



Universidade do Minho
Escola de Psicologia

Rui Manuel Costa Sofia

**The role of self-control in competitive anxiety:
A study of cognitive, coping and
motivational processes**

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Professor Doutor José Cruz

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DECLARAÇÃO

Nome

Rui Manuel Costa Sofia

Endereço eletrónico

ruisofia@gmail.com

Número do Bilhete de Identidade

12372835

Título dissertação

The role of self-control in competitive anxiety: A study of cognitive, coping and motivational processes

Orientador

Professor Doutor José Cruz, Escola de Psicologia, Universidade do Minho

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É AUTORIZADA A REPRODUÇÃO INTEGRAL DESTA DISSERTAÇÃO APENAS PARA EFEITOS DE INVESTIGAÇÃO, MEDIANTE DECLARAÇÃO ESCRITA DO INTERESSADO, QUE A TAL SE COMPROMETE

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The role of self-control in competitive anxiety: A study of cognitive, coping and motivational processes

Abstract

Self-control has been described as one of the most important structures of personality. Recently, studies have started to show its importance in the regulation of anxiety in sport competition, as well as in the processes of stress and coping. Considering these findings, and taking the advantages of the sport context as a natural laboratory, this study intended to explore the role of self-control on athletes' experience of anxiety, cognitive appraisals, coping and motivation. A sample of 197 ($M_{age} = 22.10$) athletes from different team sports completed the following measures translated and adapted to Portuguese: Brief Self-control; Sport Anxiety Scale-2; Cognitive Appraisal Scale in Sport Competition – Threat and Challenge Appraisals; Brief COPE; Behavioral Inhibition System/Behavioral Activation System Scales. Overall, results revealed that individuals with higher levels of trait self-control tended to show lower levels of competitive anxiety, perceived the competition as less threatening, and used less maladaptative coping strategies. Avoidance partially mediated the relation between self-control and anxiety, suggesting that individuals higher in self-control were less likely to use avoidance strategies, and thus experience less anxiety. These findings provide important implications for future studies, as well as for psychological interventions tackling the demeaning effects of anxiety in sports.

Keywords: Self-control, Anxiety, Cognitive appraisals and coping, Motivation, Sport competition

O papel da autocontrolo na ansiedade competitiva: O estudo dos processos cognitivos, de *coping* e motivacionais

Resumo

O autocontrolo tem sido descrito como uma das estruturas mais importantes da personalidade. Recentemente, os estudos têm demonstrado a sua importância na regulação da ansiedade no desporto, bem como nos processos de stress e *coping*. Considerando estes estudos e as vantagens do contexto esportivo como um laboratório natural, este estudo pretendeu explorar o papel da autocontrolo na experiência de ansiedade, avaliações cognitivas, *coping* e motivação dos atletas. Assim, 197 atletas ($M_{idade} = 22.10$) de diferentes modalidades coletivas completaram as seguintes medidas traduzidas e adaptadas para Português: Escala Breve de Autocontrolo; Escala de Ansiedade no Desporto-2; Escala de Avaliação Cognitiva da Competição Desportiva – Percepção de Ameaça e Desafio; Brief COPE; Escala de Inibição Comportamental/ Escala de Ativação Comportamental. Os resultados revelaram que indivíduos com maiores níveis de autocontrolo tendem a apresentar níveis mais baixos de ansiedade competitiva, percebem a competição como menos ameaçadora, e usam menos estratégias de *coping* desadaptativas. O evitamento mediou parcialmente a relação entre autocontrolo e ansiedade, sugerindo que indivíduos com níveis mais elevados de autocontrolo usam menos estratégias de evitamento, e experienciam menos ansiedade. Estes resultados proporcionam importantes implicações para estudos futuros, e para intervenções psicológicas para “combater” os efeitos negativos de ansiedade no desporto.

Palavras-chave: Autocontrolo, Ansiedade, Avaliação cognitiva e *coping*, Motivação, Competição desportiva

Make sure your worst enemy doesn't live between your ears.

Alex Morgan

Introduction

Self-control has recently been systematically described as a key variable for success in various life domains and achievement contexts (Cruz & Sofia, 2016; de Ridder et al., 2012; Duckworth & Carlson, 2013; Hofmann, Luhmann, Fisher, Vohs, & Baumeister, 2014; Moffit et al., 2011; Tangney, Baumeister & Boone, 2004; Sofia & Cruz, in press). Bauer and Baumeister (2011) defined self-control as “the capacity to override natural and automatic tendencies, desires, or behaviors; to pursue long-term goals, even at the expense of short-term attractions; and to follow socially prescribed norms and rules. In other words, self-regulation is the capacity to alter the self’s responses to achieve a desired state or outcome that otherwise would not arise naturally” (p. 65). More recently, several other definitions have converged to the idea that self-control involves the capacity to change our emotions, thoughts and behaviors to resist temptations (see Cruz & Sofia, 2016).

In sports, several studies have observed the importance of self-control for achievement and success. For instance, Toering, Elferink-Gemser, Jordet and Visschera (2009) observed that elite athletes showed higher levels of self-regulation, suggesting that they tend to be more aware of their strengths and weaknesses, as well as devote more effort into practice and competition than non-elite athletes. More recently, Toering and Jordet (2015), in a sample of professional soccer athletes, observed two factors for the Brief Self-Control Scale (Tangney et al., 2004): restraint and impulse control. Restraint was related to more hours of daily football practice and sleep at night, but less hours watching TV, whereas impulse control was related to more hours spent doing homework, and less using the Internet, gaming, and spending time with friends. Players with higher levels in of impulse control were more likely to have senior national team experience. Total self-control scores measured before the start of the season were strongly associated with final league ranking of the teams in the following season. Toering and Jordet (2015) argued that “self-control helps individuals stay on track on their pathways to excellence” (p. 346).

Among the several theoretical perspectives that have been put forward to explain self-control, the strength model of self-control (Baumeister, Vohs & Tice, 2007) has greatly contributed for the advances in the knowledge about this structure of personality (Cruz & Sofia, 2016; Sofia & Cruz, in press). According to this model, self-control depends on a limited energy source that can be depleted. Thus, individuals who had previously exerted self-

control tend to have a worst performance on subsequent task comparing to those who had not exerted any self-control acts previously, because their energy had been depleted (Baumeister et al., 2007). This phenomenon was named ego depletion (Baumeister & Alquist, 2009; Baumeister, Bratslavsky, Muraven, & Tice, 1998) and was observed in a vast amount of constructs. For instance, some studies have found that emotion regulation (Dvorak & Simons, 2009), and particularly thought suppression (Gailliot, Schmeichel, & Baumeister, 2006), exaggerating the expression of emotions, controlling attention (Schmeichel, 2007), effortful decision-making (Vohs, Baumeister, Twenge, Nelson, Rawn, Schmeichel, & Tice, 2007), and attention regulation (Schmeichel & Baumeister, 2010) depleted participants' energy for subsequent tasks. This suggests that several executive control functions seem to rely on the same mental energy resource that can be temporarily weakened (Bauer & Baumeister, 2011).

In the context of sport, this theoretical framework has already been applied in some more recent studies. Dorris, Power, and Kenefick (2012) observed that athletes performed worst (fewer press-ups and sit-ups) after performing a difficult cognitive task comparing to those who performed an easier task. Consistently Englert and Bertrams (2014a) have observed the ego depletion effect after asking athletes to imagine a soccer player who had to strongly regulate himself during a match showed. After a depletion task, athletes also showed longer reaction times before sprints (Englert & Bertrams, 2014b), were more prone to false starts (Englert, Persaud, Oudejans, & Bertrams, 2015), and pedaled with a lower cadence in a cycling task than those who were not depleted (Englert & Wolff, 2015).

Considering the importance of self-control, other studies have explored the role of self-control in the regulation of competitive anxiety. For instance, Englert and Bertrams (2012) reported that anxious athletes who were depleted were not able to control their attention and override the automatic tendency to focus on distracting stimuli, such as anxiety-related worries, thus leading to a bad performance. Conversely, non-depleted athletes were able to override the negative effects of anxiety and control their attention. More recently, Englert, Zwemmer, Bertrams, and Oudejans (2015) found that depleted participants performed worst in a dart-throwing task under pressure, suggesting that "self-control strength may serve as a buffer against the effects of anxiety on attention regulation and performance" (p. 133). In a similar vein, Englert, Bertrams, Furley and Oudejans (2015) asked basketball players to perform 30 free throws while listening to distracting audio messages about worrisome thoughts athletes experience in high-pressure situations. Players who had their self-control strength intact were able to block the distracting audio message and showed a better performance than those who were depleted.

