

Analysis of stress level and recovery of formative football coaches. Case studies Análisis del nivel de estrés y recuperación de los entrenadores de fútbol formativo. Estudios de caso

Guilherme de Sousa Pinheiro, *Marco Túlio de Mello, *Felipe Gustavo dos Santos, *Lenamar Fiorese,
*Varley Teoldo da Costa

*Federal University of Minas Gerais (Brazil), **Technical University Munich (Germany), ***Maringá State University
(Brazil)

Abstract. This study aimed to monitor and compare the levels of stress and recovery in elite football coaches of youth teams at different moments of one sports season. A descriptive study with longitudinal characteristics was conducted. Twenty-six coaches (37.60 ± 7.37 years old) with experience time (7.20 ± 5.37 years) from the categories U-15, U-17 and U-20 of the main Brazilian elite football teams were evaluated. The coaches filled out the demographic data questionnaire and the RESTQ-Coach in three periods of the sports season: vacation, training and competition. The stress levels were higher in competition periods, as well as during training moments, compared to the vacation period. The recovery levels showed a decrease in the competition period compared to the vacation period. The stress values were not higher than the recovery values of the coaches evaluated at different times of the sports season. Stress and recovery levels oscillate during a sports season. However, recovery levels have remained higher than stress. It seems that the elite football coaches are adapted and support the work pressures to which they are submitted in the sports context over one season.

Key words: RESTQ-Coach, youth category, football, elite coaches, stressors.

Resumen. El objetivo de este estudio era identificar y comparar los niveles de estrés y recuperación de los entrenadores de fútbol de élite de los equipos juveniles en diferentes momentos de una temporada deportiva. Se realizó un estudio descriptivo con características longitudinales. Se evaluaron 26 entrenadores ($37,60 \pm 7,37$ años) con tiempo de experiencia ($7,20 \pm 5,37$ años) de las categorías sub-15, sub-17 y sub-20 de los principales equipos de fútbol de élite de Brasil. Los entrenadores rellenaron el cuestionario de datos demográficos y el RESTQ-Coach en tres periodos de la temporada deportiva: vacaciones, entrenamiento y competición. Los niveles de estrés fueron más altos en los periodos de competición, así como en los momentos de entrenamiento, en comparación con el periodo de vacaciones. Los niveles de recuperación mostraron una disminución en el periodo de competición en comparación con el periodo de vacaciones. Los valores de estrés no fueron superiores a los valores de recuperación de los entrenadores evaluados en diferentes momentos de la temporada deportiva. Los niveles de estrés y recuperación oscilan durante la temporada deportiva. Sin embargo, los niveles de recuperación se han mantenido más altos que el estrés. Parece que los entrenadores de fútbol de élite están adaptados y soportan las presiones laborales a las que están sometidos en el contexto deportivo durante una temporada.

Palabras clave: RESTQ-Coach, categoría juvenil, fútbol, entrenadores de élite, estresantes.

Introduction

Coaches play a variety of roles in an athlete's life (Pérez, 2015), particularly in contributing to the ongoing development of development of physical and psychological capacities (Potts et al., 2018; Forlenza et al. 2018; Robles et al., 2011). The coach is responsible to design and delivers a systematic program to facilitate improvement in individual and team performance (Gamonales et al., 2020; Gómez-Cardona et al., 2019; Carson et al., 2019). However, sports' coaching has been

reported as a stressful occupation (Chroni et al. 2019; Santos and Costa, 2018). Coaches have to cope with several adverse circumstances, such as inconvenient working hours, traveling, temporary contracts, job insecurity, role conflicts and athlete performance (Bentzen et al., 2020; Chroni et al. 2019; Carson et al., 2019). Being affected by this potpourri of straining internal and external stressors may ultimately lead to a chronic stress reaction (Schaffran et al., 2019; Kellmann et al., 2016; Rhind et al., 2013)

The stress related to the sport can come from personal (e.g., own high expectations or coach profile) (Arnold et al., 2017; Urbano-Arévalo et al., 2020), competitive (e.g. preparing for major events) (Didymus et al., 2017) or organizational factors (Chroni et al.,

2019). Each category of stressor poses different demands for the individuals. Sports coaches frequently experience an array of stressors that are specific to them in their role as a coach, contributing to the unique nature of the coaching profession (Pots et al., 2018). Inadequate coping can lead to serious negative repercussions on both emotional aspects and the ability to perform any task (Valadez Jimenez et al., 2016). This repeated exposure to stressors has the potential to impact the coach's mental well-being (Carson et al., 2018), making these subjects more vulnerable to be affected by burnout syndrome and also the early abandonment of their work activity (Olusoga et al., 2019).

