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Association between group cohesion and pre-competition mood states in youth athletes

Asociación entre la cohesión grupal y los estados de ánimo precompetitivos de los atletas jóvenes

Associação entre coesão de grupo e estados de humor pré-competitivo de atletas juvenis

Foschiera, Diogo Bertella¹, Stefanello, Joice Mara Facco², Legnani, Rosimeide Francisco Santos³, Legnani, Elto⁴

¹Federal Institute of Paraná; ²Federal University of Paraná; ³State University of Ponta Grossa; ⁴Federal Technological University of Paraná

ABSTRACT

The purpose of this study is to analyze the possible associations of group cohesion and pre-competition mood states of youth athletes. This is a cross-sectional and quantitative study. The sample was composed of 81 athletes from both sexes, who practice collective modality sports, with average of age of 15.8 ± 1.0 years. Data was collected through the Group Environment Questionnaire and POMS Inventory – Reduced, on the week prior to the athletes' participation in state competitions. Spearman's correlation coefficient and binary logistic regression were used to analyze the data. The results indicate positive and significant correlations of group cohesion dimensions ($p < 0.05$) with the vigor mood dimension, and negative and significant correlations ($p < 0.05$) with tension, depression, anger, fatigue and confusion dimensions. Both group cohesion types (social and task) significantly predicted the mood state profiles. The highest predictive statistical indicator was presented by task cohesion ($OR = 2.481$; $IC = 1.477-4.167$; $p < 0.001$). The results found offer evidence to confirm the prior expectation that higher levels of group cohesion are associated with better pre-competitive mood states profiles in youth athletes. The results suggest that higher group cohesion levels can affect positively the pre-competition mood states in youth athletes.

Keywords: Sports; Mood States; Iceberg Profile; Adolescence; Group Environment.

RESUMEN

El propósito de este estudio es analizar las posibles asociaciones de cohesión grupal y estados de ánimo precompetitivos de los atletas jóvenes. Se trata de un estudio transversal y cuantitativo. La muestra estuvo compuesta por 81 deportistas de ambos sexos, que practican deportes de modalidad colectiva, con edad promedio de $15,8 \pm 1,0$ años. Los datos se recopilaron a través del Group Environment Questionnaire - GEQ y el Inventario POMS - Reducido, en la semana anterior a la participación de los atletas en las competencias estatales. Se utilizaron el coeficiente de correlación de Spearman y la regresión logística binaria para analizar los datos. Los resultados indican correlaciones positivas y significativas de las dimensiones de cohesión grupal ($p < 0.05$) con la dimensión de estado de ánimo vigor, y correlaciones negativas y significativas ($p < 0.05$) con las dimensiones de tensión, depresión, ira,

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fatiga y confusión. Ambos tipos de cohesión grupal (social y de tareas) predijeron significativamente los perfiles del estado de ánimo. El indicador estadístico predictivo más alto se presentó por cohesión de tareas ($OR = 2.481$; $IC = 1.477-4.167$; $p < 0.001$). Los resultados encontrados ofrecen evidencia para confirmar la expectativa previa de que niveles más altos de cohesión grupal están asociados con mejores perfiles de estados de ánimo antes de la competición en atletas jóvenes. Los resultados sugieren que los niveles más altos de cohesión grupal pueden afectar positivamente los estados de ánimo previos a la competición en los atletas jóvenes.

Palabras clave: Deportes; Estados de Ánimo; Perfil de Iceberg; Adolescencia; Ambiente Grupal.

RESUMO

O objetivo do presente estudo foi analisar as possíveis associações entre coesão de grupo e estados de humor pré-competitivo de atletas juvenis. Trata-se de um estudo transversal e quantitativo. A amostra foi constituída por 81 atletas, de ambos os sexos, praticantes de modalidades esportivas coletivas, com média de idade de $15,8 \pm 1,0$ anos. Os dados foram coletados por meio do Questionário de Ambiente de Grupo e do Inventário POMS – Reduzido, na semana que antecedente a participação dos atletas em competições estaduais. O coeficiente de correção de Spearman e a regressão logística binária foram utilizados para análise de dados. Os resultados apontaram correlações das dimensões de coesão de grupo positivas e significativas ($p < 0,05$) com a dimensão de humor vigor e negativas e significativas ($p < 0,05$) com as dimensões tensão, depressão, raiva, fadiga e confusão. Ambos os tipos de coesão de grupo (social e tarefa) foram preditoras significativas dos perfis de estados de humor. O maior indicador estatístico preditivo foi apresentado pela coesão tarefa ($OR=2,481$; $IC=1,477-4,167$; $p<0,001$). A partir dos resultados encontrados, pode-se confirmar a expectativa de que níveis mais altos de coesão de grupo estão associados a melhores perfis de estados de humor pré-competitivo em atletas juvenis. Os resultados sugerem que os níveis mais altos de coesão de grupo podem impactar positivamente nos estados de humor pré-competitivo de atletas juvenis.

