a problem”). Participants respond to items on a scale ranging from 1 (*not at all*) to 5 (*very much*). In line with past studies (Cronin & Allen, 2018; Mossman et al., 2021), we calculated total life skills development in the current study and included this as the outcome variable in our data analyses. The validity and reliability of this scale has been supported with English and Portuguese speaking participants (Cronin et al., 2017; Nascimento-Junior et al., 2019).

DATA ANALYSIS

PRELIMINARY ANALYSIS

Means, standard deviations (*SD*), reliability coefficients (Cronbach's alpha), and Pearson's correlations coefficients were calculated using SPSS 22.0 (IBM Corporation, 2013). Before the main analysis, we also assessed the data for missing values, univariate and multivariate normality, and outliers following the procedures outlined by Tabachnick and Fidell (2013).

Main Analysis

Our main aim was to verify whether satisfaction of the three basic needs (together and separately) mediated the association between coach autonomy support and the development of the eight life skills. This aim was investigated through a covariancebased structural equation modelling (SEM) in Amos 22.0 (Arbuckle, 2013). When carrying out SEM, we followed the two-step approach recommended by Anderson and

Gerbing (1988). The first step involves testing the measurement model using Confirmatory Factor Analysis (CFA), while in the second step the hypothesized structural model is tested. In line with Hu and Bentler's (1999) recommendations, we used several fit indices to assess the fit of the measurement and structural models: χ^2/df ,

Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and its associated ninety-percent Confidence Interval (CI). χ^2/df values between 1.0 and 3.0, CFI and TLI values close to or above 0.95, RMSEA values close to or below 0.08, represent an excellent fit to the data for the hypothesized model (Hu & Bentler, 1999; Kline, 2005). The internal consistency of the measurement model (Step 1) was assessed by composite reliability (CR) (Hair, Black, Babin, & Anderson, 2019), while average variance extracted (AVE) was estimated to assess convergent validity (Fornell & Larcker, 1981). CR equal or higher than 0.7 and AVE equal or higher than 0.5 are considered to indicate reliable and valid constructs (Fornell & Larcker, 1981). The quality of the structural model (Step 2) was also assessed through its factor loadings (FL), item's individual reliability, and fit indices. Finally, based on Kline's (2016) recommendation, paths were interpreted as follows: a small effect is < 20, a medium effect is between .20 and .49, and a large effect is above .50 (with all *p* values less than .05).

To test the theoretical model proposed for the study, the mediation effects were verified by the indirect effects (Williams & MacKinnon, 2008). Bias-corrected bootstrapped point estimates for the indirect effects of the independent variable on the dependent variable through the mediator were estimated. Significant indirect effects were considered if the *p* value was less than .05 and if the 90% bias corrected confidence interval did not include zero. It is important to note that bootstrapping procedures have been recommended by Williams and MacKinnon (2008) as more efficient and powerful for detecting indirect effects.

Multigroup Analysis

Once the structural models demonstrated an acceptable fit to the data, we further tested the invariance of the hypothesized model by systematically constraining the factor loadings and then the factor paths to be equal across gender (Byrne, 2013; Cheung & Rensvold, 2002). Measurement invariance involves the comparison of a series of increasingly constrained nested models and assessing whether differences between the models are significant (Van de

Schoot, Luptig, & Hox, 2012). Specifically, five types of invariances were tested: configural invariance (i.e., invariance of model form), metric invariance (i.e., equivalence of the item loadings on the factors), scalar invariance (i.e., equivalence of item intercepts), factor covariance invariance (i.e., equivalence of the factor relationships), and residual invariance (i.e., equivalence of item residuals). The multigroup analysis is conducted by assessing changes in values for χ^2 , CFI and RMSEA that indicate the existence of invariance between boys and girls in the factor structure of the mediation models. The following changes in fit indices were used for assessing the measurement model to be invariant across gender: changes in the RMSEA values of less than 0.010 and differences in the CFI values of less than -0.005 (Chen, 2007).

