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Anxiety and Burnout in Young Athletes: Mediating Role of Cognitive Appraisal

This study tested the relationship between trait anxiety, cognitive appraisal, and athletes' burnout proposing two hypotheses: (a) there is a direct relationship between athletes' trait anxiety and cognitive appraisal and burnout; and (b) cognitive appraisal mediates the relationship between trait anxiety and burnout and this mediation occurs despite the competitive level and sport records of athletes. The study included 673 young athletes and provided measures of trait anxiety, cognitive appraisal, and burnout. Structural equation modelling indicated that cognitive appraisal mediates the relationship between trait anxiety and burnout, confirming hypothesis 2, and this model provided better fit than the direct model of hypothesis 1. However, the mediation also indicated that the direct relationship between trait anxiety and burnout should be considered. The mediating model was invariant according to competitive levels and sport records. In conclusion, cognitive appraisal is an important variable in explaining athletes' burnout.

Keywords: Trait anxiety; Cognitive appraisal, Burnout; Young athletes

Anxiety and Burnout in Young Athletes: Mediating Role of Cognitive Appraisal

Cognitive appraisal is a central construct used to explain human adaptation to stress and life contexts, indicating the personal meaning and significance that an individual attribute to a potentially stressful event (Lazarus & Folkman, 1984). The analysis of cognitive appraisal allows us to understand if the stressful event will be a positive or negative experience for the individual (Lazarus, 1999). This depends on how the person evaluates the situation (i.e., primary cognitive appraisal) and how the person copes with the situation (i.e., secondary cognitive appraisal). The possibility of cognitive appraisal being involved in human adaptation to stress in sports has been discussed in the literature (Lazarus, 2000) and was considered in this study to be a key variable mediating the characteristics of athletes (e.g., trait anxiety) and their reaction to sports activity (e.g., burnout).

Based on the work of Lazarus (1999; Lazarus & Folkman, 1984), some authors have reinforced the value of cognitive appraisal when adapting to stressful situations. For example, Smith (1986) was one of the first authors analyzing burnout in sports using the cognitive-affective model of athletic burnout. Smith proposed a four-stage model in which stress and burnout evolve in parallel. In the first stage, athletes are exposed to situational demands that overcome potential resources; this raises the experience of stress that can lead to burnout if the demand continues over time. The second stage involves cognitive appraisal of the situation, describing how the athletes interpret and appraise the situation, meaning that some may feel the demands as more threatening or more challenging than others. More specifically, feelings of helplessness may arise when athletes evaluate the situation as exceeding personal resources, contributing to the physiological response (e.g., arousal) of the next stage. Therefore, the third stage identifies physiological responses that can occur if an athlete evaluates the situation as harmful or threatening (ex: feelings of tension, irritability, and fatigue). The final stage includes behavioral responses that occur after physiological responses, and may comprise behavioral consequences or coping such as poor performance, interpersonal conflicts, and even withdrawal from sports. Also, personality and motivational factors can moderate the athletes' reactions to stress in sports, helping to determine whether the athlete will burnout or cope. Considering these four stages, Smith (1986) suggests that athlete burnout is a result of chronic stress due cognitive appraisal of personal resources as insufficient to meet achievement demands. Despite this central role of cognitive appraisal in the experience of burnout, it is interesting to note that research has dedicated much more

effort to understand the personality and motivational factors that impact cognitive appraisal and then burnout (Hill, 2013; Martin & Horn, 2013; Martinent, Decret, Guillet-Descasa, & Isoard-Gautheur, 2014) than trying to understand the processes of cognitive appraisal itself.

In fact, this interest for cognitive appraisal has been recognized more recently in other theoretical proposals. This is the case of the Theory of Challenge and Threat States in Athletes (TCTSA; Jones, Meijen, McCarthy, & Sheffield, 2009) where is propose that athletes can approach their performance either adaptively (i.e., in a challenge state) or maladaptively (i.e. in a threat state). Challenge states occur if athletes believe they have sufficient, or nearly sufficient, resources to meet the demands of the situation, whereas a threat state occurs if athletes believe they have insufficient resources to meet the demands of the situation (Turner & Jones, 2014). This same idea is included in the biopsychosocial (BPS) model of challenge and threat of Blascovich and Mendes (2000), which defends that adaptive responses to stress are characterized by a challenge state, and maladaptive responses to stress are characterized by threat states. Some evidence supports TCTSA and BPS models and suggests that challenge states are better predictors of athletic performance than threat states (e.g. Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004; Moore, Wilson, Vine, Coussens, & Freeman, 2013; Turner, Jones, Sheffield, & Cross, 2012). There is also evidence that challenge and threat states are related to emotions (e.g., anxiety). Based on Lazarus's theoretical assertions, Nicholls, Levy, Jones, and Polman (2011), in a study with 11 professional rugby union players, found that challenge/benefit appraisals were associated with pleasant emotions, whereas threat/loss appraisals were associated with unpleasant emotions. Nicholls, Polman, and Levy (2012) confirmed these findings with a sample of 557 athletes, suggesting that pleasant emotions were positively associated with a challenge, whereas unpleasant emotions were positively associated with a threat.