Palavras chave: Esporte; Estados de Humor; Perfil Iceberg; Adolescência; Ambiente de Grupo.

INTRODUCTION

The sports performance of an athlete is the result of a set of physical, technical, tactical, and psychological variables that affect their performance in many competitive situations (Eys & Brawley, 2018; Weinberg & Gould, 2017). Among the psychological factors that improve or debilitate a performance, mood states stand out for promoting changes in behavior patterns (Berger & Owen, 1988; Searight & Montone, 2017; Carvalho et al. 2022), focus of vision, energy expenditure (Weinberg & Gould, 2017), aerobic resistance (Murgia et al. 2016), and modulation of athletes' organic responses (Arruda et al. 2013).

In this sense, positive mood states can help to overcome adverse or unpleasant situations during sports practice, which can cause internal imbalances that culminate in inadequate physiological and behavioral responses (Searight & Montone, 2017). Therefore, the athletes need to show an adequate mood profile to achieve higher sports performance (Brandt et al. 2014; Andrade et al. 2016; Weinberg & Gould, 2017), and said ideal profile, as named by Morgan (1980), would be the iceberg profile. When showing

the iceberg profile, the athlete experiences low negative mood indexes (tension, depression, hostility, fatigue and confusion) and high positive mood index vigor (Rohlf's et al. 2008; Searight & Montone, 2017).

However, the mood profile of an athlete can change very fast due to their ephemeral nature (Lane & Terry, 2000), being of paramount importance to identify associated variables that can be manipulated, in order to provide better sports performance and competitive condition to the athlete (Lowther & Lane, 2002).

In this sense, group cohesion, considered as one of the most relevant sports variable for improving team performance and success (Benson et al. 2016; Saénz-López et al. 2021) has been highlighted. Understood as the tendency of a group to unite and remain united in the pursuit of goals and the satisfaction of affective needs (Carron et al. 1985; Weinberg & Gould, 2017), group cohesion is manifested in the social and task dimensions.

Social cohesion refers to interpersonal relationships that seek to meet the needs of social belonging,

reflecting how much team members like each other (Carron et al. 2002; Eys et al. 2009). On the other side, task cohesion reflects the degree in which team members stay united to reach collective goals related to performance, referring on how much team members work together (Filho et al. 2014; Nascimento-Junior et al. 2016).

Both social cohesion and task cohesion notions are determined from the athletes' individual perceptions on team environment (Eys et al. 2009). This way, the athlete's perceptions and feelings on the sports environment stand out as important factors that can affect in changes in their mood states (Vieira et al. 2008). According to Oh and Gill (2017), environment perception developed by group members can affect members' cognition, individual feelings, and behaviors. Scientific literature also associates group cohesion to better interpretation of pre-competition anxiety (Wolf et al. 2014), depressive symptoms on youth athletes (Nixdorf et al. 2016), satisfaction of basic needs (Erikstad et al. 2018), stress (Benrabah et al. 2020), and athletes' personalities (Kim et al. 2020).

Thus, greater group cohesion of the teams seems to affect positively many psychological variables of sportspeople. From this presupposition, this study raises a research problem on the possibility of an associative relation between group cohesion and the athletes' mood states, when hypothesizing that higher cohesion levels are associated with better mood profiles, such as the iceberg profile.

The relation between group cohesion and mood states of adult athletes was investigated in the studies of Terry et al. (2000) and Lowther and Lane (2002), which showed strong indication of an association between the variables, offering support to the hypothesis of this study. However, when considering that emotional instability manifests more intensely in young athletes (Frank et al. 2015; Nixdorf et al. 2016; Sabato et al. 2016), the investigation of the relation between cohesion and mood in the context of youth sports is justifiable.