Following these findings, Englert and Bertrams (2015a) integrated the attentional control theory (ACT) (Eysenck, Derakshan, Santos, & Calvo, 2007) and the strength model of self-control. According to the ACT, anxiety impairs the inhibition and shifting functions of the central executive of working memory. Because these functions are compromised, the balance between the goal-directed and stimulus-driven attentional systems will be disrupted. Therefore, anxiety will lead to decreases in the ability to control attention, as well as increases in attention to threat-related stimuli. However, individuals may have compensatory processing strategies that allow them to contract the harmful effects of anxiety on performance (Eysenck et al., 2007). Englert and Bertrams (2015a) also suggested that depleted individuals show a worse performance under high levels of anxiety because they do not have enough self-control resources to regulate their attention. Conversely, individuals with sufficient levels of self-control energy are able to regulate attention, and thus self-control can act as a “shield against the negative anxiety effects on attention regulation” (p. 2).

Undoubtedly, anxiety is one of the most studied emotions in sport competition (e.g., Grossbard, Smith, Smoll, & Cummings, 2009; Jones, 1995; Mellalieu, Hanton, & Fletcher, 2009; Smith, Smoll, Cumming, & Grossbard, 2006; Woodman & Hardy, 2001). Competitive anxiety is “a specific negative emotional response to competitive stressors” (Mellalieu et al., 2009, p. 4), often arising when athletes feel a threat to their well-being and perceive a lack of personal resources to cope with the situation (Cruz, 1996a, b; Cruz & Barbosa, 1998; Lazarus, 1991, 2000).

Many theoretical approaches have been proposed to explain anxiety in sport competition and its relationship with performance (Dias, Cruz, & Fonseca, 2012; Mellalieu et al., 2009). These models seem to move from one-dimensional to more multidimensional approaches that conceptualize anxiety as a construct composed of multiple components (Giacobbi & Weinberg, 2000; Mellalieu et al., 2009; Ntoumanis & Jones, 1998). Across the several models, the distinction between the cognitive and somatic anxiety seems to be widely acknowledged (e.g., Martens, Vealey, Burton, Bump, & Smith, 1990; Smith et al., 2006), showing different relations with performance (e.g., Cruz, 1996a; Smith, Smoll, & Schutz, 1990).

Lazarus and Folkman's (1984) transactional model of stress has been considered a “fruitful theoretical framework for investigating anxiety in competitive settings” (Dias et al., 2012, p. 1). According to this model, what determines the emotions individuals feel is an underlying appraisal process (Lazarus, 1991, 1999, 2000; Lazarus & Folkman, 1984), which refers to an evaluation of the meaning “for the personal well-being, of what is happening in

the relationship person-environment” (Lazarus, 1991, p. 87). This process of cognitive appraisal determines how a stressful encounter is interpreted, and therefore which emotions an athlete will experience. Sport competition can be appraised in different ways: as a challenge, a threat and as a loss or harm (Jones, Meijen, McCarthy, & Sheffiel, 2009; Lazarus, 2000; Skinner & Brewer, 2002, 2004). However, according to Jones and colleagues (2009), athletes can be divided into those who appraise the competition as a threat (negatively) or those who appraise it as a challenge (positively). The dichotomy between threat and challenge appraisals concurs with the popular belief that “some individuals will rise to the demands of competition and perform well, while some wilt and perform poorly“ (p. 162). Studies have consistently reported the strong association between threat appraisal and competitive anxiety (Cerin, 2003; Cruz, 1996a; Dias et al., 2012; Dias, Cruz, & Fonseca, 2010, 2011; Skinner & Brewer, 2002), and more invariantly with challenge (Cerin, 2003; Jones et al., 2009).

Furthermore, Lazarus and Folkman (1984) suggest that this process of cognitive appraisal acts as a mediator for coping strategies. More specifically, coping responses are determined by cognitive appraisals, which will lead to different emotional outcomes. According Lazarus and Folkman (1984), coping refers to “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). This process begins when individuals appraise that important goals have been harmed, lost, or threatened (Folkman & Moskowitz, 2004). Lazarus and Folkman (1984) distinguished between problem-focused coping and emotion-focused coping. The former type of coping is directed at managing or altering the problem causing the distress, while the latter is directed at regulating emotional responses to the problem. Since there are several ways to deal with stress, emotion-focused coping includes a wider variety of responses, such as self-soothing, expression of negative emotion, focus on negative thoughts and attempt to escape stressful situations (e. g. wishful thinking) (Carver & Connor-Smith, 2010).

Generally, research has systematically reported that athletes who experience more anxiety tend to use more emotion-focused coping strategies (Hammermeister & Burton, 2001; Ntoumanis & Biddle, 2000). For instance, Giacobbi and Weinberg (2000) observed that athletes with higher levels of trait anxiety were more likely to use self-blame, and wishful thinking coping strategies than athletes with low trait anxiety. Dias and colleagues (2011) also found that athletes with higher levels of anxiety are more likely to use coping strategies of self-distraction, denial, emotional support, venting, and behavioral disengagement, and to

perceive the competition as more threatening. More recently, Dias and colleagues (2012) reported that higher levels of cognitive and somatic anxiety were associated with the use of emotion-focused, such as self-blame, denial, and venting.

However, other studies seem to suggest that anxious athletes use more avoidance coping strategies. Avoidance coping refers to actions to move away from the stressor, and is often emotion-focused, including strategies such as avoidance, denial, and wishful thinking, ignoring, discounting, psychological distancing, seeking out other people, and engaging in a different task instead of the current task (Anshel & Anderson, 2002; Anshel, Williams, & Williams, 2000; Carver & Connor-Smith, 2010). Conversely, approach strategies focus on dealing with the stress or related emotions (Skinner, Edge, Altman, & Sherwood, 2003), including problem-focused coping and a few types of emotion-focused coping, such as support seeking, emotion regulation, acceptance, and cognitive restructuring (Carver & Connor-Smith, 2010). Among the first studies, Krohne and Hindel (1988) suggested that tennis players who used avoidance coping to deal with physical errors showed lower levels of trait anxiety. Consistently, Wang, Marchant, and Morris (2004) observed that athletes who used an approach coping style tended to experience higher levels of anxiety, compared to those with an avoidance style. It was suggested that approach coping might cause athletes to focus on the stressor, increasing their anxiety.

Therefore, as Lazarus and Folkman (1984) have drawn attention to: “no strategy is considered inherently better than any other. The goodness (efficacy, appropriateness) of a strategy is determined only by its effects in a given encounter and its effects in the long term.” (p. 134). According to Richards (2012), one of the main reasons for studying coping is to understand what coping is effective in a specific stressful situation, therefore promoting theoretically based coping interventions (Folkman & Moskowitz, 2004). Consequently, recent studies have also advocated the importance of the development of appropriate measures for coping effectiveness (e.g., Nichols, Polman, Levy, & Borkoles 2010).

Finally, another important process in the generation of an emotion is the motivation associated with the stressful encounter (Cruz & Barbosa, 1998; Lazarus, 1991, 1999, 2000). Motivated behavior can be explained with two major systems: the Behavioral Activation System (BAS) and the Behavioral Inhibition System (BIS). The BAS, or the approach motivational system (or appetitive) reflects behaviors of approaching a desired goal whereas the BIS, or the avoidance system, refers to behaviors that reflect an avoidance of an undesired goal (Carver & White, 1994). These motivational systems are related to affects in opposite directions, specifically, approach motivation is related to positive affects whereas avoidance

motivation is related to negative affects (e.g., Carver & Harmon-Jones, 2009). More specifically, individuals high in BAS are more likely to respond to cues of reward and experience more positive affect. Conversely, individuals with high in BIS sensitivity are more prone to be behaviorally responsive to punishment cues and experience more anxiety when facing these cues (Carver & White, 1994). These systems can represent different personality factors, in which the BAS represents the impulsivity personality factor (ranging from high to low impulsivity), whereas the BIS represents the personality factor of anxiety propensity (ranging from high to low trait anxiety) (Gray, 1990).