Results

Preliminary Analysis

To begin with, there were no missing values in the dataset as the lead researcher ensured all surveys were fully completed during the data collection. Skewness values ranged from -0.86 to -0.43 and the kurtosis values ranged from -0.91 to 1.18, which indicated reasonable normality (Tabachnick & Fidell, 2013). However, analysis of Mardia's multivariate coefficient (Mardia's coefficient = 49.43) indicated that the data distribution deviated from multivariate normality, which justified the use of the BollenStine bootstrap procedure to obtain a corrected Chi-squared value of the estimated coefficients for the Maximum Likelihood Estimator (Bollen & Stine, 1993). We also verified the absence of outliers using the Squared Mahalanobis distance (D^2) since it is a prerequisite for this type of analysis.

RELIABILITY ESTIMATES, DESCRIPTIVE STATISTICS, AND CORRELATIONAL ANALYSES

Table I presents the reliability estimates, means, standard deviations, intercorrelations and scale ranges for all variables. The alpha values for all subscales were greater than .70, indicating adequate internal consistency reliability (Nunnally & Bernstein, 1994). The mean score on the 1-7 response of the PASECQ revealed that participants perceived a high level of coach autonomy support ($M = 6.13$; $SD = .67$). In relation to basic need satisfaction, the mean score on the 1-7 response scale of the BNSSS revealed that participants scored relatively high for autonomy ($M = 5.36$; $SD = 1.23$), competence ($M = 5.34$; $SD = 1.29$), and relatedness ($M = 5.13$; $SD = 1.49$) satisfaction. The mean scores on the 1-5 response scale of the LSSS revealed that participants scores for life skills development were high ($M = 4.20$; $SD = 0.52$).

The correlations in Table I revealed that coach autonomy support was significantly and positively associated with satisfaction of the three basic psy-

TABLE 1
Summary Of Intercorrelations, Scale Ranges, Means, Standard Deviations And Reliability Estimates.

Variables	Life Skills															
	CAS	BPNS ^d	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. CAS	-	.20**	.29**	.24**	.43**	.01	.04	.03	.04	.03	.04	.03	.04	.10*	.02	.22**a
2. Autonomy			.77**	.70**	.93**	.11**	.04	.03	.01	.07*	.10*	.08*	.08*	.08*	.08*	.25**
3. Competence				.72**	.92**	.02	.10**	.02	.03	.04	.07*	.09*	.09*	.09*	.06	.23**
4. Relatedness						.08*	.11**	.05	.04	.04	.08*	.10**	.10**	.10**	.11**	.45**
5. Total BPNS						.18**	.22**	.06	.10**	.05	.12**	.15**	.15**	.15**	.15**	.32**
6. Teamwork							.45**	.44**	.39**	.50**	.46**	.44**	.44**	.44**	.48**	.44**
7. Goal Setting								.42**	.46**	.45**	.40**	.44**	.44**	.44**	.45**	.47**
8. Social Skill									.38**	.42**	.41**	.40**	.40**	.40**	.48**	.57**
9. Problem Solving ^b										.44**	.42**	.40**	.40**	.40**	.40**	.50**
10. Emotional Skills											.44	.42**	.42**	.42**	.47**	.50**
11. Leadership												.42**	.42**	.47**	.47**	.54**
12. Time management														.44**	.44**	.51**
13. Communication ^c																.50**
14. Total Life Skills																
Mean score	6.13	5.36	5.34	5.13	5.10	4.19	4.15	3.85	3.90	3.88	3.97	3.77	3.77	4.08	4.08	4.20
Standard deviation	.67	1.23	1.29	1.49	1.24	.50	.58	.64	.76	.76	.64	.82	.82	.70	.70	.52
Scale range	1-7	1-7	1-7	1-7	1-7	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5
Alpha coefficient	.88	.83	.81	.75	.91	.70	.78	.71	.78	.70	.83	.79	.79	.73	.73	.88

Note. ^aCAS = Coach autonomy support; ^bproblem solving and decision making; ^cinterpersonal communication; ^dBPNS = basic psychological need satisfaction.
*p < .05, **p < .01.

chological needs (r range = .25 to .37), total basic need satisfaction ($r = .43$), time management ($r = .10$), and total life skills ($r = .22$). Autonomy satisfaction was significantly and positively associated with teamwork, goal setting, leadership, time management, interpersonal communication, and total life skills (r range = .07 to .25). Competence satisfaction was significantly and positively associated with goal setting, leadership, time management, and total life skills (r range = .07 to .23). Relatedness satisfaction was significantly and positively associated with teamwork, goal setting, leadership, time management, communication, and total life skills (r range = .08 to .45). Total basic need satisfaction total was significantly and positively associated with teamwork, goal setting, leadership, time management, interpersonal communication, and total life skills (r range = .18 to .32).