By considering that group cohesion consequences need to be widely investigated (Eys & Brawley, 2018) and new investigations on the group cohesion of young athletes are necessary (Benson et al. 2016; Eys et al. 2018; Filho et al. 2014), this study tries to

analyze possible associations between group cohesion and pre-competition mood states in youth athletes.

MATERIALS AND METHODS

Participants

81 athletes from both sexes (M=62/ 76.5%; F= 19/ 23.5%), with average age of 15.6 ± 1.2 years, who practiced collective sports (basketball, soccer, indoor soccer and volleyball) participated in the study. The sample was intentionally selected by convenience, as the purpose of the study was to investigate the pre-competition period and the athletes would participate of two state competitions. The power of the sample was calculated through G*Power 3.1.9.4 program, indicating post hoc values of $\alpha=0.05$ and $\beta=0.57$, which must be analyzed with caution (Thomas et al. 2012). The participation in the study was voluntary, and no participants were excluded. The Research Ethics Committee of Instituto Federal do Paraná approved the study with opinion n. 3.424.869.

Instruments

To assess pre-competition mood states, we used the Profile Mood States - POMS inventory (Viana et al. 2001) composed of 42 simple mood indicators, which are answered in the five-point Likert scale and gathered in six dimensions (tension, depression, hostility, fatigue, vigor and confusion). High scores for each dimension represent bigger manifestation of said mood state. In the validation process for Portuguese, the instrument showed satisfying psychometric attributes (Viana et al., 2001).

In order to identify group cohesion levels, we used the Group Environment Questionnaire - GEQ (Nascimento-Junior et al. 2012) composed of 16 items to be answered in the 9-point Likert scale. The items of this tool assess group cohesion level in sport teams, by analyzing Individual Attraction and Group Integration factors, manifested in two dimensions (Task and Social). Higher average scores mean higher cohesion level in each one of the factors and dimensions. In the validation process for Portuguese, the instrument showed satisfying psychometric attributes (Nascimento-Junior et al. 2012). Both instruments were systematized in an electronic form.

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Study Design and Methodological Procedures

This study is characterized by a cross-sectional outline with a quantitative analysis of the data (Thomas et al. 2012). In the two visits to the training sites of the teams participating in the study, we presented the research procedures and delivered them the Free and Informed Term of Consent (FITC) in our first visit. Our second visit, for signed terms collection and application of the research instruments, occurred on the week prior to the athletes' participation in the two main youth competitions of the State of Paraná, and the following procedures took place: (a) before the commencement of the training activities, the athletes were directed to reserved spaces in the gymnasiums; (b) after the delivery of the signed TIFC, the athletes received a tablet with the research instruments; and (c) after answering to the questionnaire, the athletes would return to the training activities. The average time to answer to the questionnaire was 11 minutes per athlete.

Data Processing and Analysis

The answers in the forms feed the Microsoft Excel® worksheets, which are later exported to the Statistical Package Social Sciences (SPSS®) program, version 25, for statistical treatment and analysis. The category measures of the likert scale of the data collection instruments were converted into numbers, in order to obtain the averages of each mood states dimension and group cohesion. From the average mood indexes in each dimension, the sample was dichotomized into athletes with iceberg profile (WIP), those who show tension, depression, hostility, fatigue, and mental confusion indexes below the instrument average and vigor above the average, and without iceberg profile (WOIP), representing those who did not show that profile.

The average and standard deviation were used to analyze the dimensions of mood states, group cohesion and sample description. Data normality was verified through the Kolmogorov-Smirnov test. The Spearman Correlation Coefficient (CC) was used to assess the correlation between the dimensions of mood states and group cohesion. A binary logistic regression was conducted with the sample dichotomized into WIP and WOIP, to determine the explanatory percentage (R²) of group cohesion on mood states, as well as the odds ratio (OR) and the confidence interval

(CI) of this relation. A significance level of $p < 0.05$ was used in all tests.

RESULTS

The athletes investigated in the present study are from youth academy, participate in state and national competitions and had 3.9 ± 1.7 years of sports experience (in competitions). Data referring to mood states profile indicate that 49.4% of the sample ($n=40$) showed the iceberg profile. Table 1 shows descriptive data on age, sex and quantitative number of athletes with iceberg profile.