The coach has an important influence on the athlete (Forlenza et al., 2018, Viciano et al., 2015), and the quality of the coach-athlete relationship is considered a central axis in the sport context (Contreira et al., 2019). Apart from teaching technical and tactical skills (Urbano-Arévalo et al., 2020; Gamonales et al., 2019; Gamonales et al., 2019b; Gómez-Cardona et al., 2018; Bettega et al., 2017; Bettega et al., 2016), they also support the personal and social development of their athletes (Schaffran et al., 2019; Forlenza et al., 2018; Arrechea et al., 2012). The work stress is able to diminish the football coach's ability to transmit his knowledge to his athletes (Rhind et al., 2013). Monitoring work stress in formative coaches is important to prevent and minimize the negative effects on the training environment of young athletes. Coach's behavior directly influences performance, satisfaction, confidence and motivation of the team and its members (Contreira et al., 2019b; Forlenza et al., 2018). Therefore, if these professionals are in conditions of stress and emotional imbalance there may be serious harm in the development process of athletes in the youth categories. These damages can be related not only to the technical-tactical learning of the sport, but also to physical, psychological and social aspects in the formation of the young athlete (Santos & Costa, 2018).

Psychological stress among athletes and coaches has been well documented in the sport psychology literature (Fernández et al., 2020; Didymus et al., 2017). Transactional and relational theories of stress are some of the most widely used and tested in sport (Harwood et al., 2019). Based on the Lazarus and Folkman (1987) transactional model, stress is a result of the imbalance between environmental demands and individual sources. Stress can be defined as "an ongoing process that involves individuals transacting with their environments, making appraisals of the situations they find themselves in, and

endeavoring to cope with any issues that may arise" (Thelwell et al., 2008; Fletcher et al., 2006). According to this perspective, the work stress of the coach is characterized by the interaction of the individual with the organizational demands of training and competition to which they are constantly submitted (Kelly et al., 2018) and also by the social interactions with all other individuals who act in this sports environment (Kellmann et al., 2016). Recovery is defined as an inter and intra individual process that occurs in the biopsychosocial sphere. The objective of recovery is to restore the balance between various sectors of the coach's life (Kellmann et al., 2018). Since labor stress can compromise the work of football coaches in youth categories and consequently also in the whole process of training new athletes, it is important that these professionals present throughout the sports season efficient strategies to recover and cope with these stressors (Carson et al., 2019). Inability to deal effectively with stress affects the level of coaching, reducing their decision-making capacity and contributing to emotional disorders (Carson et al., 2019).

Some studies have sought to investigate the levels of stress and/or recovery in football coaches from different countries (Hinojosa-Alcalde et al., 2020; Altfeld et al., 2018; Carson et al., 2018; Bentzen et al., 2016; Kellmann et al., 2016; Altfeld et al., 2015; Rhind, et al., 2013; Lundkvist et al., 2012; Costa et al., 2012). Other studies have attempted to longitudinally measure the levels of stress and recovery in German and Australian coaches of different sports modalities, such as volleyball (Altfeld and Kellmann, 2015; Kilo and Hassmén, 2016; Santiago et al., 2016) and in elite football coaches over 10 years (Hassmén et al., 2019). The evidence from these studies points to a balance of stress levels and recovery in professional coaches of different modalities throughout sports season. So far, no scientific evidence has been found comparing the levels of stress and recovery in football coaches of youth elite teams throughout the sports season. Thus, this study aims to monitor and compare the levels of stress and recovery of elite football coaches from youth teams in different periods of one sports season.

Materials and Methods

Design

This is a descriptive study (Thomas et al., 2012; Ato, López-García and Benavente, 2013) with longitudinal characteristic similar to other studies that sought to

evaluate psychological variables at different periods of the sports season (Altfeld et al., 2015; Balaguer et al., 2012). The present empirical study, using quantitative methodology (Montero and Orfelio, 2007) aimed to investigate longitudinally the variation in stress and recovery levels in formative football coaches in three different periods of the sports season.

Participants

Twenty-six male football coaches (37.60 ± 7.37 years old; 7.20 ± 5.37 years of experience) of Brazilian first division teams participated in this study. Among the coaches evaluated, 8 worked in the U-20 category, 7 in U-17 category and 11 in U-15 category. Regarding the educational level, most of the coaches were physical education professionals, former football players and only 2 coaches have studied Marketing and People Management.

