



Athlete's motivation and the quality of his relationship with the coach

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Abstract

This cross-sectional study investigated the influence of the perception of the quality of the coach-athlete relationship (CAR) on the motivation among young students-athletes in the state of Pernambuco, Brazil. Participants were 301 students-athletes who participated of the School Games of Pernambuco 2017. The instruments used were the Coach-athlete Relationship Questionnaire (CART-Q) and the Sport Motivation Scale-II (SMS-II). Data analysis was conducted through Kolmogorov-Smirnov and Mann-Whitney tests, Spearman Correlation and Structural Equation Modeling (SEM) ($p < .05$). The results showed that the students-athletes who perceive themselves with high quality of CAR had higher scores at identified, integrated and intrinsic regulations, while the athletes with moderate CAR had higher score at amotivation and external regulation. SEM revealed that both controlled and autonomous motivation were explained in 17% and 21%, respectively, by CAR, which had positive effect ($\beta = .45$ and $\beta = .41$) on both motivations. It is concluded that a positive relationship with the coach based on admiration, respect, trust and affiliation seems to be a fostering factor for the motivation in the school sports context.

Keyword: Self-determination; interpersonal relations; Sport; Psychology of Sport.

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Introduction

Michael Phelps, the greatest Olympic medalist of all time, directly credits all his success and motivation for sports to his great relationship with Bob Bowman, the coach who accompanied him since he was 11 years old. Recent studies show that athlete's well-being, performance and motivation are influenced by the quality of the coach-athlete relationship (CAR) (Appleton et al., 2016; Davis, Appleby et al., 2018; Nascimento Júnior et al., 2018; Vieira et al., 2018).

CAR comprises a mutual interaction and causal interdependence between the thoughts, feelings and behaviors of coaches and athletes (Jowett & Shanmugam, 2016). Thoughts are related to commitment and intention to maintain the relationship over time; feelings refer to the perception of closeness (respect, trust, taste); and behaviors refer to complementarity, responsiveness and cooperation between coach and athlete (Jowett & Poczwadowski, 2007; Jowett & Shanmugam, 2016). CAR plays an important role in the physical, motor and psychosocial development of young athletes (Jowett & Shanmugam, 2016; Yang & Jowett, 2012). It happens because coaches are responsible for the delegation of tasks to be performed by the teams, so his actions may interfere with the current and future behavior of the athletes (Cheuczuk et al., 2016).

In that context, CAR has been pointed out as one of the major factors for the development of sports career in athletes (Davis et al., 2018; Nascimento Júnior et al., 2018; Vieira et al., 2018) and, as a consequence, a differential to the sporting success for young athletes (Cheuczuk et al., 2016). Thus, it is important that athletes and their social peers (family, coach and other people involved in sport) develop self-knowledge, since this attribute is essential for the identification of the factors that motivate these young athletes to practice and what are their goals from this instant (Carvalho, Verardi, Maffei, & Monesso, 2019).

Motivation has a great influence in situations of competition, being an obstacle or a stimulus to the athletes' performance (Pineda-Espejel et al., 2015). One of the most used theories to understand the process of commitment and adherence to sports practice at the different levels of competition (Almagro & Paramio-Pérez, 2017) is the Self-Determination Theory (SDT). SDT is a broad framework that explains the different motivational aspects by mini-theories. One of these mini-theories is the Basic Psychological Needs Theory, which postulates that self-determined motivation is influenced by three basic needs: autonomy, competence and relatedness, which seem to be essential for the social development and personal well-being (Deci & Ryan, 1985; Deci & Ryan, 2012).

SDT describes motivation through various regulatory styles (external, introject, identified, integrated and internal), which are presented in a *continuum* that represents the

motivation from the least self-determined form (controlled motivation) to the most self-determined (autonomous motivation), based on various motivational forces underlying a person's behavior (Rigby & Ryan, 2018). Controlled motivation encompasses external or internal pressures (external and introjected regulations) and, largely, does not relate to personal needs and interests. Autonomous motivation is energized directly by the needs, values and interest of the individuals (identified, integrated and intrinsic regulations), resulting in volitive and high-quality motivation. Thus, individuals are committed to performing certain tasks well and, from this investment and effort, obtain greater satisfaction, vitality and well-being (Deci & Ryan, 1985; Deci & Ryan, 2012; Rigby & Ryan, 2018).

