



**Universidade do Minho**

Escola de Psicologia

Rui Manuel Costa Sofia

**Anger, aggression, coping and emotion  
regulation in sport**



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## Anger, aggression, coping and emotion regulation in sport

**Abstract:** Emotions have an undeniable influence on athletic experiences and performance, which has led to multiple theories about their differential impact on athletes. However, despite being one of the most experienced emotions during competition, there is still a dearth of studies centred on anger in sports. Furthermore, one of the most important consequences of anger is the aggressive behaviour. Aggression has always been a focus of interest of the literature in sport psychology. However, despite being “viewed” from different “angles”, the complexity associated to these behaviours is yet to be fully uncovered. Throughout 5 Studies, this thesis intends to significantly contribute to empirical and theoretical knowledge about anger and aggression. Study 1 showed positive associations between anger, aggressiveness, antisocial behaviour towards opponents and teammates, provocation and anger rumination and found that anger and aggression seem to be more frequent among male athletes from contact sports. Study 2 demonstrated that self-control, importance reappraisal, challenge appraisals, anger rumination and antisocial behaviour towards opponents were the most important predictors of competitive anger, discriminating athletes with high and low levels of anger. Study 3 is focused on the regulation of anger in sports and provided evidence that anger rumination, self-control, venting, importance reappraisal, problem efficacy and self-blame were the most important regulation strategies implicated in anger. Furthermore, it found evidence for the partial mediation role of anger rumination and self-control in the relationship between provocation and anger. Additionally, it observed the key influence of implicit theories, goals for emotion regulation and core self-evaluations in how athletes use these regulation strategies. Study 4 demonstrated the differential patterns of associations between three types of aggressive behaviour in sport, namely, retaliation towards opponents, towards teammates and physical aggression. More importantly, it was found that anxiety seems to lead to more aggression towards teammates, but suppresses the aggressive responses towards opponents. It also found support for the role of emotion regulation strategies of problem efficacy, task focus processes and wishful thinking play, leading to more aggression, whereas tension reduction, self-control and importance reappraisal lead to less aggression. Finally, Study 5 used a qualitative methodology to evidence anger as a frequently experienced emotion in sport, originated by a multiplicity of events (such as mistakes, being aggressed or provoked, the lack of effort from the teammates, losing, coach pressure and seeing a teammate being aggressive). This emotion is perceived as both harmful and beneficial for performance. In addition, but somewhat paradoxically, aggressive behaviour is still an accepted and promoted part of sports. While some athletes perceived this behaviour to be harmful for performance, most reported that aggression is a game tactic frequently used in the game in order to obtain benefits. These beliefs can partially explain the persistence of aggression in sport. Overall, these findings may contribute to a “new vision” of anger and aggression in sport competition. Considering these results, directions for future studies, as well practical implications for sport professionals and psychological interventions will be suggested.



## Raiva, agressão, *coping* e regulação emocional no desporto

**Resumo:** O impacto das emoções no desporto é inegável, o que tem levado a múltiplas teorias e investigações acerca do seu impacto diferencial nos atletas. Contudo, apesar de ser uma das emoções mais experienciadas na competição, ainda existe uma escassez de estudos centrados na raiva no desporto. Além disso, uma das consequências mais importantes da raiva é o comportamento agressivo. A agressão tem sido sempre um foco de interesse da literatura em psicologia do desporto. No entanto, apesar de ser estudada por diversos “ângulos”, a complexidade associada a este comportamento ainda não foi totalmente descoberta. Ao longo de 5 estudos, esta tese pretende contribuir significativamente para o conhecimento teórico e empírico acerca da raiva e da agressão. O Estudo 1 demonstrou associações positivas entre raiva, agressividade, comportamentos anti-sociais dirigidos a adversários e colegas de equipa e ruminação da raiva e que a raiva e a agressão são mais frequentes em atletas do sexo masculino e de desportos de contacto. O estudo 2 demonstrou que o auto-controlo, a reavaliação da importância, a percepção de desafio, a ruminação da raiva e o comportamento anti-social dirigido a adversários são os preditores mais importantes da raiva competitiva, diferenciando atletas com elevados e baixos níveis de raiva. O estudo 3 é centrado na regulação da raiva no desporto e demonstrou que a ruminação da raiva, o auto-controlo, a ventilação de emoções, a reavaliação da importância, a eficácia na resolução de problemas e a auto-culpabilização são as estratégias mais importantes implicadas na raiva. Além disso, foi também observada evidência para o papel de mediação parcial da ruminação da raiva e do auto-controlo na relação entre provocação e raiva. Adicionalmente, foi também observada a grande influência das teorias implícitas, dos objectivos de regulação emocional e das auto-avaliações nucleares no modo como os atletas usam estas estratégias. O Estudo 4 demonstrou um padrão diferencial de associações entre três tipos de comportamentos agressivos, nomeadamente, a retaliação dirigida a adversários, dirigida a colegas de equipa e a agressão física. Sobretudo, verificou-se que a ansiedade parece aumentar os comportamentos dirigidos a colegas de equipa, mas suprimir os comportamentos dirigidos a adversários. É ainda importante salientar que as estratégias de eficácia na resolução dos problemas, os processos de focalização na tarefa e de pensamento desejoso tendem a aumentar a agressão enquanto a redução da tensão, o auto-controlo e a reavaliação da importância diminuem a agressão. O estudo 5 recorreu à metodologia qualitativa demonstrando que a raiva é frequentemente experienciada no desporto e originada por uma multiplicidade de acontecimentos (como os erros, as agressões ou provocações, a falta de esforço dos colegas de equipa, as derrotas, a pressão do treinador e assistir agressões aos colegas de equipa). Esta emoção é percebida como prejudicial e benéfica para o desempenho. Adicionalmente, o comportamento agressivo continua a ser uma parte aceite e promovida do desporto. Enquanto que alguns atletas o percebem como prejudicial para o desempenho, a maioria indicou que a agressão é uma tática de jogo frequentemente utilizada para obter benefícios. Estas crenças explicam parcialmente a persistência da agressão no desporto. Em geral, estes resultados podem contribuir para uma “nova visão” da raiva e agressão no desporto. Tendo em consideração estes dados, direcções para estudos futuros, bem como implicações práticas para profissionais no desporto e intervenção psicológica serão sugeridas.





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## INTRODUCTION

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*The emotions aren't always immediately subject to reason,  
but they are always immediately subject to action.*

William James

Emotions have an undeniable influence on athletic experiences and performance, which has led to multiple theories and investigations about their differential impact on athletes (Eccles et al., 2011; Laborde, Raab, Dosseville, in press). However, despite being one of the most experienced emotions during competition (Isberg, 2000; Nicholls, Jones, Polman, & Borkoles, 2009), there is still a dearth of studies centred on anger in sports. Therefore, the knowledge about the influence of this emotion is still at an early stage. The few studies that have focused on this emotion lack a theoretical guide through which results can be interpreted and integrated towards a better understating of anger.

More recently, encouraged by the recent instrumental/utilitarian accounts on emotion regulation (e.g., Tamir, 2009) some studies have found the potential positive impact of anger on confrontational (e.g., Tamir Mitchell & Gross, 2008; Van Kleef, Dreu, Pietroni & Manstead, 2006) and physical (e.g. Woodman et al., 2009; Davis, Woodman, & Callow, 2010) tasks. However, the potential benefits of anger on performance have previously been hypothesised by Lazarus (2000), who suggested that “there could also be instances in which the mobilized energy behind anger results in better rather than worse performance”. (p. 243).

Furthermore, one of the most important consequences of anger is the aggressive behaviour (e. g., Berkowitz, 1993; Maxwell & Moores, 2007; Spileberger, 1999). Aggression has always been a focus of interest ever of the literature in sport psychology. The curiosity surrounding this topic has been fuelled by media reports about aggressive acts and their prompt explanations for such behaviours. However, despite being address from different “angles”, the complexity associated to these behaviours is yet to be fully uncovered (Kimble, Russo, Bergman, & Galindo, 2010). Theoretical approaches and empirical studies usually focus on a specific

contextual factor or a possible associated variables, but fail to combined and integrate all the elements underlying human behaviour (Smith, 2006).

One of the most serious problems with the study of aggression in sport is its operational definition. The distinction of what constitutes or not an act of aggression has been aim of controversy for some years now (Tenenbaum, Stewart, Singer & Duda, 1997; Kerr, 1999, 2002). Recently, this discussion was rekindled with the development of a new measure to access aggression in sports (Maxwell & Moores, 2007, 2008; Kerr, 2008). However, e widely accepted definition of aggression in sports is yet to be accomplished, which contributes the lack of theoretical perspectives in aggression in sport.

Motivated by the recent findings on the instrumental effects of anger on performance, as well as the lack of more integrative studies dedicated to anger and aggression in sport competition, this thesis intends to further explore these variables by taking into account solid theoretical backgrounds and recent integrative perspectives. By exploring patterns of relationships with relevant variables suggested by the literature as associated to these constructs, this thesis intends to significantly contribute for the empirical and theoretical knowledge about anger and aggression in sport competition, as well as promote theoretically based psychological interventions directed at enhancing athletes sports experiences and performance.

In this sense, this thesis is organised in 10 chapters. The first chapter includes the definition and conceptualisation of anger and two major theoretical perspectives: the trait approach to anger (Spielberger, 1999) and the Cognitive-Motivational-Relational theory of emotions (Lazarus, 1991). Additionally, the processes related to emotional experiences will also be described, considering their theoretical background and relationships with anger, namely, appraisals of threat and challenge, coping and motivational processes. The recent research on anger will also be described. Chapter II includes the definition of aggression adopted in this thesis and the classical and the more recent theories on aggression, as well as the main research findings on this issue. Finally, chapter III describes important psychological processes and structures associated with emotional experiences, namely, emotion regulation, self-control, implicit theories and core-self-evaluations.

Chapter IV describes the methodological procedures for this thesis, including the participants, self-report measures, the study of their psychometric characteristics and the procedures. Subsequently Chapter V (Empirical studies), integrates five separate empirical

studies using the same sample, but with different measures, different aims and research questions.

More specifically, study 1 is entitled “Unveiling anger and aggression in sports: The effects of type of sport, gender, age and level of achievement” and explores the differences in anger and aggression according to demographic and sport characteristics. Study 2 was named “Exploring individual differences in the experience of anger in sport competition: The importance of cognitive, emotional and motivational variables” and was performed to analyse individual differences in the experience of anger in sports and its most important correlates and predictors. Study 3 is centred on the processes of anger regulation during sport competition and is entitled “On the search for anger regulation in sports: Combining coping, emotion regulation and self-control”. Additionally, study 4 is more centred on the identification of differential patterns of associated of different types of aggression and was named “Toward a better understanding of aggressive behaviour in sports: An integrative study of its main psychological correlates” (Chapter VIII). Finally, the last study is entitled “Perceptions and beliefs about anger and aggression in sports: a qualitative study with male hockey players” and uses a qualitative approach in order to better understand the subjective experiences of anger and aggression in a sample of roller hockey players.

Lastly, Chapter VI includes a general discussion about the results across all these studies, considering the main and most important findings. Some important directions for future research and the limitations of these studies will also be described, as well as their practical implications.





## CHAPTER I

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### Anger in sports: Theoretical perspectives and empirical findings



## INTRODUCTION

The impact of emotion in human performance has been widely acknowledged (Eccles et al., 2011) and sports have been considered the “perfect” context to study how emotional processes unroll. Athletes often face high levels of pressure, which leads to a full range of emotional experiences (Laborde, Raab & Dosseville, in press). However, the definition of the concept of emotion has been surrounded by controversy and is often confused with related constructs, such as affects, humour and feeling (Dias, Corte-Real, Cruz, & Fonseca, 2013).

However, according to Dias and colleagues (2013), the literature has been consensual regarding three elements of emotional experiences. Firstly, emotions involve physiological changes, such as increases heart beating and facial expressions. Secondly, they are associated to an action tendency, such as running ways when feeling afraid, or reacting aggressively after a provocation. Thirdly, emotions are characterised as subjective experiences, reflecting how an emotion is experienced differently across individuals.

Taking into account these components, Laborde et al. (in press) defined emotion:

*An emotion is a phenomenon that is an organized psychophysiological reaction to the appraisal of ongoing relationships with the environment. This reaction consists of responses at three levels of analysis: subjective, behavioral, and neurophysiological: (a) Introspective reports are generated at the subjective level; (b) at the behavioral level are overt actions or impulses to act; and (c) at the neurophysiological level bodily symptoms and physiological changes make the emotion organismic. Each emotion can be characterized by a hedonic tone (i.e., positive and negative) and by its functional impact on performance (optimizing or dysfunctional) (p.12).*

Therefore, it is important to distinguish the concept of emotion from the concepts of mood and affect (Dias et al, 2013; Gross & Thompson, 2007). The term affect refers to a more broad concept (Frijda, 1994) that includes various states that can be quickly discriminated as good or bad, such as general stress responses, emotions, moods (e.g, depression, euphoria), as well as motivational impulses related to sex, pain, eating, among others (Gross & Thompson, 2007). Affective responses can be classified according to their positive or negative valence, as well as arousal (low and high) (Lane, Beedie & Stevens, 2005; Dias et al., 2013). On its turn, mood states often last longer than emotion and are less intense (Dias et al., 2013). Additionally, while emotions have a specific object and trigger relevant behavioral response tendencies, moods are more diffuse (Gross & Thompson, 2007). For instance, mood states of sadness can be prolonged for hours, days and even weeks and can be more diffuse (no specific identified cause), whereas

anxiety is a reaction to a specific event (e.g., important game/competition), more intense but shorter in time (Dias et al., 2013).

As a part of the human emotional life, anger has always caught the attention of behavioural scientists. Historically, anger can be traced back to 2500 years ago, when Plato recognised it as negative fundamental emotion that must be controlled by reason (Potegal & Novaco, 2011). Subsequently, authors such as Aristotle, Seneca, and Plutarch also suggested that anger arises from the perception of being treated badly, which in turn triggers revenge feelings (DiGiuseppe & Tafrate, 2007). In Buddhism, anger is seen as a moral stain that must be avoided to achieve tranquillity, or as a form of suffering as a result of feeling insulted, defeated or hurt, while Christianity classified anger as one of the seven deadly sins (Potegal & Novaco, 2011).

Darwin mentioned anger as an emotion that drives individuals to actions, causing energetic movements in the heart and the brain. In addition, Darwin provided the grounds for the current definition of anger, by suggesting that anger and rage only differ in degree, therefore implicitly defining anger as a continuum that varies from irritation to rage. However, Freud (1933/1959) considered anger a maladaptive emotion, stressing its destructive nature and the negative consequences of aggression. In his psychoanalytic theory, Freud described aggression as a fundamental instinctual drive derived from angry feelings (Spielberger & Reheiser, 2011).

Averill (1982) analysed studies related to anger that dated back to the World War I and found that most individuals admit becoming mildly to moderately angry, ranging from several times a day to several times a week. In sports, despite being one of the most experienced emotions in sport (e.g., Nicholls, Jones, Polman, & Borkoles, 2009), few studies have specifically investigated this emotion. Therefore, this chapter will describe important theoretical accounts and empirical findings related to the emotional experience of anger and emotions in sport.

Currently, it has been accepted that anger refers to “a psychobiological state or condition, consisting of angry feelings that may vary in intensity, from mild irritation or annoyance to fury and rage, with associated activation of the autonomic nervous system” (Spielberger & Reheiser, 2009, p. 281). In this sense, trait anger reflects the tendency to experience anger more often.

Therefore, this chapter starts with Spielberger's (1999) conceptualization of anger, which suggests several important distinctions within the concept of this emotion, to evolve to a more dynamic model of emotions, the cognitive-motivational-relational theory of emotion (Lazarus,

1991, 1999). Because Lazarus (1991) suggests that emotional experiences involve, as a whole, the processes of appraisal, coping and motivation, these processes will also be described, taking into consideration their relationship with anger.

## TRAIT APPROACH TO ANGER

In the development of a measure to assess anger, Spielberger, Jacobs, Russel, and Crane (1983) conceptualised anger as “an emotional state that consists of feelings that vary in intensity, from mild irritation or annoyance to intense fury or rage” (p. 161). This definition attempted to overcome the conceptual ambiguities that had been, and still are, surrounding the concepts of anger, hostility, and aggression. In this sense, Spielberger et al. (1983) suggested that these concepts must be referred collectively as the AHA! Syndrome (Table 1). Anger is placed at the core of the AHA! Syndrome, since several of its features are used in the definitions of hostility and aggression. Spielberger and Reheiser (2011) argue that anger is highly associated with hostility and frequently motivates aggressive behaviour.

**Table 5**

*Definitions of the AHA! Syndrome*

The AHA! Syndrome	
<b>Anger</b>	Generally refers to an emotional state that consists of feelings that vary in intensity from mild irritation or annoyance to intense fury or rage.
<b>Hostility</b>	Usually involves angry feelings but also has the connotation of a complex set of attitudes that motivate injuring people or damaging objects.
<b>Aggression</b>	Generally refers to destructive or punitive behavior directed toward other persons or objects in the environment.

Adapted from C.D. Spielberger and E.C. Reheiser (2011, p. 406)

Subsequently, Spielberger et al. (1988), within the development of the State-Trait Anger Scale (STAS), introduced the distinction between state and trait anger. As mentioned above, state anger reflects the emotional state while trait anger indicates individual differences in the frequency in which state anger is experienced over time (Spielberger et al., 1983). Overall, individuals high on anger trait tend to frequently experience anger across several situations (Deffenbacher, 1992).

Following new research developments on the measurement of anger, Spielberger and colleagues (1985) also considered noteworthy to distinguish between the experience of anger and different ways in which this emotion can be expressed. Anger expression varies from extreme suppression to overt expression in the form of aggressive behaviour. Hence, two different types of expression of anger were suggested: anger-in and anger-out. The first refers to the frequency in which individuals experience anger but suppress their feelings, whereas anger-out is defined in terms of how often individuals express angry feelings, either verbally or physically (Spielberger et al., 1985).

Further research that led to the development of the STAXI (State-trait Anger Expression Inventory, Spielberger, 1988), introduced the concept of anger-control, which reflects the “tendency to engage in calming and palliative activities that lower arousal and calm the individual” (Deffenbacher, Oetting, Lynch, & Morris, 1996, p. 576). The ability to control anger, or anger-control, can also be viewed as an active coping style with the aim to control the expression of angry feelings or to express them in a socially adequate manner. Additionally, two additional constructs were included in a revision of the STAXI, which resulted in the STAXI-2 (Spielberger, 1999), namely, anger control-out (control of the outward expression of angry feelings), and anger control-in (reducing the intensity of suppressed angry feelings) (Spielberger & Reheiser, 2009).

The long pathway that has culminated in the development of the STAXI-2 (Spielberger, 1999), starting from STAS (Spielberger et al., 1985), has provided several operational definitions and essential distinctions in the experience, expression, and control of anger. These constructs have contributed to a great advance in the research and knowledge about this emotion. For instance, high levels in trait anger, anger expression and anger control were found to be important risk factors for hypertension (e. g. Spielberger et al., 1985)

## **COGNITIVE-MOTIVATIONAL-RELATIONAL THEORY OF EMOTION**

In this perspective, Lazarus (1991) postulates that stress and emotion are not independent processes, arguing that “when there is stress there are also emotions” (p.35), although not always. Theoretically, stress and emotions share overlapping ideas that must be combined into a theory of emotion. Emotions include a wider number of reactions than stress, which is

considered an important aspect of the broader field of emotions (Lazarus, 1993, 2000). Although stress is important on its own, emotions encompass the phenomena of stress and, therefore can provide a far better understanding of individuals' adaptational struggles (Lazarus, 2000).

Therefore, before describing this theory, it is important to focus on how Lazarus (1991, 1993) conceptualises stress. In his perspective, psychological stress was defined as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 21). Thus, the judgment about whether an event is stressful depends on the process of cognitive appraisal. The concept of cognitive appraisals arose from the need to explain individual and group differences in reactions to stressful events (Lazarus, 1993). For instance, under similar condition, an individual can respond with anger, while another with anxiety or guilt. Cognitive appraisals were described as "evaluative cognitive processes that intervene between the encounter and the reaction" (Lazarus & Folkman, 1984, p. 52). Thus, under a stressful encounter, cognitive appraisals reflect a unique way in which the individuals with different characteristics (values, commitments, styles of perceiving and thinking) "view" the situation. Furthermore, this is also a process of categorisation about the significance of what is happening in the situation for individual's personal well-being (Lazarus, 1993, 1999; Lazarus & Folkman, 1984).

Lazarus and Folkman (1984) further distinguished between two types of cognitive appraisals: primary and secondary appraisals. These reflect two evaluative questions, "Am I in trouble or being benefited, now or in the future, and what way?" and "What if anything can be done about it?" (p.31), respectively. Primary appraisals are an evaluation about whether what is happening is relevant for the individual's goal commitments, beliefs about self and world and situational intentions. Values and beliefs are less important, given that a person can have them without acting accordingly (Lazarus, 1991, 1999). Nonetheless, goal commitment is essential to the experience of stress, because individuals will attempt to attain their goals, even through discouragement or adversity. On the other hand, a situation is considered irrelevant if the individual's goals and well-being are not at stake. Consequently, emotions and stress will not occur in the absence of stake to one's well-being (Lazarus, 1999).

More specifically, Lazarus (1991) indicated that primary appraisals have three components, namely, goal relevance, goal congruence, and type of ego-involvement. Goal relevance reflects the extent to which the individual's personal goals are affected by the stressful



encounter. An emotional response will only occur if there is goal relevance. On its turn, goal congruence describes the extent to which the encounter is consistent or inconsistent with the individual's goals, i. e., whether the situation facilitates or undermines his or her personal goals. Lastly, type of ego-involvement encompasses different aspects of ego-identity or personal commitments, namely, self- and social-esteem, moral values, meanings and ideas, other individuals and their well-being, ego-ideals and life goals. Most emotional experiences involve ego-identity, but in different types of involvement. For instance, in anger the self- or social-esteem is often threatened, while in shame all the six types of ego-identity are compromised.

As denoted previously, the experience of stress implies a stake for the individual's well-being and goals. This stressful encounter, or in Lazarus's (1999) terms, transaction, can be appraised in three different alternatives: Harm/loss, threat, and challenge. When a transaction is appraised as a harm/loss, the damage has already occurred. Threat appraisal occurs when the transaction implies a possibility of damage in the future. Conversely, in challenge, the individual appraises a potential for gain or growth and feels challenged to overcome the obstacles. Most performers, such as musicians, athletes and actors tend to enjoy the effects of challenge, but loathe the potential negative effects of a threat (Lazarus, 1991, 1999). Nonetheless, Lazarus and Folkman (1984) pointed out that appraisals of threat and challenge are not mutually exclusive. For example, a job promotion can be appraised as a challenge by considering the new gains associated with it, but at the same time can be appraised as a threat, by taking into account the risk of new demands and of not performing as expected. Thus, threat and challenge can occur simultaneously, but should be considered as two separate constructs that are often related.

In addition to appraising whether the situation compromises the well-being (primary appraisals), individuals appraise what can be done about the stressful person-environment relationship, or in Lazarus's (1991) own words: "What, if anything, can I do in this encounter, and how will what I do and what is going to happen affect my well-being?" (p. 134). Secondary appraisals also have three different components: Blame or credit, coping potential, and future expectancy. Blame and credit can be external, when directed to another individual, or internal, when directed to oneself. This implies knowing who was responsible or accountable for the frustration. Coping potential refers to how and whether the individual would deal with the demands of the transaction or update personal commitments. Future expectancy indicates whether the situation will change psychologically for better or for worse.

Lazarus and Folkman (1984) also suggested the concept of reappraisal as a "changed

appraisal on the basis of new information from the environment, which may resist or nourish pressures on the person, and/or information from the person's own reactions" (p. 38). To put it simply, reappraisal is an appraisal that follows a previous one in the same stressful encounter. This process often occurs after initial hasty and unreflective appraisals, when individuals have the opportunity and time to reevaluate the situation (Lazarus, 1991). In general, these cognitive appraisals mediate the transaction between the environment and the individual, in which original threat appraisals can be reappraised as acceptable or, on the contrary, a benign appraisal can be reappraised as a threat. This creates a cycle of changing emotions and appraisals occurring throughout the encounter (Lazarus & Folkman, 1984; Lazarus, 1991).

As the stressful encounter unfolds, the environment is in constant change, generating new information that must be appraised. These changes stem from coping processes, "whose function is to alter a troubled person-environment relationship or to sustain a desirable one" (Lazarus, 1991, p. 112). Coping was defined as "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" (Lazarus & Folkman, 1984, p.141). While appraisals refer to an evaluation of the encounter and the individual's coping options, coping processes refer to what the individual actually does (Lazarus, 1999).

Nonetheless, coping processes have an important influence on appraisals and in the personal significance of the person-environment relationship, and consequently, in the emotional experiences. According to Lazarus (1991), coping processes influence emotions in two different ways. Coping processes can change the actual relationship person-environment, and therefore changing the emotional response. An individual, for instance, can use a coping strategy that solves the problem that is causing him or her stress, changing the emotional responses (problem-focused coping). However, coping responses often fail to amend the source of stress, and can sometimes even cause more stress. Additionally, coping processes can just change the way the situation is evaluated or interpreted (emotion-focused coping). Although these strategies do not change the actual relationship, they change its personal meaning for the individual. For example, avoiding thinking about a stressful encounter can successfully ameliorate the anxiety associated with it.

From a practical standpoint, these concepts are hard to distinguish. Cognitive appraisals influence coping strategies, and coping, on its turn, changes appraisals by changing the person-environment relationship. Thus, coping often stems from emotion, but is also directed at its

regulation. In addition, coping follows an initial appraisal, and consequently changes the emotional reaction. Lazarus (1991) proposes an analogy of an electric short-circuit system to describe these processes. For instance, when facing a provocation, an individual can respond with anger, but by reappraising the situation, he or she can find that the provocation was misunderstood, changing the emotional response. In this sense, an emotion should not be conceptualized as just a response, but must include the appraisals that had generated it, as well as coping processes that may influence its quality and intensity.

These constructs of stress, cognitive appraisals, and coping form the fundamental basis of Lazarus's (1991) theory. In fact, the concepts of stress, emotion, and coping must be analysed as a whole, otherwise the nature of the phenomenon of emotion is distorted. Within these concepts, emotion is the "superior" construct that encompasses stress and coping (Lazarus, 1999). For Lazarus (1993), although the concept of stress has progressed from a unidimensional (activation) to a multi-dimensional (e.g. harm, threat, challenge) view, adding around 15 specific emotions certainly has expanded and complexified the knowledge about individuals' adaptive struggle. In this context, emotion was defined as "an organized psychophysiological reaction to ongoing relationships with the environment, most often, but not always, interpersonal or social" (Lazarus, 2000, p. 230).

Lazarus (2000) further identified negatively toned emotions, such as anger, anxiety, fright, sadness, guilt, shame, envy, jealousy, and disgust, as well as positively toned emotions, such as happiness/joy, pride, love, gratitude, and compassion. According to Lazarus (1991) positive and negative emotions are distinguished on the basis of "the harmful person-environment relationship eliciting an emotion, negative emotions always point to negative causal conditions, a meaning that should be distinguished from the negative subjective quality and from the negative adaptational consequences" (p. 7). In other words, Lazarus (1999) suggests that negatively toned emotions arise from goal thwarting or delay, whereas positively toned emotions arise from making progress toward goal gratification.

However, Lazarus (1999) argues that this division between positively and negatively toned emotions can lead to some confusion. Although positively toned emotions tend to arise in circumstances favourable to the attainment of important goals, they are also often associated to harm or threat. For instance, hope is often experienced in situations in which individuals have to prepare for the worst, but at the same hope for better. Consistently, the same adaptational encounter can be "stage" of several emotions occurring simultaneously, given that individuals

have different goals for the same event. In the specific case of sports, the study of emotions is even more complex, because emotions vary across individuals and types of sports. In order to uncover which emotions are more relevant, it is necessary to carefully describe athletes' emotional experiences both during training and in different competitive conditions, and explore their association with performance (Lazarus, 2000).

Cognitive appraisals that mediate stress responses must, therefore, be applied to emotions. In this sense, a fourth type of appraisal (in addition to harm/loss, threat, and challenge) was introduced – benefit -, which is a gain that has already occurred. By adding this type of appraisal, it is possible to encompass both positively and negatively toned emotions that arise from stress. Thus, as with stress, emotion is also influenced by individual factors, such as personal values, goals, goal hierarchies, belief systems, personal resources, and important events. In addition to environmental variables, these individual factors shape appraisals, which in turn provide the cognitive-motivational-relational key to each emotion (Lazarus, 1999, 2000). That it, the large array of emotional experiences stems from the “different plot or story about relationships between a person and the environment” (Lazarus, 1993, p. 12). Each emotion arises within a specific scenario, which is a result of the appraisal process about the significance of the stressful encounter. This “scenario” was called relational meaning, which is unique for each emotion. To better explain this concept of relational meaning, Lazarus introduced the following comparison:

*When I was a young man in college, it seemed strange to me that two gases, hydrogen and oxygen, when combined in a particular way (H<sub>2</sub>O), produced something altogether unlike either gaseous component. Only one particular combination of the two elements (two molecules of hydrogen and one of oxygen) will result in water, which adds to the value of the chemical analogy for relational meaning and emotion (Lazarus, 1991, p.90).*

By using this comparison, Lazarus (1991) suggests that the combination of specific different elements produce another completely different element, emotion. This process is relational because it takes into account personal factors and environmental demands, as well as constraints and opportunities of the situation. The relational meaning of each emotion was called core relational theme, and refers to a “composite summary for each emotion of a set of six separate appraisal judgments” (Lazarus, 2000, p. 233), which produces a single complex meaning. These components correspond to the three components of both primary and secondary appraisals mentioned above, namely, goal relevance, goal congruence, type of ego-involvement,

options for coping, coping potential, and future expectations.

**Table 6**

*Core relational meaning for each emotion*

<b>Emotion</b>	<b>Core relational theme</b>
Anger	A demeaning offense against me and mine.
Anxiety	Facing uncertain, existential threat.
Fright	An immediate, concrete, and overwhelming physical danger.
Guilty	Having transgressed a moral imperative.
Shame	Failing to live up to an ego-idea.
Sadness	Having experienced an irrevocable loss.
Envy	Wanting what someone else has.
Jealousy	Resenting a third party for the loss of, or a threat to, another's affection or favor.
Disgust	Taking in or being too close to an indigestible object or (metaphorically speaking) idea.
Happiness	Making reasonable progress toward the realization of a goal.
Pride	Enhancement of one's ego-identity by taking credit for a valued object or achievement, either one's own or that of someone or group with whom one identifies.
Relief	A distressing goal-incongruent condition that has changed for the better or gone away.
Hope	Fearing the worst but wanting better.
Love	Desiring or participating in affection, usually but not necessarily reciprocated.
Compassion	Being moved by another's suffering and wanting to help.

Source: R. Lazarus (1993, p. 13)

Table 1 presents the core relational themes for each emotion. Taking these into consideration, it is easier to understand how different individuals, in different situations, can have the same emotional experience, or on the other hand, have different emotions in the same encounter. Consistently, emotions are “transformed” into other emotions by changing the meaning associated with a particular situation. As Lazarus (2000) stated: “Change the meaning and the emotion changes” (p.234). This change can be a result of changes in the environment, but can also be self-generated. That is, after experiencing a given emotion, an individual can appraise the situation differently, and transform it into another emotion. Understanding these dynamics of appraisals is key to understand emotions.

Another important aspect of Lazarus's (1991, 1999) perspective that must be further explored is the motivational principle that underlies this cognitive-motivational-relational theory of emotion. Motivation is an important variable to properly understand how a stressful encounter results in good or bad outcomes, from the individual's standpoint. More specifically, motivation is what determines whether the situation is appraised as harmful or beneficial for the individual's

goals. Thus, as Lazarus (1991) put it: “Emotions are first and foremost reactions to the fate of active goals in everyday encounters of living and in our lives overall” (p. 92). If there is no goal at stake, there is no stress or emotion, which in the end are a result of how individuals appraise the destiny of their goals in a transaction, as well as in life in general (Lazarus, 1999).

After appraisals, coping processes are the second most important construct in this theory of emotion. This process is “responsible” for managing or regulating emotions by using several strategies, such as reappraising the significance of the situation, changing the person-environment relationship, suppressing their expression, etc. Although other authors tend to conceptualize coping as a process related to stress, Lazarus (2000) points out that coping should be treated as part of the study of emotions. In fact, in addition to appraisals, coping determines which emotion will occur and emotions are changed. For instance, if an athlete fears it might lead to a retaliation from a powerful opponent, he or she is less likely to express the anger or may reappraise the conditions for it, which changes the relational meaning that led to the anger, changing it to a different emotion such as anxiety or guilt.

Thus, coping acts as a mediator between the reaction to the situation that had provoked the emotion and the subsequent emotion. That is, what individuals think and do to cope has an influence on emotion that had emerged in the person-environment relationship. In this sense, coping must be considered an integral part of the emotional process, since it has an impact on the initial stage of the emotion generation and throughout its unfolding.

In conclusion, Lazarus (1999) suggests that this theory “points us toward the adaptational trials and errors that are made in our continuing efforts to deal with harm, threat, challenge, and benefit” (p. 278). Additionally, it points out that, in order to fully understand emotional experiences, it is necessary to study its cognitive, motivational, and relational variables associated with it. In this perspective, these variables are part of every emotional phenomenon that should be studied as a whole. Hence, the combination of cognitive, motivational, and emotional variables are essential psychological ingredients that must be considered in the individual’s different contexts in order to analyse adaptive and maladaptive behaviours.

### **The emotion of anger**

Within the cognitive-motivational-relational approach (Lazarus, 1991), anger arises when the individual’s ego-identity is at stake. However, an individual can also experience anger by watching a helpless person, or a child, being assaulted. This happens because anger can also be

vicarious, occurring as a reaction to a dangerous social situation. Besides, assaulting a helpless person also constitutes an attack to the individual's values and meanings, which are a part of ego-identity. Another example is waiting in line, which can cause frustration, and be seen as an offense resulting in anger even if no one tries to cut the line. Nonetheless, anger is not just a result of assaults to ego-identity, personality variables have also an important role in the tendency to experience anger. An offense can cause anger in an individual with a vulnerable ego-identity, while another individual can just ignore or reinterpret it. It is not being vulnerable that causes anger, but the personality trait certainly contributes to this emotion, particularly in mild provocations.

The core relational meaning for anger is a demeaning offense against me and mine. To justify this meaning Lazarus (2000) used the example of leaders, politics, and populations that collectively appraise an offense to their country, giving origin to long-lasting wars. Given these potential destructive consequences, this author considers important to understand the cognitive, and motivational variables associated, suggesting that the same must be applied to sports. Additionally, anger involves an "impulse to counterattack in order to gain revenge for an affront or repair a wounded self-esteem" (p. 243), which is what makes this emotion dangerous (Lazarus, 2000).