Although studies have not specifically used these motivational systems in the study of anxiety in sports, research has mainly suggested that anxiety is linked to avoidance motivation (see Roberts, Treasure, & Conroy, 2007, for a review). Initially, Cury and colleagues (Cury, Da Fonséca, Rufo, Peres, & Sarrazin, 2003; Cury, Elliot, Sarrazin, Da Fonséca, & Rufo, 2002) experimentally manipulated performance-avoidance (i. e., seeking favorable judgments of normative competence) and performance-approach (i. e., trying to avoid unfavorable judgments of normative competence) by asking participants to perform a basketball dribbling activity and handing them a written goal manipulation speech. Those in the performance-avoidance condition reported higher levels of state anxiety compared to those in the performance-approach. Cury and colleagues (2003) also suggested that anxious individuals might see the possibility of showing their incompetence to others as a threat, which decreases their investment in the task. More recently, Morris and Kavussanu (2009) reported that both cognitive dimensions of anxiety, concentration disruption and worry, were positively and negatively predicted by avoidance and approach goals, respectively. Consistently with Cury and colleagues (2003), Morris and Kavussanu (2009) argued that when athletes adopt these goals, they tend to be worried about showing incompetence, triggering negative thoughts about performance. Conversely, athletes who seek to approach a desirable goal are less prone to experience cognitive sport anxiety.

On the grounds of these theoretical models, this study aims to explore individual differences in trait self-control in the experience of anxiety, considering important variables associated with this emotion in sport, namely, cognitive appraisals, coping and motivation. Additionally, it also intends to investigate the potential mediating role of these variables in the relationship between self-control and competitive anxiety. To date, studies have mainly explored the role of self-control in the regulation of anxiety in laboratorial contexts (e.g., Englert & Bertrams, 2012), which highlights the need to explore the relations between these variables with a sample of athletes.

Method

Participants

The participants were 197 athletes (28.9% females) between 15 and 39 years ($M_{age} = 22.10$, $SD = 6.52$) who were at different levels of competition: senior ($n = 113$), junior ($n = 44$), and juvenile ($n = 33$). The participants competed in different types of team sports: volleyball ($n = 34$); roller hockey ($n = 64$); rugby ($n = 46$); indoor soccer ($n = 22$); basketball ($n = 8$); and handball ($n = 23$). Athletes ranged from 0 to 31 years of practice ($M = 9.18$, $SD = 6.84$).

Measures

The instruments used in this study were translated and adapted to the Portuguese language following the principals suggested for cross-cultural studies (e.g., Hambleton, Merenda, & Spielberg, 2005), as well as the guidelines of the International Test Commission (2015). Additional psychometric information about these versions is available in some previous studies (e.g. Dias, Cruz & Fonseca, 2009; Sofia & Cruz, 2015). The full questionnaire included a set of measures presented to the participants in a random order, which are described bellow.

Demographics. A brief questionnaire assessed the athletes' demographic and sport history.

Brief Self-control Scale. This scale was developed by Tangney, Baumeister and Boone (2004) to measure trait self-control. The Portuguese version used in this study includes 12 items (e.g., "I refuse things that are bad for me.") anchored on a 5-point Likert scale, ranging from 1 (*not at all like me*) to 5 (*very much like me*). The total score is obtained by summing all the items. Higher scores reflect higher levels of trait self-control. In this sample, a good reliability level of .78 was obtained.

Sport Anxiety Scale - 2. This measure was developed by Smith, Smoll, Cumming, and Grossbard (2006) and aims to assess individual differences in trait anxiety, as well as somatic trait anxiety and its two cognitive dimensions (worry and concentration disruption). It includes 15 items distributed into three 5-item subscales: somatic anxiety (e.g., "My body feels tense"), worry (e.g., "I worry that I will play badly"), and concentration disruption (e.g., "I lose focus on the game"). Participants answered how they generally feel before or during competition on a 4-point Likert scale from 1 (*not at all*) and 4 (*very much so*). Scores for each subscale are calculated by summing the corresponding items. A total score is also obtained by summing all the items. Total scores range from 5 to 20 points, measuring a

general trait of competitive anxiety (Smith et al., 2006). In this sample, reliability analysis showed a Cronbach's alpha of .86 for somatic anxiety, .81 for concentration disruption, .89 for worry, and .89 for total anxiety.

Cognitive Appraisal Scale in Sport Competition – Threat and Challenge Appraisals. This instrument is based on the Cognitive Appraisal Scale in Sport Competition – Threat Appraisals (Cruz, 1994), and on the work by Lazarus and colleagues (Lazarus, 1991; Lazarus & Folkman, 1984). This scale aims to assess the general style of primary cognitive appraisal or “what is at stake in sport competition, from the athletes’ perspective, and leads to the experience of stress and anxiety in competition” (Cruz, 1996, p. 173). Because sport competition can also be appraised as a challenge (Jones et al., 2009; Lazarus, 2000), a challenge appraisal subscale was included in the original instrument. The CASSC-TC includes 13 items, distributed into the subscales of threat appraisal (eight items) and challenge appraisal (five items). In this sample, Cronbach's alpha was .81 for the threat appraisal subscale and .77 for the challenge appraisal subscale. Items are answered on a 5-point Likert scale ranging from 1 (*not typical of me*) to 5 (*very typical of me*). The total scores of these subscales are calculated by summing the corresponding items, with scores ranging from 8 to 40 for threat appraisal and from 5 to 55 for challenge appraisal.

Brief COPE. This variable was measured using the Brief COPE, developed by Carver (1997) to assess coping strategies. Dias, Cruz and Fonseca (2009) have already established the reliability of this measure in a sample of Portuguese athletes, which has already been used in some studies (Dias, Cruz & Fonseca, 2010, 2011, 2012). In the current study, a new dimensional structure developed by Doron, Trouillet, Gana, Boiché, Neveu and Ninot (2014) was used. Therefore, the previous subscales were organized in the following five dimensions: avoidance, which includes denial, self-blame, behavioral disengagement, and substance abuse; cognitive restructuring, including positive reframing, humor, and acceptance; problem solving, comprising active coping and planning; distraction, including self-distraction and venting; support seeking, which includes instrumental support, emotional support, and religion. Participants rated on a scale ranging from 1 (*I didn't do this at all*) to 4 (*I did this a lot*). Scores in each subscale are obtained adding the respective item. Considering the trait-like nature of this study, the Brief COPE was administered in a dispositional response format in order to assess athletes' coping style. Therefore, participants were asked to recall how they usually responded to problematic and stressful situations in sport competition. In this sample, Cronbach's alphas were .60 for avoidance, .62 for cognitive restructuring, .66 for problem solving, .38 for distraction .38, and .76 for support seeking. Despite low, these levels were

accepted considering previous studies in the context of sport that used this scale (e.g., Kaiseler, Polman, & Nicholls, 2009). Additionally, estimates of internal consistency are not considered an appropriate method to assess psychometric properties of coping instruments (Billings & Moos, 1981). In fact, internal consistency “appears to be of limited utility for evaluating the potential validity of developed scales” (McCrae, Kurtz, Yamagata, & Terracciano, 2011, p. 28).

Behavioral Inhibition System/Behavioral Activation System Scales (BIS/BAS).

These scales were developed by Carver and White (1994) to measure approach (BAS) and avoidance (BIS) motivational systems. The current version includes 14 items distributed across a total BIS scale (four items) and three BAS subscales: reward responsiveness, which reflects positive responses to the occurrence or anticipation of reinforcement (five items); drive, which indicates tenacity in the pursuit of desired goals (two items); and fun seeking, which reflects the desire to obtain new reinforcements and to search for rewarding situations impulsively (three items). A reliability analysis revealed that Cronbach’s alpha was .74 for reward responsiveness, .57 for drive, .57 for the BIS, and .64 for fun seeking. Although these Cronbach’s alpha values were somewhat lower, they were considered acceptable because similar results were reported for the original scale and because this study is exploratory in nature. Participants answered on a 4-point scale ranging from 1 (*very false for me*) to 4 (*very true for me*). Each scale score is calculated by averaging the corresponding items, and higher scores reflect a greater tendency to engage in these behaviors.