Faced with this scenario, recent studies indicate that autonomous motivation is associated with positive behaviors in sport (engagement and continuity in sport) (Carvalho et al., 2019; Vieira et al., 2018), while controlled motivation can lead to inadequate behaviors (stress, exhaustion, and abandonment of modality) (Carvalho et al., 2019). Cognitive Evaluation Theory states that social environment influences on people's behavior in sport (Deci & Ryan, 1985; Rigby & Ryan, 2018). In this perspective, CAR is a factor that can lead young athletes to the development of an autonomous or controlled motivation (Cheuczuk et al., 2016). Vieira et al. (2018) and García-Calvo et al. (2014) investigated the association between motivation and CAR among professional athlete players, however, no studies have been found to address such associations among young students-athletes, which is the gap this study aims to explore.

In addition, several authors suggest that future researches must assess the impact of the quality of the CAR on the different psychological variables among athletes of different competitive levels (Appleton et al., 2016; Davis et al., 2018; Nascimento Júnior et al., 2018; Vieira et al., 2018). Therefore, this research aimed to investigate the influence of the perception of the CAR on the motivation among students-athletes from the state of Pernambuco, Brazil.

Methods

Participants

This transversal study had as population students/athletes practicing collective sports, between 15 and 17 years of age of the School Games of Pernambuco 2017. It covers students-athletes from all over the state, being contested in the collective sports of basketball, futsal, handball, football and volleyball. The minimum number of participants was calculated from the sample formula for finite populations,

adopting a 95 % confidence level, an estimation error of 5 % and an expected ratio of 50 % (Richardson et al., 2012). Considering the estimated population of 2500 athletes for the competition, the minimum number of participants was 333 students-athletes, considering the possible sample losses. The inclusion criterion for the study was to have participated in some regional/state level competition during the 2015/2016 seasons.

In this way, 335 students/athletes of team sports were selected to the study; however, 34 athletes were excluded from the study due to problems in completing the questionnaires. Thus, participants were 301 male (136) and female (165) athletes with a mean age of $16.02 \pm .83$ years. Students/athletes participated in the following sports: Futsal ($n = 124$), volleyball ($n = 133$), handball ($N = 24$) and basketball ($N = 20$). Only the athletes who signed the consent term or had the term signed by the coaches (responsible for the athletes in the event) were selected to the research.

Instruments

Coach-Athlete Relationship Questionnaire (CART-Q) was used to measure athletes' perception of the quality of the CAR (Jowett & Ntoumanis, 2004), which was validated for the Brazilian context by Vieira et al. (2015). Four items assess about closeness (e.g., "I like my coach"), three items assessing commitment (e.g., "I am committed to my coach") and four items assessing complementarity (e.g., "When I am coached by my coach, I am ready to do my best"). All CART-Q items were measured on a 7-points likert scale ranging from 1 ("Strongly Disagree") to 7 ("Strongly Agree"). The Cronbach's alpha of the instrument dimensions ranged from $\alpha = .83$ to $\alpha = .95$.

Sport Motivation Scale-II (SMS-II) was used to assess athletes' motivation for the sport. SMS-II was developed by Pelletier et al. (2013) and validated for the Brazilian context by Nascimento Junior et al. (2014). It consists of 18 items distributed into six regulations (intrinsic, integrated, identified, introject, external and amotivation). Items are responded on a 7-points likert scale ranging from 1 (Does not correspond at all) to 7 (Correspond completely). The reliability of the scale was $\alpha = .74$. According to the categories proposed in the SDT *continuum* (Deci and Ryan, 2012), identified, integrated and intrinsic regulations are the components closer to autonomous motivation, while introject and external regulations are the components closer to controlled motivation. It is noteworthy that amotivation was not used for the main analysis, since it is a component that represents the total lack of motivation and the objective of the research was to investigate the associations between the motivation (autonomous and controlled) and the CAR.