As Lazarus (1991) proposes, an angry individual feels offended and appraises a threat to his or hers ego-identity, which can be conscious or not. According to this author, even the simplest frustration can make an individual feel not worthy of esteem, which leads to an anger response. In this sense, an offense reflects a not simply the frustration of not attaining a goal, but also a perceived harm to the individual's identity. That is, frustration only leads to anger when the individual perceives to be treated in a demeaning manner, either by words or acts. If this meaning is not present, frustration would lead to other emotions, such as anxiety or shame.

Thus, the experience of anger, as well as the other emotions, depends on the complex personal meanings individuals attribute to the environmental transaction. These meanings can be flexibly changed, or manipulated by processes of appraisal and coping. Therefore, Lazarus (1991) posits that to "make sense of what people feel requires, I believe, that we examine how they think and act to cope with the demands, constraints, and resources presented by their environments and to actualize personality characteristics such as goals and belief systems" (p. 221). In this sense, it is proposed that emotions, including anger, can only be fully understood by considering all the variables involved in its experience.

Table 7

*Appraisals in the generation of anger*

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Appraisals for Anger
<b><i>Primary Appraisal Components</i></b>
1. If there is goal relevance, then any emotion is possible, including anger. If not, no emotion.
2. If there is goal incongruence, then only negative emotions are possible, including anger.
3. If the type of ego-involvement engaged is to preserve or enhance the self- or social-esteem aspect of one's ego-identity, then the emotion possibilities include anger, anxiety, and pride.
<b><i>Secondary Appraisal Components</i></b>
4. If there is blame, which derives from the knowledge that someone is accountable for the harmful actions, and they could have been controlled, then anger occurs. If the blame is to another, the anger is directed externally; if to oneself, the anger is directed internally.
5. If coping potential favors attack as viable, then anger is facilitated.
6. If future expectancy is positive about the environmental response to attack, then anger is facilitated.

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Appraisals 1 to 4 are sufficient and necessary for anger to occur – Source: Lazarus (1991, p. 226)

Lazarus (1991) points out that the best way to distinguish anger from other negative emotions is through the appraisals that had led to its generation. Appraisals are presented in a sequence in order to facilitate the comprehension of how anger is generated, and to follow a more theoretical logic by specifying appraisals until the emotion. Schematizing appraisals in a sequence does not mean that these follow any order in real life (Table 3). The first appraisal mentioned by Lazarus (1991) is goal relevance, which is essential for every emotion to occur. Emotions, including anger, only arise in situations where a goal is at stake otherwise no emotion is generated. Goal congruence, or goal incongruence, reflects whether an emotion will be positive or negative. Positive emotions arise in goal congruent encounters, whereas negative emotion arises in goal incongruence encounters. In terms of type of ego-involvement, anger is only activated when there is a basic motive to “preserve or enhance self-esteem against assault” (Lazarus, 1991, p. 222).

Moving on to secondary appraisals, blame is also an essential component in anger generation. If an individual accounts himself responsible for the damage or threat to identity (internal accountability), anger can occur, as well as guilt, or shame. On the other hand, anger toward another individual can occur if another person is held responsible for the damage or threat (external accountability). Nonetheless, external accountability is not exclusive to anger, given that other negative emotions can arise, such as fright-anxiety, disgust, and envy-jealousy.



Attributing the control of the encounter, therefore the blame, to another individual is what distinguishes anger from all other negative emotions. Moreover, if no one is held responsible, anger will not occur, but sadness can arise instead.

In anger, the appraisals of coping potential reflect an evaluation that an attack is the best response to a demeaning offense. If, conversely, the individual does not consider an attack to be the appropriate response, this action tendency will be inhibited, or another emotion could occur. Afterwards, the individual has to answer one remaining question, that is, what are the consequences of his or hers coping responses (future expectations). Indeed, an attack caused by anger can result in retaliation, social disapproval, or punishment. While in coping potential the individual evaluates whether an attack is a viable response, in future expectancies the individual weights the cost and benefits of this response.

Specifically in sports contexts, actions by coaches, opponents, spectators, oneself, and even an argument with a lover the previous day of the competition may originate anger. Therefore, as mentioned above, anger can be directed towards the person (which can also be an institution or an event) whom the individual attributes the blame for an offense (to whom the individual intends to retaliate to repair the wounded self-esteem), or oneself. In both these cases, this emotion can impair performance, although the latter can be worst. That is, self-blame can not only cause an interference on performance, but can also induce a loss of motivation, particularly among athletes with low self-esteem. However, there is still no empirical evidence on which is worst, attributing the blame to others or to oneself (Lazarus, 2000).

Despite considering that anger most often impairs performance, Lazarus (2000) proposes that: “there could also be instances in which the mobilized energy behind anger results in better rather than worse performance. I am thinking of a competitor who makes a compensatory self-statement “I’ll show [expletive] referee [or coach or whomever]” and tries all the harder to attend to what his opponent is doing and concentrate on his actions in the match” (p. 243). This idea was recently tested within the new instrumental perspectives on anger (e. g., Tamir et al., 2008; Lane et al., 2011).

## **THE TRIAD OF APPRAISALS, COPING AND MOTIVATION**

On the grounds of Lazarus theory (1991, 1991, 2000), the following section intends to provide a

deeper understanding of important processes suggested by Lazarus (1991, 1999, 2000) as involved in the generation of emotion experiences. Therefore, and because appraisal of threat and challenge are more relevant in the context of sport, some theories regarding these appraisals will be described, as well as the main appraisals implicated in the generation of anger. Secondly, a more in depth analysis of coping in sport will be present, taking into account its definition, different classifications and some recent research findings concerning this topic. In addition, recent research findings on how individual generally cope with anger will also be described.

Finally the dichotomy approach and avoidance motivation was adopted in order to account for the motivational variables involved in the experience of anger. This motivational approach was selected because it provides a more general conceptualization of motivated behaviour (Carver, 2006), but also, and more importantly, because it has particular relationship with anger, which has recently been fuelling the attention of the literature (Carver & Harmon-Jones, 2009). Therefore, the definition of both these motivational mechanisms will be described, as well as its main theoretical perspective: the self-regulation theory (Carver & Scheier, 1998). Subsequently, the relationship of anger with these two types of motivation will be analysed.

### **Appraisals of threat and challenge**

Sport competition, as well as other stressful achievement situations, often involves dealing with uncertainty, which yields a wide range of emotions, positive (e.g. hope, pride and joy) and negative (e. g. anxiety, anger and fear) (Skinner & Brewer, 2002). As mentioned above, each emotional experience depends on the process of appraisal (Lazarus, 1991, 1999; Lazarus & Folkman, 1984). According to Jones, Meijen, McCarthy, and Sheffield (2009) athletes can be generally divided into those who appraise the competition as a threat (negatively) or those who appraise it as a challenge (positively). Although Lazarus (1991, 1999) indicates the other possibilities of appraising stressful encounters are gain and loss, given the uncertainty associated with sport competition, it seems plausible that these two types of appraisals have not been considered in the field of sport sciences. Moreover, 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“ (Jones et al., 2009, p. 162).

Across the literature in achievement contexts, three major models can be applied to the sport context: the Model of Adaptive Approaches to Competition (MAAC; Skinner & Brewer, 2004), the Biopsychosocial (BPS; Blascovich & Mendes, 2000), and the Theory of Challenge and

Threat States in Athletes (TCTSA; Jones et al., 2009). These theories will be briefly described below, considering their conceptualization of threat and challenge appraisals and their main predictions.

### ***Model of adaptive approaches to competition***

This model suggests an adaptive approach to stress in achievement situations by focusing on challenge appraisals, positive emotions and beneficial perceptions of emotions. Two studies by Skinner and Brewer (2002) with psychology studies provided the basis for its main predictions. In both studies, participants completed measures of cognitive appraisals, coping expectancies, and positive and negative emotions. The first study revealed that faculty members tended to appraise the situation as less threatening, more challenging and with more positive coping expectancies, more positive emotions, and beneficial perceptions of emotion, comparing to students.

In the second study, threat and challenge appraisal styles were also negatively associated, while higher coping confidence was associated with lower threat appraisals and higher challenge appraisals. In this study, state variables were also considered, demonstrating that higher levels of state threat appraisal were associated with higher trait threat appraisals, lower coping expectancies, more negative emotions and a harmful perception of state appraisals and emotion, whereas state challenge appraisal showed the exact opposite pattern. An analysis of the exam results showed that a better performance was associated with more positive coping expectancies and more beneficial perceptions of state challenge at times 2 and 3. Additionally, it was also reported that students' state challenge and coping expectancies decreased over time (from 1 to 3), as well as beneficial perceptions of anxiety, state challenge, and threat.

Bearing these findings in mind, as well as previous theoretical assumptions (Lazarus, 1991; Lazarus & Folkman 1984; Sarason & Sarason, 1990), Skinner and Brewer (2004) developed a model of adaptive approaches to competition. According to this model, positive emotions are more likely to occur in situations appraised as a challenge and tend to be perceived as beneficial to performance. Conversely, negative emotions tend to arise in situations appraised as a threat and are perceived as harmful to performance.

In addition, the influence of trait threat and challenge appraisal styles on the appraisals and emotions of a specific situation is mediated by event-specific coping expectancies, which reflect the perceived ability to coping with stress and manage emotional experiences. Specifically,

coping expectancies activate the significance behind threat and challenge appraisals. This significance indicates whether the fears associated with threat appraisals will arise, leading to anxiety and state threat, or the goals associated with challenge appraisal will be attained, and thus leading to positive emotions and state challenge. In this sense, more positive coping expectancies (perception of better ability to deal with stress) are expected to facilitate beneficial perceptions of emotions, whereas low coping expectancies facilitate harmful perception (Skinner & Brewer, 2002, 2004).

On its turn, the valence of an emotion (negative vs. positive) also influences beneficial and harmful perceptions. That is, the perception of emotions is more favourable when the valence is positive (Skinner & Brewer, 2004). Therefore, a negative emotion, such as anxiety, is suggested tend to be perceived as harmful for performance, while positive emotions are thought to increase a beneficial perception by relieving the stressful situation and helping to maintain coping efforts during prolonged demands (Folkman & Moskowitz, 2000; Skinner & Brewer, 2004). In this sense, higher levels of positive emotion and state challenge tend to be perceived as beneficial in preparation and performance as opposed to anxiety and state threat, which tend to be perceived as harmful. However, negative emotions do not necessarily lead to a harmful perception. In line with Lazarus (1991; Lazarus & Folkman, 1984) predictions, fear and worries about a bad performance (important aspects of threat appraisals) are influenced by coping expectancies. Skinner and Brewer (2004) suggest that having higher levels of coping expectancies can lead to perceiving mild cognitive and somatic anxiety as beneficial and advantageous to performance.

Drawn upon these predictions, Skinner and Brewer (2004) pointed out some important implications for sport contexts, both for future research and practice. Firstly, the strong influence of coping expectancies on threat appraisals may suggest that when athletes perceive high coping expectancies, precompetitive worries (anxiety) can motivate them to increase their efforts to avoid failure. Secondly, and perhaps the most important implication of this theory, is the key role of challenge appraisals and positive emotion in achievement situations. Indeed, state challenge appraisals seem to increase the beneficial perception of mild anxiety. Besides, as reported in Skinner and Brewer's (2002) study, beneficial perceptions of challenge had a greater positive impact on performance comparing to threat. Therefore, it is suggested that future research must attempt to replicate this findings in a sample of athletes. Consistently, as it was found that positive emotions are perceived as beneficial to performance, psychological interventions should focus on promoting these emotions, instead of reducing anxiety.

Moreover, Skinner and Brewer (2004) posit that athletes can experience threat and challenge simultaneously. In their own words, “an athlete might also display a dual threat/challenge appraisal style in which he or she is high on cognitive anxiety, a construct similar to threat, but can nevertheless see sport competitions as challenging opportunities for success and other personal benefits” (p. 298). This idea implies that future research should consider two subgroups of athletes: those with a single appraisal style and those with dual appraisal style.

### ***The Biopsychological Model of Challenge and Threat***

It is important to highlight that this theoretical model is only applied to performance situations in which the psychological demands are higher than the physical demands, i.e., “nonmetabolically demanding performance situations” (Blascovich & Mendes, 2000, p. 60). Within these performance situations, this model is specifically concerned with situations that require active performance, such as game playing and sport competition, rather than passive performance, such as reading a book and listening to music.

Before outlining this model, it is also important to describe how the concepts of challenge and threat appraisals are operationalised within this framework. For Blascovich and Mendes (2000), threat and challenge “represent person/situation-evoked motivational states that include affective (or emotional), cognitive, and physiological components” (p. 60). In this sense, these states are the result of the interaction of physiological, cognitive, and affective processes. Physiological processes reflect approach and avoidance systems, cognitive processes are represented by Lazarus’s (1991) core relational themes and affective processes refer to negative and positive feelings and emotions.

According to Blascovich and Mendes (2000), challenge occurs when an individual appraises sufficient or almost sufficient resources to deal with the demands of the situation, while threat occurs when an individual appraises insufficient resources to deal with those demands. These states are idiosyncratic in the sense that an individual can experience threat whereas the other can experience challenge when facing the same situation. Even the same individual can experience threat at one time, and challenge in another time in the same situation. Situations in which the perception of resources is far superior comparing to the demands can make the performance situation nonevaluative, and therefore challenge and threat states will not occur. Furthermore, this model also highlights that threat and challenge states only occur in

performance situations perceived as goal-relevant and evaluative, that is, individuals must perceive that a good performance is important for their well-being or growth, and that there is an evaluation involved, either from them or others. Examples of these situations are sport competition and auditions for a role in a theatre play.

Moreover, performance situations and challenge and threat states are mediated by the cognitive appraisal process. Consistently with Lazarus (1991), this model also posits that appraisal can be primary, which refer to an evaluation of the demands of the situation and secondary, which reflect an evaluation of individuals' resources to deal with the situation. More specifically, demand appraisals include a perception or assessment of danger, an evaluation of the uncertainty of the situation and the required effort to deal with it. On their turn, resource appraisals include the perception or assessment of the knowledge and skills important for the performance situation.

Both demand and resource appraisals can be made unconsciously. An individual can appraise the performance situation, but not be aware of this process. For instance, a chess player can compare the different game hypotheses without being aware of this process. Therefore, it is possible to make nonconscious demand and resource appraisals, resulting in challenge or threat appraisals. In addition, conscious or unconscious appraisals can occur simultaneously in parallel. However, conscious appraisals consume more time and are more elaborate, although in familiar performance situations they can occur rapidly. The more aware (conscious) individuals are of the appraisals process, the more time consuming and elaborate the process will be.

But the main focus of this model is the cardiovascular response patterns associated with threat and challenge states. Blascovich and Mendes (2000) suggest that cardiovascular patterns can identify these states, as well as provide a basis to analyse associated psychological and social factors. These patterns were based upon "automatically and endocrinologically controlled cardiovascular responses" (Blascovich & Mendes, 2000, p. 65). Hence, a challenge pattern is characterised by an increase in the cardiac activity caused by an activation of the SAM (sympathetic-adreno-medullary), and an increase in stroke volume as a result of left-ventricular contractility. Together, increase in heart rate and enhanced left-ventricular contractility generate an increase in the cardiac output. As SAM is activated, it releases epinephrine, which in turn causes vasodilatation, that is, a decrease in peripheral vascular resistance (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996).

On the other hand, challenge is characterised by an increase in both SAS and PAC (pituitary-adreno-cortical). Specifically, the activation of the PAC releases adreono-corticotrophic hormone, which leads to the segregation of corticosteroids into the bloodstream by the adrenal cortex. The PAC activity inhibits the release of epinephrine triggered by the SAM. Thus, although cardiac activity is enhanced, it does not lead to vasodilatation (decrease in systemic vascular resistance). In fact, vasomotor tone does not change and may even decrease. These patterns provide continuous online information about challenge and threat states and the changes in appraisals over time, providing a clear distinction of these states in the individual. Consequently, although admitting the importance and utility of self-report instruments, Blascovich and Mendes (2000) suggest that physiological patterns are a more reliable measure of threat and challenge states.

Recently, a study has applied this model to the context of sport (Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004), with baseball and softball players. The main aim of this study was to explore the relationship between pre-performance motivational states of challenge and threat and performance in sport competition. Results showed that participants who had a challenge pattern performed better during the season than participants who had a threat pattern. Besides, patterns of challenge and threat explained a large percentage of the variance in players' performance. The importance of this study lies on the fact that it has found predictive validity of the BPS model in a real-world context, which had only been tested in laboratories up until then.

### ***Theory of Challenge and Threat States in Athletes (TCTSA)***

The TCTSA provides an integrative model of the previously mentioned theories, the Model of Adaptive Approaches to Competition (Skinner & Brewer, 2004), and the Biopsychosocial (BPS; Blascovich & Mendes, 2000), as well as the model of debilitating and facilitative competitive state anxiety model (Jones, 1995). Several aspects of these theories were combined into a broader and more thorough analysis of threat and challenge appraisals in sport. The main aim of this theory is to understand how athletes respond in competitive situations. Because athletes' appraisals of resources and demands vary according to situations and their responses are dynamic, this theory focuses on state responses. Nonetheless, it is acknowledged that dispositional traits, such as hardiness, optimism, and perfectionism, for example, have an influence on how athletes will appraise sport competition (Jones et al., 2009).

Therefore, taking into account these models, this theory posits that appraisals result from an evaluation of the demands and resources available in a given situation. Besides, and in line with the BPS model, challenge and threat states occur in situations appraised as goal-relevant and evaluative. The more important the situation is for the athlete, the more intense the emotional response will be. For instance, an athlete might have a more intense emotional response in an important competition comparing to a regular competition. While demand appraisals are determined by the relevance of the situation, resource appraisals result from a combination of three factors: self-efficacy, perceptions of control and goal orientation. In this sense, the TCTSA attempts to understand "athletes responses to competitive situations by explaining how self-efficacy, perceptions of control and goal orientation interact to determine challenge and threat states" (Jones et al., 2009, p. 164).

Self-efficacy refers to individuals' judgments about how well they will be able to perform in a certain situation (Bandura, 1993). This construct is an important aspect of resource appraisals given that athletes' belief about whether they have the skills to attain their goals has an impact on the perception of their ability to cope with the demands of the competition. According to Jones et al. (2009), athletes who believe they have the skills to deal with the demands of a given situation tend to experience a challenge state. But this belief is not sufficient, because athletes must also believe that they have enough control to use their skills.

Thus, perceived control of the competition influences resource appraisals, and consequently, whether athletes would experience state challenge or threat. Besides feeling able



to perform the necessary actions to succeed, athletes must also perceive control over the situation. For example, a cyclist may feel confident of his or her skills, but he or she may not believe that the atmospheric conditions will allow a good performance. However, the fact that there are many aspects in sport competition out of the athletes' control does not necessarily lead to a threat state. This state only occurs when athletes focus on uncontrollable factors, which can result in a low perceived control. Conversely, athletes can focus on controllable factors that can perhaps lead to a challenge state (Jones et al., 2009).

Another construct that is important to resource appraisals is the athletes' goals. In line with the achievement goal theory (e.g., Ames & Archer, 1988), there are two types of goals: achievement and mastery goals. The first reflects a focus on increasing competence by learning skills, while the latter focus on showing competence comparing to others and validating one's ability or avoiding a lack of ability (Grant & Dweck, 2003). Subsequently, this theory was expanded (Elliot & Church, 1997), and the performance goal construct was divided into approach and avoidance components, leading to a trichotomous model (mastery goals, performance-approach (PAp) goals, and performance-avoidance (PAv) goals). While individuals with approach goals attempt to be more competent, individuals with avoidance goals attempt to avoid incompetence. In an attempt to develop a more comprehensive model, Elliot and McGregor (2001) added a fourth achievement goal, mastery avoidance goals, suggesting a 2x2 achievement goal approach. Thus, mastery approach goals represent the motivation to become more competent in relation to a personal target (e.g., beat a personal record), whereas mastery avoidance goals represent the motivation to avoid becoming incompetent in relation to a personal target (e.g., avoid a performance worst than a personal record).

Research in sport has generally shown that individuals with avoidance goals are more likely to appraise competition as a threat whereas those with approach goals (especially mastery) tend to appraise it as a challenge. In turn, a challenge state may lead to higher self-efficacy beliefs and feelings of control, which can enable a more focused performance rather than just avoiding incompetence. However, while mastery approach goals are associated with challenge state, this relationship is not as clear with performance approach goals. Jones et al. (2009) suggest that self-efficacy and control influence this relationship. Specifically, an athlete may experience a challenge state if he or she strives to be better than others, perceives control over the competition, and believes to have the necessary skills to achieve success.

Generally, the TCTSA suggests that athletes tend to experience a challenge state when the following factors are present: high self-efficacy, perception of control and a focus on approach goals. Consistently, threat state arises when the athlete has low self-efficacy, low perceived control and avoidance goals. The constructs of self-efficacy, perceived control and achievement goals are interrelated, in the sense that “an athlete needs to have a high perception of control to experience high self-efficacy and be focused on demonstrating competence in the sport setting” (Jones et al., 2009, p.166). Additionally, this theory also posits that the appraisal process behind the evaluation of demands and resources can be conscious or unconscious, and vary throughout competition as individuals are continuously reappraising.

In an attempt to further develop the TCTSA, Jones et al. (2009) analysed the emotional and physiological correlates of threat and challenge states. In terms of physiological responses, and drawn upon the BPS model, the TCTSA posits that a challenge and threat states are characterised by different physiological patterns. Specifically, a challenge state is associated with an increase in the sympathetic-adreno-medullary (SAM), epinephrine and cardiac activity, and a decrease in total peripheral vascular resistance (TPR). Conversely, a threat state is characterised by an increase in SAM, as well as in pituitary-adreno-cortical (PAC) activity.

Focusing on emotional patterns, the TCTSA proposes that negative emotions are more likely to occur on a threat state, whereas positive emotions are more likely to occur on a challenge state. However, Jones et al. (2009) suggested that it is conceivable that negative emotions, such as anxiety and anger, can arise in a challenge state. Such emotions can have a motivational function and therefore be consistent with challenge appraisals. For instance, Jones et al. (2009) argue that as a challenge state can also occur with some degree of uncertainty and potential for loss, it is likely that anxiety, an emotion often associated with uncertainty, would be experienced.

The main novel idea of the TCTSA is that negative emotions are thought to also occur on a challenge state and be perceived as useful to performance. For instance, there is some evidence suggesting that feelings of anxiety can be perceived as helpful for performance (Cerin, 2003). In a similar vein, Hanin's (2000) model Individual Zones of Optimal Functioning (IZOF) suggests that negative affect can be seen as helpful for performance. Specifically, two studies (Ruiz & Hanin, 2004, 2011) have found that anger can be perceived as functional for performance. However, whether negative emotions are seen as helpful for performance seems to depend on self-efficacy and perceived control. Indeed, research has suggested that high perception of

control and self-efficacy are associated with perceiving anxiety symptoms functional for performance (Skinner & Brewer, 2002). Thus, other negative emotions can potentially be seen as useful in sport completion (Jones et al., 2009).

But most importantly, Jones et al. (2009) also sought to understand how states of threat and challenge influence performance. Within their framework, cognitive, emotional and physiological factors associated with challenge are advantageous to performance while those associated with threat undermine performance. In order to justify this prediction, a series of arguments based on other theoretical models are proposed, as well as empirical studies. Firstly, it is argued that athletes in challenge state tend to focus on the appropriate cues whereas athletes in a threat state are more likely to direct their attention to irrelevant stimuli. Another argument is based on the strength model of self-control, according to which previous acts undermine subsequent acts of self-regulation (Baumeister et al., 2007). Jones et al. (2009) argue that situations appraised as a challenge require less regulation efforts than those appraised as a threat. Thus, in a challenge state, more resources will be available for a better performance. Finally, it is also postulated that neuroendocrine and cardiovascular responses associated with challenge are related to a more adaptive approach to competition, better decision-making, more involvement in the competition and aerobic power, and therefore, a better performance.

In conclusion, this theory suggests that psychological interventions in sport must attempt to promote challenge states by increasing self-efficacy beliefs, perceived control and approach goals. By focusing on these variables, interventions can result in cardiovascular and neuroendocrine responses associated with a challenge state. Additionally, the fact that the TCTSA includes the cardiovascular patterns of challenge and threat provides a better measure to access how athletes appraise the competition. Frequently, athletes cannot describe their feelings or appraisal processes, given that these can occur unconsciously. Furthermore, physiological measures are not subjected to social desirability, a common problem in self-report measures (Jones et al., 2009).

### ***Research on appraisals in anger***

Throughout the literature in sport psychology, there is a lack of studies specifically focused on the appraisals related to anger. Bolgar, Janelle, and Giacobbi (2008) examined the appraisals involved in the anger generation in a sample of tennis players. For this purpose,

primary appraisals of threat and challenge, and secondary appraisals of acceptance, seeking knowledge, and holding back, were analyzed as function of high and low trait anger. However, results failed to identify any significant difference between these groups.

Nonetheless, the literature in general psychology has already fuelled several perspectives about the appraisals involved in anger. It is widely established that a specific emotion arises from a pattern of appraisals, and not from just a single component (Berkowitz & Harmon-Jones, 2004; Roseman & Smith, 2001). This assumption is in line with the with the componential approaches of emotion, which suggest that “emotions can be characterized and differentiated from each other on the basis of their association with a distinctive pattern of components” (Kuppens, Van Mechelen, Smits, & De Boeck, 2003, p. 254). Thus, some efforts have been made in the endeavour to find the appraisal components that can characterise and differentiate anger from other emotions (e.g., Berkowitz, 2011; Berkowitz & Harmon-Jones, 2004; Kuppens et al., 2003; Wraniak & Scherer, 2011).

Studies attempting to shed light into the appraisals in anger have searched for the necessary and/or sufficient components in the generation of anger. Instead of analysing appraisals singularly, these studies followed the componential approaches to emotions and simultaneously analysed the different components of anger. Hazebroek, Howells and Day (2001) analysed the differences in the appraisals related to anger suggested by Smith and Lazarus (1993), specifically, the core relational theme of blame, motivational relevance, motivational congruence and other-accountability. It was observed that anger arousal among individuals high in trait anger was triggered by the core relational theme of blame, other accountability and low coping potential. Likewise, anger arousal in individuals low in trait anger was triggered by the core relational theme of blame and other-accountability.

Furthermore, Kuppens et al. (2003) performed two studies with the intent to find the specific components of anger that could distinguish it from other negative emotions. Across the two studies, it was found that anger was positively associated to other accountability, frustration, arrogant entitlement (related to unfairness, i.e., “someone else arrogated something to him/herself which he/she had no right to”, p. 257), and antagonistic action tendency. These patterns of components also differentiated anger from other negative emotions, in this case, fear, shame and sadness. Furthermore, both studies consistently revealed that other accountability and arrogant entitlement (unfairness) were found to be specific components of anger, given that these were exclusively related to this emotion.

In a similar study, Kuppens and Van Mechelen (2007) considered a different set of appraisals, specifically, threat to self-esteem, other-blame, and frustration (goal obstruction). This study was based upon the interactional assumption of the appraisal theory, which suggests that an “appraisal depends on an evaluation of the environment as a function of the individual’s own goals, needs, attitudes, etc” (p. 70). Thus, this study considered situations in which these appraisals may occur (situational determinants), as well as individuals’ predispositions to experience these appraisals, namely, self-esteem, neuroticism, BIS sensitivity, perceived social esteem, and interpersonal distrust (person determinants). As was theoretically expected, the three appraisals considered in the study were positively related to anger throughout the different unpleasant contexts (participants were presented different situation vignettes), suggesting that anger is more likely to occur when individuals feel threatened in their self-esteem, blame others, and feel frustrated, regardless of the situational context. Additionally, individual differences considered in the study, namely, self-esteem, neuroticism, and BIS sensitivity, showed different patterns of association with the appraisals, and varied across situations. It was concluded that “particular situational features (e.g., evaluative nature, someone else responsible) may give rise to a particular appraisal (i.e., threatened self-esteem, other-blame), particularly for persons who are characterised by certain person dispositions (i.e., unstable self-esteem, BIS sensitivity)” (p. 73).

Another investigation (Kuppens, Van Mechelen, Smits, De Boeck, & Ceulemans, 2007) deepened the study of the appraisals related to anger by analyzing the influence of individual differences on the relationship between the characteristics of the situation and the occurrence of appraisals and anger, as well as on the relationship between appraisals and the subjective emotional experience of anger. Generally, it was found that anger often arises in “a situation that is characterised by an externally induced disadvantage in which something is at stake for the person” (p. 707). Besides, when disadvantageous situations also include norm violation, the majority of participants indicated feeling anger and most of its components. Kuppens and colleagues (2007) suggested that norm violation can be considered a sufficient situational characteristic in the process of anger generation. The analysis of the relations between anger appraisals and the experience of anger has revealed that frustration is possibly a necessary component of anger. Anger always occurred in conjunction with frustration, but the same was not true for the other appraisals. Furthermore, this study also demonstrated that individual differences have an impact on the experience of anger and its components. While for some

individuals, externally induced disadvantage was a sufficient condition to elicit anger, for others, the situation also had to involve norm violation and be appraised as deliberately caused by others and unfair. It was also found that low self-esteem and a tendency to experience unfairness is related to the appraisals of threat to self-esteem. Nonetheless, this relationship only happened in situations appraised as relevant for the individual's goals. Combining all these data, Kuppens and colleagues (2007) concluded that anger can occur with different patterns of appraisals, varying across individual and situational characteristics.

### **Coping in sport competition**

Sport competition is a demanding context that subjects athletes to high levels of stress (e.g., Cruz, 1996; Lazarus, 2000). During competition, stressful encounters are frequent and intense, such as experiencing pain, observing the opponents successful performance, making a physical or mental error, dealing with teammates' errors and being injured (Anshel, 1996; Anshel, Williams, & Hodge, 1997). Failure to deal with these sources of stress can undermine several psychological processes, such as attentional focus, concentration and arousal (Anshel, & si, 2008; Giacobbi & Weinberg, 2000; Jones & Hardy, 1990;).

Therefore, the ability to adequately cope with stress is an integral part of a successful performance (Dias, Cruz, & Fonseca, 2010; Cruz, 1996; Hoar, Kowalski, Gaudreau, & Crocker, 2006; Holt & Hogg, 2002; Nicholls & Polman, 2007a). Athletes are required to use not only their technical and tactical skills, but also an array of cognitive and behavioural coping skills inherent to success (Gould, Eklund, & Jackson, 1993; Gould, Finch, & Jackson, 1993). Indeed, throughout the literature, there is growing evidence that suggests that using maladaptive coping styles can lead to sport dissatisfaction and a poor performance (e.g., Ntoumanis & Biddle, 1998).

For these reasons, research on coping has raised the attention of sports psychology literature, especially over the past decade (Giacobbi, Foore, & Weinberg, 2004; Thatcher & Day, 2008). "Trait" and "process" perspectives emerge as the most prominent approaches to coping in sports (Nicholls & Polman, 2007a). Although the trait perspective, according to which coping reflects a tendency respond in a certain way or style throughout time and different circumstances, has found some support across the literature (e.g., Nicholls & Polman, 2007b; Yoo, 2001), most of the research follows the process approach. According to this perspective, coping is a dynamic and recursive process, involving interactions between the individual's

internal (i.e. beliefs about self, goals, and values) and external (i.e. situational) environments (Cruz & Barbosa, 1998; Lazarus, 1999). This suggests that athletes do not have a specific coping style, but their coping efforts depend on their appraisal of the situation and previous coping experiences (Nicholls & Polman, 2007a). However, it seems that both these perspectives can coexist, in the sense that dispositional coping styles can influence the reactions to new situations, thus predicting the use of specific coping strategies in a given stressful situation (e.g., Anshel & Si, 2008; Bouchard, Guillemette, & Landry-Léger, 2004)

Research has identified specific coping strategies that athletes employ in stressful encounters. For instance, studies have reported that athletes use problem-focused strategies, such as approach-cognitive strategies (Anshel, 2001), time management and concentrating on goals (Gould et al., 1993), learning about the opponents (Holt, 2003) and practice (Holt & Mandigo, 2004). On the other hand, emotion-focused strategies were also identified, such as seeking social support (Park, 2000), imaging/visualizing (Dale, 2000; Gould et al., 1993b), venting unpleasant emotions (Gaudreau & Blondin, 2002), remaining confident (Poczwadowski & Conroy, 2002) and humour (Giacobbi et al. 2004). Other studies found strategies from different higher order classifications, namely, avoidance coping (e. g., Anshel & Kaissidis, 1997), and “transcendental coping”, which was suggested by Yoo (2001) as an elimination of mundane desires and expectations through self-acceptance.

Further research examined the implications of coping strategies on several important outcomes. While problem-focused coping predicted positive effect, emotion-focused coping predicted negative affect (Ntoumanis & Biddle, 1998). In addition, the use of emotion-focused and avoidance coping strategies were found to be linked anxiety (e.g., Hammermeister & Burton, 2001; Dias et al., 2012).

### ***Coping definition***

Although the concept of coping has proven to be difficult to operationalise and explain (Compas & Epping, 1993; Crocker, Kowalski & Graham, 1998), the use of the definition proposed by Lazarus and Folkman's (1984) seems to be consensual throughout the sport psychology literature (e. g., Anshel & Wells, 2000; Anshel & Anerson, 2002; Cruz, 1996; Dias, et al., 2009, 2010, 2011; Gaudreau & Blondin, 2004; Nicholls, Polman, Levy, Taylor, & Copley, 2007; Smith, Ntoumanis, Duda, & Vansteenkiste, 2011). According to Lazarus and Folkman (1984), coping refers to “constantly changing cognitive and behavioural 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).

Along with this definition, Lazarus and Folkman (1984) pointed out some assumptions underlying the concept of coping. Specifically, coping refers to a process that is constantly changing within specific demands, rather than a fixed trait. In other words, coping is conceptualised as an ongoing dynamic process that changes to meet the specific and constantly changing demands of the stressful encounter. The dynamics and change in the coping process are not random, they are constantly changing as function of continuous appraisals and reappraisals of the shifting person-environment relationship. As such, coping processes vary not only across situations, but also over the course of the stressor (Lazarus, 1991, 1999; Lazarus & Folkman, 1984). Therefore, understanding coping processes requires knowledge about what individuals are coping with and their context (Lazarus & Folkman, 1984).

Furthermore, although athletes use frequently the term “automatic” to explain how they dealt with a situation, they might be referring to well-learned and practiced skills (Richards, 2012). In fact, coping only occurs when the individual consciously appraises the situation’s demands as taxing or exceeding his resources. This condition limits coping to psychological stressful encounters that demand conscious efforts (Lazarus & Folkman, 1984). According to Lazarus (1991, 1993, 1999), as well as recent reviews on coping (e. g., Caver & Connor-Smith, 2010; Richard, 2012), coping is solely concerned with effortful adaptive actions, excluding automatic processes and involuntary responses from the definition of coping.

