Artigo Original

# Aspectos psicobiológicos de jovens jogadores de futebol brasileiros pré e pós-competição

# Psychobiological aspects of young male Brazilian soccer players pre- and post-competition

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**Nota do Editor:** A revista *"Arquivos de Ciências do Esporte"* permanece neutra em relação às reivindicações jurisdicionais em mapas publicados e afiliações institucionais



**Resumo:** *Objetivo*: O objetivo deste estudo foi investigar o perfil de estados de humor, sintomas depressivos e níveis de ansiedade antes e depois de uma competição em jogadores brasileiros jovens de futebol e do sexo masculino. *Métodos*: Dezenove jogadores jovens de futebol masculino (18,2 ± 0,8 anos) responderam aos seguintes questionários: (1) Perfil dos Estados de Humor; (2) Inventário de Ansiedade Traço-Estado; (3) Inventário de Depressão de Beck antes e depois de uma competição nacional de futebol — para avaliar estado de humor, níveis de ansiedade e depressão, respectivamente. *Resultados*: Não houve diferença significativa no nível de ansiedade-estado (p=0,500), sintomas depressivos (p=0,418) e perfil de estados de humor (p=0,227) após a competição. *Conclusão*: Após uma competição não houve mudanças nos níveis de ansiedade-estado, sintomas depressivos e na maioria dos itens do perfil do estado de humor, exceto vigor e fadiga, nos jovens jogadores de futebol brasileiros examinados.

**Palavras-chaves:** Futebol, depressão, ansiendade, transtornos de humor, esportes.

**Abstract:** *Objective*: The aim of this study was to investigate the profile of mood states, depressive symptoms and anxiety levels before and after competition in young male Brazilian soccer players. *Methods*: Nineteen young male soccer players (18.2 ± 0.8 years) completed the following questionnaires: (1) Profile of Mood States; (2) State-Trait Anxiety Inventory; (3) Beck Depression Inventory before and after a national soccer competition — to assess mood state, levels of anxiety and depression, respectively. *Results*: No significant difference was found in state-anxiety level (p=0.500), depressive symptoms (p=0.418) and profile of mood states (p=0.227) after the competition. *Conclusion*: After a competition there were no changes in state-anxiety levels, depressive symptoms, and most of the profile mood state items, except for vigour and fatigue, in the young Brazilian soccer players examined.

**Keywords:** soccer, depression, anxiety, mood disorders, sports.

## 1. Introduction

Competitive sport is characterized by high emotionality[1]. Many elements and feelings that are linked to sports can either improve or weaken an athlete's performance, such as mood[2,3], depressive symptoms[3–6], and anxiety[3,4]. Sports psychology researchers have adopted a stimulus-based perspective of stress when identifying the "sources of stress" that sport performers encounter[1]. Collectively, the stressors identified in these studies span a wide range of issues, with organizational stressors that can be classified under four main categories: leadership and personnel issues, cultural and team issues, logistical and environmental issues, and performance and personal issues[7].

The profile of mood states is considered a decisive factor in sports performance. Its evaluation can contribute to the detection of overtraining, allowing for interventions in athletes' training to prevent them from reaching this stage[3]. Commonly, in sports and exercise research, the profile of mood states is assessed by the Profile of Mood States questionnaire (POMS), which assess tension, depression, anger, vigor, fatigue, and confusion[8].

With regard to mood disorders, the Global Disease Burden Study[9] found that anxiety and depressive disorders accounted for the highest rates of disability-adjusted life years per 100,000 individuals. In particular, depressive disorders are one of the most common types of mental disorder, and despite the positive effect of exercise on preventing and treating depressive symptoms, athletes are not free from or resistant to this mood disorder[3]. In 2015, a review by Wolanin, Gross and Hong (2015) showed that the prevalence of depressive symptoms in European soccer players varied from 15.6%[11] to 21.0%[5]. Another mental disorder is anxiety, which can be classified into two distinct types: state anxiety and trait anxiety[12]. State anxiety is a transitory emotional state or condition characterized by subjective, consciously perceived feelings of tension and apprehension, that can vary in time and intensity[12]. In contrast, trait anxiety is a relative stable characteristic related to a general tendency to respond with anxiety to situations considered threatening[12]. Pressure to succeed is one of the key factors affecting players' performance in sport and usually increases their anxiety[13]. Therefore, the capacity to handle pressure and anxiety is an integral factor in sports, especially among elite athletes[3].

Competition is a well-known acute social stressor[14]. Hypothesis has been created to analyze the influence of the competition period over the hormonal outcomes. According to them, victory would increase the levels of testosterone (to promote aggressive, sexual, and social behaviors) and the levels of cortisol would decrease, while the contrary would be expected in losers[15].