Procedures

This study is integrated into the institutional project approved by the Ethic Committee of the Federal University of "Vale do São Francisco" (opinion 1.648.086). Initially, contact was made with Secretary of Sports of the State of Pernambuco to request permission to collect School Games from Pernambuco 2017. Data collection took place in the hotels where the teams were housed, as well as in the place where the competition took place, lasting approximately 30 minutes. The order of the questionnaires was randomized among the participants and the researchers performed the application individually.

Data analysis

Preliminary analysis. The preliminary analysis for the correlation and comparison analysis and was carried out by Kolmogorov-Smirnov normality test. Since data was non-normal, correlation of Spearman (non-parametric) was used to verify the relationship between variables. Such analyses were conducted in the SPSS v.22.0. For comparison of the regulations of motivation according to the quality of the CAR, the total score of CAR was obtained and, then, the athletes were divided into two groups (high and moderate quality the coach-athlete relationship) in accordance with the "median Split" (up to 6.58 = moderate; and above 6.58 = high). The level of significance adopted was $p < .05$.

Structural Equation Modelling (SEM). The main analysis involved SEM, using the software AMOS 22.0, which performs Covariance-based SEM. If the objective of the research is to test the theory, that is, its confirmation, the appropriate method is CB-SEM, which is the case of this study (Hair, Matthews, & Matthews, 2017). The hypothetical model verified the existence of three latent factors (CAR, autonomous motivation and controlled motivation) from the dimensions of the CARTQ and SMS-II. In this way, SEM tested the role of the quality of the CAR on athletes' motivation following the two-step model building approach recommend by Anderson & Gerbing (1988). The first step involves testing the measurement model by using a Confirmatory Factor Analysis (CFA), while in the second step the hypothesized structural model is tested.

Before the main analysis, we verified the data normality, missing values, and outliers for all study variables following the procedure outlined by Tabachnick & Fidell (2013). Examination of skewness and kurtosis for all variables indicated univariate normality based on the cut-off values of skewness < 3.0 and kurtosis < 10.0 (Kline, 2012). Analysis of Mardia's multivariate coefficient (> 5.0) indicated that the data distribution derived from multivariate normality, which justified the use of the Bollen-Stine bootstrap procedure to obtain a corrected Chi-squared value of the estimated coefficients for the Maximum Likelihood Estimator (Bollen & Long, 1993).

We used several fit indices to assess the model fit according to Hu & Bentler (1999) recommendations: chi square (χ^2), Normalized Chi-Square (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). CFI, GFI and TLI values close to or above .95, RMSEA values close to or below .08, and the lower end of 90 % CI of the RMSEA containing the value of .05 represent an excellent fit to the data for the hypothesized model (Hu & Bentler, 1999). Furthermore, we used these indices for both Step 1 and Step 2. Fit quality for the structural model (Step 2) was also assessed through its factor loadings (FL) and items individual reliability. The interpretation of paths was based on the following cutoff: small effect for paths up to .20; medium effect for paths between .21 and .49; and large effect for paths above .50 (Kline, 2012).

Results

There was a significant difference in all regulations of motivation ($p < .05$) according to quality of the CAR (Table 1), with the exception of introjected regulation ($p = .055$).

It is emphasized that athletes that perceived a CAR of high quality had higher scores at the identified, integrated and intrinsic regulations, while athletes with moderate perception of CAR had higher scores of amotivation and external regulation.

It was found significant ($p < .05$) and positive correlations of the regulations closer to the autonomous motivation (identified, integrated and intrinsic regulations) with all the dimensions of CAR (Table 2). On the other hand, amotivation showed negative correlations with all dimensions of CAR, while external regulation showed negative correlation with proximity ($r = -.14$).

The measurement model (Step 1) had acceptable fit [$X^2 (17) = 21.57; p = .202; X^2/df = 1.27; CFI = .99; GFI = .98; TLI = .99; RMSEA = .03; p (RMSEA < .05) = .809$]. The quality of the local adjustment and the internal reliability of the items were also confirmed, with all trajectories obtaining significant ($p < .05$) factorial loadings and higher than .50. Thus, the hypothetical model was analyzed (Step 2). The tested model (Figure 1) provided sufficiently adjusting indicators [$X^2 (18) = 54.18; p = .001; X^2/df = 3.01; CFI = .96; GFI = .96; AGFI = .92; TLI = .94; RMSEA = .08; p (RMSEA < .05) = .018$].