Additionally, by using the word “managing”, Lazarus and Folkman (1984) intended to avoid any association of coping with mastery, arguing that “managing can include minimizing, avoiding, tolerating, and accepting the stressful conditions as well as attempts to master the environment” (p. 142). In effect, the concept of coping must not be confused with outcome, because it reflects individuals’ thoughts and actions to manage the stressful encounter, despite its consequences (Lazarus & Folkman, 1984). This distinction is of particular importance in the context of sport, since coping refers to cognitive, affective and behavioural efforts to deal with specific internal or external demands (Lazarus, 1991, 1999), and not the outcome arising from this response. If an athlete is failing constantly in a competition, that does not mean he or she is not actively dealing with the situation. Instead, his or her strategies may not be effective to reduce or extinguish the source of stress. Therefore, a bad performance can be attributed to a



multiplicity of factors, such as poor technical skills, coaching, and physiological factor and maladaptive coping as well. Thus, depending on the type and level of the specific stressor, coping may not be successful (Cruz & Barbosa, 1998; Crocker Kowalski, & Graham, 1998).

Lazarus and Folkman (1984) also distinguished between emotions as a reaction to stress and as a coping strategy. That is, in some situations, emotional reactions such as crying or screaming can be considered a coping strategy if they have an underlying goal, such as dealing with pain, for example. Conversely, an individual can just feel sad or angry, which is not a coping strategy, but a result of the stress process (Lazarus & Folkman, 1984; Lazarus, 1991). In fact, according to Lazarus (1993), coping is a goal-oriented process in which the individuals mobilise their efforts towards the goal of resolving the source of stress and/or managing the emotional reactions to stress.

Finally, this perspective asserts that the coping process occur in all stressful encounters. This process may occur within just a few moments after the event (a quickly solved argument with an opponent) or may be a process that lasts for hours, days, and weeks (e. g., an athlete dealing with a personal error that affects his career) (Lazarus & Folkman, 1984).

### ***Coping taxonomies***

While it appears to be a relative consensus about the definition and conceptualisation of coping (Endler, Parker, & Summerfeldt, 1993; Lazarus, 1991), the same cannot be said about the categories of coping (Skinner, Edge, Altman & Sherwood, 2003; Carver & Connor-Smith, 2010). As broad concept with a wide historical span, coping has been categorised using different methods, such as “rationally, using theory-based categories; empirically, using factor analysis; or through a blend of both rational and empirical techniques” (Folkman & Moskowitz, 2004, p. 751).

Despite all the efforts, a good taxonomy that links specific strategies to broad categories of coping is yet to be accomplished (Skinner et al., 2003). Thus, the endeavour for the structure of coping must continue to open the path to understanding coping. Nonetheless, throughout the following sections, the major and most popular categories of coping in sports literature will be presented.

### **Problem and emotion-focused**

This distinction is amongst the earliest, and most widely known and accepted classifications of coping (Folkman & Moskowitz, 2004). Lazarus and Folkman (1984) proposed this classification of coping according to its functions, namely, 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 distress, emotion-focused coping includes a wider variety of responses, such as self-soothing, expression of negative emotion, focus on negative thoughts and attempts to escape stressful situations (e. g. wishful thinking) (Carver & Connor-Smith, 2010).

More specifically, problem-focused coping is “directed at defining the problem, generating alternative solutions, weighting the alternatives in terms of their costs and benefits, choosing among them, and acting” (Lazarus & Folkman, 1984, p. 154). Although it may be confused with problem solving strategies, problem-focused coping implies not only an objective and an analytic process focused on the environment, but also includes strategies directed inward. Because the number problem-focused coping strategies applicable across several situations is sparse, this type of coping is more limited comparing to emotion-focused coping. However, despite being more limited to specific situations, problem-focused coping includes, for instance, problem solving, planning, seeking information or social support, suppression of competing behaviour, increasing efforts, reducing external pressures, barriers, or procedures, changing goals and finding alternative channels of gratifications (Crocker et al., 1998). In this sense, individuals actively attempt to change the relationship between themselves and the environment, which demonstrates the “action-centred” nature of problem-focused coping. Specifically in sport contexts, problem-focused strategies may include attempting to overcome the opponent’s success, discussing with the coach personal concerns and questions and seeking medical and/or psychological treatment (Anshel, Williams, & Williams, 2000).

On their turn, emotion-focused coping strategies consist of “cognitive processes directed at lessening emotional distress and includes strategies such as avoidance, minimization, distancing, selective attention, positive comparisons, and wresting positive value from negative events”. (Lazarus & Folkman, 1984, p. 154). These strategies are called cognitive because they mostly involve thinking, and not acting, to change the person-environment relationship (Lazarus, 1991). Emotion-focused also comprise mental and behavioural withdrawal, denial, relaxation,

self-blame, avoidance, wishful thinking, and several more (Crocker et al., 1998). These strategies are considered more “person-oriented” because are centred on dealing with the individual’s feelings (Endler & Parker, 1990). In sports, emotion-focused coping can be useful to deal with emotional distress after committing an error during a competition, such as imagining a successful performance, positive self-talk and relaxation (Anshel et al, 1997). A small number of these strategies may actually be directed at increasing distress. For example, an individual may need to feel worst in order to feel relief afterwards. Individuals may also “deliberately increase their emotional distress in order to mobilize themselves for action, as when athletes “psych themselves up” for a competition”(Lazarus & Folkman, 1984, p. 150).

Problem and emotional-focused coping have different proximal goals, which ultimately determine their category. However, depending on the underlying goal, a behaviour can serve either function. For instance, emotional support can serve for either emotional support, but also to obtain an advice or instrumental help. Additionally, by reducing negative distress, emotion-focused coping can facilitate problem-focused coping, allowing the individual to consider the problem more calmly, and possibly increasing its effectiveness. Therefore, these coping styles should be thought as complementary, and not as two independent and distinct coping categories (Caver & Connor-Smith, 2010; Lazarus, 1999).

Despite the recognised utility of this distinction, Skinner et al. (2003) put forward three main critics. The first asserts that emotion and problem-focused coping categories are not conceptually clear and mutually exclusive. According to these authors, this is especially true about emotion-focused coping, in which there is still no agreement about the lower order strategies it includes. Secondly, these strategies are not mutually exclusive in the sense that most forms of coping have the same function, and therefore can be classified into both categories. For instance, active planning can either serve to solve a problem or to calm emotions as well. Thirdly, problem and emotion-focused categories do not include all lower order strategies. Some lower order strategies seem to fall outside of both categories, such as social support, which is neither focused on the problem or the emotion, but on other people.

### **Approach and avoidance coping**

Roth and Cohen (1986) proposed the distinction between approach coping, also termed as sensitization, engagement, vigilance, or attention, and avoidance coping, which can also be referred as repression, disengagement, or rejection. Approach focus on dealing with the stress or

related emotions, whereas avoidance coping aims at avoiding the threat or related emotions (Skinner et al., 2003). Thus, approach coping involves taking active steps to deal with the stressor attempting to reduce its potential negative effects. Specific strategies include active steps to deal directly with the situation, such as initiating and preplanning direct actions, increasing efforts, questioning, arguing, increasing aggression through verbal confrontation or physical contact, and covertly rehearsing or imaging the stressful event (Anshel et al., 2000; Anshel & Anderson, 2002). This type of coping also includes 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).

On the other hand, avoidance coping refers to actions of moving 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 different task instead of the current task (Anshel et al., 2000; Anshel & Anderson, 2002; Carver & Connor-Smith, 2010; Endler & Parker, 1990). In some cases, the stressor may not even exist yet, but the coping process seeks to avoid having to react to it, behaviourally and emotionally. However, disengagement coping is often ineffective in reducing stress in the long run, as it does nothing to avoid the threat and its potential impact (Carver & Connor-Smith, 2010). If one is going through health problems, going to a party will not help, because the threat will remain there. Indeed, it could be even worse, because the longer one delays the threat, the less time he or she will have to deal with it. Besides, avoiding the threat could also increase intrusive thoughts, negative mood and anxiety (Najmi & Wegner 2008). This type of coping can also bring other problems, for example, the excessive use of alcohol, which could eventually lead to social and health problems. Avoidance coping also includes relinquishing goals that are threatened by the stressor (Carver, Scheier, & Weintraub, 1989). Unlike other avoidance responses, relinquishing goals is focused on both the stressor's existence and its emotional impact, giving up and investing in other goals. Renouncing threatened goals may help the individual avoid negative feelings (Carver & Connor-Smith, 2010).

Overall, Anshel and colleagues. (2000) suggested that approach coping is preferred in situations perceived as highly controllable (e.g., changing the game strategy to improve performance), whereas avoidance coping is presumably better in situations perceived as uncontrollable (e. g., referees' decisions, opponents' performance). Because approach coping seems to be better under situations perceived as controllable, when the individual knows the

source of stress, or when the outcome measures are long-termed (Roth & Cohen, 1986), it seems that approach coping is preferred when the individual seeks for situation-relevant input, and both when the athlete has relatively high levels of confidence, good communications skills and the situation is known (Anshel et al., 2000; Anshel & Anderson, 2002). For instance, an athlete may ask the referee why he received a penalty to avoid committing the same offense. Approach coping can also be used by a confident athlete to understand what went wrong after an unexpected failure (Anshel & Anderson, 2002).

Conversely, avoidance coping is better in situations perceived as uncontrollable, in which the source of stress is not known, and the individual's emotion resources are low (e. g., low self-confidence, low self-esteem) (Roth & Cohen, 1986). In specific sport situations, avoidance coping strategies appear to have some benefits. For instance, when an athlete receives unpleasant comments from the public or the opponents, he or she can use psychological distancing, which consist in distancing oneself from the unpleasant information, allowing a more objective perspective of the situation and with less stress. In addition, an athlete can also attempt to justify and/or rationalise those comments through cognitive reappraisal. For example, the comments can be interpreted as a sign of worry and anxiety of the opponents. Despite the advantages of using avoidance strategies in sports competition, their use can also lead to failures in dealing with pain or injury, and overlooking the causes of a bad performance (Anshel et al., 1997; Anshel et al., 2000).

Nonetheless, two main critics were proposed by Skinner and colleagues (2003) concerning this classification. These authors argue that these categories are not clearly defined, reporting some controversy on what qualities are attributed to approach and avoidance coping. For example, seeking social support can be also se considered avoidance since they the individual moves away from the situation towards other people. In addition, Skinner and colleagues (2003) considered that these categories do not encompass numerous important strategies, including, for instance, accommodation, aggression, and rumination.

### **Alternative classifications**

Although problem and emotion-focused, and approach and avoidance coping are certainly the most known and common, there are other distinctions in which coping can be classified. Skinner and colleagues (2003) identified several classifications that have been used to distinguish coping, suggesting that while some distinctions seem more useful than others, all are

important to create a higher order structure of coping.

Rothbaum, Weisz, and Snyder (1982) proposed primary and secondary control coping. Within this distinction, there are three categories: “*primary* control, defined as coping designed to influence objective events or conditions; *secondary* control, defined as coping aimed at maximizing one’s fit to current conditions; and *relinquished* control, defined as the absence of any coping attempt” (Rudolph, Denning, and Weisz, 1995, pp. 331, 333). This distinction has been used to classify higher order categories into lower order ways of coping. Primary control coping includes problem solving and instrumental action categories while secondary control coping includes acceptance and cognitive restructuring (Connor-Smith et al., 2000).

Arising from the theoretical background of successful aging, another distinction was created between accommodation and assimilation coping. Accommodation refers “adjusting personal preferences to situational constraints”, whereas assimilation refers to “transforming developing circumstances in accordance with personal preferences” (Brandtstädter & Renner, 1990, p. 58). That is, accommodative coping describes adjustments of the self in response to constraints. This coping style includes responses such as acceptance, cognitive restructuring, readjusting one’s goals, and self-distraction (Caver & Connor-Smith, 2010).

Folkman (1997) also proposed a related concept called “Meaning-focused coping”, which involves appraisals processes in which the individual uses his or her beliefs, values, and existential goals to motivate and sustain coping through a difficult time, and is most likely to occur in situations where the source of stress is perceived as uncontrollable (Folkman, 2008). Put in other words, it describes processes in which individuals held on their beliefs and values to find, or remind themselves of, possible benefits within a stressful situation (Tennen & Afleck, 2002). These include rearranging life priorities and inducing a positive meaning in ordinary events. Further categories of meaning-focused coping were proposed, namely, benefit finding, benefit reminding, adaptive goal processes, reordering priorities, and infusing ordinary events with positive meaning (Folkman & Moskowitz, 2000).

Finally, Aspinwall and Taylor (1997) suggested that coping can occur even before the occurrence of stress, aiming to prevent threatening or harmful situations from arising. This type of coping was termed proactive coping, and reflects mostly to problem-focused processes through accumulation of resources and analysis of environment in the search for threats. In case of detection of the beginning of a threat, it is possible to actively use strategies to prevent or remove it. This anticipation reduces the number of stressful episodes an individual would

experience, or in case it cannot be avoided, reduces its intensity (Caver & Connor-Smith, 2010).

### ***Coping effectiveness***

As Lazarus and Folkman (1984) draw attention to, “definitions of coping must include efforts to manage stressful demands, regardless of outcome. This means that 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). Despite being unsuccessful, an attempt to deal with a stressful situation is still considered coping. As Lazarus stated, “notice that the term coping is used whether the process is adaptive or nonadaptive, successful or unsuccessful, consolidated or fluid and unstable!” p. 237). Within Lazarus and Folkman’s (1984) perspective, coping processes are not either good or bad, but need to be evaluated in the specific situation in which they occur. The effectiveness of a given coping strategy varies across situations, in which a strategy can be effective for one situation but maladaptive for another (Folkman & Moskowitz, 2004). In sports, coping effectiveness was defined as “the extent to which a coping strategy, or combination of strategies, is successful in alleviating the negative emotions caused by stress” (Nicholls & Polman, 2007a, p. 15).

According to Richards (2012), one of the main reasons for studying coping is to understand what coping strategy 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 (Nicholls Polman, Levy, & Borkoles, 2010), regardless of the several constraints associated (Sommerfeld & McCrae, 2000).

Across the literature in sport psychology, there are some models that attempt understand coping effectiveness. One of the most widely known is the model of *goodness-of-fit* (Folkman, 1991, 1992), according to which individuals that choose coping strategies that fit their appraisals of controllability of a task will presumably have better outcomes comparing to individuals who do not use strategies that fit their appraisals of controllability. Active, instrumental and problem-focused coping strategies (e. g., planning, goal setting, and time management) are more effective in situations appraised as more controllable whereas active or passive emotion-focused coping strategies (e. g., relaxation, visualization and acceptance) are preferable in situations perceived as less controllable (Folkman & Moskowitz, 2004). Throughout sport psychology literature, a few studies have supported this hypothesis (Nicholls & Polman, 2007a). For example, high levels of

controllability were found to be positively linked to problem-focused coping, while a low perception of controllability was linked to emotion-focused coping (Anshel, 1996; Anshel & Kaissidis, 1997). Haney and Long (1995) also found that the perception of controllability and self-efficacy were associated with engagement coping strategies. However, in another study, Kim and Duda (2003) found partial support for this model, only observing that a perception of controllability was associated with the use problem-focused coping strategies.

However, others have supported the idea that the more experienced athletes are, the more effective their coping skills are (e. g. Holt et al. 2007). The development of coping skills appears to arise from reflection and learning processes (Tamminen & Holt, 2010; Nicholls, 2007a, b). Nicholls (2007b) has supported this idea, observing that elite athletes had more effective coping skills to deal with stress. Possibly, the experience in competing in highly demanding situations contributed to the development of effective coping skills, which in turn has positively influenced their performance. Athletes seem to use coping strategies that were previously found to be effective in their past experiences. Besides, these successful coping skills must be practiced and rehearsed regularly to be more effective. In accordance, ineffective coping was found to be associated with strategies that were not yet well learned (Nicholls, Holt, & Polman, 2005).

Consistent with this idea, Gould and colleagues (1993) proposed another explanation for coping effectiveness, indicating that the automaticity of the coping responses is highly correlated with their effectiveness and expert performance. Support for this assumption was demonstrated by Dugdale, Eklund, and Gordon (2002), who observed athletes that rated their coping as more effective during competition, also rated it as more automatic. This suggests that the ability to exert coping strategies more quickly is related to the amount of practice in these strategies (Nicholls & Polman, 2007b).

Additionally, Bolger and Zuckerman (1995) postulated that coping effectiveness depends on the athletes' coping strategies availability and how well these are adjusted to the specific situation. Both availability of coping strategies and knowledge about its use in a specific situation (through practice) predict a more effective coping. Eubank and Collins (2000) observed that positive self-talk and thinking ahead were effective coping strategies, while negative self-talk and thinking about irrelevant things were ineffective. Similarly, Nicholls, Polman, Levy, Taylor, and Cogley (2007) also supported the "choice of coping strategy" model, reporting that technique-orientated coping strategies are more effective for team sport athletes, whereas behavioural



avoidance strategies were more effective for individual sport athletes. Furthermore, coping effectiveness was also found to be associated with the athletes' ability. Athletes who competed at higher competitive standards (e.g. international, national) reported their coping as more effective comparing to county or club athletes. Further support for this model was provided with a sample of professional (e.g., Nicholls, Holt, Polman, & Bloomfield, 2006) and international adolescent (Nicholls & Polman, 2007b) rugby union players. These studies converged to the idea that strategies such as increased effort, thought stopping and changing technique were amongst the most effective, whereas as apologizing, doing nothing, and not eating before a match were reported as the least effective.

In a similar vein, Nicholls, Polman, Levy, and Borkoles (2010), taking into account findings from their research, suggested that certain types of coping may be more effective than others. Specifically, task-oriented coping was found to be more effective comparing to disengagement-oriented coping or distraction. However, athletes were not able to describe which coping strategies were more effective for a specific stressor. Conversely, Nicholls, Holt, and Polman (2005), in a sample of Irish golf players, found that more emotion-focused than problem-focused coping was associated with coping effectiveness. These apparently inconsistent findings suggest that appraisals may be behind these differences

Therefore, according to Richards (2012), there are three major elements that should be acknowledged in order to determine coping effectiveness. Besides appraisals, the knowledge of personal goals and the situational context should also be considered. The situation can be important, because, for instance, avoiding a frequently occurring stressor may not solve the source of the problem, but may be effective to deal with short pre-competitive worries. Additionally, it is also important to consider the athletes' personal goals to understand coping effectiveness. Each athlete may have a different goal for competition, which may not be related to performance. Overall, in Richard's (2012) perspective, these three concepts are essential to determine whether a coping strategy is effective.

But regardless of all these attempts, coping effectiveness is not yet fully understood. Previous research has, however, associated it to positive outcomes, such as improved performance (Pensgaard & Duda, 2003) pleasant affective experiences and lower anxiety levels (Ntoumanis & Biddle, 1998). Given this potentially wide impact on performance, more research should necessarily focus on developing a theoretical model not only to deepen the knowledge about coping effectiveness, but also to promote psychological interventions to improve

performance and sports satisfaction. Because research has not found full support to consider some coping strategies better than others, it seems plausible to provide athletes with a wide range of different coping skills (Richards, 2012). Nicholls et al. (2006) suggest that athletes should be taught different coping skills, such as emotion and problem-focused and avoidance coping, given that, depending on the situation, every coping strategy can be effective.

Notwithstanding research on coping effectiveness, there is still a dearth in the literature of universal criteria that incorporates all research paradigms, contexts, and socialcultural settings. Although a coping strategy may seem to be useful for an outcome, it may not be for another.

### *Coping with anger*

Across the literature in sport psychology, and in general psychology as well, a major limitation of the study of coping is the fact that it only focuses on stressors and coping, disregarding the important of the role of emotions (Nicholls et al., 2009a). Indeed, although anxiety is one of the most studied emotions in sport (Cheng, Hardy, & Markland, 2009), very few studies have specifically focused on this relationship (Dias et al., 2012). Similarly, despite the relevance of the anger in sport (e.g., Ruiz & Hanin, 2004, 2011; Isberg, 2000), the literature concerned with how athletes deal with anger is sparse. However, Bolgar, Janelle, and Giacobbi (2008) specifically addressed this relationship in a sample of tennis players and revealed that those high in anger control showed more use of problem- and emotion-focused coping responses comparing to those who with lower anger-control. These results suggest that anger control may allow individuals to perceive more personal coping resources.

Outside of sports, the literature concerned with anger coping has mostly identified two major coping styles, which correspond to Spielberger's (1999) dimensions of anger-in and anger-out (Trnka & Stuchlíková, 2011). As already stated, anger-in refers to the tendency to express anger outwardly, whereas anger-in reflects the tendency to turn the anger response inwards by using suppression (Spielberger & Reheiser, 2009). Consistently, Miers, Rieffe, Terwogt, Cowan and Linden (2007) argue that these expression styles represent different styles of coping, in which individuals can use aggression to vent their anger (anger-out) or intentionally retrain the anger inside to modify the anger arousal level. Furthermore, anger-control can also be considered a coping strategy, involving the tendency to manage anger by avoiding the use of aggressive behaviours or activities (Deffenbacher, et al. 1996). In fact, Deffenbacher and colleagues (1996)

described this coping strategy as a tendency to engage in calming activities to lower arousal and calm down.

Across the literature, these coping styles were found to be related to some health problems. Specifically, high levels of anger-in were associated with blood pressure and an increased risk of hypertension and cardiovascular diseases (e.g., Williams et al., 2000). On the other hand, anger-out has been linked to heart rate reactivity and hypertension (e.g., Harburg et al. 1991). A study more centred on the relationship between anger-control and Cardiovascular Disease (CVD) reported that individuals with low anger-control have a higher risk of nonfatal and fatal CVD comparing to individuals with higher anger-control (controlling for age, gender, education, marital status, body mass index, smoking, alcohol consumption, cholesterol, blood pressure and depressive symptoms) (Haukkala, Konttinen, Laatikainen, Kawachi, & Uutela, 2010).

However, research has paid little attention to how these coping styles occur in daily life contexts (Trnka & Stuchlíková, 2011). Stuchlíková and Man (2003) used a version of STAXI (Spielberger, 1999) with context-dependent scales and found that women reported less anger-out than men in the home and leisure time settings. Further, women suppressed anger more at home than men, whereas men suppressed more at work. Another study (Bongard & al'Absi, 2003) reported that women are better at controlling their anger (anger-control) and showed lower levels of anger-out both at work and at home. Additionally, Palfai and Hart (1997) reported that anger-in was a significant predictor of social support, and was negatively associated to deficiencies in appraisal support (e.g., help make the right decision), self-esteem support (e.g., help one feel better about himself), tangible support (e.g., financial support), and belongingness support (e.g., having others to engage in social activities).

Despite the substantial number of studies that have used the anger-in and anger-out from the STAXI-2 (Spielberger, 1999), some researchers find this distinction too narrow to properly evaluate individuals' coping styles (Linden et al., 2003; Miers, et al., 2007). With this in mind, Linden and colleagues (2003) developed the Behavioral Anger Response Questionnaire (BARQ), which includes six factors: Direct Anger-Out (e.g., "I make a sarcastic or critical remark to the person who annoyed me"); Assertion (e.g., "In a calm voice, I tell the angering person how I honestly feel"); Diffusion (e.g., "I just keep busy hoping to work off my anger"), Avoidance (e.g., "I put the angering event out of my mind"), Rumination (e.g., "I cannot easily stop thinking about the event"); and Social Support-Seeking (e.g., "I leave the situation. Some time later I call a friend

or family member to share my feelings”). Results from the analysis of this scale revealed that women tended to use more social support-seeking comparing to men, whereas men used the direct anger-out strategy more often than women.

In another context, by videotaping violent couples, and subsequently coding their behaviours, Ronan, Dreer, Dollard, and Ronan (2004) reported that strategies, such as compromising, describing the problem, accepting responsibility, describing past positive behaviours or paraphrasing/reflecting, were effective coping skills to deal with anger. Conversely, strategies like name-calling, describing past negative behaviours, interrupting, complaining, denying responsibility or criticizing, were considered ineffective. Another study (Goodwin, 2006) intended to analyse the association between coping behaviour when angry and depression in a sample of youths (11, 13, and 15 years). It was observed that individuals who engaged in anger coping strategies of alcohol or drug use, listening to music, fighting, praying, arguing, smoking, and taking a walk showed an increase in the likelihood of depression, whereas bike riding (exercise) was linked to a decreased the likelihood of depression. It was suggested that the feelings of enjoyment elicited when cycling or removing oneself from the anger-inducing situation decreased the likelihood of depression.

A more recent study (Maxwell & Siu, 2008) examined the relationship between anger, anger rumination and coping in a sample of Chinese adults. Active coping (operationalised as taking positive steps to solve a problem or maintaining a positive state of mind) was associated with lower levels of anger, hostility, thoughts of revenge (a component of anger rumination) and physical and verbal aggression. In addition, the use of social support was associated to lower levels of thoughts of revenge. However, passive adaptive coping (defined as accepting the reality of the situation and letting fate take its own course) and engaging in distracting hobbies (such as going for a walk) were not significantly related to anger, rumination or aggression. These results point out that engaging in active coping can help reduce anger, and anger rumination, and may even prevent aggression.

### **Approach and avoidance motivation**

Gray (1970, 1990) developed the Reinforcement Sensitivity Theory (RST) of personality as critic to Eysenk' Model of Personality (1967). Drawn upon the knowledge obtained from his studies on animal learning, Gray this theory suggests that there are two major systems of

emotion underlying motivated behaviour: the Behavioural Activation System (BAS) and the Behavioural Inhibition System (BIS). The fundamental basis of Gray's RST is that expectancies of reward moderate the relationship between individual differences in reward sensitivity and reactions toward rewarding stimuli (Corr, 2001). Thus, the BAS mediates reactions to appetitive stimuli and represents the impulsivity personality factor (ranging from high to low impulsivity), while the BIS mediates reactions to aversive stimuli and represents the personality factor of anxiety propensity (ranging from high to low trait anxiety) (Gray, 1970). Frequently, impulsivity is used to measure individual differences in reward sensitivity, and as trait anxiety to measure threat sensitivity (Corr, 2001). The literature has also referred to the BAS as approach motivation, or appetitive system, and to the BIS as avoidance motivation or aversive system (Carver & Harmon-Jones, 2009)

These motivational systems are thought to be associated with one broad affective quality. Specifically, the BIS is associated with negative affect whereas the BAS is associated with positive affect. Both BIS and BAS are presumably not associated with the alternative affect. Hence, the sensitivities to BIS or BAS appear to be orthogonal, given that these systems correspond to different affect structures (Gray, 1990). Therefore, individuals high in BAS sensitivity are more likely to respond behaviourally to cues of reward and experience more positive affect than those low in BAS sensitivity. Conversely, individuals with high in BIS sensitivity are more prone to be behaviourally responsive to punishment cues and experience more anxiety when facing these cues (Carver & White, 1994).

Furthermore, extreme cases of high or low BIS and BAS have been linked to several childhood disorders. Quay (1993) has reported that an overactive BAS is associated with the development of conduct disorders whereas an overactive BIS is associated with childhood anxiety disorders. Conversely, an underactive BIS is associated with attention-deficit hyperactivity disorder. In addition, high BAS is related to self-destructive and impulsive life-styles (Quay, 1993), whereas high BIS is related to the development of anxiety disorders (McNaughton & Corr, 2004). On the contrary, low levels of BIS are associated to antisocial behaviours (e.g., Ross et al., 2007), while low levels of BAS can promote depression by decreasing approach motivation (Fowles, 1988). Despite this effort to classify disorders according to the levels of BIS and BAS, there is still a lot to be accomplished to further understand the effects of these motivational systems on psychopathology and normal behaviour as well. This stresses the need for more empirical studies to test the adequacy of this model to human behaviour (Carver & White, 1994).

Carver and Scheier (1998) applied Gray's (1970) RST theory to goal pursuit behaviour. For Carver (2006), goal pursuit is "having a goal, assessing where one is with respect to it, and taking steps to reduce the sensed discrepancy" (p. 106). These goals may be to achieve motor-control (e.g., cycling), may be more abstract (e. g. being a good person), or may even be continually moving and evolving (e. g., be a good researcher). With this in mind, these authors developed the concept of **feedback loop**, to describe the process by which individuals are constantly receiving information about the distance from their current position to goal attainment (reference value). In this process, the current position in the movement toward a goal is compared to a reference value. This comparison results in a discrepancy, or error signal. In turn, the perceived discrepancy will change individuals' responses, which can be behavioural or internal. However, if no discrepancy is detected, individuals' responses will stay unaffected.

Furthermore, there are feedback processes in which individuals attempt to reduce the sensed discrepancy between their actual position (or current value) and what is necessary to reach their goals. These refer to **discrepancy-reducing** feedback loops (or negative feedback loop), and represent approach processes (Carver, 2006; Carver, Sutton, & Scheier, 2000). Thus, this process reflects attempts to reduce or eliminate the perceived discrepancy in order to achieve a desired goal (Carver, 2006). However, there can also be **discrepancy-enlarging** feedback loops (positive feedback loops), in which the main goal is to increase the perceived distance between the individuals' current position and a threat, or what Carver (2006) called "anti-goals" (goals that individuals want to avoid). This process reflects avoidance motivation, escape or withdrawal.

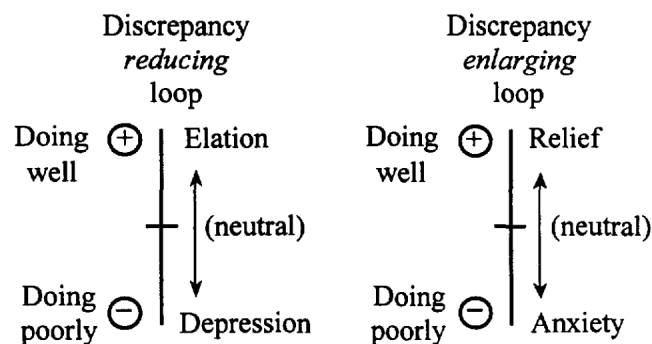
Therefore, discrepancy-reducing and discrepancy-enlarging processes represent opposite movements from the current situation toward a given goal. However, while discrepancy-reducing processes are directed to a target, even if it is in movement, discrepancy-enlarging processes have no actual direction, since the objective is to stay away from the "anti-goal". Nevertheless, both these processes can occur simultaneously: an individual can attempt to avoid an anti-goal, but at the same time an incentive may be identified. Thus, it is possible to both avoid an anti-goal and, at the same time, approach an incentive.

This feedback loop idea was also used to explain how feelings are generated. Within this perspective, affects represent a second layer of feedback systems that inform individuals about how well they are doing in the movement toward a desired goal, or away from an anti-goal (Carver & Scheier, 1998). Individuals compare their progress rate to a "criterion rate of progress",

resulting in a response in the form of affect experience. If they perceive that their progress rate exceeds the criterion, positive affect will be experienced; if the progress rate is at the same level of the criterion, no affect will be experienced; and if the rate of progress is below the criterion, negative affect will be experienced (Carver, 2006; Carver et al. 2000).

Thus, affect experiences are seen as a feedback mechanism, which provide individuals information about the error between the rate of progress and the criterion. Both negative and positive affects signal the need to adjust the rate of progress to best fit the criterion. Specifically, negative feelings indicate that the rate is too low, and therefore the individual needs to apply more effort. However, the same logic cannot be applied to positive feelings, which arise, according to this perspective, when the movement toward a desired goal is going better than it is necessary. Although it would seem reasonable to reduce the effort level, individuals do not stop, but simply “coast” until the rate of progress reaches the criterion. Therefore, they will temporarily reduce the effort applied to the specific domain that had triggered the affect (Carver, 2006).

Therefore, according to Carver and Scheier (1998), regardless of the type of goal pursuit (approach or avoidance), positive affect results from doing well toward a goal, while negative affect results from doing poorly. However, it is different to do well toward a desired goal or do well at moving away from an “anti-goal”. Thus, it is argued that there are two bipolar dimensions of affective experience: one dimension derives from affect loops associated with approach behaviour, ranging from elation to depression; and another dimension arises from affect loops associated with avoidance behaviour, and ranges from fear and anxiety to relief and



**Figure 2** Two types of feedback loop, discrepancy-enlarging and discrepancy-reducing, and the two types of affect loop. Discrepancy-reducing loops yield affect qualities of sadness and depression when the progress rate is below the criterion and eagerness, elation, or happiness, when the progress rate is above the criterion. Discrepancy-enlarging yield anxiety when the progress rate is below the criterion and contentment or relief when the progress rate is above the criterion (Retrieved from C. S. Carver and M. F. Scheier, 1998)

In conclusion, this two-layer assumption asserts that there are two types of goal pursuit behaviour, approach and avoidance, each related to different affect qualities. The affect loop indicates a sensed rate of progress, changing the rate of the movement, i.e. actions. In this sense, affects can have a direct influence on actions (Carver, 2006; Carver & Scheier, 2007, 2008). However, after an affect signal, changes in behaviours are not necessarily physical actions, but reflect a choice among potential acts. For instance, increasing the rate of progress at work may mean choosing to work until late hours, instead of going home.

Consequently, Carver and Scheier (1998) have a different view on the relations between affect and approach and avoidance motivations. While according to Gray's (1970) RST the BIS is responsible for negative affects, and the BAS is responsible for positive affect, for these authors, there are two bipolar dimensions. In this perspective, negative affect could be triggered by an approach process that is not going well in the movement toward a goal. A study by Carver (2004) has in fact provided evidence for this hypothesis, demonstrating that negative affects may not be associated with avoidance, but with a poor approach process.

Furthermore, for Carver and White (1994), it is reasonable to think that some individuals are more naturally inclined to follow incentives (approach motivation), while others are more responsive to threats and dangers while others are less attentive to this (avoidance motivation). This idea has led to the development of a self-report instrument to measure individual differences in BIS and BAS. Carver (2006) suggests that the most interesting application of these scales is the study of whether individual differences in a given phenomenon are related to BIS or BAS. It is with this in mind that Carver (2006) upholds these scales are an essential research strategy and methodological tool. A phenomenon associated with BIS is presumably related to individual differences in BIS sensitivity, whereas a phenomenon associated with BAS might be related to individual differences in BAS sensitivity. This idea was the main reason for Carver and White's (1994) interest in the study of approach and avoidance motivation.

### ***Anger: An approach related emotion?***

Despite the popular belief that the BAS is associated with positive affect, anger (as a negative affect) has also been related to this system. By using different methodologies, from brain activity to self-reported measures, anger has been consistently related to approach motivation (Carver & Harmon-Jones, 2009). Firstly, studies based on brain activity measures were based on the assumption that approach motivation is associated to more activity in the left



anterior cortical areas, while avoidance motivation is related to more activity in the right anterior cortical areas (e.g., Coan & Allen, 2003; Harmon-Jones & Allen, 1997; Gable & Harmon-Jones, 2008).

Thus, several studies have demonstrated that trait anger seems to be associated with brain activity related to approach motivation (i.e., left anterior cortical areas). An initial study (Harmon-Jones & Allen, 1998) reported that anger, measured by a trait-like scale, was found to be associated with higher levels of left anterior activity and lower right anterior activity. Subsequent studies (e.g., Rybak, Crayton, Young, Herba, & Konopka, 2006) replicated the same pattern, while one in specific (Harmon-Jones, 2004) confirmed that these results are not attributable to any positive feelings about anger individuals high in trait anger might have. More recently, Harmon-Jones (2007) had participants looking at anger-inducing and neutral pictures, observing that individuals with high trait anger showed more left anterior activity when looking at anger-inducing pictures than when looking at neutral pictures. The same pattern of results was found about state anger. In addition, Harmon-Jones and Sigelman (2001) reported that provoked participants showed more left anterior activity comparing to participants who were not provoked. More recently, Harmon-Jones, Vaughn-Scott, Mohr, Sigelman, & Harmon-Jones (2004) also suggested that the state of anger seems to both increase left anterior activity and decrease in right anterior activity. However, Harmon-Jones and colleagues (2003) found that this pattern may be related to coping potential. These authors observed that the association between anger and left anterior activity was only found among participants who felt they were able to perform a given task. This suggests that anger may be related to approach motivation, but only when individuals feel they can attain their goals.