Procedures

The athletes completed a set of self-report measures between 2012 and 2013 as part of a larger research project. The questionnaire, an informed consent form for the athletes, and another consent form for their parents (in case the athletes were younger than 18 years) were distributed and subsequently collected. In this phase, the instructions reinforced honesty and sincerity in all answers and clarified that there were no right or wrong answers. This study was conducted in accordance with the ethical guidelines of the Helsinki Declaration (1964) and subsequent revisions (e.g., Edinburgh, Scotland, 2000), as well as with the deontological and ethical guidelines of the European Federation of Psychologists Association.

Results

Data analysis

Pearson correlation analyses were performed to explore the pattern of correlations between the variables in study. Subsequently, a multivariate analysis of variance (MANOVA) was performed to analyse the differences between athletes with low and high self-control.

After screening for multivariate outliers using the Mahalanobis distance, one outlier was found and deleted from the analyses. A discriminant analysis was then performed with the variables that were significant in the MANOVA to test whether these variables would predict the differences between athletes with low and high self-control (Field, 2010; Tabachnick & Fidell, 2007). Finally, a mediation analysis was performed to test the potential mediation role of these predictors on the relationship between self-control and anxiety.

Descriptive statistics

Table 1 shows the descriptive statistics of the variables in study. Overall, in the dimension of sport anxiety, worry shows the highest mean ($M = 13.12$) compared to the other subscales. In the dimension of the BIS/BAS, it seems that the dimension of fun seeking ($M = 2.88$), followed by the BIS ($M = 2.81$) showed the highest scores, which reflect approach and avoidance motivation, respectively. No further data is noteworthy.

Table 1

Descriptive Statistics of the Variables in Study

	<i>M</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>
Sport Anxiety				
Somatic anxiety	8.55	3.05	5.00	20.00
Worry	13.12	3.80	5.00	20.00
Concentration disruption	8.06	2.64	5.00	18.00
Total anxiety	29.61	7.47	16.00	57.00
Self-control	3.51	.57	2.00	4.67
Cognitive appraisals				
Threat	24.14	6.66	8.00	38.00
Challenge	19.90	3.73	7.00	25.00
Coping				
Support seeking	15.14	3.54	6.00	23.00
Avoidance Support seeking	16.10	3.23	8.00	27.00
Cognitive restructuring	17.40	2.79	10.00	24.00
Distraction	10.36	1.95	5.00	16.00
Problem solving	12.92	1.92	6.00	16.00
BIS/BAS				
BIS	2.81	.52	1.25	4.00
Fun seeking	2.88	.62	1.00	4.00
Drive	1.90	.72	1.00	3.50
Reward responsiveness	3.37	.48	1.40	4.00

Table 2*Pearson Correlations for the Variables in Study*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Sport Anxiety																
1. Somatic anxiety	1	.46***	.52***	.83***	-.27***	.39***	.09	.23**	.25***	-.02	.24**	-.01	.24**	.01	.10	.01
2. Worry		1	.32***	.81***	-.21**	.56***	.28***	.16*	.24**	-.07	.18*	.19*	.40***	.04	-.11	.21**
3. Concentration disruption			1	.72***	-.32***	.26***	.06	.02	.36***	-.03	.10	-.18*	.17*	.03	.24**	-.04
4. Total anxiety				1	-.32***	.53***	.21**	.19**	.33***	-.05	.23**	.06	.37***	.06	.07	.14
5. Self-control					1	-.21**	.08	.03	-.34***	.15*	-.26***	.21**	-.13	-.25***	-.30***	.09
Cognitive appraisals																
6. Threat						1	.48***	.18*	.33***	.04	.27***	.17*	.42***	.15*	-.04	.20**
7. Challenge							1	.23**	.11	.15*	.21**	.31***	.23**	.05	.05	.37***
Coping																
8. Support seeking								1	.23**	.11	.31***	.22**	.28***	.14	.09	.28***
9. Avoidance									1	-.11	.35***	-.23**	.20**	.06	.36***	-.05
10. Cognitive restructuring										1	.04	.46***	.04	.30***	.07	.24**
11. Distraction											1	.20**	.28***	.24**	.19**	.26***
12. Problem solving												1	.21**	.15*	-.18*	.41***
BIS/BAS																
13. BIS													1	.28***	-.11	.42***
14. Fun seeking														1	.16*	.33***
15. Drive															1	-.03
16. Reward responsiveness																1

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

Pearson correlations between the variables in study

Because the main goal of this study is to study the role of self-control in the regulation of anxiety, this analysis will focus on this variable. Self-control showed a negative association with total anxiety, $r = -.32, p < .001$, as well as its dimension of somatic anxiety, $r = -.27, p < .001$, worry, $r = -.21, p = .005$, and concentration disruption, $r = -.32, p < .001$. Self-control was also negatively associated to threat appraisal, $r = -.21, p = .005$, coping strategies of avoidance, $r = -.34, p < .001$, and distraction, $r = -.26, p < .001$, and approach motivation dimensions of fun seeking, $r = -.25, p < .001$, and drive, $r = -.30, p < .001$. However, self-control was positively associated with cognitive restructuring, $r = .15, p = .042$, and support seeking, $r = .21, p = .005$ (Table 2).

Differences for low and high trait self-control in anxiety, cognitive appraisals, coping and motivation

In order to understand the impact of self-control in the variables in study, a media split ($M = 3.52$) was used to divide the participants in high ($n = 75$) and low trait self-control ($n = 87$). All the variables considered in this study were introduced in the analysis, except total anxiety, which was excluded to avoid multicollinearity (total anxiety with its components were correlated above .70; Pedhazur, 1997). The MANOVA was conducted to identify differences across the levels of self-control, demonstrating a significant multivariate effect, Wilk's $\lambda = .75, F(14,146) = 3.44, p < .001, \eta_p^2 = .25$. Univariate tests revealed significant differences for somatic anxiety, $F(1,160) = 4.71, p = .031, \eta_p^2 = .03$; concentration disruption, $F(1,160) = 15.71, p < .001, \eta_p^2 = .09$; coping strategies of avoidance, $F(1,160) = 13.76, p < .001, \eta_p^2 = .08$, and distraction, $F(1,160) = 8.52, p = .004, \eta_p^2 = .05$; and also for approach motivation variables of fun seeking, $F(1,160) = 4.01, p = .047, \eta_p^2 = .02$, and drive, $F(1,160) = 7.03, p = .009, \eta_p^2 = .04$. These results suggest that athletes with higher levels of trait self-control tend to report lower levels of somatic anxiety, concentration disruption, and are less prone to use the coping strategies of avoidance and distraction. However, athletes with higher levels of trait self-control are more likely to show lower levels in fun seeking and drive (Table 3).

Table 3

Differences for Low and High Trait Self-control in Anxiety, Cognitive Appraisals, Coping and Motivation

	Low trait self-control (n = 75)		High trait self-control (n = 87)		<i>F</i>	<i>p</i>	η^2
	<i>M</i>	<i>DP</i>	<i>M</i>	<i>DP</i>			
Sport Anxiety							
Somatic anxiety	8.97	3.40	7.93	2.50	4.71	.031	.03
Worry	13.77	3.74	12.63	3.97	3.56	.061	.02
Concentration disruption	8.71	2.54	7.19	2.32	15.71	.000	.09
Cognitive appraisals							
Threat	25.02	6.57	23.59	6.62	1.91	.169	.01
Challenge	19.74	3.63	20.09	3.67	.39	.534	.01
Coping							
Support seeking	14.99	3.42	15.15	3.65	.08	.777	.01
Avoidance	16.84	2.85	15.13	3.00	13.76	.000	.08
Cognitive restructuring	17.17	2.77	17.80	2.73	2.09	.150	.01
Distraction	10.83	1.72	9.96	2.06	8.52	.004	.05
Problem solving	12.85	1.83	13.24	1.74	1.91	.168	.01
BIS/BAS							
BIS	2.84	.57	2.79	.49	.42	.519	.01
Fun seeking	3.00	.58	2.80	.64	4.01	.047	.02
Drive	2.05	.71	1.75	.68	7.03	.009	.04
Reward responsiveness	3.37	.52	3.39	.41	.10	.748	.01

Discriminant analysis between low vs. high trait self-control

After identifying the differences in the variables in study as function of self-control, a discriminate analysis was performed to predict low and high trait self-control group membership considering the variables that were significant in the previous analysis (Tabachnick & Fidell, 2007). These variables revealed a significant discriminant function, Wilk's $\lambda = .83$; $\chi^2 [6] = 32.96$, $p < .001$, and the group centroid scores show that this discriminant function separates low trait self-control (.44) from high trait self-control athletes (-.48). All the variables introduced in the analysis contributed significantly to the differences between the groups, particularly concentration disruption and avoidance. In addition, a total

of 70.2 % of original grouped cases were correctly classified (72% for the low trait group and 68.2% for the high trait group) (Table 4).