MEASUREMENT AND STRUCTURAL MODEL FIT

Initially, we tested a measurement model through CFA (SEM Step 1) by assessing the relationship of the items/variables analysed with their respective latent factors. Acceptable fit indices were obtained for the measurement model (see Table II). Moreover, the factor structure and internal reliability of items were also adequate, as all paths had significant factor loadings (*Factor Loading* range = .58 to .89). In order to assess the convergent validity, AVE was computed (AVE range = .47 to .74). CR also showed acceptable values (.88 to .89).

TABLE II
Goodness-Of-Fit Indexes Of The Measurement And Structural models.

Model	χ^2	df	χ^2 / df	B-S p	RMSEA (CI 90%)	CFI	TLI
Measurement Model	524.62	116	3.523	< .001	.066 (.060, .071)	.94	.93
Structural Model 1	227.45	105	2.166	< .001	.038 (.031, .045)	.98	.97
Structural Model 2	456.01	138	3.304	< .001	.053 (.042, .060)	.95	.94
Structural Model 3	296.43	105	2.823	< .001	.047 (.040, .048)	.97	.96
Structural Model 4	321.21	121	2.655	< .001	.045 (.041, .058)	.97	.96

Note. N = 817; χ^2 = Chi-Square; df = degrees of freedom; B-S p = Bollen-Stine p value; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index.

After confirming the measurement model through CFA, the structural models were tested (SEM step 2). Specifically, the following structural models were tested: Model 1 (coach autonomy support \rightarrow total basic need satisfaction \rightarrow total life skills development), Model 2 (coach autonomy support \rightarrow autonomy satisfaction \rightarrow total life skills development), Model 3 (coach autonomy support \rightarrow relatedness satisfaction \rightarrow total life skills development), and Model 4 (coach autonomy support \rightarrow competence satisfaction \rightarrow total life skills development).

As theoretically proposed, positive and significant direct effects were found between the variables (see Figure 1). From Model 1 in Figure 1, we