Despite the value of these findings that demonstrate the differential effects of threat and challenge states, less is known of the mediating role of cognitive appraisal in human adaption to stressful situations and life contexts. As referred by Martinent and Ferrand (2015), previous research on the importance of cognitive appraisal in sport settings is limited. For example, research has analysed the dimensions of the cognitive appraisal involved in athletes' stressful situations (Graham, Kowalski, & Crocker, 2002; Thatcher & Day, 2008) but not *if* and *to what extent* cognitive appraisal can contribute to athletes' adaptation to sports and if can mediate the relation between the individual and their

reaction to sport activity, as is the case of burnout. As stated by Lazarus and Folkman (1984), the experience of psychological stress depends on situational characteristics (e.g. the type of organization and culture), personal characteristics (e.g. personality traits), and cognitive appraisal, which represents the key factor in understanding the impact of stress on human functioning. Transferring this idea to sports, considering cognitive appraisal of athletes can help to understand differential responses to situational demands and why they adapt in a positive or negative way to sport contexts.

These three factors were incorporated into this study by analysing if and to what extent cognitive appraisal mediates the relationship between the personal characteristics of athletes (e.g. trait anxiety) and their reaction to sport activity (e.g. burnout). Although individuals with a higher propensity for anxiety can be more exposed to burnout, the central role of cognitive appraisal in this relationship is not evident. That is, can cognitive appraisal (i.e. evaluating the sport activity as more threatening or more challenging) mediate the relationship between trait anxiety and burnout? This study analyses this question in a sample of young athletes, testing the mediating role of cognitive appraisal on the relationship between trait anxiety and burnout. As said, there is a lack of knowledge about the role of cognitive appraisal in the adaptation to stressful contexts (as is the case of sports); this lack of knowledge is extended to youth sports despite evidence that it can produce equal demands when compared to adult sports (Martin & Horn, 2013).

Before describing the specific hypotheses for this study, some conceptual background is required on the variables selected for analysis in conjunction with cognitive appraisal. The variables are trait anxiety and burnout. These dimensions were chosen for this study because of their central role in explaining typical emotions in sports (anxiety) and reactions to chronic stress (burnout).

Anxiety is one of the most common emotions analysed in sports contexts (McCarthy, Allen, & Jones, 2013), and burnout is one of the most debilitating states that athletes can experience due to exposure to the chronic effects of stress (Gustafsson, Hancock, & Côté, 2014). Trait anxiety refers to a predisposition to a state of high anxiety under conditions of threat (Smith, Smoll, & Wiechman, 1998). This implies that when exposed to stressful competitive situations, athletes with high trait anxiety will experience higher levels of somatic arousal, worry, and/or concentration disruption (Smith, Smoll, Cumming, & Grossbard, 2006).

Burnout is considered a psychological syndrome of emotional/physical exhaustion, a reduced sense of accomplishment, and sport devaluation caused by intense demands of

training and competition (Raedeke, 1997). Although burnout represents a subject of interest in work settings and human services (Leiter & Frame, 2014), less evidence exists for athletes (Raedeke & Smith, 2001) and on the relationship established between trait anxiety and cognitive appraisal. However, the growing interest on the topic of burnout in sports demonstrates that athletes that drop out of a sport due to burnout feel severe exhaustion and health problems (Goodger, Gorely, Lavallee, & Harwood, 2007; Gould, Tuffey, Udry, & Loehr, 1996; Raedeke & Smith, 2001) that results from exposure to prolonged and excessive stress (Gould, Tuffey, Udry, & Loehr, 1997). These results confirm the need of understanding better the phenomenon of burnout in sports and their underlying factors. For example, there are indications that some positive psychology constructs, such as healthy valence of perfectionism, optimism, passion, and hope can decrease the tendency of athlete burnout (Chen, Kee, & Tsai, 2008; Curran, Appleton, Hill, & Hall, 2011; Gustafsson, Skoog, Podlog, Lundqvist, & Wagnsson, 2013; Hill, 2013; Martin & Horn, 2013). Conversely, some negative psychology constructs, such as anxiety and chronic stress, are related to an increase in the tendency of athlete burnout (Raedeke & Smith, 2001; Wiggins, Cremades, Lai, Lee, Erdmann, 2006; Wiggins, Lai, & Deiters, 2005). Taking into consideration this intensification of interest in burnout in sports, it becomes important to determine if this negative experience is also related to the way athletes evaluate their activity. In our study, we highlight the construct of cognitive appraisal as a possible mediator between trait anxiety and burnout.

Considering all these aspects, we formulated two hypotheses to test the relationships between trait anxiety (as a personality trait), cognitive appraisal, and burnout (as a response to chronic stress in sport contexts).

First, we tested the direct relationship between trait anxiety and cognitive appraisal on athletes' burnout. That is, before testing the mediating role of cognitive appraisal on the relationship between trait anxiety and burnout, we considered important to test if there is a direct relation between these two dimensions and athletes' burnout. This provides the opportunity to identify which model (direct or mediation) best describes the burnout experience of athletes. Thus, Hypothesis 1 stated that trait anxiety is positively related to burnout, threat perception is positively related to burnout, and challenge perception is negatively related to burnout. There is some empirical evidence that sustains this hypothesis, suggesting that higher levels of anxiety are related to psychological problems in athletes (Gould et al., 1996; Wiggins et al., 2005, 2006; Wilson, Vine, & Wood, 2009), and that higher levels of trait anxiety predispose athletes to the risk of burnout (Cremades,

Wated, & Wiggins, 2011; Raedeke & Smith, 2001; Tenebaum, Jones, Kitsantas, Sacks, & Berwick, 2003). This hypothesis is also supported by the conceptual models presented before, where is suggested the central role of cognitive appraisal in the athletes' feelings of burnout (Smith, 1986), and the differential effects of challenge and threat states in performance and adaptation to stress in sports (Blascovich & Mendes, 2000; Jones et al., 2009). In fact, according to the transactional model of Lazaus (1999), positive or negative patterns of cognitive appraisal are related to different levels of psychological well-being among individuals; however, a lack of evidence exists regarding the direct relationship between both trait anxiety and cognitive appraisal and athletes' burnout