Secondly, other studies found support for the idea that anger is an approach related emotion using self-report measures (most used Carver and White's [1994] BIS/BAS Scales). Carver (2004) found that self-reported Reward Responsiveness (BAS RR) was related to higher levels of anger in response to hypothetical scenarios. In addition, self reported Drive (BAS D) was a positive predictor of anger following the terrorist attacks of September 11, 2001. Consistently, Harmon-Jones (2003) demonstrated that trait anger and physical aggression were positively associated to the BAS, and negatively to the BIS, suggesting that the BIS and BAS are related to aggression in opposite directions. Nonetheless, Smits and Kuppens (2005) found that both BIS and BAS are associated to trait anger. But when controlling for neuroticism, only the association

between anger and BAS remained. Besides, it was also found that the tendency to express anger was positively related to the BAS, and negatively to the BIS. However, the tendency to suppress anger was positively related to BIS and negatively to BAS. Carver and Harmon-Jones (2009) argue that these results suggest that anxiety (as measured by the BIS) suppress the expression of anger, while the BAS promote its expression.

Nevertheless, some studies have found that anger was also linked to the avoidance system. For instance, Zinner, Brodish, Devine, and Harmon-Jones (2008) had white participants interacting with black participants, asking them to establish a good relationship. During the interaction their brain activity was measured. Results revealed that participants who reported feeling anger before the interaction showed more right anterior activity. However, these participants also reported feeling anxiety, suggesting that when anger and anxiety are experienced simultaneously, anger is related to the BIS.

Besides, Tomarken and Zald (2009) suggest that studies on brain activity are not enough to conclude that anger is related to a given pattern, because other variables may influence this relationship. In a response to this argument, Carver and Harmon-Jones (2009b) sustain that results have been consistent in predicting that right anterior cortical areas are related to avoidance motivation, whereas left anterior cortical areas are related to approach motivation. Despite this argument, Carver and Harmon-Jones (2009b) admit that further studies are still necessary to explore the neurological correlates to approach and avoidance motivation. Besides, Tomarken and Zald (2009) also suggest that the link between anger and approach should be studied in several different contexts in order to have a more consistent conclusion about this relationship. Similarly, Carver and Harmon-Jones (2009b) not only agree, but also highlight the need for more studies on this association.

Thus, although it has been shown that anger is an approach-related emotion, no study has attempted to analyse the “uniqueness of anger” in the particular context of sports. As an undeniable human laboratory, sports will surely provide more insights to this issue. It seems important to deepen the study of this emotion by considering motivational variables, which is what seems to make anger such a distinctive emotion.

## RESEARCH ON ANGER IN SPORT

Without a doubt, anxiety is one of the most studied emotions in sport competition (Grossbard, Smith, Smoll, & Cummings, 2009; Smith, Smoll, Cumming, & Grossbard, 2006). This emotion arises when athletes feel a threat to their well-being and perceive a lack of personal resources to cope with the situation (Lazarus, 1991, 2000). However, despite the large variety of conceptualizations of anxiety across different fields of psychology, consensus about its nature and definition has not been achieved (Cheng, Hardy, & Markland, 2009). Likewise, not only the definition of anxiety has caused controversy, but also the relationship anxiety-performance still raises several questions (Woodman & Hardy, 2001). For several years it was believed that anxiety is harmful to performance, but it has also been suggested that athletes can have a better performance when levels of anxiety are moderated (Hardy, 1996; Jones, 1995).

However, some studies have provided a further understanding of anxiety in sport competition. For instance, Dias and colleagues (2010) reported that females tend to have higher levels of cognitive and somatic anxiety, and athletes from individual sports reported higher levels of worry (a component of cognitive anxiety), somatic anxiety comparing to athletes from team sports. Another study (Dias et al., 2011) has 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 perceived the competition as more threatening. More recently, Dias and colleagues (2012) reported that higher levels of cognitive and somatic anxiety were associated to the use of emotion-focused, such as self-blame, denial, and venting).

Because sport competition often “mirrors” everyday life, it is important to study the co-occurrence of different emotional experiences, negative or positively toned (e.g., Jones, 2005; Lazarus, 2000). Anger and anxiety are among the most frequent emotions experienced in sport (Nicholls et al., 2009a), but their combination seems to be a potentially “destructive” (Suinn, 2000). However, few studies have examined anger and anxiety simultaneously, and their potentially differential impact on performance. A series of cross-cultural studies in the context of academic achievement (Tanzer & Spielberger, 2005) used both trait and state measures of anger and anxiety after a test examination. Results indicated that anger and anxiety were correlated. Participants reported feeling intense anxiety and intense anger as well. Similarly to test anxiety, it seems that there is also a “test anger,” both with negative effects on test performance. In sports,

Robazza and Bortoli (2007) studies these emotions simultaneously in a sample of rugby players and observed that cognitive anxiety is a significant predictor of anger-in, anger-out, reactions to criticism and angry temperament. In addition, self-confidence was a significant positive predictor of anger control.

Despite the vast amount of studies dedicated to anxiety (e.g., Cruz, 1996; Dias et al., 2009, 2010, 2012), only a few studies have focused on the experience of anger in sport competition. In a more general study, In fact, a more general study (Nicholls & colleagues, 2009) found that anger is one of the most experienced emotions, taking the second place in the ranking of emotions felt during sport competition (anxiety was the most experienced). Therefore, it is surprising that research in anger has remained sparse.

The Table 4 summarises the studies found throughout the literature specifically dedicated to anger in sport. As can be observed, these studies followed different theoretical backgrounds and used different methodological approaches. A study in a sample of tennis players (Bolgar et al., 2008) was based on the cognitive models of emotion, stress, and coping (Lazarus, 1999; Lazarus & Folkman, 1984) and analysed the primary and secondary and secondary appraisals associated to anger experiences. Generally, it was found that tennis players who scored higher in reactive anger tended to experience more angry outbursts in the previous week of practice and competition, comparing to those with lower anger reactivity levels. However, no differences were found between players with low and high trait anger according to threat and challenge appraisals, and secondary appraisals of acceptance, seeking knowledge, and holding back. Despite these findings, athletes with higher levels of anger control reported higher secondary appraisals of control and changeability. This suggests that individuals with more anger control appraise anger-inducing events “as something to respond to in order to address or change the nature of the situation” (p.83). Consistently, individuals high in anger control also showed more use of problem- and emotion-focused coping responses comparing to those who scored lower.

Prois (2012) followed the same perspective, but with different cognitive variables, exploring the relationship between anger and morality, achievement goals and athletic identity. Analysis of individual differences showed that anger varied across the type of sports, with rhythmic gymnasts showing higher levels comparing to artistic and acrobatic gymnasts, and across gender, with boys reporting higher levels of anger. The analysis of the relationships

between the variables revealed that only that goal coach orientation (defining success as gaining the approval of a coach) was found to be a positive predictor anger.

Some studies followed the Individual Zones of Optimal Functioning (IZOF) model, (Hanin, 2000), according to which each athlete has a different level of emotional intensity considered optimal for performance. Ruiz and Hanin (2004) created a qualitative method to analyze athletes' perceptions of emotions, named metaphorical descriptions. After creating a list of emotions, and characteristics of these emotions, athletes were asked to generate words describing their perceptions when presented the list. Therefore, it was found that athletes experienced anger in both, best and worst performances, although more frequently after worst performances. The qualitative analysis of athletes' descriptions revealed a low overlap score, demonstrating the idiosyncrasy of the experience of anger in sports. Likewise, the perception of anger intensity as harmful or optimal for performance had different levels (low, moderate, or high) across the athletes. In addition, anger was found to have both debilitating and facilitative effects on performance. After a good performance, athletes tended to view anger as promoting readiness to perform and the generation of additional energy. Conversely, after a bad performance, athletes viewed anger as decreasing energy resources and readiness to perform.

In a similar study, Ruiz and Hanin (2011) combined the used metaphorical descriptions, as well as self-report measures to explore the potential functional impact of anger in sport. Results were consistent with their previous study (Ruiz & Hanin, 2004). Anger was felt both in the worst and best performances. In these performances, athletes reported feeling different anger intensities (high, moderate or low). Additionally, anger was perceived as increasing the generation of energy in good performances, and as debilitating to the generation and utilization of resources in bad performances. However, almost all athletes (75%) perceived anger as facilitate for performance. It was concluded that anger can be used by some athletes as an "emergency resource" in extremely demanding situations in an attempt to overcome a temporary lack of resources. Conversely, for other athletes, anger can decrease their attentional focus and perception of control, which can lead to an ineffective utilization of resources.

In the same theoretical line, Robazza and Bortoli (2007) further explored the perception of the facilitative or debilitating of trait anger, and whether anxiety would predict angry symptoms. Participants reported a moderate frequency of angry feelings, as found by mean scores of the STAXI-2, but a high frequency of anger control. Anxiety levels were also moderate, although with higher levels in the self-confidence component. Direction scores (facilitative or debilitating)

suggested that these emotions were perceived as facilitative for performance. An analysis of the differences between high and low-level of competition did not reveal any significant differences in anger. However, anxiety significantly differed across levels of competition, in which high-level players showed lower levels of cognitive anxiety. Finally, it was also found that cognitive anxiety direction scores were a significant predictor of anger, while self-confidence direction scores were a significant predictor of control of anger.

The development of the Competitive Anger Aggressiveness Scale (CAAS; Maxwell & Moores, 2007) triggered a series of studies focused on anger and aggressiveness in sport. The study of the development of the CAAS as provided support for the validity of this measure. Besides, it also reported that males (as opposed to females) and in contact sports (comparing to non-contact sports) tend to have higher levels of anger and aggressiveness. Thus, this scale was used in Maxwell, Visek, and Moores's (2009) study about the aggressive emotions, beliefs, behaviors and cognitions, comparing Chinese and Western athletes. The experience of anger and aggression was similar among Chinese and Western athletes. Correlation analysis revealed that anger, aggressiveness, anger expression and provocation were positively correlated, whereas anger control showed negative correlations with these variables. Additionally, rugby players (collision sport) showed the highest levels of anger, aggression, provocation and perception of the legitimacy of aggression, followed by basketball and soccer players (contact sport), and squash players (individual sport), which showed the lowest levels in these variables. These variables also differed across levels of competition, decreasing from the beginners to intermediates and advanced, except for collision sports, in which a higher level of competition was associated with higher levels of anger and aggressiveness. Presumably, experience in sport tends to reduce anger and aggressive behaviours, but not for collision sports, in which aggression is almost essential for success.

Although more centred on aggression, another study (Maxwell & Visek, 2009) examined the characteristics of players who are more likely to use unsanctioned aggression with the intention to injure an opponent. It was found that anger, aggressiveness, and professionalization were positively correlated, whereas athletic identity failed to reveal any significant association. In addition, aggressiveness, professionalization, and having been taught how to use unsanctioned aggression without being detected by officials (measured in a yes or no question) predicted past unsanctioned aggression, in which players with higher scores were more likely to use of unsanctioned aggression just to cause injury or pain to opponents. It was suggested that the

positive relationship between past aggression and professionalization indicates that players who are focused on winning tend to use unsanctioned aggression as a strategy to win the game.

Dunn, Gotwals, Dunn & Syrotuik (2006) analysed the relationship between trait anger and perfectionist orientations in sport competition. In this study, Spielberger's (1999) State-Trait Anger Expression Inventory-2 (STAXI-2) was modified to a more sport-specific language, creating the Sport-modified Trait Anger Scale. It was found the combination of high personal standards with high concern over mistakes and high perceived coach pressure (or maladaptive perfectionism) was associated with competitive trait anger, as well as and the tendency to experience this emotion as bad for performance situations. In other words, the higher the athletes' anger, the higher they scored in three perfectionism dimensions increased (concerns over mistakes, personal standards and perceived coach pressure, but not for perceived parental pressure). A subsequent study by Vallance, Dunn, and Dunn (2006) attempted to replicate these findings, but also to explore the effect of situation criticality (importance) upon anger responses of athletes. Specifically, after identifying different perfectionism clusters, Vallance et al. (2006) analysed whether athletes with different patterns of perfectionism responded to anger following mistakes in low and high-criticality situations. It was found that, regardless of the perfectionism levels, athletes reported that they would experience higher levels of anger when making a mistake in a high- criticality situation in comparison to a low-criticality situation.

Although research specifically focused on anger in sports is still relatively sparse, these studies have provided a series of important directions for future investigations. Firstly, some studies have suggested directions related to the sample. Specifically, it is suggested the importance of deepening the study of gender differences in anger (Maxwell et al., 2009; Robazza & Bortoli, 2007), as well as across different competitive and skill levels, experience levels, and types of sport (fine motor-skill vs. explosive gross motor-skill, contact vs. non-contact, and individual vs. team) (Robazza & Boltoli, 2007; Ruiz & Hanin, 2011). Likewise, Ruiz and Hanin (2011) also highlighted the relevance of exploring the impact of implicit or explicit norms present in different cultures or subcultures (e.g., cultural differences, implicit norms) on the experience, expression and control of anger. Finally, Bolgar et al. (2008) suggested the use of more representative and larger samples that allow the analysis of the differences not only of low and high- trait anger athletes, but also other levels of anger (e.g., moderate).

Others studies have underlined the importance of exploring the relationship of anger in sport with other variables. For instance, Maxwell and colleagues (2009) highlight the need to

address the effect of motivational variables on anger. For these authors, low motivation (or the perceived importance of winning) can suppress anger and aggression, because these responses are often related to an attitude of “win at all costs” (p. 295). Another important variable that might contribute to the maintenance and augmentation of the experience of anger in sports is anger rumination (Maxwell, 2004; Maxwell, Moores & Chow, 2008), therefore these studies also suggest a further analysis of this relationship. Most important, given the potential positive impact of anger on performance, some studies suggest a more thorough analysis of the relationship anger-performance (Robazza & Bortoli, 2007; Ruiz & Hanin, 2004, 2011).

Because emotions tend to “fluctuate” (Skinner & Brewer, 2002, 2004), other studies suggested the need to examine the temporal dynamics of anger throughout competition (Ruiz & Hanin, 2004) or to attempt to assess anger-related responses during and immediately after anger-inducing situations (Bolgar et al., 2008). For instance, Ruiz and Hanin (2011) advocate the use of qualitative studies to analyse situational, intra-, and inter-personal processes responsible for the changes in anger intensity. In addition, as emotions often occur in combination with other emotions (e.g., Lazarus, 2000), some studies also recommended the investigation the influence of the co-occurrence of other positive and negative emotions in the experience of anger (Robazza & Bortoli, 2007; Ruiz & Hanin, 2004).



**Table 8**

*Summary of the studies about anger in sports*

Authors and Year	Type of study	Theoretical background	Sample	Measures	Main conclusions
<b>Bolgar, Janelle, &amp; Giacobbi (2008)</b>	Quantitative	Cognitive models of anger, stress, and coping (Lazarus, 1999; Lazarus & Folkman, 1984; Novaco, 1979, 1995).	103 adolescent tennis players (52 males and 51 females), ranging between 11 and 18 years old; competing at United States Tennis Association (USTA).	Sub-scales of reactive-anger and anger-control of the Adolescent Anger Rating Scale (Burney, 2001); Cognitive appraisals (primary and secondary) were assessed using the procedures described by Eklund and Gordon (2002), which consisted of items about how the competition is perceived; Coping Function Questionnaire (CFQ; Kowalsky et al., 2001); Frequency of anger behaviours was assessed by asking participants how many times, within last week of practice and competition, they had overtly expressed their anger on the tennis court.	Tennis players with higher levels of reactive anger tended to experience more anger outbursts in the previous week of practice and competition, comparing to those with lower anger reactivity levels. However, athletes with higher levels of anger control showed more control, changeability, and more emotion and problem-focused coping strategies in anger provoking-situations.
<b>Brunelle, Janelle, &amp; Tennant (1999)</b>	Treatment efficacy	Cognitive-behaviour techniques (anger awareness and role-playing)	57 male soccer players enrolled in two Sport and Fitness soccer classes at University (equally divided in three groups: Anger awareness, role-playing, and control).	Angry Behaviour Rating Scale (an observation table of the athletes' angry behaviours); State-Trait Anger Expression Inventory (STAXI; Spielberger, 1988); Measures were completed in the pretreatment (1-6 games before the treatment), treatment (games 7-12 during the treatment) and retention phase (games 13-15, starting two	Three groups were compared: role-playing group, anger awareness group, and control group. Despite the efficacy of the anger awareness intervention on the treatment phase, participants in the role-playing group continued to reduce angry behaviour throughout the study. Comparing to the other groups, role-playing proved to be the most effective in

				weeks after the last session of anger control treatment).	reducing participants' angry behaviours.
<b>Maxwell, Visek, &amp; Moores (2009)</b>	Quantitative.	Not stated.	Hong Kong Chinese students and community residents involved in competitive sports: basketball (n= 106), association football/soccer (n =84), rugby (n= 82), and squash (n= 99).	Competitive anger and aggressiveness scale (CAAS); Maxwell & Moores, 2007a); Sport behavior inventory (SBI; Conroy et al., 2001); Provocation in sport questionnaire (PSQ; Maxwell & Moores, 2006); Chinese state/trait anger expression inventory (STAXI-C; Maxwell, Sukhodolsky, & Sit, 2009); Demographic questions.	Results demonstrated that the experience of anger and aggression among Chinese and Western athletes is similar. Anger, aggressiveness, anger expression, and provocation were positively correlated, whereas anger control showed negative correlations. Besides, collision sports (e.g., rugby) showed higher levels of anger, aggression, provocation and perception of the legitimacy of aggression. Conversely, individual sports (e.g., squash) had the lowest levels in these variables. A level of competition analysis showed that all the variables' levels decrease along with level of competition, except for collision sports, in which a higher level of competition was associated with higher levels of anger and aggressiveness.
<b>Maxwell &amp; Visek (2009)</b>	Quantitative	General Aggression Model (GAM; Anderson & Bushman, 2002)	127 players, participating in Division I (n=41), Division III (n=44), or Division V (n=42) of the Hong Kong Rugby Football Union's local league during the 2006-2007 competitive season.	Competitive Aggressiveness and Anger Scale (CAAS; Maxwell & Moores, 2007) Athletic Identity Measurement Scale (AIMS; Brewer & Cornelius, 2001) Altered version of the Context Modified Webb Scale (CMW-Modified; Visek & Watson, 2005) Past unsanctioned aggression: participants asked a yes or no question about using unsanctioned aggression in sport, and another about being taught how to use it.	Results showed that aggressiveness, professionalization, and having been taught how to use unsanctioned aggression without being detected by officials predicted past unsanctioned aggression. Specifically, higher scores in aggressiveness and professionalization were associated with the use of unsanctioned aggression just to cause injury or pain to opponents. It was also found that anger, aggressiveness, and professionalization were positively correlated, whereas athletic failed to reveal any significant association.

<p><b>Maxwell and Moores (2007)</b></p>	<p>Quantitative; Scale development.</p>	<p>Not stated.</p>	<p>309 athletes (192 males) from various sports, such as football, hockey, rugby, tennis and squash. The mean age was 25.10.</p>	<p>Competitive Aggressiveness and Anger Scale (CAAS) Buss–Perry Aggression Questionnaire (BPAQ; Buss &amp; Perry, M, 1992).</p>	<p>This study consisted in the development of a measure of anger and aggressiveness in sport competition. Both exploratory and factor analysis confirmed the good psychometric characteristics of this measure. Test-retest and concurrent validity were also demonstrated (the CAAS total and subscales were associated with all the subscales and the total of the BPAQ). Finally, discriminant validity was also demonstrated by analysing differences in three groups classified as calm, neutral, and fighters (more aggressive). Results revealed that the fighters showed significantly higher levels of anger, aggressiveness, and total of the CAAS comparing to the other groups. Conversely, the calm group showed the lowest levels. Consistently, it was also reported higher levels of anger and aggressiveness in males (as opposed to females) and in contact sports (comparing to non-contact sports).</p>
<p><b>Dunn, Gotwals, Dunn &amp; Syrotuik (2006)</b></p>	<p>Quantitative</p>	<p>Multidimensional conceptualization of Perfectionism (Flett &amp; Hewitt, 2002)</p>	<p>138 male Canadian football players.</p>	<p>Sport Multidimensional Perfectionism Scale (Sport-MPS; Dunn, Dunn, Gotwals, Vallance, Craft, &amp; Syrotuik (2006). Sport-Modified Trait Anger Scale (TAS). Modified version of the Spielberger’s (1999) STAXI-2 Reactions-to-Mistakes Anger (RTM-Anger) Scale. The RTM-Anger scale was based upon the original item content of Spielberger’s (1999) State Anger (S-Anger) subscale.</p>	<p>Results showed that the combination of high personal standards with high concern over mistakes and high perceived coach pressure (or maladaptive perfectionism) was associated with competitive trait anger, as well as the tendency to experience this emotion in bad performance situations. Specifically, the higher the athletes’ anger, the higher they scored in three perfectionism dimensions increased (concerns over mistakes, personal standards, and perceived coach pressure).</p>

<p><b>Vallance, Dunn, &amp; Dunn (2006)</b></p>	<p>Quantitative</p>	<p>Multidimensional conceptualization of Perfectionism (Flett &amp; Hewitt, 2002)</p>	<p>229 male youth ice hockey players competing at the highest levels of competitive age-group hockey in the western Canadian city (ages ranged from 12.08 to 16.08).</p>	<p>Sport Multidimensional Perfectionism Scale (Sport-MPS; Dunn, Dunn, Gotwals, Vallance, Craft, &amp; Syrotuik (2006). Sport-Modified Trait Anger Scale (TAS). Modified version of the Spielberger's (1999) STAXI-2 Reactions-to-Mistakes Anger (RTM-Anger) Scale. The RTM-Anger scale was based upon the original item content of Spielberger's (1999) State Anger (S-Anger) subscale.</p>	<p>This study supports the theoretical relationship between anger and perfectionism. It was also found that, regardless of perfectionism, athletes experienced higher levels of anger in situation perceived as important as compared to situations perceived as less important. Additionally, participants higher in perfectionism tended to experience higher levels of anger.</p>
<p><b>Robazza &amp; Bortoli (2007)</b></p>	<p>Quantitative</p>	<p>Individual Zones of Optimal Functioning (IZOF; Hanin, 2000)</p>	<p>197 Italian male rugby players from several teams enrolled in the National championship during the competitive season (aged between 18 and 37 yr)</p>	<p>Competitive Trait Anxiety Inventory-2 (CTAI-2; Albrecht &amp; Feltz, 1987) State-Trait Anger Expression Inventory (STAXI; Spielberger, 1991); A direction scale ranging from 3 (very debilitating) to +3 (very facilitative) was added for each item of the scales used.</p>	<p>Rugby players demonstrated a moderate frequency of angry symptoms, although it was found that a high frequency of anger control. Generally, it was also found participants felt their angry feelings as under personal control, and therefore, perceived them as facilitative to performance. Additionally, participants also reported feeling moderate levels of anxiety and higher levels of self-confidence, perceiving them as facilitative. Besides, participants of high-level and low-level of competition did not differ in angry symptoms, but differed in anxiety, in which high-level players showed lower levels of cognitive anxiety. Finally, it was also found that cognitive anxiety direction was a predictor of trait anger, and self-confidence direction was a predictor of control of anger.</p>

<b>Proios (2012)</b>	Quantitative	Appraisal theories (Lazarus, 1999; Lazarus & Folkman, 1984; Novaco, 1979, 1995),	140 athletes (29 boys), ranging from 8 to 17 years. Participants participated in artistic gymnastics (n = 91), rhythmic gymnastics (n = 37), and acrobatic gymnastics (n = 12), competing at different divisions ( I, n = 10; II, n = 20; III, n = 61; IV, n = 49)	Anger subscale of the Competitive Aggressiveness Anger Scale (CAAS; Maxwell & Moores, 2007); Moral Orientation Students in Physical Education Questionnaire (MOSPEQ; Proios, 2010); Athletic Identity Measurement Scale (AIMS; Brewer & Cornelius, 2001); Achievement Goal Scale for Youth Sports (AGSYS; Cumming, Smith, Smoll, Standage, & Grossbard, 2008); Social Goal Orientation (SGO; Stuntz & Weiss, 2003)	Results revealed significant differences in anger according to the type of sport, in which artistic gymnastics athletes showed higher levels than rhythmic gymnasts. Significant differences were also found in according to gender, revealing that boys had higher levels of anger. Finally, no differences were found across level of competition. It was also found that goal coach praise orientation (defining success as gaining the approval of a coach) was a positive significant predictor anger.
<b>Esfahani &amp; Soflu (2010)</b>	Quantitative	Not stated.	Participants were 214 male and female volleyball players participating in competitions of Iran universities.	Competitive State Anxiety Inventory - 2 (CSAI-2; Peter, Terry, Lane, & Shepherdson, 2004); State-Trait Anger Expression Inventory (STAXI) (Spielberger, 1999).	It was reported that males showed higher levels in the components of anxiety (cognitive, somatic and self-confidence) and in state anxiety. Conversely, females showed higher elves of anger expression. No differences were found in trait anxiety. Besides, a positive association was found between the competitive anxiety reported by male players and female players.
<b>Ruiz &amp; Hanin (2004)</b>	Qualitative.	Individual Zones of Optimal Functioning (IZOF; Hanin, 2000)	Participants were 43 (15 female) Spanish karate athletes, aging between 15 to 29 years.	Individualized emotion profiling was used to identify the idiosyncratic content and intensity of optimal and dysfunctional emotions. This process consisted of asking participants to generate words describing their optimal (helpful) and dysfunctional (harmful) perceptions of negative and positive emotions. Individualized anger profiling. In this	This study found that athletes experience anger in both, best and worst performances, although more frequently after worst performances. Participants' descriptions of anger had low overlap scores, suggesting the anger experience is highly idiosyncratic. Likewise, the same idiosyncratic nature was found about anger intensity, demonstrating that optimal or harmful anger intensity could either be low, moderate, or high for different athletes.

				part, participants generated words about their optimal (helpful) and dysfunctional (harmful) perceptions when presented different anger items. Emotion Intensity was measured with a self-report scale.	Finally, athletes perceived anger to have both helpful and harmful effects on performance. In best performances, anger was associated to motivation and generation of energy, while in worst performances, anger was associated with a perception of few resources and low readiness to perform.
<b>Ruiz &amp; Hanin (2011)</b>	Mixed: quantitative and qualitative,	Individual Zones of Optimal Functioning (IZOF; Hanin, 2000)	Participants were 20 (6 female) elite karate athletes, ranging between 17 to 38 years old.	State-Trait Anger Expression Inventory-2 (STAXI-2; Spielberger, 1999); Participants were asked to recall their best and worst performance, and to identify 2 or 3 significant situations prior to, during, and after these performances, also describing important details of the situations or their states. They were also asked about whether and how anger facilitated or debilitated their karate performance.	Athletes reported feeling anger in best and worst competitions. Anger intensity prior to, during, and after best and worst performances was found to be largely variable inter-individually. Specifically, anger intensity was high, moderate or low for different athletes, and across the performance situations. Additionally, in best performances, anger intensity was perceived as increasing the generation of energy, but in worst performances, anger intensity was associated to unsuccessful generation and utilization of resources. However, almost all athletes (75%) perceived anger as facilitate for on performance.



## CHAPTER II

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### **Aggression and aggressive behaviour in sport: theoretical perspectives and research findings**





## INTRODUCTION

Aggressive behaviour is a part of all forms of physical contact, and sports are no exception. Indeed, today this is probably one of the most serious problems in sports (Sacks, Petscher, Stanley, & Tenenbaum, 2003). Aggressive acts are constantly observed among players, opponents and even among members of the same team. Interestingly, several types of aggression that are not accepted in other contexts tend to be acknowledged and even encouraged in sports (Gill & Williams, 2008). Initially, Russel (1993) argues that the sport context is perhaps the only one where aggression is applauded and the social norms and laws are temporarily forgotten. In sports, the authority is established by referees who decide whether an aggressive act is “legal” and the severity of the penalties given to the athletes. These penalties are no more than fines or suspensions only registered in newspapers or in the league registries. Situations in which the legal system has intervened in sports are rare and confined solely to extreme cases of violence. The discrepancy between spectators and athletes is a classical example of this ambiguity. While spectators are “controlled” by police authorities, and consequently by the court, athletes, just a few meters away, are under the supervision of referees and the rules of the game. Generally, penalties in sport tend to be less severe than penalties given to spectators, even in similar situations. This tolerance towards aggression and violence can partially explain the frequency of these behaviours in sports (Russel, 1993).

Further controversy can be found in the search for an operational definition of aggression in sports, which has been the aim of several discussions in the sport psychology literature (e. g. Tenenbaum et al. 1997; Kerr, 1999, 2002). Indeed, the term aggression can be used to describe several types of behaviour in sports, ranging from a violent act to a more “powerful” performance in an important game (Cox, 1994). Baron and Richardson (1994) proposed that human aggression refers to “any type of behaviour with the intention to hurt or injure another living being motivated to avoid this treatment” (p. 7). This includes both physical and verbal aggressive behaviours. Inclusively, there are several criteria that have to be added to properly formulate its operational definition. Aggression implies an intent to cause harm, and thus hurting someone by accident is not considered aggressive behaviour. It involves an intention to cause physical or psychological harm, or deprive someone from something. Besides, it is only an

aggressive act if it is directed to another living being. For instance, injuring an opponent with a racquet is considered aggression, but breaking it on the floor is not. Besides, as the definition states, the “victim” has to be motivated to avoid this treatment, because that masochism and suicidal behaviours are not part of the aggression construct (Baron & Richardson, 1994).

Additionally, the concept of aggression has been confused with other constructs. The term aggression refers to a behaviour, and therefore is not an attitude, an emotion, or a motive. Anger and other associated constructs, although frequently associated with aggression, are not part of this construct (Widmeyer, Bray, Dorsch & McGuire, 2002). Violence is another concept often confused with aggression, yet it refers exclusively to acts of extreme physical aggression (Gill & Williams, 2008).

To provide a deeper understanding of this construct, Buss (1961) introduced the basic distinction between instrumental and hostile aggression. The former refers to an aggressive behaviour with an underlying non-aggressive goal, which is generally premeditated. Although in instrumental aggression there is also an intention to hurt, the main goal is not to inflict pain, but to gain an external advantage. In the particular context of sport, this type of aggression is the most frequent (Weinger & Gould, 2007), and serves as a mean to win, earn money or prestige (Cox, 1994). For example, when a player tackles another to get the ball, the main goal is not to hurt the opponent, but to get the ball. Instead, hostile aggression refers to aggressive actions derived from anger and/or provocation. This type of aggression is typically impulsive and implies the intention and goal to cause harm to another person (Husman & Silva, 1984). For example, if a player attacks a referee, the goal here is not to win but to cause suffering. Recently, other theorists have proposed an equivalent distinction between proactive (instrumental), and reactive aggression (hostile or affective) (Russel, 1993).

However, this distinction is perhaps simplistic because these constructs may overlap each other. Although Anderson and Bushman (2001) recognized its utility in the early development of aggression theories, at the present time this dichotomy is considered an impairment for further “understanding and controlling human aggression“ (p. 274). According to these authors there are two major problems with this dichotomy. Firstly, while instrumental aggression is often planned and unemotional, hostile aggression is automatic and triggered by an emotional cue. However, both types of aggression can be planned or spontaneous, and have affective triggers. Secondly, it is acknowledged that both instrumental and hostile aggression

have the proximal goal of causing harm, but their ultimate goal is not always clear. An individual can have the intention to cause harm, but can also have instrumental benefits from the aggressive act. For example, a player may tackle its opponent as a reaction to a provocation, yet this can also bring benefits for his performance. In fact, a study carried out by Kirker, Tenenbaum, and Mattson (2000) reported that the majority of the instrumental aggression events in sport were associated with some sort of reactive process. Thus, as suggested by Anderson and Busshman (2002), aggression should be seen more as a continuum in which it is possible to have both aggression types at the same time.

Because Baron and Richardson's (1994) definition of aggression is impracticable in sport contexts, Maxwell (2004) adopted a more suitable definition, describing aggression as "...any behaviour, not recognised as legal within the official rules of conduct, directed towards an opponent, official, team-mate or spectator who is motivated to avoid such behaviour"(p. 280). This definition acknowledges the legitimacy of aggression and is in accordance with the International Society of Sport Psychology, which holds that aggression is "the infliction of an aversive stimulus, either physical, verbal, or gestural, upon one person by another. Aggression is not an attitude but behavior and, most critically, it is reflected in acts committed with the intent to injure" (Tenenbaum et al. 1997, p. 1). Besides, it reflects both hostile and instrumental aggression (Husman & Silva, 1984), because the intent to harm is also present.

However, Kerr (2008) criticised Maxwell's definition of aggression with three major arguments. Firstly, it does not take into account certain types of sports, such as team contact sports (e. g. American Football, Ice Hockey), where aggression is intrinsic, accepted, and even a legal part of the game (Kerr, 2006). Secondly, players' perceptions of what is acceptable and unacceptable aggression (as well as collective norms), frequently overcome the official rules and laws of the game. This would contradict the idea that aggression is "not recognised as legal within the official rules of conduct" (Maxwell, 2004, p. 280). For instance, in spite of being against the rules, fighting in ice hockey is often tolerated by players, coaches, and administrators. Thirdly, Kerr (2008) argues that not all players are motivated to avoid aggression. According to this argument, players are still motivated to play even knowing that they are going to be subjected to all kinds of sports aggression (and violence). Besides, they "have willingly agreed to compete against each other" (pp. 115), and therefore accept aggression as an integral part of the game.

Another argument put forward by Kerr (2008) indicates that the specificity of aggression in sports contexts must be acknowledged, suggesting the distinction between two types of aggression: sanctioned and unsanctioned. The first refers to acts of aggression that fall within the rules and laws of the game while the second refers to aggressive behaviours that are not accepted by the rules and laws of the game, and have an underlying malicious nature (Kerr, 1999, 2002). Hence, Kerr (2008) states that Maxwell's (2004) definition of aggression does not include both these types of aggression. According to Kerr (1999) aggression is an integral part of sports and should be acknowledged as such. Classifying sanctioned acts as non-aggressive does not alter their aggressive nature. However, Maxwell and Moores (2008) agreed with Kerr's (2008) critics, clarifying that the original definition of aggression presented by Maxwell (2004) was, and can only be, applied to unsanctioned aggression.