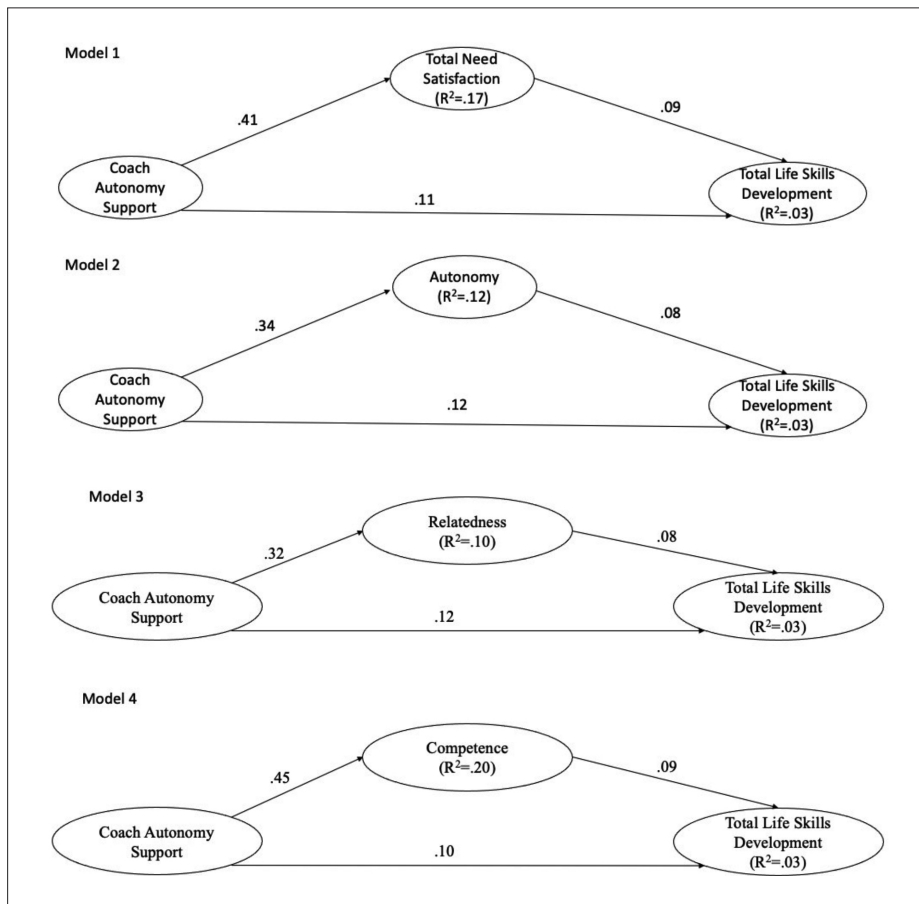


Fig. 1. - Standardized coefficients are presented; All path coefficients were significant at $p < .05$.

can see that coach autonomy support was positively associated with total needs satisfaction ($\beta = .41$; $R^2 = .17$), whilst coach autonomy support ($\beta = .11$) and total basic need satisfaction ($\beta = .09$) were positively related to total life skills development ($R^2 = .03$). In model 2, coach autonomy support was positively associated with autonomy satisfaction ($\beta = .34$; $R^2 = .12$), whilst coach autonomy support ($\beta = .12$) and autonomy satisfaction ($\beta = .08$) were positively related to total life skills development ($R^2 = .03$). In model 3, coach autonomy support was positively associated with relatedness satisfaction ($\beta = .32$; $R^2 = .10$), whilst coach autonomy support ($\beta = .12$) and relatedness satisfaction ($\beta = .08$) were positively related to total life skills development ($R^2 = .03$). In model 4, coach autonomy support was positively associated with competence satisfaction ($\beta = .45$; $R^2 = .20$), whilst coach autonomy support ($\beta = .10$) and competence satisfaction ($\beta = .09$) were positively related to total life skills development ($R^2 = .03$).

The indirect effects were significant via total needs satisfaction (Model 1), autonomy satisfaction (Model 2), relatedness satisfaction (Model 3), and competence satisfaction (Model 4) (see Table III). This means that total need satisfaction and each of the three basic psychological needs mediated the associations between coach autonomy support and participant's total life skills development through sport.

INVARIANCE ANALYSIS ACROSS GENDER

Multigroup analyses was conducted to examine whether the mediation models differed across gender. Specifically, the direct and indirect effects of the four mediation models are invariant across male and female athletes. This was possible to infer based on the ΔCFI and $\Delta RMSEA$ between the configurational, metric, structural and residual models ($< .01$ and $< .015$, respectively, and that there was equivalence of the intercepts of the paths between groups (Wang et al., 2018) (see Table IV). In summary, this indicates that there were no gender differences on the mediation models tested.

Discussion

This research aimed to explore the purported links between coach autonomy support, basic needs satisfaction, and total life skills development in Brazilian youth sport participants. Specifically, this study used SDT (Ryan & Deci, 2017; Rigby & Ryan, 2018) as a theoretical framework for investigating if total needs satisfaction, along with autonomy satisfaction, relatedness

TABLE III
Standardized direct and indirect effects for the structural model.

			90% CI		
			Lower	Upper	
<i>Structural Model 1</i>					
<i>Direct effects</i>					
Coach's Autonomy Support	->	Basic Psychological Needs	.41	.35	.47
Coach's Autonomy Support	->	Life Skills	.11	.03	.19
Basic Psychological Needs	->	Life Skills	.09	.01	.17
<i>Indirect effects</i>					
<u>Coach's Autonomy Support</u>	<u>≥</u>	Life Skills	.06	.04	.07
<i>Structural Model 2</i>					
<i>Direct effects</i>					
Coach's Autonomy Support	->	Autonomy	.34	.28	.41
Coach's Autonomy Support	->	Life Skills	.12	.04	.19
Autonomy	->	Life Skills	.08	.01	.15
<i>Indirect effects</i>					
<u>Coach's Autonomy Support</u>	<u>≥</u>	Life Skills	.03	.02	.05
<i>Structural Model 3</i>					
<i>Direct effects</i>					
Coach's Autonomy Support	->	Relatedness	.32	.26	.38
Coach's Autonomy Support	->	Life Skills	.12	.04	.19
Relatedness	->	Life Skills	.08	.01	.16
<i>Indirect effects</i>					
<u>Coach's Autonomy Support</u>	<u>≥</u>	Life Skills	.03	.02	.05
<i>Structural Model 4</i>					
Parameters					B
<i>Direct effects</i>					
Coach's Autonomy Support	->	Competence	.45	.39	.51
Coach's Autonomy Support	->	Life Skills	.10	.02	.19
Competence	->	Life Skills	.09	.01	.19
<i>Indirect effects</i>					
<u>Coach's Autonomy Support</u>	<u>≥</u>	<u>Life Skills</u>	<u>.05</u>	<u>.04</u>	<u>.07</u>