Second, hypothesis 2 stated that cognitive appraisal mediates the relationship between anxiety (as an antecedent variable) and burnout (as a consequent variable), and this mediation provides better fit than the direct model of hypothesis 1. In this case, we tested a partial mediation model (in which direct paths from anxiety to cognitive appraisal are assumed) and a full mediation model (in which the direct path from anxiety to burnout is removed). Thus, this hypothesis analyses *if* and *to what extent* cognitive appraisal accounts for the relationship between the predictor variable (trait anxiety) and the criterion variable (burnout). If the mediation reduces the link between the independent (predictor) and dependent (criterion) variables, partial mediation is assumed to exist. If the mediation eliminates the link between both variables, full mediation is assumed to exist (Baron & Kenny, 1986). There is some evidence that cognitive appraisal can assume a mediating role in human adaptation to stress at work (Gomes, Faria, & Gonçalves, 2013), military (McCuaig Edge & Ivey, 2012) and in sport contexts (Nicholls, Perry, & Calmeiro, 2014; Raedeke & Smith, 2004). However, to the best of our knowledge, there is no evidence of the specific relation between trait anxiety, cognitive appraisal, and burnout in sports, particularly for young athletes.

In the final step of data analysis of this study, we explored if cognitive appraisal mediates the relationship between trait anxiety and burnout according to characteristics of sports and athletes (e.g., competitive level and sport records). Although we tested the possibility of cognitive appraisal to be a key variable in explaining athletes' reactions to sports, it is also important to test in what conditions this mediation occurs. Thus, we tested the invariance of cognitive appraisal as a mediating variable between trait anxiety and burnout, considering the characteristics of sport contexts and the characteristics of athletes of this study. Again, findings on this subject are scarce, but competitive level and

sport records are important variables in the explanation of athletes' reactions to sports (Campo, Mellalieu, Ferrand, Martinent, & Rosnet, 2012).

In summary, this study highlights the importance of cognitive appraisal on athletes' adaptation to sports considering the relation between trait anxiety and burnout. To the best of our knowledge, this study is the first to test these specific mediating relations.

Methods

Participants

The total sample consisted of 673 young athletes of Northern Portugal, of which 588 were males (87.4%) and 85 were females (12.6%). Participants' ages varied between 12 and 19 years ($M = 14.78$ years; $SD = 1.86$ years), and all participants were practicing either soccer ($n = 323$, 48%), volleyball ($n = 86$, 12.8%), basketball ($n = 76$, 11.3%), soccer with teams of 7 players ($n = 45$, 6.7%), rugby ($n = 36$, 5.3%), futsal ($n = 33$, 4.9%), handball ($n = 33$, 4.9%), water polo ($n = 27$, 4%), or roller hockey ($n = 14$, 2.1%). Athletes were practicing sports at an official level, distributed by the second national division ($n = 436$, 64.8%) and first national division ($n = 229$, 34%); eight athletes did not provide information on this subject. The majority of athletes did not achieve any sport title in their careers ($n = 406$, 60.3%), and 225 athletes (33.4%) had been champions at least one time at regional and/or national levels.

Measures

The Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006; adapted by Cruz & Gomes, 2007). This scale evaluates cognitive and somatic trait anxiety in sport performance settings and includes 15 items distributed across three dimensions: (a) somatic anxiety: evaluates indices of autonomic arousal centered in the stomach and muscles (five items; $\alpha = 0.84$ for this study); (b) worry: evaluates concerns of poor performance and the resulting negative consequences (five items; $\alpha = 0.86$ for this study); and (c) concentration disruption: evaluates the difficulties in focusing on task-relevant cues (five items; $\alpha = 0.71$ for this study). The items were measured on a 4-point Likert scale (1 = *Not at all;* 4 = *Very much*). The authors scored the scales by individually adding and dividing each result. Therefore, high scores on each scale indicate higher perceptions of somatic anxiety, worry, and concentration disruption. It is also possible to obtain a global score of sport trait anxiety by adding and dividing the total scores of each dimension of this instrument (fifteen items; $\alpha = 0.87$ for this study). Confirmatory factor analysis showed

acceptable fit for the three-factor model of trait anxiety (χ^2(87 *df*) = 350.82, *p* < 0.001; RMSEA = 0.067, 90% C.I. [0.060; 0.075]; CFI = 0.93; NFI = 0.91; TLI = 0.92) (Bentler, 2007).

Cognitive Appraisal Scale (CAS; Gomes & Teixeira, 2016). This instrument evaluates primary and secondary cognitive appraisals and was adapted for sport contexts for this study by replacing the word 'work' for 'sport' in the instructions given to athletes to complete the scale. For this study, it was evaluated three dimensions of primary cognitive appraisal: (a) sport importance: indicates the extent to which the athlete evaluates the sport activity as significant and important for their personal well-being (three items; α = 0.85 for this study); (b) threat perception: indicates the extent to which the athlete evaluates the sport activity as disturbing and negative for their personal well-being (three items; α = 0.76 for this study); and (c) challenge perception: indicates the extent to which the athlete evaluates the sport activity as stimulating and exciting for their personal well-being (three items; α = 0.68 for this study). Each item was measured on a 7-point Likert scale (example: 0 = *Means nothing to me;* 6 = *Means a lot to me*). The authors scored the scales by individually adding and dividing each result. Therefore, high scores on each scale indicate greater importance, threat, and challenge perceptions. Confirmatory factor analysis showed acceptable fit for the three-factor model of primary cognitive appraisal (χ^2(24 *df*) = 39.28, *p* < 0.001; RMSEA = 0.031, 90% C.I. [0.011; 0.048]; CFI = 0.99; NFI = 0.98; TLI = 0.99) (Bentler, 2007).

Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001, 2004; adapted by Vilela & Gomes, 2015). The questionnaire evaluates burnout as a psychological syndrome represented using three dimensions: (a) emotional/physical exhaustion: evaluates emotional and physical feelings of exhaustion associated with the intense demands of training and competing (five items; α = 0.88 for this study); (b) reduced sense of accomplishment: evaluates a reduced sense of accomplishment among athletes regarding their sport skills and abilities (five items; α = 0.66 for this study); and (c) sport devaluation: evaluates negative and uncaring attitude of athletes toward sport and their own performance (five items; α = 0.83 for this study). The items were measured on a 5-point Likert scale (1 = *Almost never*; 5 = *Almost always*). The authors scored the scales by individually adding and dividing each result. Therefore, high scores on each scale indicated higher perceptions of burnout on the three described dimensions. It is also possible to obtain a global score of burnout by adding and dividing the total scores of

each dimension of this instrument (fifteen items; $\alpha = 0.89$ for this study). Confirmatory factor analysis showed acceptable fit for the three-factor model of burnout ($\chi^2(84\ g.l.) = 364.17$, $p < 0.001$; RMSEA = 0.070, 90% C.I. [0.063; 0.077]; CFI = 0.94; NFI = 0.92; TLI = 0.92) (Bentler, 2007). However, these values were achieved only by correlating the error values between two pairs of items (2-4 and 1-14). In the case of items 2 and 4, both items evaluate feelings of tiredness regarding sport participation, which may explain the athletes' similar responses (e.g., "I feel so tired from my training that I have trouble finding energy to do other things" and "I feel overly tired from my sport participation."). In the case of items 1 and 14, they evaluate feelings of accomplishment/success regarding sport participation, and they were the only exception of items formulated in a positive way that may have also contributed to similar athletes' responses ("I'm accomplishing many worthwhile things in sport" and "I feel successful at sport"). This similarity between items 1 and 14 probably explains the relatively low value of alpha of the reduced sense of accomplishment scale. Nevertheless, the factor structure and alpha values were accepted in this study because the global score of the three scales seems a reliable measure of burnout.

Procedure

This study was approved by the Ethics Committee of the university, to which the first author of this paper belongs (ref. CEUM 030/2014). The data collection involved three steps. First, sport teams were contacted in order to explain the goals of this study and data collection procedures. Second, after receiving the approval from teams, parents and athletes who were invited to participate in the study, the participants were assured that the data would remain anonymous and confidential. The parents who agreed to be part of this study gave informed consent for their children to participate in this study. Third, after obtaining authorization from the parents and athletes, we began the data collection, which included the evaluation protocol with the described psychological measures and a letter with specific information about the study's goals. Data collection occurred in a reserved room of each sport team and in the presence of researchers of this study and athletes.

Data Screening

First, we checked for missing values and concluded that the loss of cases was small with no more than three percent (Graham, 2009). Thus, the mean substitution was used

to calculate the values of variables with no answers from participants. Then we checked univariate and multivariate outliers (Tabachnick & Fidell, 2013). Standardized z-scores were inspected, and scores greater than 3.29 ($p < .001$) were removed. Cases with a Mahalanobis distance greater than $\chi^2_{(8)}=26.12$ ($p < .001$) were also removed. Twenty participants were removed. Thus, a total of 653 athletes were included in the following analysis.

Data Analysis

The adequacy of the proposed models (i.e. direct and mediation) were assessed by structural equation modelling (SEM) using AMOS 21. Although SEM requires that all variables be of a continuous scale, it is also acceptable to use it with ordinary scales that typically characterize psychological data, which is the case in our study (Byrne, 2001). In addition, SEM represents a comprehensive method for assessing, modifying, and testing theoretical relations between variables (Bentler, 2007). As referred by Anderson and Gerbing (1998), calculating the measurement model in conjunction with the structural model provides a comprehensive and confirmatory assessment of construct validity. The analysis consisted of two steps. In the first step, the measurement model was tested to assess its construct validity and in the second step the structural models (direct and mediated) were tested.

To assess model fit, we used the χ^2 goodness-of-fit statistic, the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the Tucker-Lewis index (TLI), and the comparative fit index (CFI). The cut-off criteria used in this study followed generally accepted indices appearing in the literature: RMSEA values < .05 indicate excellent fit, <= .08 indicates acceptable fit; SRMR values < .05 indicates excellent fit, <= .08 indicates acceptable fit; TLI values greater than .90 are considered an acceptable fit; CFI values close to .95 indicate excellent fit and those >= .90 are interpreted as a good fit (Bentler, 2007). Finally, the bootstrap procedure of AMOS was also used to obtain 95% confidence intervals around parameter estimates (MacKinnon, Fairchild, & Fritz, 2007). Bootstrapping is considered a powerful resampling method to obtain parameter estimates and confidence intervals because the method does not assume that the variables are normally distributed.

Note that the scores of sport importance of the CAS subscale were used to analyze if athletes attributed some personal value to the sport activity. More specifically, it was

assumed that it makes sense to study the relationship among trait anxiety, cognitive appraisal, and burnout if athletes attributed some importance to the sport. This assertion is based on the idea that only events considered significant have the potential to cause stress or strain or, conversely, can result in a positive personal growth experience (Gomes, 2014). Thus, participants with values less than or equal to two points on the Likert scale for the sport importance dimension were checked in the database for potential removal from the study, but all participants had these established values.