Table 4

Discriminant Analysis for Low vs. High Trait Self-control Groups

Variable	Wilk's Lambda	<i>p</i>	SCDFC
Somatic anxiety	.97	.013	.01
Concentration disruption	.90	< .001	.57
Coping - Avoidance	.91	< .001	.44
Coping - Distraction	.96	.006	.17
Fun seeking	.97	.028	.30
Drive	.95	.003	.20

Prediction of group membership			
Group	Number of participants	Correctly classified	Incorrectly classified
Low trait self-control	93	67 (72%)	26 (28%)
High trait self-control	85	58 (68.2%)	27 (31.8%)

Note. In all, 70.2% of the participants in the original groups were correctly classified. SCDFC = standardized canonical discriminant function coefficients.

Mediation analysis for the relationship between self-control and anxiety

Considering the results from the discriminant analysis, the potential mediating role of avoidance, distraction, fun seeking and drive on the relationship between self-control and total anxiety was tested using mediation analysis. To test the mediation, the procedures described by Preacher and Hayes (2008) were followed using the macro they provided for SPSS (Preacher & Hayes, August, 2013). This macro performs the causal steps criteria for mediation described by Baron and Kenny (1986), the significance tests of the total and specific indirect effects, as well as the bootstrapping method suggested by some of authors for testing mediation (e.g., MacKinnon, Lockwood, & Williams, 2004). The bootstrapping method is preferred to the normal theory test for indirect effects (Sobel, 1982) because it reduces Type I error, increases power and does not impose the assumption of normality (Preacher & Hayes, 2008). In the bootstrapping method, the indirect effect is considered significant if the 95% interval does not encompass zero. For this study, 5000 bootstrap samples with replacement were requested.

Avoidance showed a partial mediation between self-control and anxiety. Self-control predicted avoidance, $\beta = -.34, p < .001$, and anxiety, $\beta = -.32, p < .001$. Additionally, anxiety was also predicted by avoidance, $\beta = .34, p < .001$. When controlling for the effects of avoidance, self-control remained a significant predictor of anxiety, $\beta = -.24, p = .001$. Indirect effects showed the mediating role of avoidance, indirect effect estimate (IE) = -1.01, 95% CI [-2.01, -.32]. The Sobel test confirmed the mediation, $Z = 2.63, p = .009$ (Figure 1).

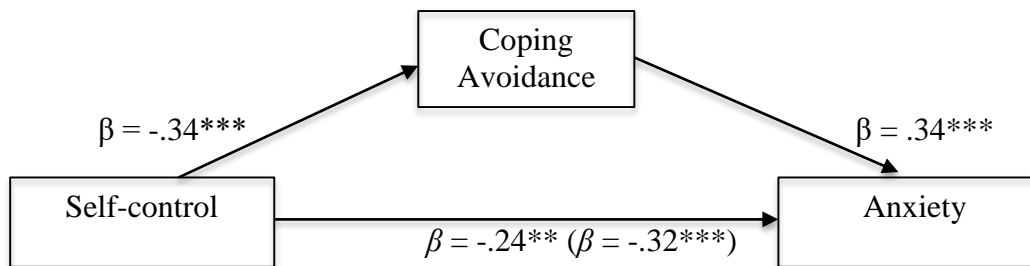


Figure 1. Avoidance as a partial mediator of the relationship between self-control and anxiety. Note. ** $p < .01$; *** $p < .001$.

Discussion

The purpose of this study was to explore the role of self-control in the regulation of anxiety in sports. Overall, the correlations and analysis of differences seem to suggest that athletes with higher levels of trait self-control tend to show lower levels of competitive anxiety. Indeed, previous studies have shown that high trait self-control is linked to low levels of anxiety (e.g., Tangney et al., 2004). These results seem to be consistent with previous studies that suggest that self-control enables athletes to control their attention and overcome the demeaning effects of anxiety (Englert & Bertrams, 2012; Englert, Bertrams, et al., 2015; Englert, Zwemmer, et al., 2015). However, no differences were observed in the cognitive dimension of worry as function of self-control capacity. Although unexpected, this finding is in line with the integration of the ACT (Eysenck et al., 2007) with the strength model of self-control (Englert & Bertrams, 2015A) demonstrating that despite similar levels of worry, individuals with a higher self-control capacity may have better capacity to block worries.

When analyzing cognitive appraisals and coping strategies, results seem to suggest that athletes with higher levels of self-control tend to appraise the competition as less threatening and use more adaptive as well as less maladaptive coping strategies. Although few

studies have yet to thoroughly explore the role of self-control on stress and coping, recently Galla and Wood (2015) suggested that self-control “involves restraining maladaptive automatic processes and consciously guiding behavior in concordance with reflective goal standards” (p. 70). In their study, the authors reported that adolescents with high self-control capacity reported lower stress severity and fewer daily stressors, and used more problem-focused coping, buffering emotional reactions to stress. Englert, Bertrams, and Dickhäuser (2011) also reported that individuals with higher levels of self-control were more likely to use positive, and less likely negative coping strategies. In this study, athletes with higher self-control were less likely to use maladaptive coping strategies of avoidance and distraction. Indeed, individuals with higher levels of self-control tend to use strategies more proactive and anticipatory strategies (e.g., Duckworth, Gendler & Gross, 2014; Hofmann, Baumeister, Förster, & Vohs, 2012; Hofmann & Kotabe, 2012).

Although it appears paradoxical, athletes with higher levels of self-control showed lower levels of approach motivation, particularly in the dimensions of fun seeking and drive. However, these scales are more related to impulsivity (e.g., Gray, 1990; Quilty & Oakman, 2004) and reflect initiation, as opposed to inhibition (Corr, 2004), which explains these findings. Nonetheless, approach motivation is negatively associated with anxiety (e.g., Cury et al., 2002, 2003; Morris & Kavussanu, 2009), which was also observed in this study in the dimensions of fun seeking and drive. Therefore, these findings must be interpreted in light of the theoretical background of the measures used in this study. The Brief Self-control Scale (Tangney et al., 2004) is focused on inhibitory self-control behaviors, disregarding active goal pursuit. In fact, some recent alternative structures of this measure have been proposed to reflect these two dimensions in general domains (de Ridder, de Boer, Lugtig, Bakker, & van Hooft, 2011; Maloney, Grawitch, & Barber, 2012), but also in sport (Toering & Jordet, 2015).

A discriminant analysis showed that somatic anxiety, concentration disruption, avoidance, distraction, fun seeking and drive were significant predictors of the differences between high and low trait self-control athletes. These results suggest the important role of self-control in the regulation of competitive anxiety. It seems that those with a greater self-control capacity tend to experience less anxiety in competition (e.g., Englert & Bertrams, 2012) and use less coping strategies avoidance coping strategies, including distraction (Englert et al., 2011; Galla & Wood, 2015). Additionally, fun seeking and drive were also predictors of the differences in self-control, suggesting that higher levels of self-control are related to less impulsive behaviors (e.g., Gray, 1990).