Table 2 shows that social cohesion has a significant negative correlation with the depression and fatigue dimensions at 0.05 level ($r = -.214$ and $r = -.260$, respectively) and with the anger and confusion dimensions at 0.01 level ($r = -.313$ and $r = -.348$, respectively). Social cohesion is positively correlated with the vigor dimension ($r = .371$; $p < 0.01$), and no correlation with the tension dimension was observed. Task cohesion has a significant negative correlation with the tension dimension at 0.05 level ($r = -.243$) and with the depression, anger, fatigue and confusion dimensions at 0.01 level ($r = -.309$, $r = -.359$, $r = -.334$, and $r = -.462$ respectively). The task cohesion also has a positive correlation with vigor state ($r = .381$; $p < 0.01$). The strongest correlation identified was negative, between task cohesion and confusion state ($r = -.462$; $p < 0.01$).

Table 3 shows the results of the binary logistic regression, including the dimensions of social cohesion and task cohesion as predictor variables, and outcome variable dichotomized into groups with iceberg profile (WIP) and without iceberg profile (WOIP). Both social dimension ($r^2 = 0.218$; $OR = 2.056$; $IC = 1.35-3.12$) and task dimension ($r^2 = 0.259$; $OR = 2.481$; $IC = 1.47-4.16$) are shown as significant predictors of the athletes' pre-competition mood states profile. Higher indexes of task and social cohesion are associated to the iceberg profile. Among the cohesion dimensions, task dimension appears as a stronger predictor of mood states.

Table 1*Characteristics of the sample as to mood states profile, age (average), and sex (n=81).*

	n (%)	Age	Male (%)	Female (%)
WIP	40 (49.4)	15.4±1.3	35 (56.5)	5 (26.3)
WOIP	41 (50.6)	15.7±1.1	27 (43.5)	14 (73.7)
Total	81 (100)	15.6±1.2	62 (76.5)	19 (23.5)

WIP= group with iceberg profile; WOIP=group without iceberg profile; ±=standard deviation.

Source: research data.

Table 2*Correlation Coefficients (Spearman) between task and social cohesions and mood states dimensions (n=81).*

	Tension	Depression	Anger	Fatigue	Confusion	Vigor
Social Cohesion	-.113	-.214*	-.313**	-.260*	-.348**	.371**
Task Cohesion	-.243*	-.309**	-.359**	-.334**	-.462**	.381**

*The correlation is significant at 0.05 level; **The correlation is significant at 0.01 level.

Source: research data.

Table 3*Logistic regression of cohesion dimensions to groups with or without the iceberg mood state (n=81).*

<i>Included</i>	<i>Confidence Interval of 95%</i>			<i>R²</i>	<i>p</i>
	<i>β (SE)</i>	<i>OR</i>	<i>Inf.-Sup.</i>		
Constant	-4.647 (1.41)				0.001
Social Cohesion	.721 (.214)	2.056	1.351- 3.129	.218	0.001
Constant	-7.022 (2.08)				0.001
Task Cohesion	.909 (.265)	2.481	1.477 - 4.167	.259	0.001

β= output variable logit (with iceberg profile); SE= logit standard error; inf.= inferior margin of confidence interval; OR= Odds Ratio; Sup. = superior margin of confidence interval; R²= Nagelkerke's R-square; p= Wald's significance.

Source: research data

DISCUSSION

This study sought to investigate the relation between group cohesion of sport teams and the pre-competition mood profile of youth athletes. The main findings indicate that: (a) practically half of the investigated athletes presented the iceberg profile, however, a representative part of the sample (50.6%) did not have a positive model of mood in the pre-competitive period; (b) social cohesion has a positive correlation with vigor state and negative correlation with depression, anger, fatigue, and confusion states; (c)

possible emotional alterations to most parts of the athletes in the period preceding the competition. Results that diverge from previous studies (Arruda et al. 2013; Brandt et al. 2014; Escobar & Lacerda, 2010; Neves et al. 2016), which indicated the prevalence of iceberg profile athletes during pre-competition period. It is worth to emphasize that these studies were conducted in semi-elite or elite adult athletes, unlike this research, which was carried out on youth athletes.