Table 1
Comparison of the regulations of motivation among young athletes according to quality of the CAR.

Variáveis	High CAR (n=148)	Moderate CAR (n=153)	p
	Md (Q1 - Q3)	Md (Q1 - Q3)	
Amotivation	2.33 (1.00 - 3.00)	3.00 (1.33 - 4.50)	.006*
External Regulation	3.00 (2.33 - 4.67)	3.33 (2.50 - 5.00)	.035*
Introjected. Regulation	5.67 (5.00 - 6.67)	5.67 (4.33 - 6.33)	.055
Identified Regulation	6.67 (6.00 - 7.00)	6.33 (5.33 - 6.67)	.001*
Integrated Regulation	6.33 (5.41 - 7.00)	5.67 (5.00 - 6.67)	.001*
Intrinsic Regulation	6.67 (6.00 - 7.00)	6.00 (5.33 - 6.67)	.001*

* Significant difference: $p < .05$ (Test "U" of Mann-Whitney).
Note: CAR = Coach-athlete relationship.

Table 2
Correlation between the quality of the CAR and regulations of motivation.

Variables	Motivational regulations						CAR		
	1	2	3	4	5	6	7	8	9
1.Amotivation		.45**	-.11	-.15**	-.23**	-.24**	-.16**	-.21**	-.12*
2.External Reg			.20**	.18**	.12*	.06	-.14*	-.09	-.07
3.Introjected. Reg.				.51**	.48**	.49**	.11*	.18**	.21**
4.Identified Reg.					.68**	.65**	.21**	.31**	.26**
5.Integrated Reg.						.63**	.19**	.29**	.23**
6.Intrinsic Reg.							.21**	.28**	.25**
7. Proximity								.66**	.71**
8. Commitment									.69**
9. Complementarity									

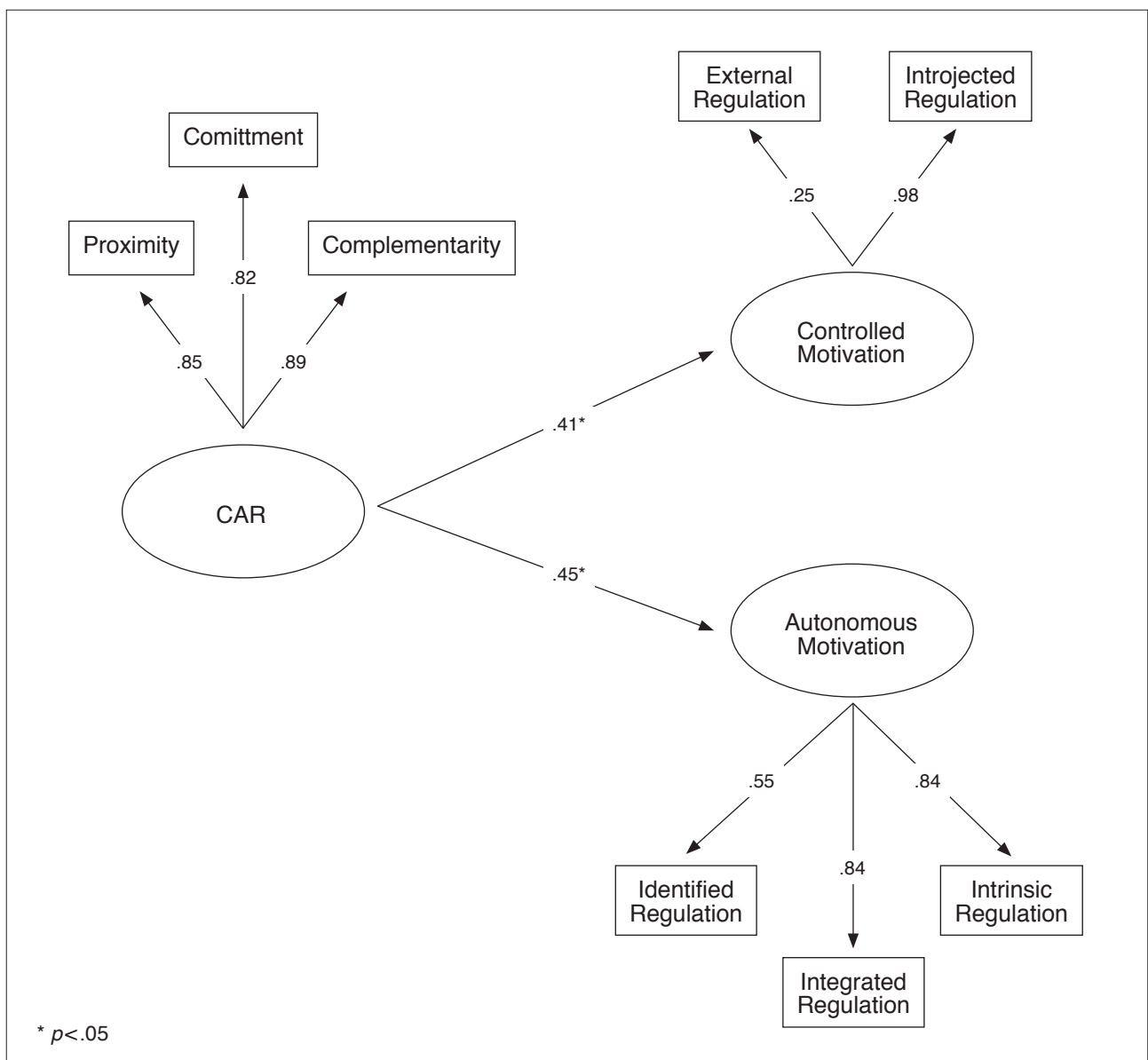
**The correlation is significant at the level .01. *The correlation is significant at level .05.
Note: CAR = Coach-athlete relationship.