Note. B = standardized coefficient; CI 90% = Confidence Interval at 90%.

TABLE IV.
Goodness-of-fit indexes for the invariance across gender.

Models	χ^2	df	$\Delta\chi^2$	Δdf	p	CFI	ΔCFI	RMSEA	$\Delta RMSEA$
Male vs Female									
<i>Model 1</i>									
Configural invariance	377.54	210	-	-	.001	.975	-	.031	-
Metric invariance	387.70	224	14		10.16	.001	.976	.001	.030
Structural weights	405.05	227	17		27.51	.001	.974	.001	.031
Structural covariance	405.24	228	18		27.70	.001	.974	.001	.031
Structural residuals	408.15	230	20		30.61	.001	.974	.001	.031
<i>Model 2</i>									
Configural invariance	652.60	276	-	-	.001	.946	-	.041	-
Metric invariance	665.16	292	12.56		16	.001	.947	.001	.040
Structural weights	678.41	295	25.81		19	.001	.945	.002	.040
Structural covariance	678.53	296	25.93		20	.001	.945	.000	.040
Structural residuals	681.48	298	28.88		22	.001	.942	.004	.040
<i>Model 3</i>									
Configural invariance	449.14	210	-	-	.001	.962	-	.037	-
Metric invariance	470.20	224	21.06		14	.001	.961	.001	.037
Structural weights	484.85	227	35.71		17	.001	.959	.003	.037
Structural covariance	484.97	228	35.83		18	.001	.959	.003	.037
Structural residuals	488.92	230	39.78		20	.001	.959	.003	.037
<i>Model 4</i>									
Configural invariance	474.49	242	-	-	.001	.965	-	.034	-
Metric invariance	491.08	257	15		16.59	.001	.965	.001	.033
Structural weights	503.11	260	18		28.62	.001	.964	.003	.034
Structural covariance	503.24	261	19		28.75	.001	.964	.003	.034
Structural residuals	507.84	263	21		33.35	.001	.963	.003	.034

Note. χ^2 = Chi-Square; df = degrees of freedom; $\Delta\chi^2$ = differences in Chi-Square values; Δdf = differences in degrees of freedom; CFI = Comparative Fit Index; ΔCFI = differences in the Comparative Fit Index values; RMSEA = Root Mean Square Error of Approximation; $\Delta RMSEA$ = differences in the Root Mean Square error of Approximation.

satisfaction, and competence satisfaction, mediated the associations between coach autonomy support and participant’s total life skills development.

In relation to the first hypotheses, we confirmed our hypothesis that coach autonomy support would be directly related to Brazilian youth sports

participants total life skills development. These findings corroborate previous research demonstrating that coach or teacher autonomy support are positively associated with participants development of life skills in sport (Nascimento Junior et al., 2021; Cronin et al., 2022;

Cronin & Allen, 2018) and physical education (Cronin et al., 2019; Cronin et al., 2020). Thus, the evidence from the present study indicates that coaches should offer participants meaningful choices during practice, try to understand their perspectives, provide justification for any instructions given, encourage autonomy during decisionmaking, and create opportunities for self-initiated behavior (Mallett, 2005) in order to help young people to develop their life skills through sport.