Instruments

The demographic data questionnaire was used to characterize the sample and the RESTQ-Coach questionnaire (stress and recovery questionnaire for coaches) to evaluate the perceptions of stress and recovery in sport coaches. The questionnaire was developed by Kallus and Kellmann in the English language. The Brazilian version was validated by Costa et al. (2012), and already been used in other studies (Costa et al., 2012b; Silva et al., 2016) The instrument is composed of 81 questions, with a 7-point Likert scale ranging from 0 (never) to 6 (always) and must be filled out based on the situations experienced by the coach in the last three days and three nights.

Variables

RESTQ-Coach assesses the dimensions of General Stress (EG), Specific Stress (EE), General Recovery (RG), Self-efficacy (AE), Physical Welfare (BE) and Cognitive Techniques (TC). In this study only the EG, EE and RG dimensions were used to fulfill the proposed goals.

Procedures

The study was submitted to and approved by the Research Ethics Committee and all volunteers signed the Free and Informed Consent Term. All procedures performed in the study were in strict accordance with the ethical standards of the Declaration of Helsinki.

The evaluations were carried out at the training and match venues of the coaches, with prior scheduling,

minimizing external interferences and respecting the individuality of each volunteer. The data collection was conducted in three periods (vacation, training and competition), throughout the sports season. The periods have the following characteristics:

- Vacation period: characterized as the interval between two sports seasons, in which the coach remains absent from his work activities. During this period, physical, psychological and social abilities are re-established. To evaluate this period the measures were carried out 20 days after the vacation had started. These values were considered baseline values.

- Training period: characterized by the development of physical, technical, tactical and psychological capabilities of athletes in which coaches are responsible for conducting the entire training process and application of training contents. During this period there was no participation in official competitions. The mean weekly training period had 24 hours. The data collection was conducted 20 days after the start of the training period, corresponding to the third week of the pre-season.

- Competition period: characterizes the moment when the team plays the main official matches of the season. The matches represented 4 hours per week. In this phase the coaches evaluated are submitted to the process of stress due to the matches and competitions they participate with their teams. The evaluation was conducted during a competitive micro cycle, specifically one day before a team's knockout match in the state competition of each coach.

Statistical analysis

The Shapiro-Wilk test was used to check the normality of the data. As the data did not present normal distribution beyond the descriptive statistics composed by mean and standard deviation, the median and the mean position were used. To verify differences between the constructs of general stress, specific stress and general recovery in the different periods of the sports season we used the nonparametric test of Friedman, later the Dunn test was used to identify between which periods the differences occurred. In order to identify any possible differences in the evaluated constructs between coaches from different categories (U15, U17 and U20), the Kruskal-Wallis test was performed, and when necessary Dunn's post hoc test was used.

Effect size (ES) values were considered small if ($.20 \leq d < .50$); medium if ($.50 \leq d < .80$) and large if ($d \geq$

.80) (Cohen, 1988). The internal consistency values assessed by Alpha de Cronbach of the dimensions in the three periods evaluated were: EG ($\alpha=0.832$ vacation, $\alpha=0.895$ training and $\alpha=0.931$ competition), EE ($\alpha=0.835$ vacation, $\alpha=0.855$ training and $\alpha=0.940$ competition) and RG ($\alpha=0.861$ vacation, $\alpha=0.774$ training and $\alpha=0.875$).

The statistical procedures were calculated by Statistical Package for the Social Sciences (IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp) and GraphPad Prism (version 7.00 for Windows, GraphPad Software, La Jolla California USA). The level of significance adopted was $p<0.05$.

Results

The median, maximum and minimum values of general and specific stress and recovery of coaches at different times of the season are presented in table 1.

Table 1
Results of the behavior of stress variables and recovery of coaches during the season

Period and Variables	Median	Minimum - Maximum
Vacation		
General Stress	0.90	0.35-2.90 ^{a,b}
Specific Stress	1.03	0.12-2.24 ^{c,d}
General Recovery	4.21	2.50-4.92 ^e
Training		
General Stress	1.30	0.55-2.70
Specific Stress	1.73	0.35-2.65
General Recovery	3.42	2.17-4.83
Competition		
General Stress	1.30	0.10-4.20
Specific Stress	2.06	0.35-4.29
General Recovery	2.91	1.83-4.75

a= indicates significant difference between vacation and General Stress training; b= indicates significant difference between vacation and General Stress competition; c= indicates significant difference between vacation and Specific Stress training; d= indicates significant difference between vacation and Specific Stress competition; e= indicates significant difference between vacation and General Stress competition.