The latent variables of controlled motivation and autonomous motivation were explained in 17% and 21%, respectively, by the quality of the CAR (Figure 1). In the direct association established between CAR and both autonomous and controlled motivation, the effects were positive ($\beta = .45$ and $\beta = .41$, respectively), indicating that each increase of 1 standard deviation in the unit of the CAR there is an increase of .45 and .41 standard deviation in the drive of both autonomous and controlled motivation. This finding shows that as much as young athletes perceive a positive relationship with the coach, mainly based on admiration, respect, trust and affiliation, they will be more motivated for sports practice, especially in an autonomous way.

Discussion

The purpose of this study was to investigate the influence of the perception of the quality of the CAR on motivation among young students-athletes of the state of Pernambuco, Brazil. The main results indicated associations between the quality of the CAR and both autonomous and controlled motivations (Figure 1). In addition, the students-athletes who showed higher perception of CAR quality were those who had the higher scores of autonomous motivation, while the athletes with moderate perception of CAR quality showed higher amotivation and controlled motivation (Table 1).

Figure 1
Structural model of the role of the CAR on the motivation of young athletes.



Note: CAR = Coach-athlete relationship.

The main result of the study concerns the linear association between the quality of the CAR and both autonomous and controlled motivation (Figure 1). This result may be due to autonomous motivation being responsible for participation and continuity in the sport, as well as the social connections originating from the sporting context (Balbinotti & Balbinotti, 2018; Carvalho et al., 2019; Bengoechea, 1997; Pérez-González et al., 2019). Thus, admiration, respect, trust and affiliation with the coach seem to act as protective factor against amotivation and low quality motivation among students-athletes for sports practice (Balaguer, Castillo, Ródenas, Fabra, & Duda, 2015; Jowett & Shanmugam, 2016; Vieira et al., 2018). These findings are in agreement with the elements of the Cognitive Evaluation Theory, which explains that social environment influences the type of behavior exercised by people (Prentice, Jayawickreme, & Fleeson, 2018). Corroborating our findings, Pérez-González et al. (2019) conducted a systematic review with youth students of physical education, verifying that higher levels of motivation, classroom engagement, and increased regular physical activity are consequence of the teacher's autonomy support. Moura et al. (2019) and Sánchez Oliva et al. (2012) observed that high quality CAR is essential to develop pleasure and satisfaction during sports practice in athletes. Moreover, social peers (e.g. parents, friends, idols) also work as a source of motivation for task accomplishment (autonomous motivation), as the inferences made by the coaches can reflect on the relationship of the team.