Given that concern about the relationship between sports and the above-mentioned aspects is high and rising[4,13], studies of the effects of the pre-competition period on the profile of mood states, depressive symptoms and anxiety levels are needed. Therefore, the aim of this study was to investigate the profile of mood states, depressive symptoms, anxiety levels of young male soccer players before and after a competition. We hypothesized that scores on psychobiological variables would differ between pre- and post-competition periods.

## 2. Methods

### Participants

Twenty young, male, Brazilian competitive soccer players from the Associação Atlética Portela Futebol team (Teixeira de Freitas, Bahia) were evaluated. The inclusion criteria were: (i) to be registered in the competition in which the team was to participate and

(ii) to regularly train with the team. The exclusion criteria were: (i) undergoing psychological follow-up of depressive symptoms or anxiety; and (ii) not completing all stages of the data collection. One athlete was excluded because he did not complete the assessment before competition. Therefore, the final sample comprised nineteen athletes (Table 1). All participants and parents (for those under 18 years old) were informed of the potential risks and benefits of the study and signed an informed consent form to take part. All experimental procedures were approved by the Ethics Committee of State University of Bahia (CAAE: 96548518.8.0000.0057) and conformed to the principles outlined in the Declaration of Helsinki.

**Table 1.** Characteristics of the participants

| Variables | Mean ± standard deviation | Minimum-maximum |
|---|---|---|
| Age (years) | 18.2 ± 0.8 | 17.0–19.0 |
| Body mass (kg) | 69.2 ± 10.7 | 52.0–88.0 |
| Height (m) | 1.77 ± 0.08 | 1.65–1.94 |
| Body mass index (kg/m2) | 22.7 ± 2.3 | 18.4–26.3 |

**Study design**

A descriptive, longitudinal study design was used for this study. The soccer team involved was taking part in the Copa São Paulo de Futebol Júnior in 2018, that is the most important Brazilian championship for soccer athletes under 20 years old. This was a non-professional competition coordinated by the Paulista Football Federation between January 2nd and 25th, 2018. The competition was played in seven phases: first, second, third, fourth, fifth, sixth (semi-final), and seventh (final). A total of 128 teams divided into 32 groups of four participated in the first phase, each of the four teams playing against others in the group. The two teams with the highest score in each group qualified for the second phase. The team in this study was in group 32 and played in the first phase of the competition only.

To achieve the purpose of the study, the athletes answered the following questionnaires before and after the competition: (1) the POMS; (2) the State Anxiety Inventory; and (3) the Beck Depression Inventory (BDI). The Trait Anxiety Inventory was completed before the competition only. Figure 1 shows the experimental study design.

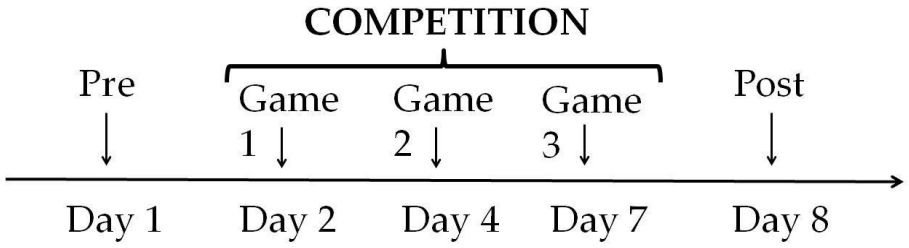


Figure 1. The experimental study design.

**Profile mood of states**

The POMS questionnaire was developed by McNair et al.[8], and the Brazilian Portuguese version used here validated by Peluso (2003). The POMS is a self-report questionnaire consisting of 65 adjectives relating to six items: tension, depression, anger, vigor, fatigue, and confusion. Respondents rate the adjectives on a five-point Likert scale from 0 (not at all) to 4 (extremely). An overall score for total mood disturbance is obtained by

adding together the scores for tension, depression, anger, fatigue, and confusion and subtracting that for vigor from the total[8].

A graphical representation of mood responses, proposed by Morgan[17] to be typical of successful athletes, approximates the shape of an iceberg. This pattern of mood responses (iceberg) combines high vigor with low tension, depression, anger, fatigue, and confusion scores[18].