Finally, to reduce chance capitalization, we randomly divided the total sample into an exploration sample (Sample 1, $n = 326$), which was used to test the measurement and structural models, and a model validation sample (Sample 2, $n = 327$), which was used to cross-validate the final model.

Results

Relations between the Variables

The means, standard deviations, and Spearman correlations between the variables are presented in Table 1. The most frequent symptom of anxiety was concerns of poor performance. The principal indicator of cognitive appraisal was challenge perception. The main indicators of burnout include emotional/physical exhaustion and a reduced sense of accomplishment.

For the correlation values, the three dimensions of trait anxiety (SAS-2) correlated positively with each other, positively with the threat perception of the cognitive appraisal instrument (CAS), and negatively with challenge perception (although not all values were significant). Additionally, the three dimensions of trait anxiety correlated positively with the three dimensions of burnout (except for the non-significant result between worry and sport devaluation dimensions). Finally, threat perception correlated positively with the three dimensions of burnout, and challenge perception correlated negatively with the three dimensions of burnout.

Table 1

Means, Standard Deviations, and Correlations between Trait Anxiety (SAS-2), Cognitive Appraisal (CAS), and Burnout (ABQ) (n = 653)

Variables	M (SD)	1	2	3	4	5	6	7	8
1. SAS-2: Somatic anxiety	1.66 (.61)	--							
2. SAS-2: Worry	2.79 (.78)	.40***	--						
3. SAS-2: Concentration disruption	1.77 (.53)	.58***	.39***	--					
4. CAS: Threat perception	0.71 (1.15)	.20***	.04	.23***	--				
5. CAS: Challenge perception	5.32 (0.88)	-.03	.08*	-.10**	-.14***	--			
6. ABQ: Emotional/physical exhaustion	2.04 (0.86)	.36***	.14***	.32***	.23***	-.13**	--		
7. ABQ: Reduced sense of accomplishment	2.06 (0.69)	.17***	.09*	.29***	.31***	-.24***	.43***	--	
8. ABQ: Sport devaluation	1.68 (.83)	.24***	.02	.28***	.29***	-.20***	.61***	.64***	--

* p < .05; ** p < .01; *** p < .001

Trait Anxiety and Burnout: Preliminary Analysis

To simplify the models to be tested, we reduced the number of manifest variables in the analysis for trait anxiety and burnout dimensions, creating a single variable for trait-anxiety (resulting from the conjunction of somatic anxiety, worry, and concentration disruption dimensions) and burnout (resulting from the conjunction of emotional/physical exhaustion, reduced sense of accomplishment, and sport devaluation). The possibility of a single latent variable for trait anxiety and burnout dimensions followed indications of the authors for both instruments (Raedeke & Smith, 2001, 2004; Smith et al., 2006) and are explained by four reasons: the augment of factor reliability, the higher possibility of normally distributed factors, the reduction of idiosyncratic variance, and the reduction of the ratio of measured variables to subjects (Marsh, Richards, Johnson, Roche, & Tremayne, 1994).

Regarding the trait anxiety dimensions, the confirmatory factor analysis revealed good fit ($\chi^2(83) = 144.75$, $p < 0.001$; RMSEA = 0.048; SRMR = 0.050; CFI = 0.97; TLI = 0.96). For the burnout dimensions, the confirmatory factor analysis revealed good fit ($\chi^2(76) = 164.85$, $p < 0.05$; SRMR = 0.053; RMSEA = 0.060; CFI = 0.96; TLI = 0.94).

Measurement Models

Before testing our hypotheses, we tested the measurement model to support the adequacy of the operationalization of the study's variables. The measurement model was tested in Sample 1. Regarding the model that tested the relation between trait anxiety, primary cognitive appraisal, and burnout, the fit of the 1-factor model with all items from the eight study variables loading on a single latent variable was compared with that of a 4-factor model that included trait anxiety, threat perception, challenge perception, and burnout. The 4-factor model fit well with the data $\chi^2(560) = 888.10$, $p < .01$; RMSEA = 0.042 ($p_{\text{close}} = 0.992$); SRMR = 0.054; CFI = 0.93; TLI = 0.92, and its fit was superior to that of the 1-factor model ($\Delta\chi^2(28) = 1838.16$; $p < .001$). All standardized factor loadings were significant, ranging from 0.29 to 0.83. These results confirmed the validity of the 4-factor specified measurement model.

Testing the Structural Models

In this step of the data analysis, we tested whether a mediated model (hypothesis 2) showed a better fit than the direct effects models (hypothesis 1) and which type of

mediation (e.g. partial or full) could better describe the data. In the direct model, we established a relation from trait anxiety and cognitive appraisal to burnout. In the partial mediation model, we added direct paths from trait anxiety to cognitive appraisal (e.g. threat perception and challenge perception). Finally, in the full mediation model, we removed the direct paths from trait anxiety to burnout.

The direct effects model showed nearly acceptable fit indices (χ^2(580 $g.l.$) = 999.09, $p < 0.001$; RMSEA = 0.047, 90% C.I. [0.042; 0.045]; SRMR = 0.075; CFI = 0.91, TLI = 0.90) and the full mediation model showed acceptable fit indices (χ^2(579 $g.l.$) = 979.4, $p < 0.001$; RMSEA = 0.046, 90% C.I. [0.041; 0.051]; SRMR = 0.072: CFI = 0.91; TLI = 0.90), but the partial mediation model, which included all direct and indirect effects, appeared to have the best fit (χ^2(578 $g.l.$) = 968.98, $p < 0.001$; RMSEA = 0.046, 90% C.I. [0.041; 0.051]; SRMR = 0.066; CFI = 0.91; TLI = 0.90).