Consequently, the endeavor to find a definition of aggression in sports is still yet to be accomplished. More recently, despite Kerr's (1999, 2000) critics, Maxwell, Visek, and Moores (2009) proposed a return to the ISSP definition of aggression (Tenenbaum et al., 1997), but considering that it applies to both sanctioned and unsanctioned aggression, and that the harm is caused intentionally. Therefore, this definition overcomes one of the major problems associated with the definition of aggression in sports, i.e., what can be considered sanctioned or unsanctioned aggression. As Kerr (1999) highlighted, the fact that sanctioned aggression is not penalised does not change the underlying aggressive nature of the behaviour. However, there is still one problem to solve: how to distinguish whether an aggressive act was intentional or not? Ultimately, only the athlete will know the true nature of his or her intentions (Russel, 2008).

Perhaps the solution to this problem would be to focus on the study of the antecedents of aggression (Maxwell & Moores, 2007). Anger and aggressiveness were identified by Berkowitz (1993) as important antecedents of aggression. Anger is an emotion described as a "subjective feeling that varies in intensity from mild annoyance to irritation to intense fury or rage" (Spielberger, 1988, p. 161). Aggressiveness refers to the "dispositions to become aggressive or acceptance of and willingness to use aggression" (Maxwell & Moores, 2007, p. 182). Both anger and aggressiveness are relatively stable personality characteristics that are not specific to sports. Individuals high on anger and aggressiveness are more inclined to behave aggressively (Farrington, 1978).

For the purpose of this thesis, the ISSP conceptualisation (“the infliction of an aversive stimulus, either physical, verbal, or gestural, upon one person by another”, Tenenbaum et al., 1997, p. 1) will be used as the operational definition of aggression, assuming that it applies to both sanctioned (accepted by rules and laws of the game) and unsanctioned (not accepted by rules and laws of the game) aggression. By taking this position, it is asserted that aggression involves any type aversive stimulus (physical or verbal), regardless of being accepted by the rules, laws, and even implicit norms of the game. In addition, this definition only applies to aggressive acts that occur intentionally, and not those that are merely accidentally.

## **“CLASSIC” THEORIES OF AGGRESSION IN SPORT**

Because aggression is such a controversial topic, many theories have been developed in an attempt to explain why athletes aggress in sport competition (Russel, 2008). In this sense, the following section describes the theories that have guided most of the research in this subject throughout the past decades.

### **Instinct Theory**

This theory is based upon the works of two influential authors in the field of psychology. Freud (1950) considered aggression to be an innate drive, similar to hunger and sex. Aggression is seen as inevitable, although it could be avoided through discharge or satiation. Likewise, Lorenz (1966) suggests that individuals have an innate fight instinct developed through evolution, which generates energy that is intensified until it extinguishes in an act of aggression. The more instinct energy accumulated, the more likely aggression will occur, and the more destructive it will be.

Within this perspective, aggression is an energy that keeps accumulating, but its discharge should avoid the use of violence (Gill & Williams, 2008). This process of energy discharge was named catharsis (Lorenz, 1966), which can occur through social unacceptable behaviours, such as criminality, or through more social acceptable behaviours, such as sports (Anshel, 1994). Therefore, beating an opponent can work as a release or catharsis of aggressive energy accumulated (Cox, 1994). Besides, catharsis can occur only symbolically, in which a

player can just visualise aggressive acts during competition (Anshel, 1994). In this sense, sport can be seen as a “channel” through which aggressive energy is expressed in a socially accepted way (Gill & Williams, 2008).

However, this theory has not been acknowledged as an appropriate explanation for aggression (Russel, 2008). Among the many critics presented toward this theory, one of the most important refers to its cultural decontextualisation. According to the instinct theory, every culture has the same innate impulses to aggress, with similar levels of energy and patterns of expression. However, research on intercultural differences has found evidence for the contrary (e.g., Maxwell, Moores, & Chow, 2008). Likewise, according to this theory, athletes who play aggressive sports would be calmer, which has not been empirically supported. For instance, Collins, Hale and Loomis (1995) compared the behaviour of players of aggressive sports and players of non-aggressive sports, and found no significant differences. Despite these findings, another study reported that coaches and sports spectators considered that athletes were aggressive because of their innate characteristics (Russell, Arms & Bibby, 1995).

Additionally, Anshel (1994) argued that this biologically innate instinct has not been identified yet, neither was the notion of catharsis. This conclusion invalidates the hypothesis that sports could serve as a catharsis for aggression in a socially accepted way (Weinberg & Gould, 2007). Regardless of the lack of evidence to support this theory, people will continue to use it to attempt to explain aggressive behaviours, given its appellant simplicity and wide range of real life examples that appear to support this notion (Russel, 2008).

### **Frustration-aggression hypothesis**

This theory is amongst the most popular explanations for aggression. Sports spectators and sportscasters tend to assume that an act of aggression does not occur without a reason and frequently point to frustration as an explanation for such behaviours (Russel, 2008). The frustration-aggression hypothesis was originally proposed by Yale, Dollard, Doob, Miller, Mowerer and Sears (1939), who argued that anything that obstructs the attainment of a goal creates a state of frustration that inevitably culminates with aggressive behaviour (Russel, 1993). Frustration does not result in aggression on its own, but will create an energy that facilitates this behaviour. Similarly to the instinct theory, aggression can also be channelled to more social

accepted behaviours, such as sports. However, there is no evidence to the fact that sports can reduce aggression (Gill & Williams, 2008).

Thus, the aggression-frustration hypothesis was also the target of many critics, mostly centred on situations in which this theory does not apply. For instance, when an individual faces an obstacle, he or she can intensify efforts, rather than using aggression. Instead of aggression, individuals can show behaviours typical of other developmental stages, such as avoiding the situation or sulking. These behaviours show that there are multiple response possibilities to frustration besides aggression. On the other hand, aggression is not exclusively caused by frustration. Other factors, such as a threat, or an insult can trigger aggression. For example, an athlete can aggress his or her opponent because he or she is simply following the coach's commands (Russel, 1993, 2008).

In a revision of this theory, Miller (1941) introduced a more realistic approach to the role of frustration in aggression. According to this author, frustration can lead to several different responses, including aggression. Individuals face frustration very frequently in their daily lives, yet they do not react aggressively every time. The likelihood of an aggressive response is determined by two factors: the intensity of the frustration and the level progress in achieving a goal. The more individuals are close to attain their goals, the more frustration they will feel, and therefore the more aggressive their responses will be.

Furthermore, Berkowitz (1993) argues that even though frustration arises in several situations, aggression is still very unlikely to occur. Therefore, frustration does not lead directly to aggression, but can be a result of negative affects originated by frustration. If athletes are enjoying and/or are in advantage in the competition, their tendency to aggress following frustration will be somehow "buffered" (Russel, 1993). In this sense, the absence of negative affect when a goal is not achieved can restrain athletes' aggressive responses. Another critic postulated by Berkowitz (1993) suggests that aggression does not arise from an energy drive that needs to be discharged, but is a result of situational cues and learning. Aggression only occurs if there is both an opportunity and the appropriate stimuli, such as a provocation from the opponent, or the public. For example, Berkowitz (1962) compared the number of electric shocks angry and non-angry participants applied to another person. While it was found that angry individuals gave more electric shocks, other situational factors had an important role in the individuals' responses. The presence of a gun, watching an aggressive film, and the "victim's"



characteristics (being a boxer or having the same name as an aggressive character) increased aggressive behaviour, i.e., the number of electric shocks. Despite all these critics, this theory has provided an essential contribute to the comprehension of aggression by highlighting the role of frustration (Weinberg & Gould, 2007).

### **Social Learning Theory**

According to this perspective, neither frustration nor biological drives are adequate to explain human aggression. This theory argues that aggression is the result of a learning process, suggesting that previous acts of aggression only serve as the basis for other acts of aggression, rather than releasing some kind of energy (Cox, 1994). Albert Bandura (1973) was the pioneer of this theory, according to which aggression is a social behaviour, and as such, is triggered and maintained in the same way as other social behaviours. Thus, aggression is learned through reinforcement and observation. In the context of sports, this learning process is quite clear. For instance, when a football player tackles an opponent to get the ball, he or she will be reinforced by the supporters' applauses. This reinforcement can also be subtler, such as when a player is reinforced when arriving home. The social learning theory is also more optimistic than the instinct or the frustration-aggression hypothesis because if aggressive responses are learned, assertive responses can also be learned. Within this view, aggression can be avoided, whereas in the drive or instinct theories, this behaviour was seen as inevitable (Cox, 1994).

The well-known bobo dolls experiment provided empirical support for this theory (Bandura, Ross & Ross, 1963). Generally, results revealed that children exposed to the aggressive model, either by watching live or in a video, showed more aggression towards the doll. Subsequently, children observed the aggressive model being reinforced or punished for his behaviour. Children who saw the model being reinforced increased aggression, while those who saw the model being punished decreased aggression. In addition, children who were reinforced directly for their aggressive behaviour also increased aggression. This suggests that vicarious reinforcement or punishment also influences children's aggressive responses.

Consistently, other studies have also demonstrated that the observation of violence in the media was associated with aggression (e. g., Anderson & Bushman, 2001). As children are constantly being exposed to violence in the media, they may learn that this behaviour is a socially accepted way to deal with confrontational situations. Likewise, sports events portrayed in the

media are frequently filled with aggressive episodes that could affect not only children in general, but youth athletes in particular (Weinberg & Gould, 2007). The specific case of hockey provides a textbook example of this process of social learning. Smith (1988) observed that amateur athletes watched their idols being recognised by coaches, teammates, and parents for their aggressive behaviours. Consequently, these athletes will imitate this behaviour, and will also probably be reinforced, forming a cycle of aggression (Weinberg & Gould, 2007).

### **Moral Reasoning Approach in sport**

In sport contexts, the moral reasoning approach has been mainly considered in two different perspectives: social cognitive paradigm (Bandura, 1991, 1999) and the structural and developmental approach (Shields & Bredemeier, 1995; Weiss & Smith, 2002). The first posits that moral reasoning arises from the process of learning and reinforcement by significant others. This perspective is based upon the social cognitive theory of reasoning (Bandura, 1991), according to which individuals use a set of multidimensional and standard rules to determine whether an action is morally correct, such as the consequences of the action, the potential personal loss and personal motivations for using aggression. When facing moral dilemmas, individuals integrate all this information to determine the morality of their actions.

Bandura (1991) also stresses the role of self-regulation in moral behaviour as a process of self-monitorisation of actions considering personal standards and environmental circumstances. The ability to effectively self-regulate moral behaviour involves monitoring, judgement, and evaluation, as well as self-regulatory efficacy (belief in the ability to accomplish personal control). A higher perception of self-regulatory efficacy would suggest that an individual would be able to follow his or her personal standards and resist the social pressure to transgress.

Perhaps the most noteworthy of Bandura's (1999) contributions is the concept of duality in morality, suggesting that this concept includes both positive and negative aspects. Specifically, this author distinguished proactive morality, which refers to the capacity to have a humanly behaviour, and inhibited morality, which reflects the avoidance of the inhumane behaviour. In this sense, "individuals do good deeds, or avoid doing bad deeds" (Bandura, 1999, p. 194). In sport settings, encouraging others, or helping an opponent off the floor are examples of prosocial behaviours (or proactive morality). Conversely, inhibited morality consists in refraining from

behaving badly, which reflects antisocial behaviours, such as cheating, and verbal and physical aggression (Sage, Kavussanu, & Duda, 2006).

Within this context, Bandura (1991, 1999) introduced the concept of moral disengagement to refer to the process by which individuals use cognitive restructuring to justify their amoral actions. This process can occur on a daily basis through eight different mechanisms: (a) Moral justification consists of turning a negative conduct into something more social and personally acceptable (considering that a given amoral act had a higher social purpose), such as entering a fight to protect someone; (b) advantageous comparison occurs when individuals compare their own actions to others considered worse, like thinking that it is worse to physically aggress someone than “just” using verbal aggression; (c) by using euphemistic labeling, the individuals camouflage their potentially harmful actions as innocent or use a more euphemistic language to describe them, such as hitting someone and then saying: “I took care of his health”; (d) individuals can also minimize or ignore the consequences of their actions, such as ignoring an act of aggression if it did not have any consequences; (e) another mechanism is attributing the blame of a reprehensible action to others or to the circumstances of the situation; (f) it is also possible to use the mechanism of dehumanization, which refers to considering the “victim” of an aggressive act as unhuman, or characterizing him or her with animalistic qualities; (g) on its turn, displacement of responsibility occurs when individuals avoid feeling personally responsible for their actions by attributing the to the pressure or the power of authority; (h) finally, by diffusing the responsibility, an individual can attribute the responsibility of his or hers actions to several individuals acting together, thus not feeling personally responsible (Bandura, 1991; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996).

Although the study of moral disengagement is still relatively sparse within the sport context, some authors have been centring their interest on this topic. For instance, two recent qualitative studies (Corrion, Long, Smith, & d’Arripe-Longueville, 2009; Long, Pantaléon, Bruant, & d’Arripe-Longueville, 2006) have reported that elite athletes use these moral disengagement mechanisms to justify their transgressive acts.

On another look at aggression as a moral problem, Bredmeier and Shields (1995) conceptualised this behaviour as a form of social interaction and not just a simple response. Aggression is defined within a structural developmental perspective, in which a moral reasoning

structure underlies judgements of what is right or wrong. In this context, moral reasoning refers to judgements about the appropriateness of a given behaviour (Bredemeier & Shields, 1998). Individuals' moral reasoning evolves through a developmental process, which occurs throughout their cognitive maturing and social interactions. This process of moral development moves the individual from a focus on self-interest to an other-orientation and to considering mutual interest and welfare. Aggressive behaviour can reflect the level of moral reasoning where the individual is situated. In this sense, moral reasoning refers to a decision process about the integrity, or not, of a given line of conduct, which results from both individuals' psychological growth and development and their personal experiences (Weiss, Smith, & Stuntz, 2008).

In addition, Bredemeier and Shields (1986) also introduced the concept of "bracketed morality" (also known as game reasoning) to suggest that athletes have different definitions of justice and responsibility. Sport is different from everyday life in three aspects: it is separated from daily life by specific spatial and temporal boundaries; most of the decisions are in the "hands" of officials and coaches, thus athletes feel less responsible and accountable for their actions; and game rules do not allow a constructive dialogue between teams and opponents (Gill & Williams, 2008). Therefore, sport constitutes a unique field where athletes feel less obligated to think of others and tend to be more self-centred or egocentric. Indeed, among a sample of 100 high school and college basketball players and nonathletes, it was found that moral reasoning about sport is more egocentric than moral reasoning about everyday life (Bredemeier & Shields, 1986).

## **NEW THEORETICAL PERSPECTIVES ON AGGRESSION**

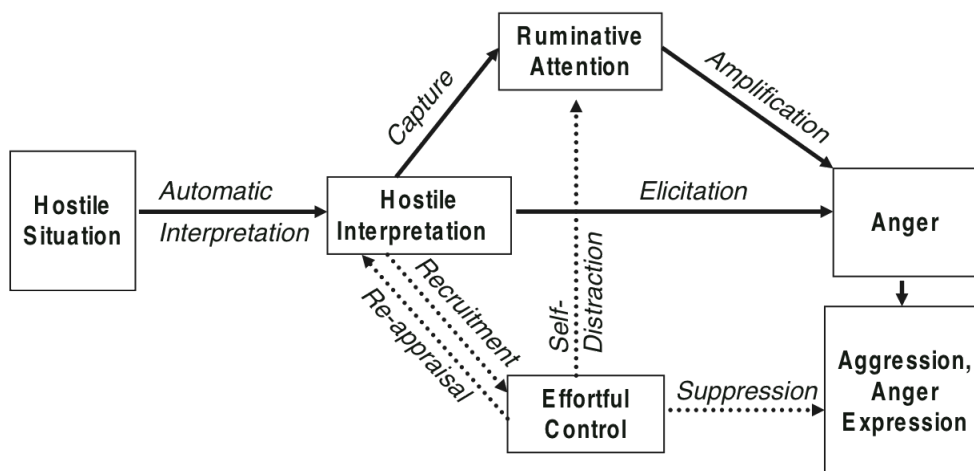
The following section describes three more recent theories of aggression, which intent to provide a deeper understanding of this phenomenon by combining notions from the previous classical theories and integrating recent research findings.

## Integrative Cognitive Model of Trait Anger and Reactive Aggression

Drawn upon past influential models on aggression (Anderson & Bushman, 2002; Berkowitz, 1993; Crick & Dodge, 1994) and recent attempts to reanalyze these models within a cognitive approach, the Integrative Cognitive Model (ICM) focuses on the conceptual breach between anger and reactive aggression. This model intends to integrate three stages of information processing that have been linked to trait anger, namely, selective attention, interpretation and effortful control (Wilkowski & Robinson, 2008a).

In order to understand this model, it is important to first conceptualise some constructs. Reactive aggression is a central construct in this model, and reflects a tendency to react aggressively when provoked. Conversely, proactive aggression reflects the use of aggression for instrumental purposes. In addition, state anger is “an emotional state marked by subjective feelings that may vary in intensity from mild annoyance or irritation to intense fury or rage” (Spielberger, et al. 1983, p. 162). Therefore, trait anger refers to individual differences in the frequency, duration, and intensity of the state anger experience (Spielberger, 1988).

Overall, Figure 1 schematizes the ICM (Wilkowski & Robinson, 2008a, b), suggesting that individuals’ cognitive processing tendencies mediate the relationship between hostile situational inputs and anger and reactive aggressive responses. While the solid lines represent cognitive processes that increase anger and reactive aggression, the dashed lines demonstrate processes that decrease these response tendencies.



**Figure 3:** Schematization of the Integrative Cognitive Model of Trait Anger and Reactive Aggression (Source: B. Wilkowski and M. Robinson, 2008, p. 13)

According to this model, the interpretation of the situational input occurs automatically and is one of the most important processes to understand trait anger. Some individuals have biased automatic interpretations of situational inputs, generating anger-related responses (Wilkowski & Robinson, 2008a, b). This idea is consistent with the appraisal theories of emotion (Smith & Lazarus, 1990) and previous anger and aggression models (e.g., Anderson & Bushman, 2002). In fact, Wilkowski and Robinson (2008a) suggested that individuals high in trait anger tend to automatically interpret ambiguous situations as hostile.

At a next stage, hostile interpretations are followed by different types of cognitive processes that can either minimize or exacerbate anger experiences. As other types of negative information, hostile information automatically captures individuals' attention (e.g., Robinson, 1998), which can lead to rumination. The longer rumination lasts, the more likely the existing anger will be intensified and turned into retaliatory aggression (Bushman, 2002). However, effortful control processes allow individuals to override these automatic cognitive tendencies (Posner & Rothbart, 2000). While individuals high in trait anger tend not to control automatic processes, individuals low in trait anger have learned to control their automatic tendencies by recruiting effortful control processes (Wilkowski & Robinson, 2008a). The importance of effortful processes to emotional regulation has already been acknowledged by recent perspectives on self-regulation (Rueda, Posner, & Cohen, 2004). Consistently with Bausmeister's et al. (2007) model of self-control, the ICM also asserts that the capacity for effortful control is limited and typically remains dormant, although it can be recruited to deal with specific situations (Wilkowski & Robinson, 2008b).

According to the ICM, effortful processes can operate in three different forms, as can be observed in the dashed lines of Figure 1. Individuals can reappraise the situation as a nonhostile (Anderson & Bushman, 2002); they can interrupt the attention (self-distract) to ruminative thoughts, blocking hostile interpretations (Siegle, Carter, & Thase, 2006); and can help suppress the tendency to behave aggressively (e.g., DeWall, Baumeister, Stillman, & Gailliot, 2007) and bodily reactions to anger (Gross, 1998). Therefore, the ICM posits that effortful control processes are also central to the comprehension of individual differences in the reactions to hostile situations.

In sum, the IMC posits that there are three cognitive processes, namely, hostile interpretations, ruminative attention and effortful control essential to understand individual

differences in anger and reactive aggression. In addition, the ICM argues that individuals high in trait anger are more likely to interpret ambiguous situations as hostile, which in turn will trigger automatic rumination processes that lead to the intensification of anger and aggressive impulses. Besides, these individuals also tend to have fewer resources to control these hostile thoughts. Conversely, individuals low in trait anger are more prone to control their hostile thoughts and have learned to do so automatically (Wilkowski & Robinson, 2008a, b).

## **General Model of Aggression**

The General Aggression Model (GAM) arose from the need to integrate several existing “mini-theories” on aggression, namely, Cognitive Neoassociation Theory (Berkowitz, 1993), Social Learning Theory (Bandura, 2001; Mischel & Shoda 1995), Script Theory (Huesmann, 1998), Excitation Transfer Theory (Zillmann 1983), and Social Interaction Theory (Tedeschi & Felson 1994), into a unified theoretical framework (Anderson & Bushman, 2002; Dewart, Anderson, & Bushman, 2011). Anderson and Carnagey (2004) described GAM as “a dynamic, social-cognitive, develop model that includes situational, individual (personological), and biological variables and provides an integrative framework for domain specific theories of aggression” (p. 173). Underlying this theory is the assumption that social behaviour depends on the individuals’ “construal” of the events, including their interpretation of the events, beliefs about how to react to those events, perceived competencies for responding and expectations about the outcomes. These construals provide some stability, since individuals tend to behave in their own characteristic way across situations, as well as some situational specificity, due to reality constraints.

### ***Knowledge structures***

Furthermore, the GAM also incorporates a more developmental perspective, according to which personality is a “set of stable knowledge structures that individuals use to interpret events in their social world and to guide their behaviour” (Anderson & Bushman, 2002, p. 27). These knowledge structures are developed from experience, can become automatized with use and influence all types of perceptions, ranging from simple visual patterns to more complex behavioural sequences. Besides, these can also contain, or be associated to, affective states,

behavioural programs, and beliefs. In this sense, they are employed to guide individuals' interpretations, as well as behavioural responses, within their social and physical environment (Anderson & Bushman, 2002; Anderson & Carnagey, 2004).

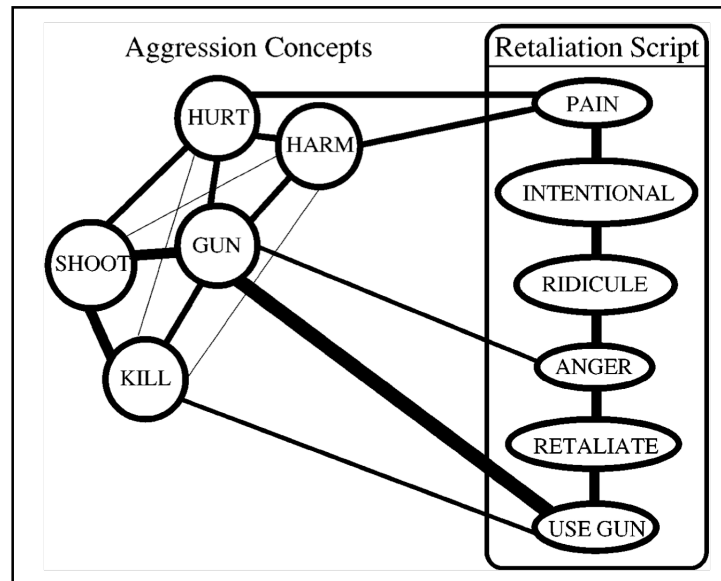
Knowledge structures can be classified into three subtypes with different functions: "(a) perceptual schemata, which are used to identify phenomena as simple as everyday physical objects (chair, person) or as complex as social events (personal insult); (b) person schemata, which include beliefs about a particular person or groups of people; and (c) behavioral scripts, which contain information about how people behave under varying circumstances" (Anderson & Bushman, 2002, p. 33).

Finally, there are three different ways in which knowledge structures influence affect. Knowledge structures can be associated to a given affect experience or concept, thus if a knowledge structure linked to anxiety is activated, this emotion will be experienced. Secondly, they include information about affect, such as when and how a given emotion should be experienced, and its influence on behaviour and judgment. Thirdly, behavioural scripts can contain affect as an action rule, in a way that, for instance, a personal insult script may lead to aggressive retaliation, but only if anger levels are high or fear levels are low (Anderson & Bushman, 2002).

Figure 3 shows an example of how knowledge structures operate. Two types of knowledge structures are presented, a perceptual schemata about guns and a behavioural script for retaliation. In the presence of a gun, other concepts are activated simultaneously (e.g., shoot, kill, hurt, harm). The thickness of the lines represents the strength of the association, while the proximity represents the meaning similarity. As can be observed, a network of associations can activate different behavioural scripts. For instance, when the nodes gun, kill, and hurt are activated, a given retaliation script is activated, becoming a tool for interpreting an ambiguous situation, and therefore increasing the likelihood of an aggressive response.

In addition, the GAM explains aggression by analysing a single episode cycle of an ongoing social interaction (Fig. 4). In general terms, a single episode of aggression includes three critical stages: "(1) person and situation inputs, (2) present internal states (i.e., cognition, arousal, affect, including brain activity) [cognitive, affective, and arousal routes through which input variables have their impact], and (3) outcomes of appraisal and decision-making processes" (Dewall, et al., 2011, p. 246).





**Figure 4:** Example of how knowledge structures operate (C. Anderson & B. Bushman, 2002, p.30)

Inputs include both situational factors that increase aggression (e. g. presence of a weapon, uncomfortable temperature, and insults), and person factors that represent what the person “brings” to the current situation (e. g., behavioural tendencies, beliefs, attitudes, genetic predispositions) (Anderson & Carnagey, 2004). More specifically, person factors represent personality, which to according Anderson and Bushman (2002), is the sum of the several knowledge structures. These structures also exert an influence on what situations the individual selects and avoids.

In a similar way, situation factors also influence aggressive responses. For instance, several situational factors were found to increase aggression, such as provocation (e. g., Berkowitz 1993), aggressive cues (television, movies, or video games) (e. g., Anderson & Dill, 2000), frustration (e.g., Dill & Anderson 1995), drugs (alcohol and caffeine) (Bushman, 1993), among others. As with person factors, situation factors exert an influence on aggressive behaviour through influencing cognition, affect, and arousal.

Both these inputs then create a present internal state by which behaviour is influenced. The most important internal states are cognition, affect and arousal (also referred to as routes). An input variable can influence aggressive behaviour by influencing one, two, or all three of these variables. Cognition refers to hostile thoughts and scripts, while affect includes mood, emotion, and expressive motor responses, which are automatic actions that occur when a certain emotion

arises (e.g., facial expression of anger). Finally, arousal influences aggression in three different ways: it can strengthen or energise an action tendency; can be elicited by irrelevant sources (e.g., exercise) and mistakenly perceived as anger; and may create aversive states (low or high arousal) that lead to aggression (Anderson & Bushman, 2002; Anderson & Carnagey, 2004).

Finally, the outcomes include numerous complex appraisal and decision processes. These processes range from automatic to highly controllable (e.g., Smith & Lazarus, 1993). Anderson and Carnagey (2004) referred to automatic appraisals as “immediate appraisal” and to controlled processes as “reappraisal”. Within this perspective, immediate appraisals are effortless and spontaneous processes that occur without awareness. These include information about affects, goals, and intentions and are determined by the present internal state, which in turn was determined by situational and personal factors. In this sense, responses vary considerably from person to person, according to individuals’ present state of mind and social learning history.

Reappraisal then occurs if the individual has available resources, such as time, cognitive capacity or if the immediate appraisal is seen as important and unsatisfactory. Thus, if the individual does not have available resources, or the outcome was appraised as not important and satisfactory, an impulsive action is likely to occur. This action can be aggressive or nonaggressive, according to the content of the immediate appraisals. In the process of reappraisal, individuals search for an alternative view of the situation, and may recruit and test several different structures, such as scripts and memories of similar events. Throughout this process, multiple reappraisal cycles can occur, but eventually they cease and a thoughtful action occurs. However, reappraisal does not always mean that a nonaggressive response is generated. Reappraisal can result in a highly aggressive response, either cold and calculated, or hot and affective. For instance, reappraisal can increase aggressive behaviour and anger by recruiting past memories of the target person or making the damage to the individual’s social image more noticeable. Furthermore, the present internal state can be affected by both processes of immediate appraisal and reappraisal (Anderson & Carnagey, 2004; DeWall et al., 2011). In sum, input variables have an effect on the present internal state, which in turn affects the appraisal and decision processes (Figure 4). The outcomes from these processes result in the actual final action of the social episode. Subsequently, the final action integrates the input (person and situation) and can influence forthcoming episodes.

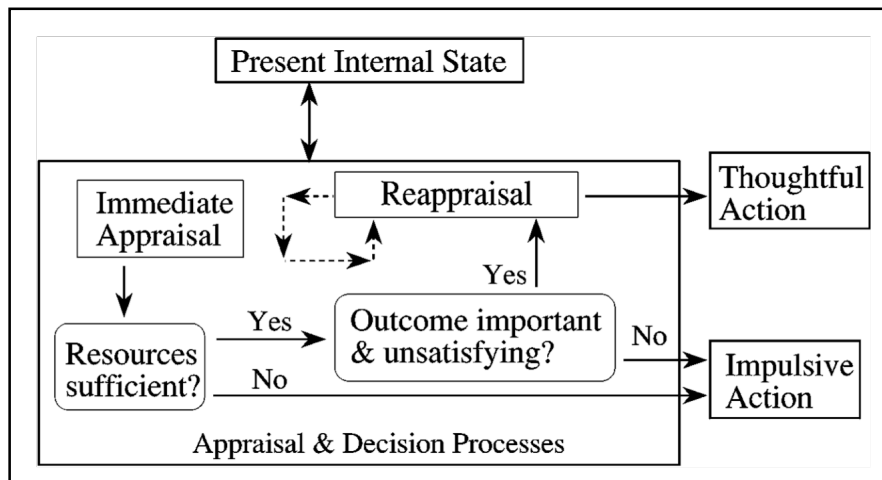


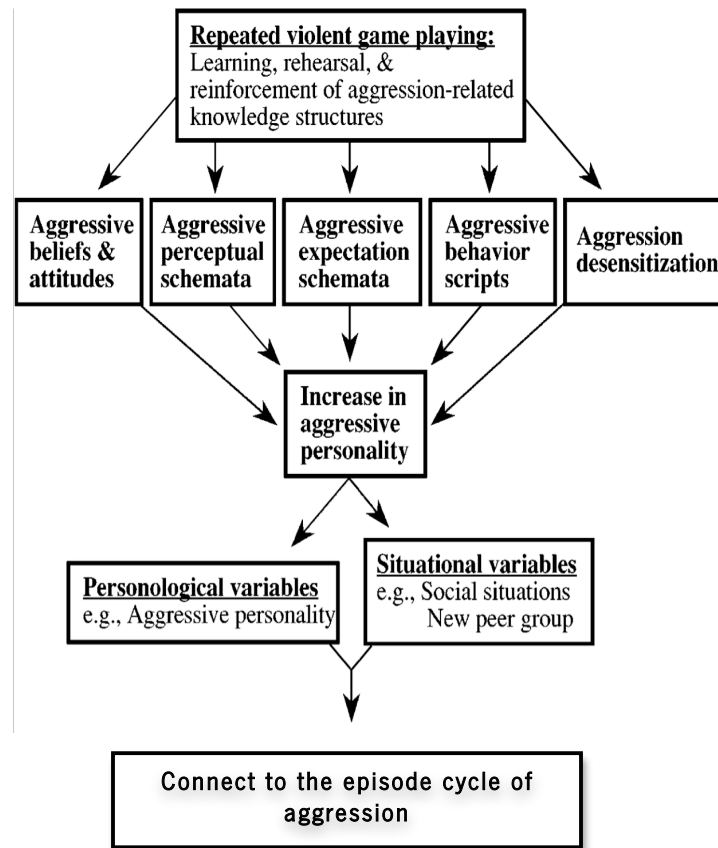
Figure 4: Appraisal and decision processes (C. Anderson & B. Bushman, 2002, p.40)

In addition to the episode cycle, the GAM also proposes a development cycle that both the past and the future have to be taken into account and not just the episode and present internal state. Whereas past is what the person “brings” the episode, future is the individual’s expectations, plans and goals. Within this developmental perspective, children who are repeatedly exposed to factors such as media violence and poor parenting can become aggressive adults. Anderson and Bushman (2002) suggest that this happens through the development, automatization and reinforcement of knowledge structures associated with aggression.

Figure 5 demonstrates how knowledge structures “transform” the individual’s personality. In this specific example, five types of knowledge structures associated with media violence exposure are represented. Whilst these structures are created and automatized, they can change individuals’ personality. For example, individuals repeatedly exposed to media violence can develop more aggressive attitudes, behaviour, beliefs and perceptual biases. These “aggressive” knowledge structures influence both inputs (person and situation) of the aggression episode cycle. Although the association with person inputs is fairly obvious, it is more complex with situation inputs.

In sum, this theory portrays aggression in an episode cycle, in which aggressive episodes enter the cycle again by changing personality. Personality is seen as a set of stable knowledge structures that influence individuals’ responses, which in turn determine their situational and interpersonal experiences, influencing personality back again (Anderson & Bushman, 2002;

Anderson & Carnagey, 2004). Accordingly, the older an individual is, the harder it is to change his or hers aggressive behaviours. As an individual increases life experiences, the more maladaptive knowledge structures may be learnt and automatised. Given the several ways in which these can be learnt, interventions based on a single trait or situation are less likely to succeed. Thus, the GAM proposes that interventions on aggression should broaden the scope of factors included in order to address the multiple sources of maladaptive learning experiences and target groups preferably at a relatively young age.



**Figure 5:** Development Cycle (Source: C. Anderson & B. Bushman, 2002, p.42)

### I Cubed (I3) Theory

Based upon recent findings on self-control and aggression (e.g., Denson, von Hippel, Kemp, & Teo, 2010; Denson, Pedersen, Friese, Hahm, & Roberts, 2011), very recently Slotter and Finkel (2011) developed the I cubed theory attempting “(a) to impose theoretical coherence on the massive number of established risk factors for aggression and (b) to employ the tools of

statistical (and conceptual) moderation to gain new insights into the processes by which a previously nonaggressive interaction escalates into an aggressive one” (p. 35). Instead of suggesting a single key variable, or even a set of variables, the I3 theory intends to present an organizational structure for understanding both the processes by which a given risk factor promotes aggression, and how multiple risk factors interrelate to aggravate or mitigate aggression-promoting tendencies (Slotter & Finkel, 2011).

On the basis of the I3 theory, Slotter and Finkel (2011) posed three main questions: “First, does at least one individual in the interaction experience strong instigating triggers toward aggression? Second, does that individual experience strong impelling forces toward aggression? Third, does that individual experience weak forces to inhibit or override the aggressive impulses?” (p. 2). The likelihood to aggress increases with each positive answer, either by the main effect, or the interaction effect of each variable on another, or on both. In effect, according to this theory, there are three processes underlying aggression: instigation, impellance, and inhibition (the three I’s).

Instigation was defined as “exposure to discrete social dynamics with the potential victim that normatively triggers an urge to aggress (e.g., provocation)”. In other words, it refers to situational events or circumstances that lead the individual toward physical aggression. Without instigations, impelling and inhibiting forces lose their predictive power over aggression, given that individuals are not aggressive all the time. As much as one individual is more prone to use aggression, situational variables are indispensable to trigger this behaviour. Through processes of automatic association or cognitive appraisal, aversive events (instigations) may trigger hostile cognitive, affective, physiological, and motor tendencies that lead individuals to aggress (e. g., Berkowitz, 1993; DeWall, Anderson, & Bushman, 2011). However, other situations can also trigger aggression, yet with an underlying instrumental goal, such as being paid to hit somebody (Slotter & Finkel, 2011).