There was statistical difference between the three constructs, general stress ($p=0.002$), general recovery ($p=0.025$) and specific stress ($p=0.001$). The general stress construct presented significant differences between vacation and training ($p=0.006$; $ES = 0.62$) and vacation and competition ($p=0.008$; $ES = 0.59$). For the specific stress construct significant differences were identified between vacation and training periods ($p=0.016$; $ES=0.97$) and between vacation and competition periods ($p=0.001$; $ES= 1.26$). And regarding the general recovery construct it was observed significant differences only between vacation and competition periods ($p=0.020$; $ES = 0.96$).

It was not identified significant differences in general stress levels between periods of training and competition ($p=0.999$; $ES = 0.15$), similarly the specific

stress did not present significant differences between periods of training and competition ($p=0.563$; $ES = 0.40$). For general recovery levels it was not identified significant differences between vacation and training ($p=0.436$; $ES = 0.76$) or training and competition ($p=0.636$; $ES = 0.29$).

No statistically significant differences were found in the variables measured (Vacation: general stress, $p=0.996$; specific stress, $p=0.140$; and general recovery, $p=0.853$; Training: general stress, $p=0.888$; specific stress, $p=0.252$; and general recovery, $p=0.571$; Competition: general stress, $p=0.731$; specific stress, $p=0.818$; and general recovery, $p=0.571$) when comparing coaches from the three different categories (U15, U17 and U20).

Discussion

This study aims to monitor and compare the levels of stress and recovery of elite football coaches from youth teams in different periods of one sports season. The results indicate that during the sports season there are an oscillation in stress levels and recovery of elite youth football coaches. The levels of general stress and specific stress are higher during periods of training and competition, and there are significant differences on overall recovery levels between vacation and competition periods.

During the training period, there was a significant increase in general and specific stress levels in coaches when compared to the vacation period. Since these coaches work on the formation of new athletes, it seems that the training period generates stress levels similar to the competitive period. The present finding corroborates with previous findings by Altfred et al. (2018) and Costa et al. (2012), which indicate that coaches have to regularly deal with a range of potential stressors in the workplace, ultimately leading to coach burnout. Other research with coaches from a variety of levels (youth to national and elite) suggested that coaches encounter situation specific stressors when performing in training and competition (Chroni et al., 2013; Norris et al., 2017). Conflicts with coaching staff and athletes, professional instability and pressure to form new athletes are sources of stress that affect and contribute to the increase in coaches' stress levels over the training period (Lundkvist et al., 2012; Thelwell et al., 2017; Dixon et al., 2017). In the youth categories it is common for the coach to be more involved in athlete evaluation processes. Besides that, during the training

period (or pre-season) the annual sport planning is developed, such factors require assertive decision making by coaches, factors that can influence coach's mental health (Didymus, 2017). The absence of significant differences in stress levels between the training period and the competition period also shows that the training period is as stressful as the competitive one.

Competition is considered stressful in itself as well as the scheduling of competitions (Rosa et al., 2016) are typical contributors to impaired sleep (Altfeld et al., 2018). Coaches can also have their volume and sleep quality affected. Sleep represents one of the many available forms of recovery, thus sleep deprivation may worsen many metabolic (Dáttilo et al., 2020) and cognitive conditions (Cullen et al., 2020), causing difficulty in the ability to function at work. In 2018, 253 championships were held all over Brazil. Of these, 53% of the competitions realized were of the youth categories. When analyzing the number of matches, the competitions of the youth categories represented more than 64% of all matches while the main category competitions represented 31% (Ernst and Young, 2019). These coaches are more involved in important competitions at the end of the sports season due to the sports calendar. This factor usually leads to an increase in the number of travels and the time spent preparing the teams, consequently increasing the time needed to work, the stress levels and also reducing recovery time (Schaffran et al., 2019).

During training and competitions there is a significant increase in stress levels (Rhind et al., 2013) and a reduction in recovery (Altfeld and Kellmann, 2015; Altfeld et al., 2018). The sports calendar concentrates the main competitions in the youth categories in certain months of the year (Lundkvist et al., 2012; Bentzen et al., 2016), especially in Brazil (Ernst and Young, 2019), thus during this period that coaches are most likely to be fired due to competitive results. Despite this, no increase in stress levels of youth football coaches was observed between training and competition periods, indicating that in youth categories it is not only competition that stresses coaches. Corroborating the present finding, Kellman et al. (2016) indicated that stress levels of Australian football coaches did not increase during the competitive season. Nevertheless, studies with different sports in the adult category indicated the competition period as a moment in the sports season that increases the stress levels in coaches (Hudson et al., 2013) and can lead to burnout (Santiago

et al., 2016).