**Anxiety levels and depressive symptoms**

*State and Trait Anxiety*

The State and Trait Anxiety Inventory (STAI) was developed by Spielberger et al.[19] and validated for the Brazilian Portuguese language by Biaggio and Natalício[20]. The components score of the Portuguese version had a reliability coefficient of 0.93. The STAI is a self-completion tool that focuses on symptoms and attitudes across 20 items on both scales: one scale evaluating state anxiety, the other trait anxiety. Although it serves no diagnostic purpose, it can reliably classify anxiety levels. The volunteers were instructed to answer each of the items according to how they felt "right now, at this moment" for state anxiety, and how they feel in typical situations that everyone experiences on a daily basis for trait anxiety. The items evaluate subjective feelings of worry, calm, tension, nervousness, and apprehension, with other questions assessing autonomic nervous system activity. For state anxiety, responses indicate the intensity of a feeling on a Likert scale of 1 to 4: "not at all," "somewhat," "moderately so," and "very much so," respectively. Scores range from 20 to 80, a score of 31 to 49 indicating intermediate symptoms of anxiety and scores greater than or equal to 50 suggesting higher symptoms of anxiety[19–21]. For trait anxiety, the subject responds on a scale of 1 to 4, where 1 refers to "absolutely not," 2 "a little," 3 "quite" and 4 "a lot." The cut-off points are the same as those used in the validation for the Portuguese version, where less than 33 points indicates mild anxiety, 33 to 49 points indicates average anxiety, and more than 49 points indicates high anxiety. As with the state anxiety scale, scores range from 20 to 80 points; the higher the score, the greater the degree of anxiety[19–21].

*Depressive symptoms*

The Beck Depression Inventory (BDI) was developed by Beck et al.[22] and validated for the Brazilian Portuguese language by Gorenstein and Andrade (1996). The components score of the Portuguese version had a reliability coefficient of 0.81[21]. The BDI is a self-rating scale composed of 21 groups of affirmations. Items assess symptoms that are psychological (items 1 to 13) or somatic (items 14 to 21) in nature. Scores from 0 to 9, 10 to 16, 17 to 29, and above 30 represent minimal, mild, moderate, and severe depressive symptoms, respectively[22].

**Statistical analysis**

The data were entered into an Excel spreadsheet (Microsoft, USA) and imported into the Statistical Package for the Social Science (SPSS) version 20.0 (IBM, USA) for statistical analysis. Data are presented as mean ± standard deviations (minimum-maximum values). The *Shapiro-Wilk* test was used to test the normality of the data. We used the paired t-test for data with normal distributions (for the following items of POMS: anger, vigor, and fatigue; state-anxiety) and the Wilcoxon test for data with non-normal distributions (for the following items of POMS: tension, depression, and confusion; depressive symptoms). A significance level of 0.05 was adopted for all statistical tests.

## 3. Results

### Profiles of mood states

The participants did not present statistical difference ($p > 0.05$) between the scores in most of profile of mood state items (tension, depression, anger and confusion) pre- and post-competition. Nonetheless, a statistical difference was found in two of the items, vigour and fatigue, pre (17.74±4.69) and post (14.47±6.79) (p=0.042), pre (3.68±2.14) and post (5.11±2.33) (p=0.038), respectively.

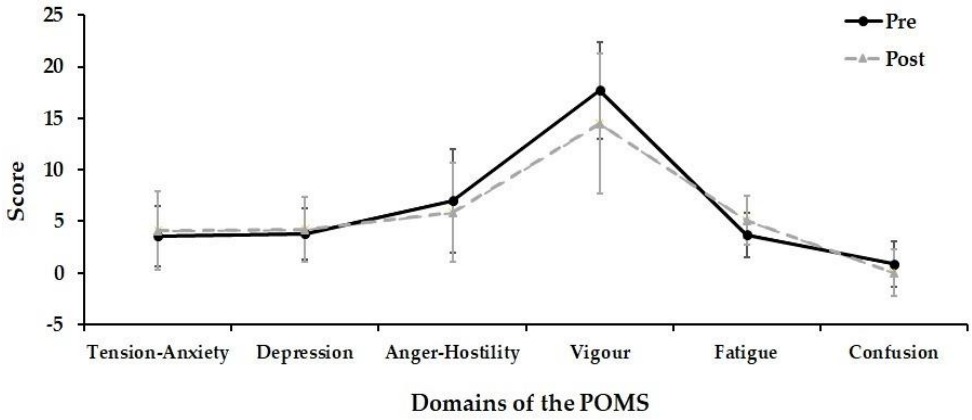


Figure 2. The scores of POMS pre- and post-competition (n = 19)

### Anxiety levels and depressive symptoms

The average trait-anxiety level in the pre-competition period was 38.73 ± 6.46, considered intermediate according to the STAI[20]. State-anxiety levels did not change after the competition (p = 0.5). No statistically significant difference (p = 0.418) in depressive symptoms was found between pre- (29.16 ± 2.71) and post- (29.79 ± 1.72) competition values, both representing moderate depressive symptoms. Table 2 shows additional information on all anxiety levels and depressive symptoms before and