These instigation triggers were distinguished in two types: dyadic and third-party. The former are events or circumstances that the individual perceived as caused by a given target. A classic example of this type of trigger is provocation (Anderson & Bushman, 2002). On the other hand, the latter reflects events or circumstances in which the individual perceives that somebody else, other than the target of aggression, is responsible. These triggers lead to the same urges to aggress, but are directed toward a third party. An individual who is provoked by another may feel

an urge to aggress against him and/or another target more acceptable or desirable (Slotter & Finkel, 2011). For instance, a soccer player who is provoked by his teammates may find it more socially acceptable to react against his opponents.

In some situations, individuals may easily overcome instigation triggers, even without noticing them, while others may react aggressively. This difference may be caused by impellance, or impelling forces, which refer to “dispositional or situational factors that psychologically prepare the individual to experience a strong urge to aggress when encountering specific instigators in specific contexts (e.g., trait aggressiveness, trait anger)” (Denson, Dewall, & Finkel, 2012, p. 1). Slotter and Finkel (2011) described impellance as forces that increase the likelihood of an aggressive response in the face of an instigating trigger. The strength of aggressive impulses can result either from the main effect of the impellance forces, or their interaction with instigation triggers. Individuals with more powerful aggressive impulses are more likely to act aggressively comparing to individuals with less powerful impulses (Slotter & Finkel, 2011).

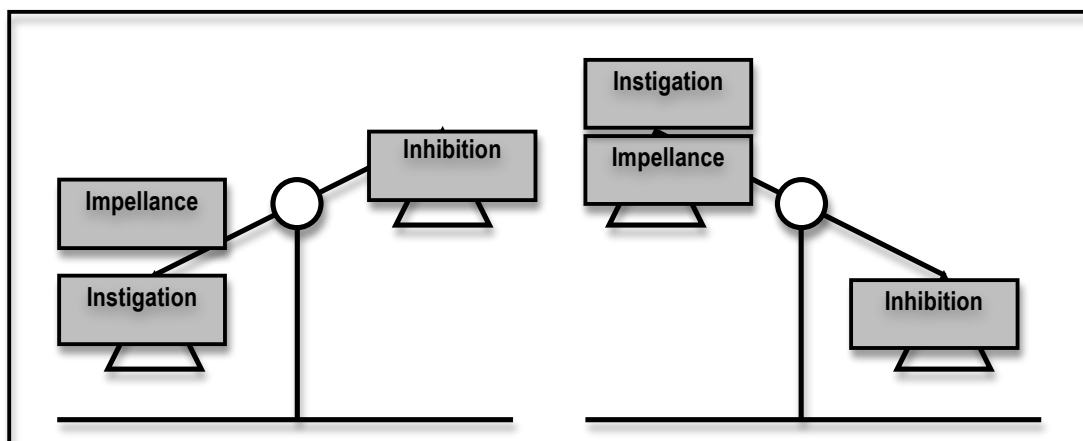
Impelling forces can be organised in four different categories, namely, evolutionary and cultural, personal, dyadic, and situational. The first represent individuals’ biological and cultural heritage that can potentially lead them to aggression, including evolutionary adaptations and social norms. For instance, social norms determine which instigating triggers provoke stronger aggressive impulses. The second, personal impellers represent stable characteristics of the individual, such as personality traits, attitude, beliefs and genetics. For instance, these can include narcissism (e.g., Twenge & Campbell, 2003), and testosterone levels (e.g., Van Goozen, Frijda, & Van de Poll, 1994). On its turn, dyadic impellers reflect the characteristics of the relationship between the potential aggressor and the potential target. For example, feelings of vulnerability or insecurity in a relationship can increase aggression (e.g., Dutton, 2011). Finally, situational impellers are cognitive, affective, or physiological experiences that are momentarily present, such as exposure to violent media (Anderson & Bushman, 2001; Anderson, Carnagey, & Eubanks, 2003), or uncomfortable temperatures (Anderson, Anderson et al., 2000).

At the third stage, the I3 theory places the inhibiting forces, which allow individuals to override their aggressive impulses that had emerged from instigating triggers, impelling factors and their interaction. Inhibition reflects “dispositional or situational factors that increase the likelihood that people will override an aggressive urge (e.g., trait self-control).” (Denson et al., 2012, p. 1). While some individuals are not able to retrain their aggressive impulses, others can

control them and not engage in aggressive behaviour. These inhibiting forces decrease the likelihood of the occurrence of aggression by overriding aggressive impulses.

Inhibiting forces are also organised in four categories, as with impelling forces (evolutionary and cultural, personal, dyadic, and situational). For instance, evolutionary and cultural inhibitors can be a result of evolution that skilled ancestral men and women with the capacity to restrain aggressive impulses in certain situations (Baumeister, 2005). Examples of personal inhibitors include dispositional self-control (Finkel, DeWall, Slotter, Oaten, & Foshee, 2009) and executive functioning (Giancola, 2000). Dyadic inhibitors can include relationship commitment (e.g., Slotter, Finkel, & Bodenhausen, 2009), and relative physical size (Archer & Benson, 2008). As for situational inhibitors, these include nondepleted self-regulatory resources (DeWall et al., 2007; Finkel et al., 2009) and sobriety (no alcohol consumption) (Bushman & Cooper, 1990).

As depicted in Figure 6, if the inhibiting forces are weaker than the collective forces of instigating triggers and impelling forces, aggression is more likely to occur (right scale). Conversely, if the forces of inhibition are stronger than the combination of instigating triggers and impelling forces, aggression is less likely to occur (left scale). Aggression is therefore the result of the interaction between these variables, occurring more frequently when inhibition is weaker than instigations and impellance.



**Figure 6:** Metaphorical Schematisation of the I cubed theory. According to the I cubed theory, this figure depicts a scale metaphor of the interactions between the three I's. On the right scale, the forces of inhibition (e.g., non-depleted self-regulatory resources, sugar consumption, sobriety, self-control practice) are stronger than the combination of the instigation (e.g., provocation, social rejection) and impellance (e.g., trait aggressiveness, anger rumination) forces, and thus aggression is less likely to occur. In opposition, on the left scale, instigation and impellance forces are stronger than the inhibition forces, increasing the likelihood of the occurrence of aggressive behaviour (Adapted from Denson et al., 2012).

While inhibition can also involve social control, such as physical restraint, most inhibitory factors rely on self-control. Therefore, within the I3 theory, self-control is seen as a key ingredient that allows individuals to restrain aggressive urges and respond in accordance with social standards (Denson et al., 2012). In fact, Bettencourt, Talley, Benjamin, and Valentine (2006) have argued, “most theories of aggression largely ignore the role that self-regulation plays in aggressive behavior” (p. 753). In this sense, this theory is also an attempt to provide and integrative framework of the role of self-control as a mechanism to restrain aggression (Finkel et al., 2012).

Recently, two hypotheses about self-control and aggression have been guiding research on self-control and aggression. The depletion hypothesis predicts that when the self-control resources are depleted, reactive aggression is more likely to occur. Research has asserted that self-control capacity is limited and can be temporarily depleted (e. g., Baumeister et al., 2007). Consequently, recent research findings (Denson et al., 2010; DeWall et al., 2007) reported that provoked individuals tend to behave more aggressively when their self-control capacity is depleted. These results have been replicated with different measures of aggression, such as serving hot sauce to someone who dislikes spicy food and giving noise blasts to another person. A more recent research has expanded these results to intimate partner violence (Finkel et al., 2009). Participants who received a negative feedback from their partners (provocation condition) let them hold painful body poses for substantially longer when they were depleted comparing to when they were not depleted. This suggests that a reduced self-control capacity can lead to increased aggression in both strangers and intimate partners.

On the other hand, the bolstering hypothesis posits that increasing self-control capacity can reduce aggressive behaviour. Denson, Capper, Oaten, Friese, & Schofield (2011) found that training self-control (using the nondominant hand for everyday tasks for the 2 weeks) decreased participants anger when provoked comparing to those who did not practiced any self-control exercises. Sugar consumption is also another method to bolster self-control (Gailliot et al., 2007). This method was found to be effective to improve performance in measures of working memory and executive functions (Gailliot et al., 2007). In two studies, Denson et al. (2010) also found that consuming glucose decreased participants' aggression by improving their self-control capacity.



In conclusion, by expanding our knowledge of aggression, the I3 theory can also help develop psychological interventions aimed at reducing this behaviour. Indeed, because this theory holds that inhibitory factors are central to restrain aggression, it seems that interventions that focus on strengthening individuals capacity to control their impulses are more effective than intervention focused on preventing those impulses (Baumeister, 2005; Slotter & Finkel, 2011).

## **RESEARCH ON AGGRESSION IN SPORT**

Although the study of aggression remains a topic of interest, research on this subject is somehow disperse through different theoretical and methodological approaches. It seems that the curiosity, interest, and importance surrounding aggression in sport does not translate into a more systematic and thorough research on this phenomenon (Kimble, Russo, Bergman, & Galindo, 2010). This section intends to provide a more comprehensive and organised review of the empirical studies about aggression in sport. Studies are organised according to different themes and perspectives that have emerged during this literature review.

### **Aggression and performance**

Despite the relevance of this topic, not many investigations have thoroughly studied this relationship. In an archival study based on 4 seasons of 32 teams of the National Hockey League (NHL), Widmeyer and Birch (1984) failed to reveal a significant relationship between team aggression and team performance in any of the four seasons considered in the study. Nonetheless, in a similar study, Engelhardt (1995) measured aggression by the number of fighting penalties, while performance was assessed by NHL standing. Although a negative relationship between aggression and performance was found in some seasons, in other seasons no significant relationship was reported.

Other investigations have deepened the study of this relationship by including other variables. McGuire, Widmeyer, Courneya, and Carron (1992) studied 840 season games of the NHL, but added game location (home vs. visiting). Generally, it was found that visiting players tended to be more aggressive in games they lost, while home players were more likely to aggress in games they won. This study highlighted game location as an important mediator between

aggression and performance. Given the complexity of this topic, Mudimela (2010) included achievement motivation and anxiety to the study of this relationship. Using a sample of soccer players, performance was assessed using a scale rated by experts. Results generally indicated that both aggression and achievement motivation were positive predictors of performance, while anxiety showed a negative impact on performance.

### **Situational and contextual factors of aggression**

Aggressive behaviour in sports has several situational factors that can act as facilitators, modelling and potentiating aggression (Anshel, 1994; Russel, 1993). For instance, Russell and Drewry (1976) used the records of the Canadian ice hockey league, revealing that crowd size was positively associated to aggression. Besides, it was also found that aggression increased throughout the three periods of the hockey game, but not across the whole season. In a similar study, Russell (1983) investigated crowd density and aggression using the data from the records of all the games in one season of the Western Hockey League. Crowd density was computed by the ratio of game attendees to seat capacity, while aggression was measured by a composite index of physical and verbal aggression during the games. In addition, performance was also included by using the number of goals scored. However, both crowd size and performance were negatively correlated to aggression in visiting teams, but not in home teams. The author suggested that visiting teams are less aggressive with larger crowds because they might feel a natural instinct to escape danger. It was also reported that aggression seems to increase during intra-divisional home games.

Widmeyer and McGuire (1997) further analysed whether the frequency of competitions between teams also had an impact on athletes' aggression. 345 intradivisional games (teams played each other seven or eight times) were compared to 495 interdivisional games (teams competed with each other only three times). As expected, more aggression was observed in the teams that competed more frequently (intradivisional) comparing to teams that competed less frequently (interdivisional). Interestingly, within both intradivisional and interdivisional competition, it was also found that aggression increased as the number of meetings between the teams increased.

Additionally, other studies further explored the influence of game location by analysing the differences in aggressive behaviour between home and away games. As mentioned above, McGuire et al. (1992) found that visiting players tended to be more aggressive in games they lost, whereas home players tended to be more aggressive in games they won. Similarly, in a longitudinal study, Kelly and McCarthy (1979) examined the number of aggressive acts in college ice hockey players throughout seven years to explore whether these behaviours occur in a specific time or place. An analysis of low versus high aggressive players revealed significant differences, demonstrating that aggression was higher in the final part of the game and was more frequent at home than away. The authors suggested that this may occur because of fatigue, which may lead athletes to break the rules in order to improve their performance.

More recently, Jones, Bray, and Olivier (2005) randomly taped 21 professional rugby league games and then asked a sample of seven rugby league players (each with approximately 10 years of playing experience) to code aggressive behaviours throughout the games. Results did not show any significant differences in the frequency of aggression between home and visiting teams. In addition, home and visiting teams did not differ in aggression as function of time of the game (first vs. second half) and current state of the game (winning vs. losing vs. tying). Yet, home and visiting teams did differ as function of game outcome (performance), in which visiting teams tended to be more aggressive in games they lost comparing to games they won, consistently with McGuire's et al. (1992) study. In an archival study, Thomas, Reeves and Smith (2006) analysed 1140 games from the English Football Premiership. Aggression was measure by the frequency of yellow, red and sanctioned penalties. Generally, it was observed that visiting team players tended to have more yellow cards than home teams in both decided and tied games. Furthermore, home and visiting teams did not differ in red cards or sanctioned penalties. Another study (Gee & Sullivan, 2006) did not find significant differences in aggressive behaviour across all three periods of the game, different positions (offensive and defensive), and team status (winning, losing, tied). Nevertheless, results revealed that aggression increased when score differential was small. Interestingly, these authors also found that that 81% of the aggressive actions were not noticed by the game official.

A series of studies have centred their efforts on the potential effects of uniform colour in athletes' aggression. Frank and Gilovich (1988) measured aggression by the number of yellow and red cards in the National Football League (NFL) and by the number of minutes penalized in

the NHL. Subsequently, the levels of aggression of teams wearing black uniforms were compared to levels of aggression of the other teams. Teams that wore black uniforms were more aggressive both on the NFL and NHL. In addition, players who wore black showed more aggressive ideations. On the other hand, it was reported that referees tended to penalize more players wearing black. Therefore, the author suggests that further research should attempt to find if this relationship results from the players' perceptions or the way they are perceived by others (e.g., referees). Attempting to replicate these findings, Mills and French (1996) also investigated the relationship between aggressive penalties and uniform colour in the NFL and NHL. Records of two teams' (Los Angeles Kings and Minnesota/ Dallas Stars) aggressive penalties were analysed 1, 2, and 3 years before switching from multicoloured to white, yellow, purple, and predominantly black jerseys. However, no significant relationship was found between uniform colour and aggressive penalties.

Other studies went even further and searched for environmental variables that can exert an influence in athletes' aggressive behaviours. Bearing in mind that the literature has reported a positive relationship between aggression and temperature (Russel, 2008), Reifman, Larrick, and Fein (1991) tested whether hot weather would increase athletes' aggression. After analysing three seasons of the Major League of Baseball, it was indeed found that aggression increased with temperature. Similarly, two other studies (Russel & Dua, 1983; Rusell & de Graaf, 1985) analysed whether lunar cycles were somehow associated with aggression in sports. The records of 5000 Western Hockey League games were analysed, but no association was found between these variables.

### **Differences in gender, level of competition and type of sport**

Despite the undeniable importance of understanding patterns of aggression across different types of sports, levels of competition, and gender, not many studies have focused specifically on this topic. Across the literature, these differences are not usually the main aim of investigation, but come often in a "second place" in the analysis of aggression. Nonetheless, Coulomb and Pfister (1998) in an attempt to find whether time of the game and level of competition produced differences in athletes' use of hostile and instrumental aggression. Therefore, French soccer championship games from different levels of competition were examined, namely, national level (NL), regional level (RL) and departmental level (DL). It was

observed that players were more likely to engage in hostile aggression in the second half than in the first half of the game, whereas instrumental aggression had the opposite pattern (players were more likely to use instrumental aggression in the first half comparing to the second half of the game). Besides, the higher the level of competition (NL players), the higher the level of instrumental aggression (comparing to RL and DL players). Conversely, the lowest level of competition (DL players) showed higher levels of hostile aggression than the other levels (NL and RL players). It was concluded that players in the highest levels of competition learnt to use aggression to their own benefit, thus employing more instrumental aggression. Likewise, Coulomb-Cabagno and Rascle (2005) studied the relationship between aggression and level of competition (national, regional, departmental) and also gender differences. Two ratters observed 90 handball and 90 soccer games revealing that, generally, male players tended to engage in more acts of both hostile and instrumental aggression than female players. Additionally, and similarly to Coulomb and Pfister (1998), instrumental aggression increased with level of competition, whereas hostile aggression decreased with level of competition.

Another study (Guilbert, 2006) examined the differences in aggression across different types of sports, namely, basketball, table tennis, karate, swimming and shooting, across national and regional/local competitive levels. Considering the entire sample, 77% of the athletes admitted that violence does occur in their sports. More specifically, athletes reported using psychological (27.7%), verbal (26.3%), physical (19%) aggression and cheating (4%). When analyzing the differences across type of sport, it was found that karate fighters tended to use more physical violence; basketball players used both physical and verbal violence; table-tennis players and swimmers used psychological and verbal violence; and shooters were non-violent. Generally, basketball was found to be the most violent sport, while shooting was the least violent. In order to deepen the knowledge about violence in sport, types of sport were crossed with levels of competition. The pattern of difference was the same as when considering solely the type of sport. However, players in the same sport did not differ in the use of violence as function of level of competition.

Moreover, Keeler (2007) also considered gender differences in the analysis of relationship of aggression and type of sports. In this study, a sample of 161 men and women who participated in sports with different levels of contact, namely collision (rugby), contact (soccer), or non-contact (volleyball) was compared according to their levels of hostile and

instrumental aggression, life aggression and life assertion. No significant differences were found between the three levels of contact considered in this study. However, significant gender differences were found in life assertion and life aggression, in which males had a higher level in both variables. In addition, both males and females showed a positive relationship between hostile aggression and life aggression, but a negative relationship between the use of instrumental aggression in sports and life aggression. It was also found that, while men had significantly higher levels of assault, women had significantly higher levels of indirect hostility.

Other studies have focused on the study of the differences in variables related to aggression. For example, Visek and Watson (2005) explored the potential differences across age and competitive level in perceived legitimacy of aggression and professionalization of attitudes. In a sample of male ice hockey players, it was found that perceived legitimacy of aggression and attitudes of professionalization increased with age, as well as with competitive level. Additionally, an investigation (Mintah & Huddleston, 2006) explored whether contact and “semi” contact sports athletes used of intentional acts of aggression. Generally, no significant differences were found in use of hostile and instrumental aggression in sport and between the reasons reported to justify hostile and instrumental aggression. In addition, athletes in contact sports tended to disagree more with the use of instrumental aggression than semi contact sport participants.

### **Prediction of aggression**

Another set of studies have attempted to predict athletes' aggression by analysing related variables. Harrell (1980) provided a pioneer study by trying to identify predictors of aggression among school basketball players. For this purpose, observers rated players and their opponents' behaviours as a measure of aggression. Results revealed that the strongest predictor of both aggression and the number of fouls committed was the amount of aggression committed against them by the opponents.

More recently, Chow, Murray and Feltz (2009) examined the potential predictive power of different social, personal, and situational factors on the younger soccer players' likelihood of using aggression. Participants completed measures of stage of moral development, team norms for aggression, and self-described likelihood to aggress an opponent. In addition, their coaches also completed a measure of coaching efficacy. Among the variables analysed, team norms about aggression, i.e., athletes' perceptions about whether teammates would use aggression, was the

most significant predictor of aggression. This predictor was not only significant when considering each individual's perceptions about team norms, but also the collective perception of team norms. In addition, coaches' beliefs about their self-efficacy in competition were also an important predictor of aggression. These authors pointed out that coaches with higher self-efficacy beliefs tend to consider aggression as a legitimate way to obtain benefits in the game.

Moreover, Bushman and Wells (1998) sought to analyse the predictive value of the Physical Aggression subscale of the Aggression Questionnaire (Buss & Perry, 1992) on observed penalties committed in high school ice hockey (different aggressive acts perpetrated by players). Penalties were measured based on minutes in the penalty box, distinguishing between aggressive (e.g., fighting, slashing, tripping), and non-aggressive penalties (e.g., delay of game, illegal equipment, too many players). Results showed that self-reported physical aggression scores predicted aggressive penalty minutes, but not non-aggressive penalty minutes. Despite considering the Aggression Questionnaire as a useful method to select players to positions in which aggression could be a problem, or to predict the likelihood of athletes' aggressive behaviour, these authors do not advise its use for these purposes.

Another study (Stornes & Roland, 2004) explored whether aggressive personality traits predicted instrumental aggression within a sample of male adolescent handball players. For this purpose, a measure was developed including instrumental aggression (aggression as a winning strategy), proactive aggression (personal dispositions to use aggression to gain power or increase the affiliation with others) and reactive aggression (dispositions to act with anger caused by a frustrating or aversive event). Overall, it was found that traits of aggression accounted for 22% of the variance in instrumental aggression. Specifically, individuals with a hot temper (high trait reactive aggression) and the need to demonstrate power towards opponents (a component of proactive aggression) tended to use more instrumental aggression.

Finally, Bar-Eli, Shimkin and Wolf (2009) performed an experimental study on the prediction of aggression, but from the players' perspective. Specifically, this study sought to understand whether professional basketball players could predict on-field aggressive behaviour. Through a series of three experiments, professional basketball players were asked to attempt to predict the likelihood of a defence player committing an unsportsmanlike foul toward an offence player. Predictions of unsportsmanlike fouls relied on two relevant dispositions of the perpetrator, aggressiveness and victimisation. Specifically, players with high aggressiveness and a low

propensity to victimization were considered more likely to engage in unsportsmanlike fouls. Conversely, when photos of real players were used, perpetrators' victimization propensity was more important in predicting fouls.

### **Aggression and motivation**

Research on motivation and aggression has mainly relied on the concept of moral atmosphere or climate. This concept was originally proposed in the achievement goal theory (Duda, 2001), according to which there are two orthogonal goal orientations, namely task (mastery) and ego (performance) orientations. Ego-oriented athletes attempt to be better and show a superior ability comparing to others and (there is an emphasis on winning), whereas task-orientated athletes see the achievement activity as an end in itself and are more concerned with learning and self-referenced improvement. Theoretically, because task orientated individuals are more concerned with skill improvement, they are more likely to show fair play and rule compliance. Conversely, ego orientated individual may use cheating or foul play in order to show superiority above others (Duda, Olson, & Templin, 1991). Therefore, Rasclé, Coulomb, and Pfister (1998) explored the relationship between goal orientations and aggression among male handball players from different sport settings, namely, physical education, interscholastic and League.. Generally, it was found that ego-goal orientations were significantly higher among the League setting, comparing to the other settings. A positive association was also found between ego-goal orientation and observed aggression. Finally, players with higher ego-goal orientation were more likely to use instrumental aggression comparing to players with lower ego-goal orientations.

In a similar study, Rasclé, Coulomb-Cabagno and Delsarte (2005) studied the relationship between perceived motivational climate and observed aggression as a function of competitive level in a sample of 162 male handball players (aged between 13 and 15), as well as 21 coaches. A positive association was also found between performance motivational climate and hostile aggression among players of the lower competitive levels. Among players of higher competitive levels, those with a higher perception of performance motivational climate used more instrumental aggression comparing to those with lower perception. Additionally, it was also reported that players tended to have a higher perception of performance motivational climate than their coaches.



From a different standpoint, Chantal, Robin, Vernat, and Bernache-Assollant (2005) analysed the relationships between sport motivation, athletic aggression and “sportspersonship” orientation. Generally, “sportspersonship” was found to mediate the relationship between sport motivation and athletic aggression. More specifically, higher levels of sport motivation were related to higher levels “sportspersonship” orientations. On its turn, “sportspersonship” orientations were found to have a distinctive relationship with the different forms of athletic aggression. Higher “sportspersonship” orientations were related to less reactive aggression, but more use of instrumental aggression.

### **Individual differences in aggression in sport**

In the search for a better comprehension of this topic, some studies have explored specific individual variables and their differential impact on aggressive behaviour. For instance, in the pursuit of the personality factors associated with aggression and violence in sports, Weinstein, Smith, and Wiesenthal (1995) hypothesised that masculinity can contribute to increase this behaviour. For this purpose, aggression was measured by the number of fistfights and penalty minutes. It was found that masculinity was a significant predictor of fistfights and penalty minutes, accounting for 23% and 36% of the variance, respectively. Similarly, Russell (1981) tested the influence of leadership and conservatism (which reflects the degree to which players respect and submit to their coaches) on aggression. Within a sample of 203 Canadian ice hockey players, a significant relationship was found between physical aggression and violations (challenge of authority) and thus less conservatism. Aggression and less conservatism were also positively associated with staff’s ratings of their players’ aggressive behaviour. Besides, leaders tended to be less aggressive than non-leaders.

In a more complex study, Timmerman (2007) studied a set of individual, as well as situational variables and their influence on aggression. For this purpose, a total of 74,197 games from the Major Baseball League between 1960 to 1992 and 2000 to 2004 were analyzed. Besides aggression, which was measured in hit-by-pitches (when a batter or his equipment, except his bat, was hit in some part of his body by a pitch), several variables of game situation (e.g., hitting a batter who previously hit a homerun), region of pitcher (Southern, non-Southern), and race of the batters were also analysed. Results revealed that pitchers tended to hit batters in situations associated with defending their honour, restoring justice and protecting valued social

identities. In addition, the likelihood of being hit by a pitch depended both on the background of the pitcher and the race of the batter. Specifically, African-American batters tended to be less hit than Latinos or Whites by Southern pitchers. In addition, Caucasian batters were more prone to be hit by Southern pitchers after hitting a home run and in a retaliation situation comparing to African-American batters. Timmerman (2007) concluded that aggression depends on several variables, such as pitcher birthplace, batter race, and the context of retaliation. These findings were also found to be consistent with the general aggression model, according to which personal and situational characteristics interacted to predict this behaviour.

In order to broaden the study of aggression in sports to other related constructs, Maxwell (2004) explored the relationship between the athletes' tendency to ruminate on anger and their aggressive behaviour. It was predicted that higher levels of anger rumination would lead to a higher propensity to aggress. Differences across gender, competitive level, and sport type were also examined. It was found that both provocation and anger rumination predicted aggressive behaviour. Furthermore, no significant differences were found in anger rumination as function of gender, competitive level, and type of sport. However, males and team players reported higher levels of aggression comparing to female and individual players, respectively. On the contrary, no differences were found in aggression across competitive level. Maxwell (2004) concluded that anger rumination is an important cognitive factor that precedes aggressive behaviour in sports. Therefore, the author suggests that teaching more appropriate cognitions in response to provocation can help athletes control their aggression. Thought-stopping (e.g., yelling stop) and thought-switching techniques (e.g., replacing negative thoughts with positive) can be effective in reducing aggression.

Furthermore, Donahue, Rip, & Vallerand (2009) explored the relationship between aggression and basketball athletes' harmonious and obsessive passion for sports. This study was based on the Dualistic Model of Passion (Vallerand et al., 2006), and showed that athletes with an obsessive passion tended to have higher levels of aggression than those with a harmonious passion.

In study 2, participants were divided according to their predominant type of passion (harmonious and obsessive), and subsequently assigned to one of two conditions, self-threat and self-affirmation. It also was suggested that obsessive passion is associated with more aggression under a self-threat condition.

Finally, Gee and Leith (2007) moved on from individual differences, and attempted to explore cultural differences in aggression in sports. In this sense, their study intended to find whether North American hockey players differed from European players in aggression and if these differences are associated with performance. After observing 200 games from the 2003/2004 season, it was reported that North American players tended to be more aggressive than Europeans. It was suggested that North Americans are more encouraged and socially reinforced to use aggression. A further analysis showed that situational factors (game period, point difference, and position in the championship) had no effect on aggression. Furthermore, players in higher levels of competition showed more aggression, possibly because they were exposed to aggressive norms and attitudes for a longer period of time. Additionally, aggression did not have a positive impact on performance. According to these authors, aggressive behaviour is still a part of sports mostly because athletes believe that it has a positive impact on performance.

### **Moral reasoning and moral atmosphere**

Research on this topic generally comes to the conclusion that sport “is a particular kind of activity separated from normal life with its own moral atmosphere. It concludes that participation in sport is often accompanied by less mature moral reasoning which reflects the self-interested nature of the activity” (Jones & McNamee, 2000, p.143). Bredemeier and Shields (1986) provided one of the most prominent studies in this area by examining the relationships between sport involvement variables (participation and interest) and young athletes’ morality, including reasoning maturity and aggressive tendencies. For this purpose, a sample of 106 basketball players and non-athletes from high school and college was interviewed. Results demonstrated that boys' participation and interest in high contact sports and girls' participation in medium contact sports were positively correlated with less mature moral reasoning and more aggression. Furthermore, authors also found that athletes tended to have a “bracketed” morality, because their moral reasoning was more self-centred within sport settings. It seems that athletes tended to temporarily suspend their typical moral obligations and to consider selfish attitudes and cognitions as more socially acceptable in sports. In a similar study, Bredmeier, Weiss, Shields, and Cooper (1986) also studied moral reasoning in sports by analysing 106 children from the fourth to the seventh grade. A small negative correlation was observed between moral reasoning

levels and participation in medium-contact sports among females and participation in high-contact sports among men. In addition, both boys and girls involved in high and medium-contact sports tended to have a more self-centred morality, both in everyday life and in sports. Besides, boys and girls who reported preferring watching high-contact sports were found to be more physically aggressive in everyday life and in sports. However, girls participating in low-contact sports reported being less likely to be physically aggressive in everyday life.

Other studies have considered the influence of moral atmosphere, which reflects the norms and values of a given group, affecting individuals' moral reasoning. In a study by Guivernau and Duda (2002), the relationship between team moral atmosphere and aggressive tendencies in youth soccer was examined. Within a sample of 194 male and female soccer players between the ages of 13–19 years old, it was found that athletes' perceptions of their team pro-aggressive norms (which is a facet of the team moral atmosphere) was the most consistent predictor of self-described likelihood to aggress (SLA). It was also reported that athletes' perceptions of their coach norms for cheating and aggression were the most important factors in their decision to be aggressive. In fact, both male and female athletes reported that they would engage in more aggression if they perceived that their coach supported this behaviour. Finally, and contrary to the literature, no gender differences were found in athletes' SLA. However, male and female athletes differed in their perceived team norms for cheating, in which male reported higher perceptions of "peer acceptance of cheating".

Furthermore, Kavussanu, Roberts, and Ntoumanis (2002) explored the influence of moral atmosphere of the team and perceived performance motivational climate (where success and failure are defined in comparison to the performance of others) on athletes' moral functioning. Participants were 199 college basketball players and results revealed that players tended to view inappropriate behaviours as appropriate and to report a greater intention of engaging in such behaviours when they perceived a team environment sanctioning inappropriate actions. These findings demonstrated the direct influence of moral atmosphere on moral functioning. Nonetheless, performance motivational climate failed to show an influence on athletes' moral functioning. Despite this finding, an association between perceived performance motivational climate and moral atmosphere of the team was reported. More specifically, athletes who perceived that their coaches pay more attention to best players and emphasize normative

success, also tend to believe that their coaches would encourage inappropriate behaviours and their teammates would engage in such behaviours if “winning is at stake”.

In a similar vein, Kavussanu and Spray (2006) studied the influence of moral atmosphere, perceived performance motivational climate on moral functioning among a sample of 324 male soccer players from a youth soccer league. Results revealed that the moral atmosphere of the team had a strong influence on players' moral functioning. More specifically, perceiving that the coach and a large number of teammates would engage in aggressive behaviours (e.g., verbally or physically provoking an opponent, hurting an opponent with a tackle) in situations in which winning is at stake had a strong impact on how players perceived these behaviours, their intention to engage in them and their actual involvement throughout the soccer season. Indeed, the relationship between moral atmosphere and moral functioning was the strongest found in this study. Additionally, perceiving a performance climate was also significantly associated with moral functioning: players with perceptions of a performance climate tended to have low levels of moral functioning.

In another study, Kavussanu and Roberts (2001) explored the influence of achievement goals on indices of moral functioning (moral judgment, intention and behaviour), but also explored unsportsmanlike attitudes and judgments about the legitimacy of injurious acts, within a sample of 199 college basketball players. It was found that ego orientation was associated to the judgment that behaviours such as risking to injure an opponent, intimidating an opponent and faking an injury are appropriate. Similarly, ego orientation was also found to be associated with the intention to engage on such behaviours. However, and contrarily to what the authors were expecting, ego orientation was not associated with those behaviours, perhaps because they are less likely to occur in basketball. Gender differences were also observed, in which males tended to show higher ego orientation, lower task orientation, and lower levels of moral functioning. Besides, males also judge injurious acts as more legitimate than females.

Likewise, Ommundsen, Roberts, Lemyre, and Treasure (2003) attempted to find the relations between the perceived motivational climate, sportpersonship (being fair and just in competition by acting as a responsible and considerate athlete), social-moral functioning and team norms (the norms of the team about the use of antisocial behaviour). In this sense, 279 male soccer players, ranging between the ages of 12 and 14 years completed measures of the variables on study, and were presented with different sport dilemmas. Results about the

relationship between motivational climate and social moral functioning revealed that players with a coach that encouraged a mastery-oriented motivational climate tended to generally have a higher level of moral functioning. These players considered the fairness of an act (a more mature moral motive) when deciding what to do in a moral dilemma. In addition, these players were also less prone to fake or risk injuring an opponent, and to report an intention to intimidate an opponent, as well as stating that they do not engage in these behaviours. On the contrary, those players with a perception of performance climate were more likely to engage in such behaviours. Secondly, the analysis of the relationship between motivational climate and sportpersonship behaviours demonstrated that players who perceive a mastery climate reported more respect for rules, officials, and for social conventions. A further analysis of the climate profiles showed that the group with high performance/low mastery climate had lower levels of sportpersonship comparing to the group with high mastery/low performance. Thirdly, with regards to the relationship between motivational climate and social-moral team norms, it was found that mastery climate had a negative association with coach encouragement of pro-aggressive behaviour, whereas performance climate had a positive association. Furthermore, a mastery climate was also found to be associated with players that reported that their teammates were less likely to engage in inappropriate behaviours against opponents. These results suggest the strong impact of motivational climate in youth soccer players' social-moral functioning, sportpersonship and social-moral team norms.

Moreover, a study by Miller, Roberts, and Ommundsen (2005) also examined the potential effect of perceived motivational climate on several moral-related variables, namely, moral functioning, team moral atmosphere perceptions, and the legitimacy of intentionally injurious acts, in a sample of 705 competitive Norwegian youth football players. The main finding in this study was that performance climate predicted lower moral cognitions and behaviours. An analysis of the interactive relationships between mastery and performance climates revealed that both high performance and high mastery climate predicted low moral judgment, and the legitimacy of using physical intimidation. Besides, results demonstrated the influence of the coach-created motivational climate. Specifically, when coaches emphasised a mastery climate, a more mature moral functioning and a moral atmosphere not advocating the use of aggressive, and cheating behaviour were predicted. Conversely, a coach-created performance climate predicted low sport morality, negatively influencing players' moral cognitions and behaviours. In

addition, gender differences were also reported, with males showing a lower morality comparing to females.