The level of recovery of the coaches did not change between the training and competition periods. However, there was a significant decrease in recovery levels in the competition period compared to the vacation period, similar to the findings from (Altfeld and Kellmann, 2015). It is important to note that even with the reduction in recovery levels during the competition period the recovery levels were still higher than the stress levels. This allows hypothesizing that the coaches were able to control the levels of work stress during one competitive season. Corroborating with this study, coaches in the professional and youth category of Brazilian football presented similar psychometric responses during the competitive period (Costa et al., 2012).

Time experience in coaching profession is a variable that can contribute to a greater control of stress and consequently recovery levels, because more experienced coaches manage better stressors elements of the profession (Knights and Ruddock-Hudson, 2016). Another hypothesis to understand the profile found by the football coaches from youth elite teams is the resilience capacity of these professionals. The construct of resilience has gained significant attention in sport psychology over the last decade (Bryan et al., 2019). This construct has typically been used to understand how the person is able to reach or maintain positive adaptation despite exposure to stress or adversity (Szedlak et al., 2020). Resilient coaches may be able to handle the daily work stress of training and competitions, and in the face of such adversities be able to maintain low levels of stress with a consequent effective recovery process during a sports season.

In this study no differences were identified in the variables measured between coaches of different categories. This result can be partially explained by the small size of the sub-samples of each category. However, there are indications that coaches in higher levels may suffer higher stress levels due to job insecurity (Bentzen et al., 2020). Evidence in the literature indicated that the stress levels of coaches had little variability throughout the season, but seems to be higher at the end of the competitive phase (Altfeld and Kellmann, 2015; Kellmann et al., 2016). Our findings corroborate this evidence, since it was observed that the coaches had lower levels of stress than recovery in the beginning of the season. That can be explained by the low pressure experienced by the coaches at this moment. Coaches during the vacation period have more opportunities to

be involved in social activities, which consequently give them the opportunity to carry out a greater number of pleasurable activities, which is commonly obstructed during the sports season (Santos and Costa, 2018; Lundkvist et al., 2012). Studies that evaluated the levels of stress and recovery in coaches of different modalities at the beginning of the sports season found similar results to this study (Altfeld and Kellmann, 2015; Kellman et al., 2016). The vacation period assumes an important role in reducing stress levels and balancing the demands of stress and recovery of coaches for the beginning of the sports season. No significant differences were observed between training and vacation periods for general recovery levels. This finding suggests that even with the increase of stress sources in the work context, football coaches of youth categories showed effective stress management behaviors. It is important to note that these findings can lead to different types of analysis. First, the coaches may be really adapted, as the perception of stress is not so latent due to the pleasure of working in the football environment. Or the coaches may be underestimating stress and overestimating recovery, showing an image that may not be real of the perception of the work activity. The general and specific stress levels were similar in the periods of training and competition between coaches, which demonstrates a particularity in youth football. The training of the young athlete, especially in the pre-season, is as stressful as the competition period for these professionals.

Thus, physiological measures of stress and recovery should be done together with psychometric evaluations, which represented a limitation of this study. Despite this limitation, the results of this study provide unprecedented information on the assessment of stress and recovery in football coaches from youth elite teams at different times of the sports season. The findings of this study may contribute to football professional's comprehension of the impact of these variables throughout a sports season, especially in the Brazilian context. It provides information for effective actions to minimize stress and increase biopsychosocial recovery processes.

Conclusion

The stress and recovery levels of formative coaches may oscillate over a competitive season. The football coaches from youth elite teams presented general stress and specific stress are higher during periods of training and competition, and there are significant differences

on overall recovery levels between vacation and competition periods. These professionals seem to have a mechanism for adaptation and stress control, observed by better recovery levels. This analysis contributes to a more accurate diagnosis of the stress-recovery relationship. Football teams should monitor coaches' stress levels and recovery periodically, as altered levels of these variables can compromise the formative process for new athletes.

However, this study analyzed only one competitive season, perhaps the psychological responses may vary over several seasons. Future studies should monitor longitudinal levels of stress and recovery in a larger sample of elite soccer coaches, and include another psychological variable. It would be interesting to analyze coping strategies in order to identify mechanisms adopted by coaches and verify if coaches change their behavior frequently according to the season period. The analysis of the coaches characteristics, such as self-defined profile or leadership style (Viciano et al., 2015) could provide information about influencing factors on stress and recovery.

Disclosure statement

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