Finally, the mediation analysis has suggested that athletes with higher levels of self-

control are less likely to use avoidance coping strategies, and thus experience less anxiety. This finding may provide an important cue to explain how self-control allows individuals to control anxiety. As Galla and Wood (2015) argued, self-control may be associated with more effective coping strategies. Supposedly, individuals with a higher self-control capacity seem to develop “beneficial habits” (Galla & Duckworth, 2015), and are better at controlling their environments (Ent, Baumeister, & Tice, 2015; Fujita, 2011; Hoffman et al., 2012; Milyavskaya, Inzlicht, Hope & Koestner, 2015), which may explain their ability to control their emotions.

Conclusion

Overall, these results provided further support for previous laboratorial studies (e.g., Englert & Bertrams, 2012; Englert, Bertrams, et al., 2015; Englert, Zwemmer, et al., 2015) concerning the role of self-control as an important mechanism to regulate anxiety in sport competition. Additionally, this study also advances an important cue to clarify how self-control capacity helps individuals control their anxiety. Consistently with previous findings (Englert et al., 2011; Galla & Wood, 2005), this study suggests that individuals with a higher self-control capacity seem to be better at dealing with stress (e.g., Gailliot et al., 2006; Tangney et al., 2004). Alternatively, Englert and colleagues (2011) argue that individuals with higher levels of self-control tend to use less adaptive or more negative coping strategies because anxiety impairs their self-control capacity. Therefore, future studies should further explore and clarify these relations. More specifically, whether anxiety decreases self-control, and thus leads to the use of less adaptive coping strategies, or if trait self-control capacity is linked to the use of better coping skills, thus controlling anxiety.

Another important direction for future studies should be the reanalysis of the structure of the Brief Self-control Scale (Tangney et al., 2004) in order to reflect both initiatory and inhibitory self-control behaviors (Sofia & Cruz, in press). Possibly, this development would allow a better understanding of the relations between self-control, anxiety and approach and avoidance motivation.

Considering the dynamical nature of sport competition (Lazarus, 2000), the present trait-approach study does not allow a full understanding how anxiety and self-control fluctuates over time. Therefore, future longitudinal studies could help learn more about individual state experiences in anxiety and self-control. The retrospective characteristics of the measures used in this study may also influence the results. So, future research should also

use diaries or think aloud protocols to capture the dynamic nature of emotional experiences and self-control (Nicholls & Ntoumanis, 2010).

From a practical standpoint, and considering the undeniable importance of self-control on the regulation of anxiety (e.g., Englert & Bertrams, 2015), psychological interventions should be directed at improving athletes' self-control capacity. Indeed, self-control has been found to be a learnable and trainable capacity (e.g., Baumeister et al., 2007; Cruz & Sofia, 2016; Duckworth et al., 2014). Several psychological programs have been found to be effective in improving this capacity. For instance, using *if-then* plans enabled individuals to preserve their self-control capacity (Webb & Sheeran, 2003), but also improved performance in a school task among secondary students (Duckworth, Gollwitzer, Kirby, & Oettingen, 2013). Furthermore, it seems that relaxation can also be used to preserve self-control energy to regulate anxiety. Englert and Bertrams (2015b) observed that basketball players with low state self-control were able to regulate their anxiety and sustain their performance levels in a free-throw task when they were told to relax as much as possible while listening to a relaxing song.

In conclusion, “self-control appears to depend on knowledge and skills that can be learned directly, modeled vicariously, practiced, and reinforced” (Duckworth et al., 2014, p. 212). Therefore, self-control may be a key variable to promote success and improve well-being in the demanding and challenging context of sport competition.

References

- Anshel, M., & Anderson, D. (2002). Coping with acute stress in sport: Linking athletes' coping style, coping strategies, affect, and motor performance. *Anxiety, Stress & Coping, 15*, 193-209. doi: 10.1080/10615800290028486
- Anshel, M. H., Williams, L. R. T., & Williams, S. M. (2000). Coping style following acute stress in competitive sport. *The Journal of social psychology, 140*, 751-773. doi: 10.1080/00224540009600515
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology, 51*, 1173-1182. doi: 10.1037/0022-3514.51.6.1173
- Bauer, I. M., & Baumeister, R. F. (2011). Self-regulatory strength. In K. H. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 64-82). New York: Guilford Press
- Baumeister, R. F., & Alquist, J. L. (2009). Is there a downside to good self-control? *Self and Identity, 8*, 115-130. doi: 10.1080/15298860802501474
- Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science, 16*, 351-355. doi: 10.1111/j.1467-8721.2007.00534.x
- Bertrams, A., Englert, C., Dickhäuser, O., & Baumeister, R. F. (2013). Role of self-control strength in the relation between anxiety and cognitive performance. *Emotion, 13*, 668-680. doi: 10.1037/a0031921
- Bierman, K. L., Coie, J. D., Dodge, K. A., Greenberg, M. T., Lochman, J. E., McMahon, R. J., & Pinderhughes, E. (2010). The effects of a multiyear universal social–emotional learning program: The role of student and school characteristics. *Journal of Consulting and Clinical Psychology, 78*, 156-168. doi: 10.1037/a0018607
- Billings, A. G., & Moos, R. H. (1981). The role of coping responses and social resources in attenuating the stress of life events. *Journal of Behavioral Medicine, 4*, 139-157.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief cope. *International Journal of Behavioral Medicine, 4*, 92-100. doi: 10.1207/s15327558ijbm0401_6
- Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual review of Psychology, 61*, 679-704. doi: 10.1146/annurev.psych.093008.100352

- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, *67*, 319-333. doi: 10.1037/0022-3514.67.2.319
- Cerin, E. (2003). Anxiety versus fundamental emotions as predictors of perceived functionality of pre-competitive emotional states, threat, and challenge in individual sports. *Journal of Applied Sport Psychology*, *15*, 223-238 doi: 10.1080/10413200305389
- Corr, P. J. (2004). Reinforcement sensitivity theory and personality. *Neuroscience & Biobehavioral Reviews*, *28*, 317-332. doi: 10.1016/j.neubiorev.2004.01.005
- Cruz, J. F. (1994). *Stress, ansiedade e rendimento na competição desportiva: A importância das competências e processos psicológicos*. Unpublished Doctoral thesis. Braga, Portugal: Universidade do Minho
- Cruz, J. F. (1996a). *Stress, ansiedade e rendimento na competição desportiva*. Braga, Portugal: Centro de Estudos em Educação e Psicologia, Instituto de Educação e Psicologia, Universidade do Minho.
- Cruz, J. F. (1996b). Stress e ansiedade na competição desportiva: Natureza, efeitos e avaliação. In J. F. Cruz (Ed.), *Manual de Psicologia do Desporto*. Braga: Sistemas humanos e organizacionais, Lda.
- Cruz, J., & Barbosa, L. (1998). Stress, ansiedade e confronto psicológico na competição desportiva: Uma nova abordagem de natureza cognitiva, motivacional e relacional. *Psicologia: Teoria, Investigação e Prática*, *3*, 21-70.
- Cruz, J. F. & Sofia, R. M. (2016). The Pursuit of success and excellence: Self-Control in achievement contexts. In C. Sauters (Ed.), *Psychology of self-control: New Research* (pp. 33-72). Nova Science Publishers,
- Cury, F., Da Fonséca, D., Rufo, M., Peres, C., & Sarrazin, P. (2003). The trichotomous model and investment in learning to prepare for a sport test: A mediational analysis. *British Journal of Educational Psychology*, *73*, 529-543. doi: 10.1348/000709903322591226
- Cury, F., Elliot, A.J., Sarrazin, P., Da Fonseca, D., & Rufo, M. (2002). The trichotomous achievement goal model and intrinsic motivation: A sequential mediational analysis. *Journal of Experimental Social Psychology*, *38*, 473-481. doi: 10.1016/S0022-1031(02)00017-3
- de Ridder, D. T., de Boer, B. J., Lugtig, P., Bakker, A. B., & van Hooft, E. A. (2011). Not doing bad things is not equivalent to doing the right thing: Distinguishing between