**Table 2.** Descriptive statistics for anxiety levels and depressive symptoms by competition period

| Variables | Pre | Post | *P* | Change (%) |
|---|---|---|---|---|
| Anxiety levels | | | | |
| Trait-anxiety[1] | 38.73 ± 6.46 | NA | NA | NA |
| State-anxiety[1] | 41.73 ± 6.04 | 40.32 ± 8.64 | 0.500 [3] | -3.4 |
| Depressive symptoms[1] | 29.16 ± 2.71 | 29.79 ± 1.72 | 0.418 [2] | 2.2 |

NA: not applicable. [1] Data are shown as mean ± standard deviation. [2] P value from Wilcoxon test. [3] P value from paired t-test

## 4. Discussion

The current study investigated profiles of mood states, depressive symptoms, and anxiety levels in young male soccer players before and after a competition. The main findings of this study were: (i) no change in state-anxiety levels, most of the item of the profiles of mood states (tension, depression, anger and confusion), or depressive symptoms following the competition; (ii) changes in items of the profile of mood states (vigor and fatigue).

It has been shown that elite young athletes are confronted with 640 different stressors, including leadership, cultural, team-related, and logistical factors, as well as environmental, performance, and personal ones[7]. In young soccer players, there is growing concern about mental health and its relation to performance[4,13,24].

In spite of this, we found no changes in most of the items of the profiles of mood states (tension, depression, confusion and anger), depressive and anxious symptoms. Elite athletes regard participation in competitions as challenging, experiencing more pleasant emotions than unpleasant ones in the pre-competition period[25]. In their study, Alix-Sy et al. (2008) found the profile of mood states to be relatively stable across three league games, possibly as a result of the athletes' experience at this level. Participation in competitions produces an anticipatory acute response of cortisol in the pre-competition period, which potentially prepares the athlete to perform; moreover, physiological stress (e.g., an anticipatory rise in cortisol concentrations) is related to negative somatic emotions, and cortisol may constitute a measure of emotional response in the pre-competition period[25]. However, the items vigor and fatigue presented changes on the scores after competition. Filaire *et al.*, (2001) found decrease in vigor, but did not find in fatigue, in training season, that was justified by the increasing training intensity. Our study evaluated athletes in competition season, and it is reasonable to assume that the physiological strains can be similar to an intensity training session. Filaire and Pequinot (2003) showed decrease in vigor and increase in fatigue at the ending of a competitive season, what resemble to our results. Silva *et al.* (2008) verified associations among decrease in vigor, larger training volume, and fewer victories. The performance of the athletes evaluated in our study could be explained by the decline in the vigor.

Regarding the depressive symptoms and anxiety levels, our data revealed that the scores of evaluated athletes presented at least as moderate depressive symptoms and that the scores of the athletes presented is classified as intermediate level of anxious symptoms before competition. This result is alarming and higher than previous studies conducted with young athletes. A study conducted by Gulliver et al.[29] explored the prevalence of symptoms of general psychological distress and common mental disorders among elite Australian athletes. The authors found that around 46% of athletes were experiencing symptoms of at least one of the mental health problems under study, such as anxiety, depressive symptoms, or distress. This is in line with the prevalence rates (especially of anxiety/depressive symptoms) found by another study in professional footballers from five European countries[30]. Proctor and Boan-Lenzo (2010) compared prevalence of depressive symptoms between male intercollegiate team sport athletes and male non-athletes. The authors found that the prevalence of depressive symptoms was lower in athlete and that prevalence of depressive symptoms was 15.6%. Yang et al. (2007) showed that prevalence of depression among competitive collegiate athletes from both sexes was 21%.

In the current study, we found no change in depressive symptoms or state-anxiety levels in the post-competition period. The scores, both from anxious and depressive symptoms, were considered moderate. What can be explained by the period of the questionnaires' application, pre- and post-competition. On the first moment, the scores obtained could be explained by the stress of the upcoming competition. On the second

moment, the scores obtained could be explained by the team's bad campaign on the competition.

As with all studies employing questionnaires, the present results rely on the honesty and level of recall of the respondents. However, the reliability and validity of the instrument used to gather data in this study have been established by previous studies. The absence of a control group is a further factor to be considered. Despite these limitations, the results are nevertheless meaningful and do not prevent conclusions being drawn.

## 5. Conclusion

Our results indicate that after participation in a competition there were no changes in state-anxiety levels, depressive symptoms, and most of the profile mood state items, with the exception of vigor and fatigue, in the young Brazilian soccer players examined here. These findings may help coaches and sports managers to improve their strategies in relation to psychobiological factors (for example, to introduce a sports psychologist during season or, at least, during most important competitions). Future studies that are related to these findings are suggest.

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**Author Contributions:** DS, GS, and CL made the design of the study. GS collected the data. LLG, NM, DS, and RS performed statistical analysis. RBV, RV, WS and MA contributed meaningfully to the intellectual content of this paper. All authors agreed upon the final version of the paper.

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**Conflict of interest:** The authors declare there are no competing interests.

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