The difference in chi-square between the direct effects model and the partially mediated model was significant, $\Delta\chi2(2) = 30.11$; $p < .001$, indicating that the mediation effects should not be ignored. The difference in chi-square between the fully and partially mediated models was significant, $\Delta\chi2(1) = 10.72$; $p < .01$, indicating that the direct effects should not be ignored. Based on the results from the model exploration in Sample 1, the partial mediation model was cross-validated in Sample 2. The fit indices of the partial mediation model showed good fit to the data (χ^2(578 $g.l.$) = 1045.10, $p < 0.001$; RMSEA = 0.050, 90% C.I. [0.045; 0.055]; SRMR = 0.071; CFI = 0.90; TLI = 0.90).

For the assessment of the invariance of the research model across the two samples, the partial mediation model was simultaneously tested with the data of the two samples, and all structural paths were constrained to be equal across samples. The fit of the resulting constrained multi-group model, $\chi2(1229) = 2076.33$, RMSEA = 0.033, 90% C.I. [0.030; 0.035]; SRMR = 0.071, CFI = 0.91, TLI = 0.91, was compared with that of the freely estimated model, $\chi2(1156) = 1156$, RMSEA = 0.034, 90% C.I. [0.031; 0.036], SRMR = 0.071, CFI = 0.90, TLI = 0.90. Compared with the fit of the constraint model, the fit of the freely estimated model was not significantly worse, $\Delta\chi2(73) = 62.23$; p = .81, demonstrating the invariance of the research model. Figure 1 presents the standardized effects for the partial mediation model, namely, the parameter estimates of the structural paths' coefficients and the squared multiple correlation coefficients. The estimates of the direct and indirect effects were based on 1,000 bootstrap samples. The corresponding 95% confidence intervals of these bootstrap estimates are presented in parentheses. The

partial mediation model explained 15% of the variance associated with threat perception, and 1% of the variance associated with challenge perception. Additionally, this model explained 40% of the variance in burnout.
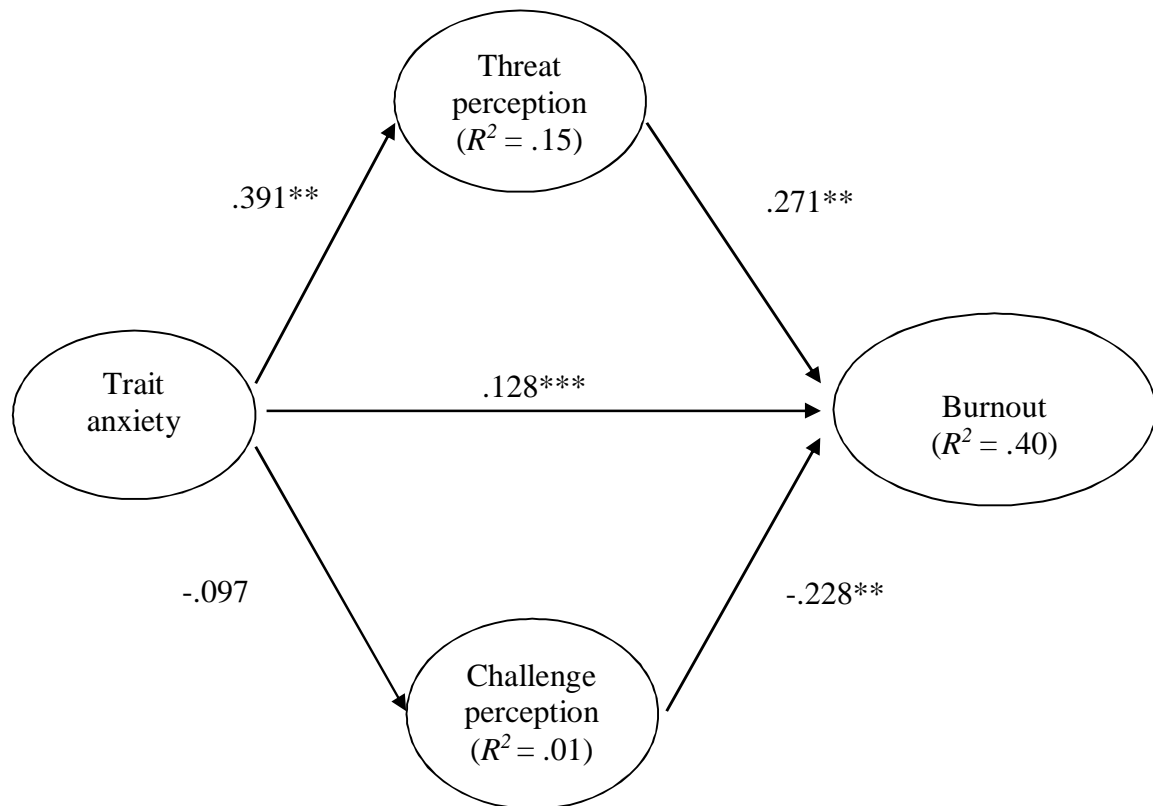
Figure 1. The partial mediation model: Adjusted model with standardized regression coefficients.

** $p < .01$; *** $p < .01$

Note: confidence intervals of parameter estimates of the structural paths' coefficients were as follows: Trait anxiety to threat perception [0.244; 0.533]; trait anxiety to challenge perception [-0.280; 0.072]; trait anxiety to burnout – indirect effect [0.058; 0.234]; threat perception to burnout [0.111; 0.428]; challenge perception to burnout [-0.362; -0.087]. Confidence intervals of squared multiple correlation coefficients were as following: threat perception [0.059; 0.284]; challenge perception [0.000; 0.069]; burnout [0.278; 0.509].