- inhibitory and initiatory self-control. *Personality and Individual Differences*, *50*, 1006-1011. doi: 10.1016/j.paid.2011.01.015
- de Ridder, D. T., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review*, *16*, 76-99. doi: 10.1177/1088868311418749
- Dias, C., Cruz, J. F., & Fonseca, A. M. (2009). Anxiety and coping strategies in sport contexts: A look at the psychometric properties of Portuguese instruments for their assessment. *The Spanish Journal of Psychology*, *12*, 338-348. doi: 10.1017/S1138741600001736
- Dias, C. S., Cruz, J. F. A., & Fonseca, A. M. (2010). Coping strategies, multidimensional competitive anxiety and cognitive threat appraisal: Differences across sex, age and type of sport. *Serbian Journal of Sports Sciences*, *4*, 23-31.
- Dias, C. S., Cruz, J. F. A., & Fonseca, A. M. (2011). Ansiedad, percepción de amenaza y estrategias de afrontamiento en el deporte: diferencias individuales en el rasgo de ansiedad. *Ansiedad y Estrés*, *17*, 1-13.
- Dias, C. S., Cruz, J. F. A., & Fonseca, A. M. (2012). The relationship between multidimensional competitive anxiety, cognitive threat appraisal, and coping strategies: A multi-sport study. *International Journal of Sport and Exercise Psychology*, *10*, 52-65. doi: 10.1080/1612197X.2012.645131
- Doron, J., Trouillet, R., Gana, K., Boiché, J., Neveu, D., & Ninot, G. (2014). Examination of the hierarchical structure of the Brief COPE in a French sample: Empirical and theoretical convergences. *Journal of Personality Assessment*, *96*, 567-575. doi: 10.1080/00223891.2014.886255
- Dorris, D. C., Power, D. A., & Kenefick, E. (2012). Investigating the effects of ego depletion on physical exercise routines of athletes. *Psychology of Sport and Exercise*, *13*, 118-125. doi: 10.1016/j.psychsport.2011.10.004
- Duckworth, A. L., & Carlson, S. M. (2013). Self-regulation and school success. In B. W. Sokol, F. M. Grouzet, & U. Mülle (Eds.), *Self-regulation and autonomy: Social and developmental dimensions of human conduct* (pp. 208-230). New York: Cambridge University Press. doi: 10.1017/CBO9781139152198.015
- Duckworth, A. L., Gendler, T. S., & Gross, J. J. (2014). Self-control in school-age children. *Educational Psychologist*, *49*, 199-217. doi: 10.1080/00461520.2014.926225

- Duckworth, A. L., Kirby, T. A., Gollwitzer, A., & Oettingen, G. (2013). From fantasy to action: Mental contrasting with implementation intentions (MCII) improves academic performance in children. *Social Psychological and Personality Science*, *4*, 745-753. doi: 10.1177/1948550613476307
- Dvorak, R. D., & Simons, J. S. (2009). Moderation of resource depletion in the self-control strength model: Differing effects of two modes of self-control. *Personality and Social Psychology Bulletin*, *35*, 572-583. doi: 10.1177/0146167208330855
- Englert, C., & Bertrams, A. (2012). Anxiety, ego depletion, and sports performance. *Journal of Sport and Exercise Psychology*, *34*, 580-599.
- Englert, C., & Bertrams, A. (2014a). What is self-control depleting in sports? Effects of vicarious experiences on performance. *International Journal of Sport Psychology*, *45*, 1-10.
- Englert, C., & Bertrams, A. (2014b). The effect of ego depletion on sprint start reaction time. *Journal of Sport & Exercise Psychology*, *36*, 506-515. doi: 10.1123/jsep.2014-0029
- Englert, C., & Bertrams, A. (2015a). Integrating attentional control theory and the strength model of self-control. *Frontiers in Psychology*, *6*, 824-830. doi: 10.3389/fpsyg.2015.00824
- Englert, C., & Bertrams, A. (2015b). Active relaxation counteracts the effects of ego depletion on performance under evaluative pressure in a state of ego depletion. *Sportwissenschaft*, *46*, 110-115.
- Englert, C., Bertrams, A., Furley, P., & Oudejans, R. R. (2015). Is ego depletion associated with increased distractibility? Results from a basketball free throw task. *Psychology of Sport and Exercise*, *18*, 26-31. doi: 10.1016/j.psychsport.2014.12.001
- Englert, C., Persaud, B. N., Oudejans, R. R., & Bertrams, A. (2015). The influence of ego depletion on sprint start performance in athletes without track and field experience. *Frontiers in Psychology*, *6*, 1-16. doi: 10.3389/fpsyg.2015.01207
- Englert, C., & Wolff, W. (2015). Ego depletion and persistent performance in a cycling task. *International Journal of Sport Psychology*, *46*, 137-151 doi: 10.7352/IJSP2015.46.137
- Englert, C., Zwemmer, K., Bertrams, A., & Oudejans, R. R. (2015). Ego depletion and attention regulation under pressure: is a temporary loss of self-control strength indeed related to impaired attention regulation? *Journal of Sport & Exercise Psychology*, *37*, 127-137. doi: 10.1123/jsep.2014-0219

- Ent, M. R., Baumeister, R. F., & Tice, D. M. (2015). Trait self-control and the avoidance of temptation. *Personality and Individual Differences, 74*, 12-15. doi: 10.1016/j.paid.2014.09.031
- Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: attentional control theory. *Emotion, 7*, 336-353. doi: 10.1037/1528-3542.7.2.336
- Field, A. (2007). *Discovering statistics using IBM SPSS statistics*. London: Sage.
- Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology, 55*, 745-774. doi: 10.1146/annurev.psych.55.090902.141456
- Fujita, K. (2011). On conceptualizing self-control as more than the effortful inhibition of impulses. *Personality and Social Psychology Review, 15*, 352-366. doi: 10.1177/1088868311411165
- Gailliot, M. T., Schmeichel, B. J., & Baumeister, R. F. (2006). Self-regulatory processes defend against the threat of death: Effects of self-control depletion and trait self-control on thoughts and fears of dying. *Journal of Personality and Social Psychology, 91*, 49-62. doi: 10.1037/0022-3514.91.1.49
- Galla, B. M., & Duckworth, A. L. (2015). More than resisting temptation: Beneficial habits mediate the relationship between self-control and positive life outcomes. *Journal of Personality and Social Psychology, 109*, 508-525. doi: 10.1037/pspp0000026
- Galla, B. M., & Wood, J. J. (2012). Emotional self-efficacy moderates anxiety-related impairments in math performance in elementary school-age youth. *Personality and Individual Differences, 52*, 118-122. doi: 10.1016/j.paid.2011.09.012
- Giacobbi Jr, P. R., & Weinberg, R. S. (2000). An examination of coping in sport: individual trait anxiety differences and situational consistency. *Sport Psychologist, 14*, 42-62.
- Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition & Emotion, 4*, 269-288. doi: 10.1080/02699939008410799
- Grossbard, J. R., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2009). Competitive anxiety in young athletes: Differentiating somatic anxiety, worry, and concentration disruption. *Anxiety, Stress, & Coping, 22*, 153-166. doi: 10.1080/10615800802020643
- Hambleton, Merenda, P. F., & Spielberger, C. D. (2005). *Adapting educational and psychological test for cross-cultural assessment*. London: Lawrence Erlbaum Associates.

- Hammermeister, J., & Burton, D. (2001). Stress, appraisal, and coping revisited: examining the antecedents of competitive state anxiety with endurance athletes. *Sport Psychologist, 15*, 66-90.
- Hofmann, W., Baumeister, R. F., Förster, G., & Vohs, K. D. (2012). Everyday temptations: an experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology, 102*, 1318-1335. doi: 10.1037/a0026545
- Hofmann, W., & Kotabe, H. (2012). A general model of preventive and interventive self-control. *Social and Personality Psychology Compass, 6*, 707-722. doi: 10.1111/j.1751-9004.2012.00461.x
- Hofmann, W., Luhmann, M., Fisher, R. R., Vohs, K. D., & Baumeister, R. F. (2014). Yes, but are they happy? Effects of trait self-control on affective well-being and life satisfaction. *Journal of Personality, 82*, 265-277. doi: 10.1111/jopy.12050
- Jones, G. (1995). More than just a game: Research developments and issues in competitive anxiety in sport. *British Journal of Psychology, 86*, 449-478. doi: 10.1111/j.2044-8295.1995.tb02565.x
- Jones, M., Meijen, C., McCarthy, P. J., & Sheffield, D. (2009). A theory of challenge and threat states in athletes. *International Review of Sport and Exercise Psychology, 2*, 161-180. doi: 10.1080/17509840902829331
- Kaiseler, M., Polman, R., & Nicholls, A. (2009). Mental toughness, stress, stress appraisal, coping and coping effectiveness in sport. *Personality and Individual Differences, 47*, 728-733. doi: 10.1016/j.paid.2009.06.012
- Krohne, H. W., & Hindel, C. (1988). Trait anxiety, state anxiety, and coping behavior as predictors of athletic performance. *Anxiety Research, 1*, 225-234. doi: 10.1080/08917778808248721
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York: Oxford University Press.
- Lazarus, R. S. (1999). *Stress and emotion: A new synthesis*. New York: Oxford University Press.
- Lazarus, R. S. (2000). How emotions influence performance in competitive sports. *The Sport Psychologist, 14*, 229-252.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York, NY: Springer.
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99-128. doi: 10.1207/s15327906mbr3901_4