According to Vieira et al. (2008), changes in the athletes' mood in the sport context, among other factors, can depend on previous experiences. In this sense, a possible speculation that can justify the

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disagreement of the results of this study with other results already presented in the literature is the influence of sports experience on the regulation of pre-competitive mood, as adult athletes have a longer sport trajectory, greater emotional intelligence (Suárez & Jiménez, 2021) and a more effective control of feelings of anxiety and distress (Zarceño et al. 2017), which can contribute in mood adjustment.

Although there is consensus on the importance of appropriate mood for the moment of competition (Brandt et al. 2014; Parsons-Smith et al. 2017; Weinberg & Gould, 2017), the lower rate of iceberg profile among young athletes (even more expressive in young women athletes), if compared to adult athletes who have better mood states (Arruda et al. 2013; Brandt et al. 2014; Escobar & Lacerda, 2010; Neves et al. 2016), suggest the need for a more careful look into mood states of youth athletes.

Both group cohesion dimensions (social and task) have a positive correlation with vigor and a negative correlation with negative mood states (except for social cohesion and tension states), indicating association between higher group cohesion levels with better pre-competition mood states. Fitzgerald et al. (2012) suggest that social relation influence the athletes' behavioral and psychosocial results. In addition, according to Vieira et al. (2008), mood states of an athlete can alter from their situation awareness. In this sense, when perceiving a more cohesive, pleasant and welcoming social environment, due to the greater cohesion of their group, the athlete tends to have a more positive mood profile.

The results of this study suggest that the greater the cohesion perception among team members, the greater the chance of the athlete showing the iceberg profile. Kavussanu & Al-Yaaribi (2019) also identified a strong relation between pro-social behavior within the team and better emotional results on athletes, reinforcing this theory. In this sense, we can consider the development of good group cohesion levels as fundamental, which can affect positively mood and, consequently, the team's sport performance.

Task cohesion correlates strongly with mood states dimensions. In addition, logistic regression indicated higher odds ratio for task cohesion as mood states predictor. In this sense, athletes with high task cohesion levels have a greater chance of presenting

mood states appropriate for better sport performance. Although social and task cohesion standards are susceptible to changes throughout the useful life of the group (Jamieson, 2010), for Dunlop et al. (2013), social cohesion can take some time to develop. As group members get to know each other, task cohesion manifests quickly, and can justify higher task dimensions levels in the assessed teams.

In general, task related aspects are more relevant for people involved in sport teams than social aspects (Leo-Marcos et al. 2013; Nascimento-Junior et al. 2018). In a complementary way, López et al. (2012) emphasize that in performance-oriented sport teams, there is a tendency to model behaviors aimed at task aspects, which can justify greater relevance of task cohesion for pre-competition mood states in youth athletes.

Recent reviews have indicated greater relation of task dimension with better sport teams performance (Benson et al. 2016; Filho et al. 2014), emphasizing the prominent role of task cohesion for teamwork productivity (Callow et al. 2009). Considering that highly task oriented individuals tend to feel well succeeded when they strive and see improvements as a result of their hard work (Kavussanu & Al-Yaaribi, 2019), it seems plausible a greater correlation of task dimension with better pre-competition mood states.

This study has some limitations. In relation to data collection instruments, although both have been validated for Portuguese context, specific versions for the age group of the surveyed population could have been used. No data were collected on the athletes' recent injury history. In addition, a larger sample could enable other analysis perspectives.

Finally, it is important to highlight that the intention of this study was not to exhaust the discussions about associative relation between the variables, but the opposite. We tried to explore in a preliminary manner the relation between group cohesion and mood states of youth athletes. In this sense, even considering these limitations, the original character of the study can represent an initial step for new investigations on the relation of constructs group cohesion and mood states and on how these variables relate to the sports performance of athletes in these age groups.

FINAL CONSIDERATIONS

This study tried to investigate the possible relation of group cohesion and pre-competition mood states of youth athletes of collective sport modalities. The expectation a priori was that higher group cohesion levels would be associated to the occurrence of the iceberg mood profile. The main results indicated that both task cohesion and social cohesion have a significant positive correlation with vigor state and a negative correlation with negative mood dimensions. In addition, task cohesion was revealed to be the strongest predictor of mood states, confirming the hypothesis of this study.

Data still suggest that youth athletes have a less adjusted mood profile than older and professional athletes, justifying a more accentuated care with this age group of athletes. In this sense, new studies on different aspects of mood in this population are necessary.

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