Regarding the second hypothesis, we confirmed our hypothesis that total need satisfaction (autonomy, competence, and relatedness combined) would mediate the positive associations between coach autonomy support and participant's total life skills development in sport. This finding provides support for Hodge et al.'s (2013, 2016) conceptual framework for life skills development. Specifically, our findings indicated that coach autonomy support helps foster Brazilian youth sport participants total life skills development through the nurturing of the three basic needs combined. This finding also supports Deci and Ryan's (2000) contention that the three basic needs are "innate psychological nutrients that are essential for ongoing psychological growth" (p. 229). Importantly, testing Hodge et al. (2013, 2016) conceptual framework with Brazilian youth sport participants was an important development as past research has highlighted the need to further investigate life skills development in non-English speaking countries (Santos et al., 2016).

Following on from the above two hypotheses, we explored if each of the three basic needs would mediate the predicted associations between coach autonomy support and participant's total life skills development in sport. In this regard, we found that each of the three basic psychological needs mediated the associations between coach autonomy support and participants' total life skills development. Such a finding was similar to a recent study by Cronin et al. (2022) which found that the three basic needs mediated the positive associations between coach autonomy support and British youth sport participant's life skills development. In practice, this indicates that coaches, parents, peers, and other stakeholders should create a sporting environment that attends to participants' three basic needs if they are to promote life skills development through youth sport. Recent guidance has been provided by Ahmadi et al. (2022) to support the three basic psychological needs. This guidance suggests that coaches can ensure autonomy satisfaction by allowing for participant input and choice, coaching in ways preferred by

the participants, providing a rationale for practice activities, ensuring participants progress at their own pace, allowing participants to initiate practice activities, and asking participants about their experiences of practice. Competence satisfaction can be supported by providing participants with optimal challenges, giving specific feedback, praising effort and improvement, setting goals based on self-referenced standards, demonstrating technique, providing explicit and clear guidance, clarifying expectations, and allowing for the self-monitoring of progress and effort. Relatedness satisfaction can be supported by coaches showing unconditional positive regard, asking about participant's progress and welfare, expressing affection, promoting cooperation amongst participants, being enthusiastic, and showing understanding of participant's point of view.

Finally, we explored any gender differences for the study findings. Our findings firstly indicated no differences between the genders for life skills development. Additionally, there were no gender differences for each of the four mediational models tested. That is, total need satisfaction, and autonomy, competence and relatedness satisfaction mediated the positive associations between coach autonomy support and participant's life skills development in a similar manner for both genders. Thus, these findings indicate that coach autonomy support and all three basic psychological needs should be the focus of future efforts to improve youth sport participant's life skills development regardless of gender.

Limitations and Future Directions

The results of this study have some limitations that should be considered. First, because of its cross-sectional nature, the data obtained only allows us to make inferences of association between the variables, but not inferences of causality. Therefore, future studies might study these relationships longitudinally to permit an understanding of the cause-and-effect relationships. Although the scale used in the current study assesses participants' perception of life skills development, it is important to note that some researchers believe that development is best studied longitudinally (e.g., García-Bengochea & Johnson, 2001). Therefore, future studies should assess the associations between variables in the current study in a longitudinal manner. The second point was that we assessed only certain aspects of SDT. In the future, other investigators might further assess other aspects of SDT such as coach competence and relatedness support, and/or parents support for the three basic psychological needs, and their relationships with participants' life

skills development through sport. In line with past research (e.g., Monteiro et al., 2018), future studies could seek to combine theories (e.g., SDT and Achievement Goals Theory) to investigate life skills development in youth sport participants. Given the recent criticism of the life skills development through sports literature (Ronkainen et al., 2021), future studies could also investigate a wider range of positive (e.g., team cohesion) and negative (e.g., group conflict) experiences that may affect participants life skills development in a positive or negative manner. In sum, the new findings showed that autonomy support coaching is positively related to youth sport participants' development of life skills through satisfying relationship, autonomy, and competence needs.

Conclusion

In conclusion, the present study clearly highlighted that self-determination theory (Ryan & Deci, 2017) is a viable theory for investigating the processes by which Brazilian youth sport participants develop their life skills through sport. Specifically, our findings indicated that total basic psychological need satisfaction – along with the three basic needs for autonomy, competence, and relatedness – mediated the positive associations between coach autonomy support and participant's total life skill development through sport. Such a finding was present irrespective of the gender of participants. In practice, our findings suggest that coaches should display autonomy support behaviors and seek to support participant's basic psychological needs in order to develop their life skills in sport.

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