Also, Kavussanu and Ntoumanis (2003) sought to analyse the effect of sports participation on the relationship between motivation and moral functioning. In a sample of 221 college athletes from different types of sports (basketball, soccer, field hockey, and rugby), it was found that contact sports participation was a positive predictor of ego orientation. Furthermore, ego orientation predicted low levels of moral functioning, that is, participation in medium and high contact sports was found to have a negative effect on athletes' moral functioning. Thus, athletes involved in sports for longer tended to report a high ego orientation, which in turn led to low levels of moral functioning. However, task orientation was associated with higher levels of moral functioning.

Finally, Tod and Hodge (2001) analysed the relationship between moral reasoning and achievement motivation using a qualitative approach. For this purpose, eight rugby union players ranging between the ages of 19 and 21 years were interviewed throughout three moments within a six-months rugby season. In each individual interview, players were presented a dilemma and asked a question about moral reasoning and achievement goals within that background. It was found that individuals with ego orientation tended to have a less mature level of moral reasoning, characterised by self-centeredness and a "win-at-all-costs" attitude. Conversely, players with a combination of both task and ego orientations tended to have a more mature level of moral reasoning, showing more concern toward people involved in the moral dilemma. Therefore, these authors highlighted the importance of studying other situation variables that may influence the relationship between achievement motivation and moral reasoning in sport contexts.

## **Prosocial and antisocial behaviours**

A large number of studies analysed moral reasoning from Bandura's (1991) perspective of morality as a dual concept, exploring different relationship patterns between contextual and situational variables and antisocial and prosocial behaviours. In this sense, a study by Kavussanu, Seal, and Phillips (2006), used an observational approach to analyse the frequency of prosocial and antisocial behaviours in soccer teams, as well as the age differences and motivational variables (performance and mastery motivational climates). Within a sample of 313

adolescent soccer players, participants were divided into three different age groups: under 13, under 15 and under 17. Participants were all filmed during the games and completed measures of the variables in study. Two observers recorded prosocial and antisocial behaviours for each team by using a previous list with these behaviours. Results from the observation revealed very few prosocial behaviours, in which the most frequent was helping an opponent off the floor while the least frequent was congratulating an opposing player. However, antisocial behaviours, were significantly more frequent than prosocial (including different types: physically obstructing and winding up an opposing player to provoke a reaction, elbowing, pretending to be injured, shirt pulling, and late tackle). While reported and observed antisocial behaviour showed a positive and strong association, reported and observed prosocial behaviors were not significantly associated. The analysis of the differences across age demonstrated that the oldest players engaged in more antisocial behaviours and less prosocial behaviours. In addition, the older group also perceived a stronger performance climate and a weaker mastery climate in their team comparing to the other younger groups.

Kavussanu, Stamp, Slade, and Ring (2009) also performed an observational study to explore gender differences in prosocial and antisocial behaviours and the influence of empathy, motivational climate and sports experience. For this purpose, 46 soccer teams from recreational English league (comprising a total of 464 soccer players) were observed throughout 23 games. Generally, prosocial behaviours occurred more frequently and encouraging teammates was the most common behaviour. Within the most frequent antisocial behaviours were committing a late tackle, pushing, and physical obstruction. While there were no significant gender differences in prosocial behaviours, antisocial behaviours did differ according to gender, in which males engaged in more antisocial behaviours than females. Besides, males showed less empathy, a higher perception of performance motivation climate and had more experience in soccer comparing to females. Males also tended to be older than females, but did not differ in the perception of mastery motivational climate. Additionally, 23% of the variance in antisocial behaviours was attributed to players' gender.

In order to increase the knowledge about antisocial and prosocial behavioural patterns, another study by Rutten, Dekovic, Stams, Schuengel, Hoeksma, and Biesta (2009) attempted to identify factors related to these types of behaviours both on-field (during games and practice, under the rules of the game and supervision of referees and coaches) and off-field (before and



after practice, when players are not under the supervision of coaches and referees). Generally, 8% and 14% of the variance in on-field antisocial and prosocial behaviour, respectively, as well as 21% of the variance in off-field antisocial behaviour, can be attributed to characteristics of the sporting environment, such as positive attitude toward fair play, relational support from the coach and exposure to high levels of sociomoral reasoning about sports dilemmas. More specifically, relational support was the only factor associated to both antisocial and prosocial behaviours, in which players who perceived more relational support from their coach showed more on-field prosocial behaviour and less off-field antisocial behaviour. Besides, having a fair play (positive) attitude was the only variable negatively associated with antisocial behaviour. Therefore, the importance of contextual factors in the study of antisocial behaviours were highlighted.

Furthermore, Boardley and Kavussanu (2009) tested whether prosocial and antisocial behaviours towards teammates and opponents were influenced by perceived motivational climate and coaching character-building competency, and whether moral disengagement served as a mediator between coaches' character-building competency (perception of coach's competence in promoting an attitude of moral character, fair play, and respect for others) and the behaviours. Results indicated that players of field hockey and netball who perceived a mastery motivational climate tended to report more prosocial behaviours, and less antisocial behaviours towards their teammates. However, mastery motivational climate did not predict prosocial and anti-social behaviours toward opponents. On the other hand, performance motivational climate positively predicted antisocial behaviour towards teammates, but not towards opponents. Moral disengagement fully mediated the relationship between character-building competency and prosocial and antisocial behaviours towards opponents and partially mediated the relationship between character-building competency and partially for the antisocial teammate behaviours. These findings suggest that players who perceived their coach with more character-building competency tended to use less morally disengagement mechanisms. In addition, these players tended to behave less antisocially towards both opponents and teammates and to behave more prosocially towards opponents. Besides, these results were consistent across hockey and netball.

Subsequently, Boardley and Kavussanu (2010) also investigated the predictors of antisocial behaviours toward teammates and opponents and the potential mediating role of moral disengagement in a sample of 307 male soccer players. In general, results indicated that players who reported an ego orientation (motivation to be better than others) tended to engage more in

antisocial behaviours towards opponents and teammates, such as trying to injure and physically intimidating opponents. Conversely, players who reported a task orientation (focusing on achieving personal improvement) tended to engage in less antisocial behaviours, but only towards opponents. The fact that task orientation had no effect on players' antisocial behaviour toward teammates was not expected, because it was predicted that athletes with a task orientation would be more likely to cooperate with peers. Furthermore, moral disengagement was found to be a mediator between ego orientation and antisocial behaviours. In addition, the perceived value of toughness had an indirect positive effect on antisocial acts towards teammates and opponents, which was mediated by moral disengagement. This suggests that players who perceive that their teammates have more respect towards those who are seen as though are more likely to engage in moral disengagement comparing to those who did not have this perception. Consequently, these moral disengagement processes seem to result in more antisocial behaviours toward teammates and opponents.

More recently, Hodge and Lonsdale (2011) tested the application of the self-determination theory (SDT) to prosocial and antisocial behaviours in sports. Specifically, these authors explored whether the relationships between contextual factors (autonomy-supportive vs. controlling coaching style) and person factors (autonomous vs. controlled motivation) had an effect on prosocial and antisocial behaviours. In addition, it was also analysed whether moral disengagement was a mediator of these relationships. Within a sample of 292 competitive sport athletes, it was found that an autonomy-supportive coaching style had a weak negative relationship with antisocial behaviour toward both teammates and opponents and a positive association (although weak) to prosocial behaviour toward teammates (but not toward opponents). With respect to motivation, it was observed that autonomous motivation had positive relationship to prosocial behaviour toward teammates (but not toward opponents), whereas controlled motivation had a positive association to antisocial behaviour toward both teammates and opponents. On its turn, moral disengagement was positively associated with antisocial behaviour toward both teammates and opponents, and mediated the relationship between controlled motivation and antisocial behaviour toward teammates and opponents.



## CHAPTER III

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### Psychological processes and structures associated to anger



## INTRODUCTION

This chapter is dedicated to the processes and structures related to emotional experiences suggested by recent theoretical advances and empirical investigations. In this sense, a brief review of the literature about these constructs will be presented, taking into account their relationship with anger and aggression. The main aim of this chapter is to “look” at the experience of anger and aggression from different perspectives and therefore provide a solid theoretical basis that will guide this thesis. In addition, by combining all these variables, it also intends to contribute the development an integrative view on anger and aggression.

Firstly, because emotion regulation is an important construct in sport competition (Lane, Beedie, Devonport & Stanley, 2011), three main theoretical perspectives of emotion regulation will be described, namely, the “Modal” model of emotions (Gross & Thompson, 2007; Gross, 2008a, b), the Instrumental Account of Emotions Regulation (Tamir, 2009), and the model of Emotional Regulation during Test-taking (Schutz & Davis, 2000; Schutz, Davis, & Schwanenflugel, 2002; Schutz, Distefano, Benson, & Davis, 2004). Some particularly relevant emotion regulation strategies will also be presented, as well as some recent research about the emotion regulation of anger.

Additionally, because self-control has an important role in the regulation of anger and aggression (e.g., Denson et al., 2010, 2011), this process will also be thoroughly described taking into account the recent perspectives about this construct. Recent research on this topic will also be presented, especially investigation dedicated to anger and aggression.

Attempting to provide a basis for future theoretical developments to a more integrative view of the processes of coping, emotion regulation and self-control, the distinction and potential interaction between these constructs will also be presented. Similarly, because recent research has suggested the importance of implicit theories in emotion regulation (Tamir, John, Srivastava & Gross, 2007) and self-control (Job, Dweck, & Walton, 2010), these processes will also be defined, also including some recent research in this topic. Finally, the concept of core self-evaluations will also be addressed given its hypothesised potential impact on the processes of coping and emotion regulation, as well as its relevance for the analysis individual differences.

## Emotion regulation

Emotions have a great influence on athletes' well-being and performance (e.g., Lazarus, 2000; Jones, 2003), it is important to understand how they are regulated within the context of sport. Throughout the recent years, the field of emotion regulation has the aim of a substantial increase in interest across the literature (Gross, 2007). This has led to a wide variety of theoretical perspectives, using different methodological approaches (Gross, 1999). Originally, the term emotion regulation was first used in the development literature (Campos, Barrett, Lamb, Goldsmith & Stenberg, 1983), but since then it has also raised the attention of the adult literature (Gross, 1998b).

In the meantime, although research in sport has focused on how athletes could reduce negative emotions, such as anger and anxiety, it seems that recent studies have found the potential instrumental benefits of such emotions (e.g., Tamir, Mitchell, & Gross, 2008). In addition, instead of attempting to reduce negative emotions, athletes may attempt to increase the frequency and intensity of positive emotions, such as happiness or excitement (Uphill & Jones, 2007). In fact, positive emotions are associated with perceiving the competition as a challenge and with a better performance (e.g., Skinner & Brewer, 2004).

Emotion regulation can be defined as “processes by which we influence which emotions we have, when we have them, and how we experience and express these emotions” (Gross, 2008a). Therefore, emotion regulation involves efforts to evoke, decrease, prolong or intensify emotional experiences, including its cognitions, expression and/or physiology (Gross & Thompson, 2007). Because emotion regulation can occur in several different ways (Richards & Gross, 2000), it is important to provide sport psychologists an integrative framework, based both on theory and research, to help athletes regulate their emotions (Uphill, McCarthy, & Jones, 2009).

### *The “modal” model of emotion*

Before describing emotion regulation processes, it is important to describe how emotion is conceptualised within this framework. Despite this controversy surrounding this concept, there are three main characteristics that have been acknowledged as the basis of emotion (Gross,

2008a). The first characteristic refers to the situation that elicits emotions. Emotions arise when the individual faces a situation appraised as relevant for his or her goals (Lazarus, 1991). These goals can be central to the individual's self-concept, such as being more competent, or more peripheral, such as wanting to go to a party. Similarly, these can be more conscious and complex, such as academic success, or unconscious and simple, such as running away from a dog. Besides, it is also possible to have goals shared in a given culture (professional success) or more personal and less understood by others (travelling around the world by bike) (Gross, 2008a,b).

The second characteristic widely accepted by the literature refers to the components of emotions, which include: peripheral physiology, actions tendencies, and subjective experiences (Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). Peripheral physiology reflects the automatic and neuroendocrine changes that precede and follow behavioural responses. Subjective experience refers to how the emotion is experienced by the individual as it unfolds. Finally, action tendencies or behavioural responses reflect how emotions increase or decrease the likelihood of a given behaviour (Fridja, 1986).

The third characteristic suggested by Gross (2008a, b) is malleability. Emotions often compete with other responses (originated by our goals and situations), but do not necessarily affect them. In this sense, emotions “can be, and often are, modified as they arise and then play themselves out” (Gross, 2008a, p. 703). Within this perspective, the malleability of an emotion forms the basis of individuals' ability to regulate their emotions.

Gross and Thompson (2007) suggest that the “modal model” of emotion incorporates these three characteristics. In this sense, this model argues that emotion involves “a person–situation transaction that compels attention, has particular meaning to an individual, and gives rise to a coordinated yet flexible multisystem response to the ongoing person–situation transaction” (p. 5). Thus, the modal model specifies the process by which emotions unfold. Firstly, this process begins with a relevant situation that is frequently external and observable, although it can also be internal, based on mental representations (Gross & Thompson, 2007; Gross, 2008a,b). Situations (external or internal) are then attended by the individual (attention), originating an appraisal about their familiarity, valence and relevance (Ellsworth & Scherer, 2003). This process of appraisal gives rise to emotions, which involve changes in behavioural, neurobiological, and experiential systems. In turn, these changes will alter the situation that had



firstly originated the emotional response.

Figure 7 shows the process of emotion generation, from the situation to the response, with the representation of the individual as the “black box”. The line between situation and response represents the feedback loop process by which emotions change the original situation and in turn lead to other emotions, and so forth. This recursive aspect of emotion, is also shown in the three cycles of feedback loop (three miniatures of figure 7, in which the situation (S) originates an emotional response (R), in turn leading to another situation. For example, after an argument between two co-workers (S), one of them starts to cry (R), which changes the original situation to an interaction with someone who is crying (S). Then, an apology is made to the crying co-worker (R), again changing the situation into responding to someone who has just apologised (S), and therefore leading to another response, such as embarrassment (R). This example illustrates the recursive aspect of emotion by demonstrating how a given emotion produces changes in the environment and then alters the subsequent emotional response, and so on (Gross & Thompson, 2007; Gross, 2008a,b).

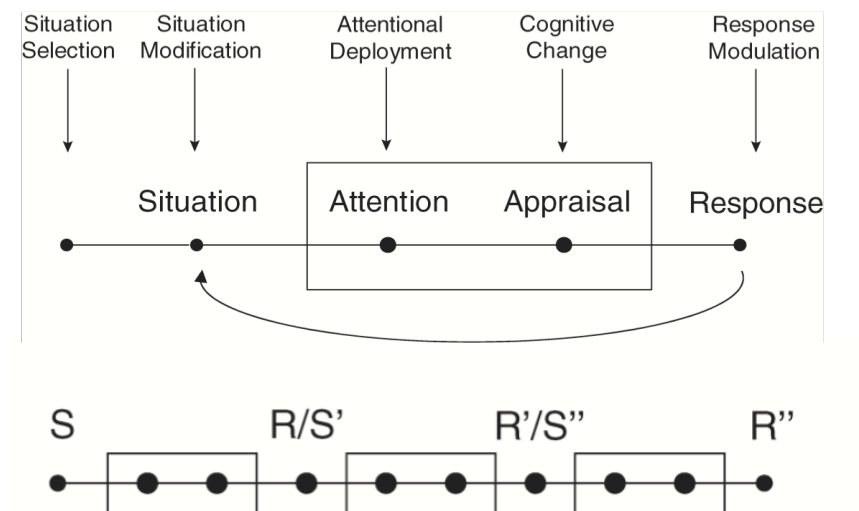


Figure 5 - Modal model of emotion with the feedback loop, the illustration of three interactions of situation-emotion and the five families of emotion regulation strategies (Source from J. J. Gross & R. A. Thompson, 2007, p. 6)

After conceptualising emotion, the modal model of emotion regulation moves on to describe how emotion regulation is operationalised within this perspective. As the concept of emotion, the concept of emotion regulation is also complex and difficult to conceptualise. When

analysing emotion regulation, it is not always clear whether this is about regulation by emotions, as in how emotions regulate other aspects, such as blood pressure, thoughts and behaviours, or regulation of emotions, i.e., how emotions regulate themselves. However, because emotion often lead to physiological and behavioural changes, the concept of regulation by emotions implies that the all aspects of emotion could be seen as emotion regulation. In this sense, the preferable term is “regulation of emotions”, which refers to “heterogeneous set of processes by which emotions are themselves regulated” (Gross, 2008a, p. 500). Additionally, emotion regulation refers to both processes of regulation of one’s own emotions (intrinsic) and processes of regulation of the emotions of others (extrinsic). Gross (2008a, b) argues that the terms extrinsic and intrinsic should be used to distinguish these types of emotion regulation processes.

Gross and Thompson (2007) also point out three central aspects that should be considered when conceptualising emotion regulation. Firstly, emotion regulation involves the regulation of both positive and negative emotions. For instance, Tamir (2005) demonstrated that individuals purposely increased their levels of anger when expecting a confrontation task. Secondly, emotion regulation can start as a consciously, but can become unconscious afterwards. Therefore, the modal model stresses that emotion regulation should be seen as a continuous process, ranging from conscious, effortful and deliberate, to unconscious, effortless and automatic regulation. Thirdly, an emotion regulation strategy cannot be characterized as either good or bad, but can be used to make the situation better or worst, depending on the context. A soccer player can decrease his anger after an unfair penalty by attempting to cool down, but can make the situation worst, by getting distracted from the game. Furthermore, emotion regulation strategies may be seen as maladaptive, but be consistent with the individual’s goals. A child can cry to get something he or she desires, but other may see this as an inadequate or improper action (Gross & Thompson, 2007).

There is a multiplicity of emotion regulation processes “involved in increasing, decreasing, maintaining, or increasing one or more aspects of emotion (Gross, 2008a, p.500). In line with the modal model of emotion, Gross (2001) suggests that emotion regulation can occur at different points in the process of emotion generation. More specifically, each point of the emotion generation process can be aim of a different set/family of emotion regulation processes. Figure 1 also shows the emotion generation process and the five families of emotion regulation: situation selection, situation modification, attentional deployment, cognitive change, and response

modulation.

Situation selection affects the situation changing its trajectory from the beginning. Gross and Thompson (2007) refer to situation selection as “taking actions that make it more (or less) likely that we will end up in a situation we expect will give rise to desirable (or undesirable) emotions” (p. 11). For instance, avoiding the boss at work, or going to the cinema to feel better. However, not all daily actions can be considered situation selection, but only those that involve an intention to influence emotion responses.

However, a given situation does not necessarily lead to a specific emotional response, because individuals have the capacity to change the situations they face. Situation modification refers to “efforts to modify the situation directly so as to alter its emotional impact” (Gross & Thompson, 2007, p. 12). For example, an individual can always make a joke in an upsetting situation, changing the situation.

While the types of emotion regulation described above are directed at changing the situation, there are also strategies to regulate emotions without altering the environment. In this sense, attentional deployment refers to “how individuals direct their attention within a given situation in order to influence their emotions” (Gross & Thompson, 2007, p. 13).

Once the emotion-eliciting situation is attended to, the individual has to appraise its meaning or significance. Each individual appraises the situation in a different way, which can originate different emotions in the same situation. Cognitive change is, therefore, a change in “one or more of these appraisals in a way that alters the situation's emotional significance, by changing how one thinks either about the situation itself or about one's capacity to manage the demands it poses” (Gross, 2008a, p. 714).

Finally, unlike the other types of emotion regulation processes, this type of strategies occur later in the process of emotion generation, after the response has started (as seen in figure 3). Response modulation can be defined as “influencing physiological, experiential, or behavioral responses relatively directly” (Gross, 2008a, p. 504). Relaxation is a classic example of this type of strategies, where the individual attempts to reduce the physiological and experiential aspects of anxiety. Using drugs, alcohol, cigarettes, and even food are also other examples of attempts to change the emotional experience (Gross & Thompson, 2007).

### *Instrumental account on emotion regulation*

Instead of focusing on how individuals modify their emotions, this account is centred on why individuals do so. Accordingly, individuals regulate their emotions because they want to attain a desired emotional state, which “sets the course for the entire process of emotion regulation” (Tamir, 2009a, p. 101). This account suggests that individuals want to feel pleasant emotions and avoid unpleasant ones. However, individuals also want to feel emotions that are useful for their long-term goals and avoid emotion that would compromise these goals. Therefore, it is argued that emotional preferences depend on both pleasure and utility. More specifically, emotional preferences depend on an evaluation of the immediate benefits vs. the long-term benefits. Individuals would prefer a pleasant emotion when the immediate pleasure (short-term benefits) outweighs delaying the pleasure to attain a goal (long-term benefits). Conversely, individuals would prefer useful emotions when long-term benefits outweigh the immediate pleasure. Ultimately, this evaluation depends on the individual goals.

In order to understand why individuals choose to feel a given emotion, the instrumental account integrates several empirical studies that can help clarify emotional preferences. Emotions can be pleasant or unpleasant, but can also be useful or harmful depending on the individuals' goals. Thus, Tamir (2009a) suggests that “because emotions provide both pleasure and utility, people may want to feel an emotion to maximize immediate pleasure, utility, or both” (p. 101). However, individuals often sacrifice immediate pleasure for the sake of long-term goals, such as studying hard to have good grades.

According to this instrumental account, although some emotions are unpleasant, individuals may still want to feel them because these can promote successful goal pursuit. For example, a study by Tamir, Chiu and Gross (2007) has demonstrated that the perception of utility of a given emotion predicted participants' emotional preferences, even for unpleasant emotions. Even though some emotions are unpleasant, participants still choose them because they were seen as useful in a given situation. Specifically, participants increased worry feelings because they believed that these were useful in a situation of threat avoidance.

To explain why individuals sometimes choose to feel unpleasant emotions, Tamir (2009a) relied on Berridge and Robinson's (2003) distinction of “wanting” and “liking”. While “wanting” refers to pursuing useful stimuli that promote goal attainment, “liking” reflects the pursuit of

stimuli related to immediate pleasure. Consequently, individuals may “want” to feel an emotion to achieve a goal, but not necessarily “like” this emotion. However, according to Tamir (2009)a, wanting to feel an emotion (emotional preference) may not be based on rational choice. For instance, the potential utility of an emotion can be underestimated.

On its turn, the utility associated with an emotion is based on what goals individuals are seeking. For instance, Tamir, Mitchell, and Gross (2008) have found that participants choose to feel angry before a confrontational task (playing a video game) because they wanted to have a good performance and believe that anger would be useful for this task. However, the emotions individuals choose to feel depend on future expectancies about the potential utility of a given emotion, which are often uncertain. This leads to another important concept in this account: motivation. Tamir (2009) argues that the more motivated individuals are to attain a given goal and expect an emotion to be useful, the more they will want to feel it. Taking the example of the study presented above, the more individuals highly motivated to have a good performance and expect anger to be useful, the more anger they would want to feel.

Because individuals have different goals, they differ in the emotions they prefer to feel in a given situation. In turn, individuals’ goals are influenced by personality and individual differences. Tamir (2009b) pointed out that individuals high in extraversion prefer to feel happiness and excitement before a potentially rewarding situation. In this study, it was found that extroverts were more likely to engage in activities that induced happiness or excitement before taking a test, because they view this situation as rewarding, comparing to introverts. Other differences, such as age, also influence individuals’ goals. Tamir (2009a) suggests that older adults are more prone to seek pleasant emotions comparing to younger adults, perhaps because immediate pleasure is more important than long-term benefits. This implies that individuals “differ in what they want to feel in certain contexts and that such differences are linked to the goals they pursue” (p. 103).

Additionally, individuals’ goals also differ according to the situation, and thus emotional preferences also depend on the context. To test this prediction, Tamir and Ford (2009) explored whether participants wanted to feel afraid when expecting threat avoidance situations (a computer game in which participants had to avoid monsters). Indeed, it was found that participants preferred to engage in activities that induce fear (listening to music evoking fear). Besides, the more participants expected the activity to make them feel afraid, the more they wanted to engage in it before the threat avoidance situation. In another study, Tamir and Ford

(2012) also explored whether this prediction can be applied to the context of interpersonal negotiation. Results revealed that participants in a confrontation condition preferred to engage in anger-inducing activities while participants in a collaborative condition preferred to engage in happiness-inducing activities. In addition, an analysis of the participants' performance demonstrated that anger was more helpful in the confrontational condition, given that participants playing the tenant agreed to his demands.

Ultimately, individuals' expectancies on the utility of emotions also influence emotional preferences. In Tamir and Ford's (2012) study, preferences for using anger were mediated by the expected utility of this emotion in the context of a confrontational negotiation. Consistently, those who expected happiness to be useful in the collaborative negotiation condition, preferred to feel this emotion. According to Tamir (2009), these findings suggest that individuals prefer emotions that are expected to be useful, regardless of their actual utility.

Although emotional preferences can be conscious and deliberate, individuals may not be aware of the factors that contribute to this decision. In this sense, expectancies about emotions, can be, and often are, unconscious (Roese & Sherman, 2007). For instance, Tamir, Chiu, and Gross (2007) found that participants expected fear to be useful in the context of threat avoidance. However, they did not report fear as being useful to avoid threat when they were asked explicitly. Yet, they still preferred fear-inducing activities before a threat avoidance situation. Therefore, individuals may not be aware of their emotional preferences. Tamir (2009) proposed that this might be the reason why individuals have difficulties in changing their emotions.

The instrumental approach to emotion provides an alternative framework in which emotions can be analysed. Contrarily to the other approaches that suggest that individuals want to feel pleasant and avoid unpleasant emotions, Tamir's (2009) instrumental account on emotional regulation suggests that individuals may choose emotions that are useful in a given context. Therefore, this new perspective on emotion regulation has also some important theoretical and practical implications. Because some emotions are useful to achieve certain goals, it seems that promoting individuals' knowledge about what emotions are useful in a given situation would help them attain their goals. Given that the knowledge about emotions' utility may be acquired through learning, teaching someone that an emotion is useful for a given goal may lead to a change in his or hers emotional preferences. Accordingly, research should also attempt to explore the learning mechanisms by which individuals learn about the utility of emotions.

Moreover, this account also implies that dysfunctional emotion regulation may be a result of having incorrect expectancies about the potential utility of an emotion, or seeking goals that are not appropriate for the current situation, such as having confrontational goals in an interaction with a friend. Therefore, future research should explore how individuals develop expectation about the utility of emotions. Likewise, although research has been focusing on the utility of unpleasant emotions across different situations, future research should attempt to explore whether the hedonic quality of pleasant emotions differ across situations, i.e., if a pleasant emotion remains as such through the different contexts (Tamir, 2009).

### ***Emotional regulation during achievement situations***

Based upon a review of the literature on emotions, emotion regulation, coping and test anxiety, as well as empirical data, Shutz and colleagues (Shutz & Davis, 2000; Schutz, Distefano, Benson, & Davis, 2004) proposed a three-dimensional model of emotional regulation during achievement situations, which includes: cognitive-appraising processes, task-focusing processes and emotion-focusing processes. These three dimensions “involve both cognitive and behavioral processes that could be used as strategies for the regulation of emotions”(Shutz & Davis, 2000, p. 246).

#### **Cognitive appraising processes**

Emotion and emotion regulation start with a process of cognitive appraisal about a goal-directed, person-environment transaction (Lazarus 1991; Schutz & Davis, 2000). During the appraisal process, individuals compare their goals to their current position. However, if the situation is not relevant for their goals, emotions are not likely to arise. Therefore, appraisal processes are essential for emotion generation, occurring rapidly and without conscious awareness (Schutz et al. 2004). Besides, appraisals are influenced by individuals' subjective knowledge, namely, their beliefs, standards, and personal theories about the nature of emotions and emotional regulation (Schutz & Davis, 2000). Ultimately, the appraisal process will determine the way individuals view the situation, which means that changing the appraisal can change the emotions associated with the test. This suggests that efforts to understand individuals' attempts

to control anxiety during achievement situations should start from the appraisals (Schutz et al., 2004).

Besides goal relevance, there are other components of the appraisal process that have an influence on students' emotional experiences. Another important component refers to the perceived goal congruence of the situation, that is, whether what is happening in test will help students achieve their goals. Positive emotions (e.g., enjoyment) will arise if the test is perceived as helpful for their goals, whereas negative (e.g., anger) emotions are more likely to occur if the test is perceived as not helpful for their goals. The perception of control over the situation is also another important component of the appraisal process that will determine individuals' emotions (Problem efficacy. For instance, anger may occur if individuals blame someone else for not being able to perform, while pride is likely to arise if the success is attributed to themselves (Smith, 1991; Schutz & DeCuir, 2002). Finally, perceived coping potential or whether individuals feel confident in their ability to deal with the situation, is also an appraisal that influences the emotion generation process. The answer to the question "Can I handle what will occur during this situation?" will determine the individuals' emotions. More specifically, individuals might feel hope if they feel capable to deal with the situation, or anxiety if they feel they are not capable (Schutz & Davis, 2000; Schutz & DeCuir, 2002).

### **Task-Focusing processes**

Task-Focusing processes generally refer to attempts to focus the attention on managing the present task. The main purpose of these processes is to gain, maintain, or regain task focus, by directing the internal talk to activities that keep the attention on the performance task (Schutz et al., 2004). Task-focusing processes derive from individuals' appraisals about how the situation is going, and are influenced by their personal beliefs about emotion and emotional regulation (Schutz & DeCuir, 2002).

Three categories of task-focusing processes were originally identified (Schutz, DiStefano, Benson, & Davis, 1999). Specifically, task-focusing processes involve thoughts and tactics of managing the time left, or searching for the main idea in a question in an attempt to keep the attentional focus on the task and away from disruptive negative thoughts. These strategies are



perhaps the most helpful to gain or keep the focus on the current task. Tension-reduction processes during achievement situations involve blocking or slowing down distracting internal talk and regaining the focus on the task, such as taking a one-minute pause, or slowing the breathing rhythm. Such strategies allow individuals to re-direct their attention away from the self and their feelings to the current task. Importance-reappraisal processes were also identified, which refer to “attempts to keep the importance of the [situation] in context or to emphasize the positive aspects of the test” (Schutz & Davis, 2000, p. 248). These strategies can also help to regain the focus on the task, by stopping or slowing the off-task internal talk. For instance, thinking that a specific game in comparison to other more important things in life can allow individuals to switch their attention from the self and in to the task.

### **Emotion-focusing processes**

Emotion-focusing processes involve “disengagement from [the situation] and a focus on managing feelings and thoughts about one’s performance...and the potential causes for that performance” (Schutz & DeCuir, 2002, p. 320). For instance, these include daydreaming about how things could be different (wishful thinking), self-blame or self-criticism about how one is doing or deemphasizing the importance of a situation. Thus, these processes involve directing the attention to thoughts and feelings about the situation, instead of the task itself. In this sense, engaging in these processes may distract individuals from the task and potentially decrease the performance.

These processes of cognitive appraising, task-focus and emotion-focused strategies were originally developed for the context of “test-taking”, but can also be applied to other achievement situations. Because sport competition involves emotional experiences that are constantly changing (Laborde et al., in press), this model seems useful in order to better explain and characterise the fluctuation of emotion regulation strategies that can occur during sport competition, as a clear achievement context.

## The emotion regulation of anger

Because anger is a frequently experienced emotion, either in everyday life (Spielberger, 1999) and in sport competition (Isberg, 2000; Nicholls et al., 2009), some studies have attempted to explore how this emotion is regulated. Perhaps one of the most influential studies was Bushman's (2002) attempt to analyse how emotion regulation strategies of distraction and rumination influence anger levels, and the subsequent aggressive behaviour. For this purpose, a sample of 600 college students (300 women) was criticised about an essay they had written to increase their anger levels. Results revealed that showed that "venting to reduce anger is like using gasoline to put out a fire—it only feeds the flame" (p. 729). Participants in a rumination condition had the highest levels of anger and were the most aggressive. However, while participants in a distraction condition showed less anger comparing to those in the rumination condition, they did not show less aggression. This suggests that "hitting a bag" can increase aggression, regardless of using the strategies of rumination and distraction. As expected, the control group had the lowest levels in anger and aggression.

Similarly, Mauss, Cook, Cheng and Gross (2007) tested whether the emotion regulation strategy of cognitive reappraisal could help to reduce anger levels and avoid the physiological costs associated with other forms of emotion regulation (such as suppression). Overall, participants high in reappraisal experienced less anger, more positive emotions during the baseline and anger provocation than those low in reappraisal. Participants high in reappraisal also tended to show more adaptive physiological patterns (cardiovascular challenge response) whereas participants low in reappraisal showed a maladaptive physiological patterns (cardiovascular threat response).

Furthermore, another study (Mauss, Evers, Wilhelm, & Gross, 2006) intended to find if it is possible to overcome the costs associated with deliberate emotion regulation of anger (e.g., Richards & Gross, 1999) by using automatic regulation. As automatic emotion regulation cannot be explicitly accessed, Mauss et al. (2006) assumed that an implicit positive evaluation of emotion regulation (having a positive implicit attitudes toward emotion regulation) were associated with the use of automatic emotion regulation. Therefore, these results suggest that "automatic emotion regulation may be a more effective and efficient way to manage anger" (p. 12).

More recently, Denson, Moulds and Grisham (2012) tested the effects of three different emotion regulation strategies, namely, analytical rumination, cognitive reappraisal and distraction, on the experience of anger. Analytical rumination reflects the distinction between the rumination that is carried out in a distant and detached way, i.e., from a distant perspective (also known as “cool”) or in an emotionally immersive way (also known as “hot”). The latter results in higher levels of anger when comparing to the first (e.g., Ayduk & Kross, 2008). While the other emotion regulation strategies were able to reduce anger, rumination maintained its levels. However, a further analysis demonstrated that those who ruminated in a hot way felt more anger than those who reappraised. In addition, those who ruminate in a cool way showed similar levels of anger comparing to those who reappraised, but lower levels of anger comparing to hot ruminators.

Tamir and colleagues (Tamir & Ford, 2009, 2012; Tamir, Mitchell, & Gross, 2008) performed some laboratory studies (also described above) in which participants were given the opportunity to engage in different activities before having to perform a task (e.g., play a video game, negotiation). Generally, all the studies converged to the idea that individuals prefer to engage in activities that would trigger emotions they expected to be useful in the subsequent task. In the specific case of anger, participants preferred to engage in anger-inducing activities before a confrontational task. A similar study (Ford & Tamir, 2012) explored whether individuals who preferred to feel an unpleasant emotion (anger) to have a better performance in a given task were more emotionally intelligent comparing to individuals who prefer to feel emotions that may not be useful. Results showed that participants with higher emotional intelligence preferred more useful emotions (anger for a confrontational situation and happiness for a collaborative situation). Conversely, those low in emotional intelligence tended to choose less useful emotions. Results remained the same when controlling for trait emotions and cognitive intelligence. To conclude, Ford and Tamir (2012) pointed out that “wanting to feel good at all times may not necessarily be an intelligent choice” (p. 688).