- McCrae, R. R., Kurtz, J. E., & Yamagata, S. T. A. (2011). Internal consistency, retest reliability, and their implications for personality scale validity. *Personality and Social Psychology Review, 15*, 28-50. doi: 10.1177/1088868310366253
- Maloney, P. W., Grawitch, M. J., & Barber, L. K. (2012). The multi-factor structure of the Brief Self-Control Scale: Discriminant validity of restraint and impulsivity. *Journal of Research in Personality, 46*, 111-115. doi: 10.1016/j.jrp.2011.10.001
- Martens, R., Vealey, R. S., Burton, D., Bump, L., & Smith, D. E. (1990). Development and validation of the Competitive Sports Anxiety Inventory-2. In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 127–173). Champaign, IL: Human Kinetics.
- Mellalieu, S. D., Hanton, S., & Fletcher, D. (2009). *A competitive anxiety review: Recent directions in sport psychology research*. New York: Nova Science Pub Incorporated
- Milyavskaya, M., Inzlicht, M., Hope, N., & Koestner, R. (2015). Saying "no" to temptation: Want-to motivation improves self-regulation by reducing temptation rather than by increasing self-control. *Journal of Personality and Social Psychology, 109*, 677-693. doi: 10.1037/pspp0000045
- Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., ... & Sears, M. R. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences, 108*, 2693-2698. doi: 10.1073/pnas.1010076108
- Morris, R. L., & Kavussanu, M. (2009). Approach-avoidance achievement goals in sport: Psychological correlates and a comparison with the dichotomous model. *International Journal of Sport & Exercise Psychology, 9*, 185-202. doi: 10.1080/1612197X.2009.9671899
- Nicholls, A. R., & Ntoumanis, N. (2010). Traditional and new methods of assessing coping in sport. In A. R. Nicholls (Ed.), *Coping in sport: Theory, methods and related constructs* (pp. 35–51). New York, NY: Nova Science Publishers, Inc.
- Nicholls, A. R., Polman, R. C., Levy, A. R., & Borkoles, E. (2010). The mediating role of coping: A cross-sectional analysis of the relationship between coping self-efficacy and coping effectiveness among athletes. *International Journal of Stress Management, 17*, 181- 192. doi: 10.1037/a0020064
- Ntoumanis, N., & Biddle, S. J. H. (2000). Relationship of intensity and direction of competitive state anxiety with coping strategies. *The Sport Psychologist, 14*, 360–371.

- Ntoumanis, N., & Jones, G. (1998). Interpretation of competitive trait anxiety symptoms as a function of locus of control beliefs. *International Journal of Sport Psychology*, 29, 99-114.
- Pedhazur, EJ (1997). *Multiple regression in behavioral research*. Harcourt Brace: Orlando, FL.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879-891. doi: 10.3758/BRM.40.3.879
- Preacher, K. J., & Hayes, A. F. (August, 2013). SPSS and SAS macro for bootstrapping indirect effects in multiple mediator models. <http://www.comm.ohio-state.edu/ahayes/SPSS%20programs/indirect.htm>.
- Quilty, L. C., & Oakman, J. M. (2004). The assessment of behavioural activation—the relationship between impulsivity and behavioural activation. *Personality and Individual Differences*, 37, 429-442. doi: 10.1016/j.paid.2003.09.014
- Richards, H. (2012). Coping processes in sport. In J. Thatcher, M. Jones, & D. Lavalle (Eds.) *Coping and emotion in sport* (1-32). Oxon: Nova Science Publishers.
- Roberts, G. C., Treasure, D. C., & Conroy, D. E. (2007). Understanding the dynamics of motivation in sport and physical activity: An achievement goal interpretation. In G. Tenenbaum, & R.C. Eklund (Eds), *Handbook of sport psychology* (pp. 3–30). Hoboken, New Jersey: Wiley & Sons. doi: 10.1002/9781118270011.ch1
- Schmeichel, B. J. (2007). Attention control, memory updating, and emotion regulation temporarily reduce the capacity for executive control. *Journal of Experimental Psychology: General*, 136, 241-255. doi: 10.1037/0096-3445.136.2.241
- Schmeichel, B. J., & Baumeister, R. F. (2010). Effortful attention control. In B. Bruya (Ed.), *Effortless attention: A new perspective in the cognitive science of attention and action* (pp. 29-49). Cambridge, MA: MIT Press. doi: 10.7551/mitpress/9780262013840.003.0002
- Skinner, N., & Brewer, N. (2002). The dynamics of threat and challenge appraisals prior to a stressful achievement event. *Journal of Personality and Social Psychology*, 83, 678-692. doi: 10.1037/0022-3514.83.3.678
- Skinner, N., & Brewer, N. (2004). Adaptive approaches to competition: Challenge appraisals and positive emotions. *Journal of Sport and Exercise Psychology*, 26, 283–305.

- Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: a review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, *129*, 216-269. doi: 10.1037/0033-2909.129.2.216
- Smith, R. E., Smoll, F. L., Cumming, S. P., & Grossbard, J. R. (2006). Measurement of multidimensional sport performance anxiety in children and adults: The Sport Anxiety Scale-2. *Journal of Sport and Exercise Psychology*, *28*, 479-501.
- Smith, R. E., Smoll, F. L., & Schutz, R. W. (1990). Measurement and correlates of sport-specific cognitive and somatic trait anxiety: The Sport Anxiety Scale. *Anxiety Research*, *2*, 263-280. doi: 10.1080/08917779008248733
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology*, *13*, 290-312. doi: 10.2307/270723
- Sofia, R. M., & Cruz, J. F. A. (2015). Avaliação cognitiva da competição desportiva e objetivos de regulação emocional: Estudo adaptação e validação de instrumentos numa amostra de atletas portuguesas. *Psicologia, Educação e Cultura*, *19*, 57-93.
- Sofia, R. M., & Cruz, J.F. (in press). "Giving in to temptation": Self-control as a valuable but limited resource? *Trends in Psychology/Temas em Psicologia*, *24*.
- Tabachnick, B.G. & Fidell, L.S. (2007), *Using Multivariate Statistics* (5th ed.). New York: Allyn and Bacon.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, *72*, 271-324. doi: 10.1111/j.0022-3506.2004.00263.x
- Toering, T. T., Elferink-Gemser, M. T., Jordet, G., & Visscher, C. (2009). Self-regulation and performance level of elite and non-elite youth soccer players. *Journal of Sports Sciences*, *27*, 1509-1517. doi: 10.1080/02640410903369919
- Toering, T., & Jordet, G. (2015). Self-control in professional soccer players. *Journal of Applied Sport Psychology*, *27*, 335-350. doi: 10.1080/10413200.2015.1010047
- Vohs, K. D., Baumeister, R. F., Schmeichel, B. J., Twenge, J. M., Nelson, N. M., & Tice, D. M. (2014). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Motivation Science*, *1*, 19-42. doi: 10.1037/2333-8113.1.S.19
- Wang, J., Marchant, D., & Morris, T. (2004). Coping style and susceptibility to choking. *Journal of Sport Behavior*, *27*, 75-92.

Woodman, T., & Hardy, L. (2003). The relative impact of cognitive anxiety and self-confidence upon sport performance: A meta-analysis. *Journal of Sports Sciences, 21*, 443-457. doi: 10.1080/0264041031000101809