Analysis of Multigroup Invariance

Finally, we tested the invariance of cognitive appraisal as a mediating variable between trait anxiety and burnout according to the competitive level (e.g., first and second national divisions) and sport records of athletes (with and without titles of champion at

regional and/or national levels). An analysis of multigroup invariance was conducted to examine whether the model showed equivalence for these variables. For each variable, five models were successively tested for the invariance of parameters of factor loadings (FL), factor variances (FV), and path coefficients (PC). The findings support the invariance of the proposed model with respect to competitive level and sport records: the chi-square difference between the successive invariance models was non-significant (see Table 2).

Table 2

Fit Indices for the Tested Models

Invariance analysis	χ2	*df*	RMSEA and 90% CI	SRMR	CFI	TLI	Δ χ2	Δ *df*
Competitive level No invariance	2117.73	1160	0.036 (0.033-0.038)	0.067	0.90	0.89		
FL	2158.84	1188	0.036 (0.033-0.038)	0.067	0.90	0.89	41.11n.s.	28
FL+FV	2168.45	1192	0.036 (0.033-0.038)	0.068	0.90	0.89	9.61n.s.	4
FL+FV+PC	2185.23	1201	0.036 (0.033-0.038)	0.069			16.78 n.s.	9
Sport records No invariance	1991.52	1160	0.034 (0.032-0.037)	0.063	0.90	0.90		
FL	2027.54	1188	0.034 (0.031-0.037)	0.065	0.90	0.90	36.02 n.s.	28
FL+FV	2036.06	1192	0.034 (0.032-0.037)	0.065	0.90	0.90	8.52 n.s.	4
FL+FV+PC	2043.31	1201	0.034 (0.031-0.036)	0.065	0.90	0.90	7.52 n.s.	9

Note: FL: Factor loading invariance; FV: Factor variance invariance; PC: Path coefficients invariance; n.s.: non-significant

Discussion

This study analysed the relationships between trait anxiety, cognitive appraisal, and burnout in a sample of youth athletes, and defined two hypotheses. First, we proposed that both trait anxiety and cognitive appraisal were directly related to athletes´ burnout. Second, we proposed that cognitive appraisal mediates the relationship between trait anxiety and athletes´ burnout and that this model would have better fit than the model proposed in hypothesis 1. Third, as for exploratory analysis, we tested the invariance of the mediated model of cognitive appraisal on the relationship between trait anxiety and burnout according to the athletes' competitive level and sport records. The results

provided some positive indications about the hypotheses, mainly for hypothesis 2, sustaining the potential value of cognitive appraisal as a mechanism to explain the adaptation of young athletes to sports.

Hypothesis 1 demonstrated that higher trait anxiety and threat perception associated with lower challenge perception are related to higher levels of burnout. That is, if young athletes perceive the sport activity as less stressful and threatening and more challenging, they experience less burnout. This final model explained 28% of the variance of athletes' burnout experience. Literature has shown that negative emotions (as is the case of anxiety) are related to less positive experiences for athletes (Neil, Wilson, Mellalieu, Hanton, & Taylor, 2012; Wilson et al., 2009) and can increase the experience of burnout (Cremades et al., 2011; Vealey, Udry, Zimmerman, & Soliday, 1992). In addition, different patterns of cognitive appraisal (e.g. perceive sports as more challenging or more threatening) also impact the attitude of athletes towards sports (Lazarus, 2000; Moore, Vine, Wilson, & Freeman, 2012) and from a conceptual point of view can increase or decrease burnout (Blascovich & Mendes, 2000; Jones et al., 2009; Smith, 1986). Our results confirmed these indications of literature, adding the notion that both trait anxiety and cognitive appraisal impact feelings of burnout in athletes, meaning that stable dimensions of psychological functioning of athletes (as proposed by Smith, 1986) and also dynamic dimensions related to the way situations are appraised by athletes (as proposed again by Smith, 1986 and by Lazaus, 1999) can influence athletes' burnout.

Hypothesis 2 demonstrated that cognitive appraisal mediates the relationship between trait anxiety and burnout, and this relationship is better explained by the partial model where direct paths from trait anxiety to cognitive appraisal continue to be significant. The partial model, which included cognitive appraisal as a mediator of the relationship between trait anxiety and burnout and which removed the direct path from trait anxiety to burnout, explained 40% of the variance of athletes' burnout experience, which is slightly better than the variance explained in the direct model of hypothesis 1. In other words, the relationship between trait anxiety and burnout is mediated by cognitive appraisal of athletes, meaning that higher threat perception is related to increased burnout and, conversely, higher challenge perception is related to decreased burnout. This implies that cognitive appraisal is an important variable to consider when explaining the relationship between trait anxiety and burnout.

However, this conclusion should not ignore the direct effects of trait anxiety on athletes' burnout, which also reinforces previous findings suggesting the negative effects

of anxiety on athletes' wellbeing (Koivula, Hassmén, & Fallby, 2002; Wilson et al., 2009) and burnout (Raedeke & Smith, 2001; Tenebaum et al., 2003). For example, Cremades et al. (2011) in a study with collegiate athletes found that cognitive anxiety predicted burnout (more specifically the dimension of reduced sense of accomplishment) and the directional scale of self-confidence predicted the three dimensions of burnout (reduced sense of accomplishment, emotional/physical exhaustion, and devaluation). Also, Wiggins and colleagues in two studies about the relationship between trait anxiety and burnout found that athletes interpreting anxiety as debilitative to performance experienced higher burnout (Wiggins et al., 2005, 2006). Despite the interest of these findings, our results confirm above all that the way athletes perceive the sport (e.g., as less threatening and more challenging) is an important underlying mechanism in explaining adaptation to sports.