These findings are according to the SDT mini-theory of Relationships Motivation (Deci & Ryan, 2012), which points out that social environment exert influence on people's choices and continuity in the activity. Thus, social peers can stimulate the athletes to enhance individual and team skills. Vieira et al. (2018) also found that CAR is fundamental for behavior regulated by external factors not to negatively influence the perception of team cohesion in the context of professional football. On the other hand, Carvalho et al. (2019) have shown that low quality CAR can enhance youth football athletes' amotivation, leading to disengagement of the athletes in the sports.

Further, the correlations evidenced that regulations closer to autonomous motivation demonstrated higher associations with the dimensions of CAR (Table 2). These results indicate that when the thoughts and behaviors of students-athletes are mutually related to their coach/teachers, there is a greater tendency that students-athletes presents a behavior regulated by intrinsic factors in the face of sports practice (Carvalho et al., 2019; Pérez-González et al., 2019; Cheuczuk et al., 2016). These results receive support from SDT that it points out that the motivation of individuals is influenced by authority figures such as parents, coaches and teachers who con-

duct activities and impact on their development (Deci & Ryan, 2012). Thus, it should be noted that the positive experiences that these figures provide can focus on the psychological attitudes of young athletes as motivation and satisfaction.

Further, amotivation showed negative correlation with all dimensions of CAR (Table 2), indicating that athlete's lack of motivation and interest to perform a task is associated to a poor relationship with the coach (Table 2). According to with SDT, amotivation refers to the lack of motivation, both intrinsic and extrinsic, in which the individual has no (more) motive to accomplish the task and feels incompetent (Deci & Ryan, 2012). Although recent studies point out that amotivation for sports practice is also related to factors such as excessive training, injuries, bullying and low perception of competence (Myer et al., 2015), the social context is also considered a factor involved in the lack of motivation among adolescents (Vieira et al., 2013; Nascimento Junior et al., 2017). Nascimento Junior et al. (2017) found a strong relationship between amotivation and rejection and overprotection of the parents among futsal athletes, indicating that the negative influence of the social peers may increase the athlete's amotivation. Thus, the quality of the CAR is very important to keep the young athlete intrinsically motivated for sports practice.

Another important finding refers to the higher score in regulations closer to the autonomous motivation for athletes who perceive themselves with high CAR quality (Table 1) (Hampson & Jowett, 2014; Jowett & Shanmugam, 2016; Torres, 2014). These findings indicate that student-athletes who perceive higher proximity, commitment and complementarity with the coach are more self-determined to sports practice. Jowett & Shanmugam (2016) claim that diadic relationships allow the transformation of coaches and athletes. Thus, an effective mutual connection is beneficial to feelings of belonging and valorization within sports teams. Hampson & Jowett (2014) indicate that athlete's perception about affective, cognitive, and behavioral relationship with the coach promotes a higher quality motivation for the athlete to execute tasks and learn new skills. Therefore, the quality of the CAR plays a key role on the student-athlete's motivation at the school sports context.

Despite the contributions to literature regarding the association between the quality of CAR and motivation in the context of school sports, some limitations need to be pointed out. First, students-athletes from only one state (Pernambuco) participated of the present study, which does not represent the reality of the all the Brazilian youth athletes. However, the sample can be considered relevant because the students-athletes participated of the main school competition in the state. The second limitation

refers to the cross-sectional design used in the research, allowing no inferences of causality between the variables. Other limitation was that gender (male x female), modality (individual x team sports) and age group were not compared. In this way, future investigations should continue to explore the association between such variables, analyzing players of other regions of the country and the use of a prospective design, with the aim of establishing new evidences about the association of the quality of the CAR and motivation of young athletes over time.

Conclusion

It can be concluded that the quality of CAR can be considered a key factor for the development of student-athlete motivation (controlled and autonomous) for sports practice. It should be pointed out that the more the athlete has a quality CAR, greater the development of autonomous motivation. However, CAR can also lead to the development of controlled motivation, but with less intensity. As practical implications, the importance of the development of an environment for the relationship based on autonomy, trust, commitment, and closeness on the part of coaches, physical education professionals, as this environment tends to contribute to the development of the adolescent's intrinsic motivation within the context sporty.

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