This central role of cognitive appraisal is according to theoretical models of human adaptation to stress. In fact, we verified a relationship between cognitive appraisal and athletes' burnout (as suggested by Smith, 1986) and found that challenge and threat states of athletes correspond to differential adaptive and maladaptive responses of athletes to sports (as suggested by Blascovich & Mendes, 2000 and Jones et al., 2009). However, our results extend these proposals by establishing cognitive appraisal as a mediator variable between trait anxiety and burnout, meaning that promoting positive patterns of approaching competition and sports may, indeed, protect young athletes from the negative consequences of burnout.

Scarce findings exist concerning the mediation of cognitive appraisal on the relationship between trait anxiety and burnout, but some evidence exists regarding the importance of cognitive appraisal as a mediator of other related variables. For example, Meijen, Jones, McCarthy, Sheffield, and Allen (2013) in a study with collegiate athletes, found that threat appraisal partially mediates the relationship between anxiety and avoidance goals. Also, Raedeke and Smith (2004) in a study with swimmers found that general coping behaviors and social support satisfaction mediate the relationship between stress and strain in athletes. Despite these scarce findings, the indications so far suggest that cognitive appraisal can represent an important variable in reducing athletes' tendency to experience burnout. This is important because there is evidence indicating negative effects of burnout on the well-being of young athletes in different domains as, for example, passion (Curran et al., 2011), motivation (Martinent et al., 2014; Smith, Gustafsson, & Hassmén, 2010), and hope (Gustafsson et al., 2013).

The final set of analysis of this study demonstrated that the mediation of cognitive appraisal between trait anxiety and burnout was invariant according to characteristics of sport contexts and athletes (e.g. competitive level and sport records). It is interesting to note that individual attributes of athletes and characteristics of sports are involved in emotional experiences and adaptation of athletes to sports (Campo et al, 2012; Cerin, Szabo, Hunt, & Williams, 2000). For example, there is evidence that elite players interpret their anxiety symptoms as more facilitating than non-elite players (Neil, Mellalieu, & Hanton, 2006). However, our results confirm that, when considered together, the relation between anxiety, cognitive appraisal, and burnout is invariant, meaning that cognitive appraisal is a key variable in explaining athletes' burnout experiences in sports despite their level of competition or sport success. Once again, this reinforces the main propositions of theoretical models analysing adaptation to stressful events (Blascovich & Mendes, 2000; Jones et al., 2009; Lazarus, 1999) and stresses the need of working at earlier ages the way young athletes perceive their sport activity. In fact, more than having athletes competing at higher levels of competition or having athletes with sport success it is important to promote positive patters of cognitive appraisal toward sports.

In sum, the findings from this study support the role of cognitive appraisal as an important factor in explaining young athletes' burnout experience, suggesting its utility in explaining adaptation to life contexts and stressful situations, as indicated by some theoretical models (Blascovich & Mendes, 2000; Gomes, 2014; Jones et al., 2009; Lazarus, 1999). However, our results also indicate that the direct effects of trait anxiety on burnout should not be neglected, which supports the need to study the mechanisms of how anxiety (and other emotions) interfere with athletes' performance and well-being with respect to sports.

The main limitation of this study was the cross-sectional nature of data collection that did not allow cause-effects conclusions on the relationship between trait anxiety, cognitive appraisal, and burnout. This is important due the dynamic and transactional relation established between emotions, cognitive appraisal, coping, and the well-being of athletes. However, our goal was to demonstrate the mediating role of cognitive appraisal on the relationship between trait anxiety and burnout, and the results seem to support this possibility. Additionally, the significant imbalance between males and females of our sample should be mentioned.

Finally, these results have practical implications for sport psychology consultants. Developing athlete strategies to control the levels of anxiety in competition and

implementing adaptive forms of perceiving sport activities as a challenging are important. In fact, sport psychologists may use cognitive behavioral therapy (Hofmann, Asmundson, & Beck, 2013) to help athletes do deal with irrational beliefs that lead to dysfunctional emotions (i.e., anxiety) and to perceive competition and sports as more threatening than challenging. A scarcity of findings exist on changing primary cognitive appraisals of athletes, but there is some evidence that disputing and changing irrational beliefs can turn the sport experience into a more positive experience for athletes (Turner, Slater, & Barker, 2014). Importantly, athletes should have the opportunity to improve psychological skills that can be useful during the stressful event (ex: emotion and arousal regulation, imagery, concentration plans, among others) (Turner & Jones, 2014). For example, setting internal performance goals can help athletes to focus on improving their skills and performance (Weinberg, 2014) and may help them to approach competition in a more challenging way.

Perspectives

This study demonstrated that cognitive appraisal mediates the relationship between trait anxiety and burnout, and this result was better than the one obtained by the direct relationship between trait anxiety and burnout. Also important, the mediation occurred despite the competitive level and sport records of athletes. Thus, sport psychology consultants can intervene in attending to the specific characteristics of stressful events (e.g., how can the negative effects of stress derived from youth sport practice be prevented), and the role of cognitive appraisal on adaptation to stress (e.g., how can the perception of challenge in sport practice be promoted). Researchers interested in studying cognitive appraisal of young athletes should consider the dynamic and long-term relationship established between the stressful event and the way athletes perceived their sport activity. Additionally, future research should include processes of secondary appraisal in order to understand not only the way sports is perceived by athletes (i.e., primary cognitive appraisal) but also the way they cope with stressful events and negative emotions, which is the cause of anxiety.

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