Additionally, Davis, Woodman and Callow (2010) explored the regulation of anger as a mediator of the relationship between anger and performance. Specifically, it was predicted that the emotion regulation strategy of anger-out (overt expression of anger) would increase performance in a peak force task, whereas anger-in (suppression of the expression of anger) would decrease performance. Results revealed that anger increased performance in the peak

force task. Moreover, although anger-out did not exert an influence, anger-in inhibited the trait anger–performance relationship. These results highlight the complex role of emotions regulation in the relationship anger-performance.

Considering that recent research findings have reported that people actively engage in self-regulation strategies in order to maintain and change emotions to achieve their desired goals (Carver, 2004; Tamir, 2009; Tamir & Ford, 2009, 2012), Lane, Beedie, Devonport and Stanley (2011) explored whether athletes preferred to increase anger and anxiety before competition. As expected, results showed that participants who believed that increasing anger and anxiety would improve their performance actually experienced higher levels of anger and anxiety comparing to those who did not have the same belief. Besides, those who believed anxiety and anger could increase performance used strategies to increase unpleasant emotions. These findings suggest that psychological interventions should take into consideration not only hedonic motives for emotions regulation, but also instrumental motives.

### ***Anger Rumination***

The experience of anger is very common in everyday life, but while sometimes individuals can just “let it go”, sometimes they cannot stop thinking about it. This process refers to angry rumination and can be defined as “perseverative thinking about a personally meaningful anger-inducing event” (Denson, 2013, p. 103). This definition is based on the idea of cognitive perseveration, which reflects the tendency to keep thinking about an emotional experience. Generally, rumination is associated with negative experiences, leading to intrusive repetitive thoughts. However, it is also possible to ruminate about positive experiences, such as important events in life.

Furthermore, Sukhodolsky, Golub, and Cromwell (2001) suggested that the generation and experience of anger are processes intertwined with anger rumination, which can ultimately sustain and increase anger (e.g. Bushman, 2002; Maxwell, 2004). In a literature review about ruminative thoughts, self-focused attention, emotion regulation, and counterfactual thinking, these authors found that anger rumination includes three processes: memories of past anger experiences, attention to immediate anger experiences and counterfactual thoughts about anger experience. Memories of anger past experiences can trigger new episodes of anger; attention to

anger experiences may increase its intensity and duration; and counterfactual thoughts are judgments associated with action tendencies towards resolution or retaliation.

In the development of the Anger Rumination Scale, Sukhodolsky and colleagues (2001) found that angry memories could be divided into two components: thinking about causes and thinking about revenge. Thoughts about the causes of the anger episodes are processes of working through and attempting to construct a meaningful understanding of the anger episode. Conversely, fantasies of revenge reflect action tendencies and efforts to achieve closure in the conflict. This scale was found to be highly correlated with measures of anger experience, anger expression and negative affectivity. Moderated correlations were also found to trait anger, anger-in and negative affectivity, and smaller correlations to measures of emotion clarity, emotion repair, subjective well-being, social desirability, and anger-control. Sukhodolsky et al. (2001) concluded that this scale can be useful not only to clinical practice, but also to “understanding cognitive mechanisms in excessive or inappropriate anger experience” (p. 698).

### ***Thought suppression***

On many occasions, individuals attempt to suppress their thoughts in order to stop worrying about a problem, concentrate on a task, fall asleep, avoid a bad mood, among others. However, the process of suppressing our thoughts does not come easy and is in fact, often unsuccessful (Wegner & Erber, 1992). Most of the times, as Wegner (1994) argues, our efforts to control our thoughts “will surface and ironically overwhelm the intended control to yield the opposite of the mental state that is desired” (p. 34). It seems that the efforts to control our thoughts, desires or feelings often fail and produce exactly the opposite. The more individuals want to suppress a thought, the more these thoughts will arise (e.g., try to stop thinking about food when dieting).

Precisely this idea has led to the development of the theory of the ironic processes of mental control. Often, the individual tries to suppress negative thoughts in order to attain a desired state (e.g., avoid thinking about a problem to feel happier). However, instead of suppressing undesired thoughts, individuals will ironically engage in the thoughts they are trying to avoid, leading to the opposite effect (e.g., feeling sad instead of happy). This theory suggests that the central variable that explains whether individuals can control these ironic effects and be successful is the availability of mental capacity. Accordingly, when individuals have the adequate

mental capacity to achieve control, the more likely they will be successful in doing so. But when this capacity is reduced, because of processes such as distraction, time pressure, cognitive load, stress, individuals will almost surely fail. Consequently, instead of attaining the desired state, ironic effects will arise, leading to the opposite desired state (Wegner, 1994).

In addition, this theory suggests that there are two processes working together by which mental control can occur: an intentional operating process searching for mental contents related to the desired mental state and an ironic monitoring process that looks for signs of failure to achieve the desired state. For instance, when individuals try to suppress negative thoughts to be happy, they both look for mental contents related to happiness (operating process) and for signs that suggest that happiness has not been attained (monitoring process). While the first process occurs consciously and is effortful, the monitoring process is often unconscious, autonomous, and requires less mental effort (Wegner, 1994; Wegner & Erber, 1992).

One of the first investigations to document the difficulty in thought suppression is a laboratory study by Wegner, Schneider, Carter and White (1987). In this study, participants were asked not to think about a white bear and to report their thoughts aloud. While participants were first able to suppress their thoughts, after a short period of time, they started to think about a white bear. Similar results were found when participants were asked to write their thoughts and suppress cheerful or depressing thoughts (Wenzlaff, Wegner, & Roper, 1988). This pattern of results was found among a variety of outcomes, such as suppressing the desire to eat chocolate has led to eating more (Erskine, 2008) and suppressing thoughts before going to sleep caused participants to report dreaming about these thoughts (Wegner, Wenzlaff, & Kozak, 2004).

Moreover, because suppressed thoughts can easily return to our consciousness (e.g., Wegner et al., 1987; Wegner, 1994), they can bring unwanted emotions associated with these thoughts, which will be experienced with a higher intensity (Wegner, 2009). For instance, Wegner, Broome, and Blumber (1997) found that suppressed anxiety thoughts returned to participants' consciousness, triggering anxiety even at higher intensity. However, stopping suppressed thoughts from returning to our mind is not impossible. Wegner (2009) argues that if individuals have enough time to dedicate to the "project", they can get absorbed in their own self-distractions.

The relevance of thought suppression in sports has also been acknowledged (Wegner, 2009). For instance, a study among a sample of golfers has demonstrated that suppressive

imagery (i.e., try to avoid a certain specific mistake) decreased their performance (Beilock, Afremow, Rabe, & Carr, 2001). Similarly, Bakker, Oudejans, Binsch, and van der Kamp (2006) found that soccer players who were instructed not to shoot within reach of the keeper or outside the goal were more likely to direct their gaze to the area they were told to avoid, thus leading to less successful shots. More recently, Cruz, Alves, Sofia, Amaral and Valente (2013), in a sample of 129 soccer players, have found that thought suppression was positively associated to threat perception and to somatic anxiety and one of its cognitive dimensions (worry). Additionally, thought suppression was also positively related to thoughts of escape and negatively to concentration skills. Besides, individuals who showed higher levels of threat perception during competition were more likely to engage in thought suppression, comparing to individuals with medium and low levels of threat perception.

## **SELF-CONTROL**

In everyday life, we are constantly facing situations in which it is necessary to “resist the temptation” of the immediate pleasure, or of taking the easiest action, as it might imply long-term costs, or be socially inappropriate (Baumeister, Vohs, & Tice, 2007). For instance, resisting the temptation of eating a sweet, continuing to sleep during the morning, or acting violently. Indeed, failing to resist temptations may lead to crime, teen pregnancy, alcoholism, drug addiction, venereal disease, education underachievement, among others (Baumeister & Heatherton, 1996).

Baumeister and Alquist (2009) believe that all organisms seek harmony within their environment, not only to have security and peace, but also to satisfy their needs. To achieve this, it is necessary to change the environment or the self, although it is far more viable to change the self. In fact, changing the environment is not always possible, especially in social contexts. In an argument or conflict of interests, individuals may disagree and get disappointed. Thus, the ability to exert control over our actions seems to be a key element for individual and cultural success.

Within Baumeister’s et al. (2007) framework, the terms self-control and self-regulation are used interchangeably, although they acknowledge that these refer to different processes. Self-control is a conscious, deliberate and effortful subtype of self-regulation. On the other hand, self-regulation is a broader construct, which involves homeostatic processes, such as regulation of the body temperature. Self-control can be defined “as the capacity to override natural and

automatic tendencies, desires, or behaviours; 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" (Baumeister & Bauer, 2011, p. 65).

This capacity is amongst the most important and valuable structures of the human personality, because it allows the necessary flexibility to attain the desired goals (Gailliot et al., 2007). Therefore, because self-control is essential to follow many rules and standards, including moral rules, this construct has also been referred to as the "moral muscle" (Baumeister & Exline, 1999), to suggest the capacity to overcome selfish impulses and act in a socially desirable way. In a more evolutionist perspective, self-control facilitates group membership because it allows us to be constantly regulating our behaviour to follow social norms, moral principles and laws. Ultimately, self-control enables human beings to create and maintain complex groups to which they belong, such as cultural systems (Baumeister et al., 2007).

### **Strength model of self-control**

Folk wisdom has always advocated the concept of willpower as some sort of strength or inner energy necessary to resist temptation (Baumeister & Alquist, 2009). However, behavioural and cognitive models have scarcely mentioned this "energy" idea. In fact, over the last half of century, research has focused almost exclusively on self-control as a cognitive structure (e.g., Greenwald & Banaji, 1989).

After an extensive review of the literature, Baumeister, Heatherton, and Tice (1994) suggested that self-control depends on a limited energy. In this sense, previous acts of self-control deplete the energy for subsequent acts, decreasing individuals' ability to exert self-control. In other words, the limited strength model of self-control predicts that individuals who had previously exerted self-control tend to have a worst performance on subsequent tasks comparing to those who had not exerted any self-control acts previously because their energy had been depleted.

Empirical evidence for this idea first came from two studies (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998). Specifically, Baumeister et al. (1998) presented to participants a table with both chocolate cookies and vegetables. Participants



were randomly assigned to either eat the vegetables or the cookies, and performed a self-control task afterwards. A control group went directly to the self-control task. Those who had to eat the vegetables (and resist the temptation of the cookies) had a worst performance on the self-control task than those who ate the cookies. The effort spent to resist the cookies had presumably weakened some kind of psychological resource that was less available for the subsequent self-control task. Accordingly, participants who did not have any food condition were the best at the second self-control task. Similarly, Muraven, and colleagues (1998) tested the strength model of self-regulation in a series of four studies. Results indicated that failure in emotion control was associated with previous regulatory demands and fatigue. Overall, these studies confirmed the strength model of self-regulation.

The term *ego depletion* was used to refer to a state in which self-control energy is temporarily weakened or undermined (Baumeister et al., 1998; Baumeister & Alquist, 2009). This effect is not caused by a decrease of self-efficacy beliefs about self-control energy. Indeed, Wallace and Baumeister (2002) gave participants different feedback (success vs. failure) in self-control tasks, and measured their levels of self-efficacy afterwards. Results showed no differences between the participants, suggesting that self-efficacy beliefs have no influence on ego depletion.

Across the literature, the ego depletion effect has been consistently documented using different dependent and independent measures, and by several research teams worldwide. Research has shown that several types of behaviours and responses are susceptible to this effect, namely, emotion regulation, thought suppression, inhibition of stereotypes, and control of impulses and temptations (Bauer & Baumesiter, 2011).

Vohs and Heatherton (2000) studied the self-control among dieters who were depleted, demonstrating that sitting close to a candy bowl made them ate more ice cream and showed less persistence in a cognitive task than non-depleted dieters. Consistently, resisting temptations seems to compromise self-control energy in a variety of other addictions. For instance, Shmueli and Prochaska (2009) found that smokers were more likely to smoke when they had to resist a highly tempting food, comparing to those who had to resist a low tempting food. Therefore, behavioural change should be targeted at one bad habit at a time, rather than ambitiously attempting to change several behaviours simultaneously. Other temptations were also studied within the limited energy framework, such as spending too much money, alcohol consumption, and sexual behaviour (e.g., Gailliot & Baumeister, 2007; Muraven, Collins, & Nienhaus, 2002;

Vohs & Faber, 2007). Generally, these results support the idea that resisting temptations can reduce individuals' capacity to control themselves thereafter.

Additionally, self-control involves a wide variety of behaviours, in which several responses have to be restrained in favour of a higher goal (Bauer & Baumeister, 2011). Thus, other studies provided support for the ego depletion effect among other constructs. A study on emotion regulation (Dvorak & Simons, 2009) reported that participants who had to suppress their emotions while watching a disgust-inducing video were less persistent on a subsequent anagram task than the control group (who did not have to control their emotions). Extending a previous study on thought suppression and self-control (Muaven et al., 1998), Gailliot, Schmeichel, & Baumeister (2006) explored the effect suppression of thoughts related to death on self-control. Overall, it was found that participants high (vs. low) in self-control demonstrated fewer death-related thoughts after being primed with death. In addition, coping with thoughts about death depleted participants' self-control energy. The findings suggest that suppressing death thoughts depletes the energy for subsequent self-control tasks.

Other processes that involve executive control are also affected by the ego depletion effect. A series of studies by Schmeichel (2007) found that processes such as exaggerating the expression of emotions, controlling attention, and inhibiting a dominant response undermined subsequent processes associated with working memory. Moreover, a working memory task can also decrease the capacity to inhibit emotional responses. This demonstrates that several executive control processes seem to share a common energy.

Moreover, influenced by the energy models brought from biology, which argue that humans need energy from food for all their activities, Gailliot and colleagues (2007) found that acts of self-control reduced the levels of glucose, predicting a poorer performance in subsequent self-control tasks. Consistently, when participants were given a glass of lemonade with sugar, their levels of glucose were restored, annulling the effects of ego depletion. Further, when the glass of lemonade was mixed with a diet sweetener (without glucose), the effect of ego depletion appeared again. These findings suggest that self-control energy appears to rely on glucose.

This body of research brings evidence for the strength model of self-control, demonstrating that the depletion effect can be observed in a variety of self-control tasks, such as resisting temptations, suppressing thoughts, regulating emotions, and sustaining physical

stamina. In addition, it has also demonstrated that self-control behaviours seems to rely on the same energy resource that can be temporarily weakened (Bauer & Baumeister, 2011).

As a result, a “muscle” metaphor was used to describe the gradual deterioration of the capacity for self-control, such as happens with a muscle (Baumeister et al., 2007). This comparison is based on three major assumptions. Firstly, exercises to improve self-control can improve the “strength” of the willpower, as physical exercises also enhance the strength of a muscle (Baumeister et al., 2007). This creates a resistance to the effects of ego depletion, in which self-control deteriorates at a slower rate. For instance, daily exercises, like altering verbal behaviour, or using the non-dominant hand, can gradually improve self-control. Besides, the fact that this improvement in self-control is also transferred to different tasks proves that this was not due to an improvement in skills or self-efficacy beliefs (Baumeister et al., 2007).

Secondly, individuals presumably preserve their self-regulatory resources when they sense that these are diminishing, such as athletes that attempt to preserve their energy when their muscles are tired. Therefore, the energy spent on a certain self-control task depends on the expectancies of future tasks. Muraven, Shmueli and Burkley (2006) pointed out that individuals that expected to exert self-control in subsequent tasks had a lower performance comparing to those who did not expect any more tasks.

Finally, in situations where the stakes are high, individuals do not show the ego depletion effect. For instance, giving money or other rewards in exchange for a good performance on a self-control task counteracted this effect (Muraven & Slessareva, 2003). Taking the analogy of a muscle, it is often observed that athletes can use their remaining strength in decisive moments, although after a while fatigue may become unbearable (Baumeister et al., 2007).

### **Strategies that counteract the “ego-depletion effect”**

Bearing in mind that self-control capacity is essential to human life, it seems implausible that the ego depletion effect would completely expend our ability to exert regulation. In fact, research has suggested that individuals may never be completely depleted, without any capacity to regulate themselves (Bauer & Baumeister, 2011). Therefore, some studies have centred on how individuals conserve their self-regulatory resources.

As mentioned above, expecting to exert self-control on a subsequent task conserved their energy resources for the third task, hence diminishing their performance in the second task. Thus, individuals seem to preserve their self-control energy for situations that may arise in the future (Muraven et al., 2006). Consistently, another study by Martijn, Tenbült, Merckelbach, Dreezens, and de Vries (2002) manipulated participants' expectancies about self-control capacity. It was found that participants whose expectancies (implicit) were that exerting self-control does not affect their performance were not depleted in a second self-control task. Additionally, it was observed that participants generally believe that exerting self-control consumes energy. These results suggest that self-control is highly susceptible to expectancies about how self-control influences performance. In a similar vein, Job, Dweck, and Walton (2010) intended to study individual differences in implicit theories about the availability and depletability of self-control resources. A series of studies showed that only the individuals who believe, or were led to believe that their willpower depends on a limited resource demonstrated the effects of ego depletion. Conversely, those who thought that their resources are unlimited did not show signs of ego depletion after a demanding initial task. Besides, the more participants believed in the limited-resource theory, the lower would be their self-regulation capacity in the real world.

Other studies have moved on to explore the influence of other variables in the ego depletion phenomenon. For example, Tice, Baumeister, Shmueli, and Muraven (2007) studied the impact of positive affect on self-regulation after depletion. After a self-control task, participants watched a comedy video, or received a surprise gift to induce positive emotions. It was found that these participants performed as well as nondepleted participants on a subsequent self-control task. This indicates that positive emotions were effective in restoring self-control energy following depletion.

Another strategy that can also counteract the effects of ego depletion is the use of self-affirmations. A series of studies showed that depleted participants in an affirmation condition performed better than those in a no-affirmation condition. Besides, no differences were found in the nondepleted participants. These findings support the hypothesis that self-affirmation can overcome the ego depletion effect, suggesting that self-control can be improved by promoting individuals' long-term goals and higher-order values (Schmeichel & Vohs, 2009).

Another study found that if participants had a 10-minute interval or a 3-minute period of relaxation between self-control tasks, their performance does not decrease in the second task

(Tyler & Burns, 2008). Similarly, after a previous self-control task, distracting participants' attention during the second task (consisting of holding up weight) countered the ego depletion effect (Alberts, Martijn, Nieuvelstein, Jansen, & De Vries, 2008). Additionally, exposing depleted participants to the concept of persistence also prevented ego depletion (Alberts, Martijn, Greb, Merckelbach, & De Vries, 2007).

Motivation has also been shown to decrease ego depletion. As mentioned in the muscle metaphor, Muraven and Slessareva (2003) found that offering money or other incentives to participants reduced ego depletion. Muraven, Gagné, and Rosman (2008) also reported that participants who were intrinsically motivated for the initial self-control task had a better performance in the second task comparing to participants with extrinsic motivation. Additionally, implementation of intentions ("if-then" statements) is another way in which ego depletion can be avoided. A study by Webb and Sheeran (2003) observed that participants who planned their actions were more persistent in an unsolvable tracing puzzle than the control group (who did not form an implementation intention). Besides, previously depleted participants who formed an implementation intention did not show a decrease in performance on a subsequent self-control task.

Overall, these findings are consistent with the idea that it is possible to overcome the effect of ego depletion by using strategies such as motivation, positive emotion, rest, manipulation of expectations, self-affirmation, among others. In this sense, future studies should focus on other variables that may influence how individuals spend and conserve their energy in order to fully understand self-control processes.

### **Benefits and costs self-control**

Self-control enables individuals to adjust to the environment by allowing more behaviour flexibility, acting as a mechanism to override impulses and current responses in favour of more appropriate behaviours. This flexibility provided by self-control capacity also allows individuals to take advantage of the requirements and opportunities present in human social life. Specifically, self-control enables individuals to navigate through society within its several constraints and opportunities, adjusting behaviours toward better outcomes. In this sense, this process can bring benefits not only for individuals but for society as well (Baumeister & Alquist, 2009).

Indeed, research has widely confirmed the benefits of self-control. One of the most famous and paradigmatic studies that first provided empirical evidence for self-control benefits was the “marshmallow test” (Mischel, Shoda, & Peake, 1988; Shoda, Mischel, & Peake, 1990). This study had 4-year old children attempt to delay the gratification of eating a marshmallow in order to get another marshmallow. Follow up studies demonstrated that children who were more able to restrain from eating the marshmallow grew up to be more successful adults, in both academic and social areas (Ayduk et al., 2000).

In order to deepen the study of self-control, Tangney, Baumeister, and Boone (2004) correlated a trait self-control measure to several outcomes. Individuals high in trait self-control had better grades in school and in college, reported more secure and satisfying relationships, and less anger and aggression than individuals low in self-control. Furthermore, high self-control individuals were less likely to report several pathologies, namely, depression, anxiety, eating disorders, drinking problems, and psychoticism. High levels of self-control were also positively correlated with more emotion stability. All these observations remained the same even after controlling for social desirability, which shows that these results are not attributed to self-report bias.

Within the society benefits, the maintenance of long-term relationships can also be considered another benefit of self-control (Baumeister & Alquist, 2009; Tangney et al., 2004). For instance, satisfying long-term relationships are related to fewer mental and physical health problems (DeLongis, Folkman, & Lazarus, 1988) and better chances at surviving cancer (Goodwin, Hunt, Key, & Samet, 1987). Moreover, individuals happily married are less prone to commit suicide (Rothberg & Jones, 1987).

Moreover, Cox (2000) used a more independent measure of self-control by asking subordinates to rate their supervisors. Those rated with higher scores in self-control were also rated as better supervisors (considering both their work capacity and interpersonal skills) comparing to those who were rated with lower scores in self-control. This suggests the potential benefits of self-control for society. Supervisors high in self-control may have benefited from both their good work and from the appreciation of their subordinates.

Furthermore, other studies reported a wide range of benefits of self-control to society. Gottfredson and Hirschi (1990), for instance, reported that poor self-control is amongst the most important causes of criminality. This conclusion was supported by a more recent research (Pratt

& Cullen, 2000), which reported strong links between poor self-control and criminal, violent, and antisocial behaviour patterns. A study with incarcerated offenders also showed an association between low self-control and more drug use, higher unemployment, and lower levels of education, comparing to those high in self-control (Mathews, Youman, Stuewig, & Tangney, 2007). This highlights the benefits of self-control as an important aspect for both individual and society.

Nonetheless, self-control is a tool that can be used for both good and bad purposes. Although most individuals' goals are aligned with general social norms, some may use self-control for destructive and antisocial goals. When used for antisocial goals, such as crime, high self-control can be a useful weapon, increasing the harmful results. Thus, the costs of self-control for society are more related to its use for antisocial goals (Baumeister & Alquist, 2009).

Regardless of the underlying goal, exerting self-control implies that individuals have to make sacrifices. Exerting self-control requires a great amount of effort to overdrive impulses and desires. On a daily basis, people have to restrain from eating or drinking what they want, driving fast, or sleeping during the morning. These sacrifices are, however, the foundation of self-control benefits. That is, people make sacrifices in order to achieve a higher goal, as a trade-off. Delay of gratification is a quintessential example of the direct link between these costs and the possible benefits. In the marshmallow studies (Mischel et al. 1988; Shoda et al., 1990), participants had to choose between an immediate gain and a greater delayed gain. Although with short-term costs, this delay increased the benefits in the long run. Other examples can be found in many areas of human culture. For instance, academic success is only possible with delay of gratification. While sacrifices may be hard, they are certainly compensated in the long run.

Moreover, the strength model of self-control, as cited above, predicts that previous acts of self-control weaken the capacity for subsequent self-control tasks (e.g., Baumeister et al., 1998). Thus, since people have to constantly restrain impulses, habits, and temptations in order to behave in a more appropriate way, their self-regulatory strength is lowered for other actions. Several studies have indicated that when this happens, individuals are more prone to spend impulsively (Vohs & Faber, 2007), to fail on a diet (Vohs & Heatherton, 2000), and to indulge inappropriate sexual impulses (Gailliot & Baumeister, 2007), comparing to individuals who were not depleted by previous acts of regulation. A similar effect can be observed in interpersonal relationships, in which depleted participants respond more aggressively when provoked (DeWall,

Baumeister, Stillman, & Gailliot, 2007), fail to make a good impression of themselves (Vohs, Baumeister, & Ciarocco, 2005), and are persuaded more easily by weak arguments (Wheeler, Briñol, & Hermann, 2007). Thus, the temporary depletion of self-control energy is one of the most important costs of self-control.

Therefore, despite all the benefits resisting temptations can bring, it does not come without a price. Recently, Zabelina, Robinson, and Anicha (2007) had participants write about their thoughts on a daily basis for seven days. It was found that participants high in self-control were less prone to write about positive and negative affects as compared to participants low in self-control. It appears that individuals high in self-control have a reduced affective response, which can either be a benefit or a cost. Besides, individuals high in self-control were perceived as less spontaneous and extroverted than individuals low in self-control. Similarly, Stillman and Alquist (2007) observed that participants described the most self-controlled person they know as less open to experiences comparing to the less self-controlled person they know. This suggests that self-control may have interpersonal costs, given that individuals generally like spontaneity, extraversion, and openness to experience. Indeed, a study reported that socially anxious individuals thought that popularity could be promoted by hedonic and risky behaviours, while restraint was thought to have the opposite effect (Kashdan, Elhai, & Breen, 2007).

Also, from a physiological perspective, the exertion of self-control is believed to increase variability in heart rate, as found by Segerstrom and Nes (2007). This presumably happens because individuals have homeostatic mechanisms that work to maintain the heart rate, and exerting self-control spends that same energy used to regulate the body. Possibly, the same may happen to the immune system, which could explain why people under stress are more vulnerable to illness. Further studies should attempt to clear this question.

### **The role of self-control in anger and aggression**

In line with the strength model of self-control, some studies have been focusing on how self-control helps individuals control their aggressive behaviour. In a literature review, DeWall, Finkel, and Denson (2011) concluded that self-control is an important variable in the regulation of anger and aggression. Indeed, DeWall and colleagues (2007) reported that the self-regulation of aggression depends on a limited energy that decreases each time it is used. Thus, an individual is more likely to show an aggressive response when facing a stimulus after a previous self-control



task. It was suggested that individuals have a limited capacity to control aggression, as well as other anti-social behaviours. Similarly, looking at self-control as a trait, individuals low in trait self-control are more vulnerable to the effects of depletion (showing less energy to regulate aggression) than individuals with higher levels of self-control. Thus, this study demonstrates the importance of considering self-control as an important variable for the comprehension of human aggression.

Thus, assuming that high self-control reduces aggression, Denson, Capper, Oaten, Friese, and Schofield (2011) attempted to find whether self-control training reduces individuals' aggressive responses to provocation. Consistently with the proposed hypothesis, among participants high in trait aggression, the self-control training group reported less aggressive behaviour than participants of the control group. In other words, among aggressive individuals, self-control training for two weeks appears to have reduced their aggressive responses.

In a similar vein, glucose also seems to reduce aggressive impulses. A study by Denson, von Hippel, Kemp, and Teo (2010) tested the effects of its consumption on aggressive behaviour. In a first study, participants were offered the chance to retaliate a provocation. Among those high in trait aggression, participants who consumed glucose were less aggressive than participants who consumed a placebo (regardless of being depleted or not). A second study was conducted to understand whether glucose reduces aggression uniquely in provocation situations, or in other situations as well. As expected, when participants were provoked, glucose reduced aggression among those high in trait aggression. Surprisingly, in participants (also high trait aggression) who were not provoked, glucose actually increased aggression. It was argued that glucose had possibly energised participants' aggressive responses. These high in trait aggression participants tend to respond aggressively to provocation, but the same may not be true for low in trait aggression individuals.

Still on the search for understanding the relationship between provocation and aggression, Denson, Pedersen, Friese, Hahm, and Roberts (2011) analysed the influence of self-control and anger rumination as mediators. Overall, results demonstrated that participants who were provoked demonstrated a reduced self-control capacity comparing to participants who were not provoked. Consistently, among provoked participants, anger rumination (as opposed to distraction) reduced individuals' self-control capacity, which in turn increased their aggressive responses. However, after angry rumination, glucose consumption (as opposed to a placebo) was

able to increase self-control capacity, allowing participants to control their aggression. Generally, these findings suggest that the self-regulatory process implicated in anger rumination undermines self-control capacity, but glucose consumption seems to buffer its depleting effects.

## **DISTINCTION BETWEEN COPING, EMOTION REGULATION, AND SELF-CONTROL**

The constructs of coping, emotion regulation, and self-control, described above, are often a source of confusion across the literature. Several authors seem to use these concepts interchangeably, without considering their theoretical background. The overlapping nature of these processes (Gross & Thompson, 2007; Koole, 2009; Koole, van Dillen, & Sheppes, 2011) appears to fuel even more the “chaos” surrounding these concepts. For instance, reappraisal can be both an emotion regulation strategy (e.g., Gross, 2008a, b), and a coping strategy (e.g., Carver, 1997).

As an effort to clarify these constructs, Gross and Thompson (2007) distinguished between coping and emotion regulation. These authors suggest that emotion regulation is part, as well as coping, of a broader concept, affect regulation, which includes: coping, emotion regulation, mood regulation, and psychological defences. Within the two concepts, coping is the larger category, because it includes nonemotional actions executed to achieve nonemotional goals (Scheier, Weintraub, & Carver, 1986), such as buying a map to avoid getting lost. Another important difference is related to the period of time through which these processes occur. While coping can typically take longer periods of hours, days, or months, such as adjusting to university, emotion regulation can take just seconds or minutes. In addition, although coping is a broader concept, it does not include the regulation of physiological and expressive aspects of emotion (Gross, 1999; Gross & Thompson, 2007). Finally, while coping only involves conscious efforts (Lazarus & Folkman, 1984), emotion regulation can occur automatically, without awareness of this process (Mauss, et al, 2007).

Likewise, a relevant difference between self-control and emotion regulation, is that the first is a deliberate and conscious process (Baumeister et al., 2007). Furthermore, Koole (2009) distinguished between hedonic and normative emotion regulation in order to analyse the relationship between self-control and emotion regulation. Hedonic emotion regulation reflects

the tendency to pursue positive emotions and avoid negative ones. This type of emotion regulation has a different time frame comparing to self-control. While self-control is future-oriented and involves following goals over weeks, months, or years, hedonic emotion regulation is more oriented to the immediate present, in which individuals seek more pleasant emotions. Because self-regulation often implies forsaking the immediate pleasure to pursue long-term goals (such as avoid eating an ice cream to lose weight), these types of regulation seem to be in conflict with each other. In fact, this conflict may undermine individuals' ability to exert self-control. Under acute emotional distress, individuals may abandon their long-term goals and seek more immediately gratifying emotional experiences. For example, a study (Tice, Bratslavsky, & Baumeister, 2001) has demonstrated that participants experiencing emotional distress are more likely to fail at self-control comparing to those who did not experience any distress.

On the other hand, Koole (2009) referred to normative emotion regulation to describe the regulation whereby individuals choose to feel certain emotions more consistent with the situation they are in, regardless of being positive or negative. For instance, avoid displaying a cheerful mood at a funeral. This type of emotion regulation is more consistent with the goals underlying self-control, and may be seen as a part of it (Erber & Erber, 2000). However, given that these processes are very similar, performing an act of self-control may impair subsequent efforts at normative emotion regulation, and vice versa. Indeed, Schmeichel (2007) has reported that individuals are less able to regulate their emotions after an emotion-eliciting film clip, if they had previously been engaged in a self-control task.

Despite most studies suggesting that emotion regulation undermines the ability to exert self-control, Koole (2009) suggests that emotion regulation can also facilitate self-control. In fact, feeling positive emotions was found to help individuals maintain their energy levels after their resources had been depleted by a previous self-control task (Tice et al., 2007). Nonetheless, the main argument proposed by this author derives from the of Personality Systems Interactions Theory (Kuhl & Koole, 2004), according to which changes in positive and negative emotion can activate or deactivate certain functions of the self-control. In this sense, self-regulation is facilitated by changes in emotional states, and thus, emotion regulation. For instance, chronically high levels of positive emotion can lead to impulsivity, whereas low levels are associated with problems in decision making, mostly because positive emotions are necessary to implement intended actions (Kuhl & Kazén, 1999). Furthermore, another type of emotion regulation is also

suggested: systemic emotion regulation. In this type of emotion regulation, the main goal is to coordinate between both the individuals' emotional states and the demands of the situation. According to Koole (2009), systemic emotion regulation facilitates the maintenance of the balance between individuals' motivational, cognitive, and emotional functions, thus facilitating successful self-regulation. Consistently, exerting self-control may promote emotion regulation. Engaging in working memory tasks can help clear the mind of negative feelings (Van Dillen & Koole, 2007), and in turn, working memory is implicated some forms of self-regulation (Schmeichel, 2007). Considering these assumptions, Koole (2009) suggests that engaging in self-control can facilitate emotion regulation.

Lastly, the literature dedicated to the combination self-control and coping remains sparse. However, Muraven and Baumeister (2000) suggest that coping, as self-control, also involves inhibition. Coping involves continuous monitorization of threatening stimuli (Lazarus & Folkman, 1984), which requires the inhibition of the individuals' general tendency to diffuse attention. Similarly, coping often inhibits or alters negative emotions and arousal (Hancock & Warm, 1989), as well as other responses, such as blocking sensations and stopping thoughts (Wegner & Pennebaker, 1993). Consistently, some coping measures have items that refer to inhibition, as can be found this item from the Ways of Coping Questionnaire (Lazarus & Folkman, 1984): "I tried to keep my feelings from interfering with other things too much". Additionally, coping seems to rely on the same mental energy as self-control, as it was reported by Gailliot et al. (2006), who found that coping with thoughts and fear of death decreased participants' performance in a subsequent self-control task. Muraven and Baumeister (2000) further suggest that coping with stress may lead to diet breaking and smoking relapses (behaviours that involve self-control). By trying to feel better when coping with negative affect, individuals are also presumably more likely to fail at self-control tasks

In conclusion, these processes of self-control, emotion regulation and coping seem to rely on the same mental energy. Specifically, acts of coping and emotions regulation can undermine subsequent acts of self-control (e.g., Gailliot et al., 2006), suggesting that exerting coping or emotion regulation can deplete individuals' limited mental resources (ego depletion). However, while Koole (2009) argues that certain specific types of emotion regulation can facilitate self-control, the same has still not been suggested for coping. Taking these assumptions

into consideration, it seems important to study these three processes as a whole and try to understand whether these processes facilitate or undermine each other.

## IMPLICIT THEORIES AND CORE SELF-EVALUATIONS

Recently, an important line of studies in psychology has highlighted the importance of implicit theories in shaping behaviour (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Molden & Dweck, 2006). Originally, Dweck and colleagues (Dweck, Chiu, Hong, 1995; Dweck & Leggett, 1988; Chiu, Hong, & Dweck, 1997) developed the concept of implicit theories, which refer to:

*two different assumptions people may make about the malleability of personal attributes; they may believe that a highly valuable personal attribute, such as intelligence or morality, is a fixed, non-malleable trait-like entity (entity theory), or they may believe that the attribute is a malleable quality that can be changed and developed (incremental theory) (Dweck et al., 1995, p. 267).*

Although these theories are poorly articulated, they provide an interpretative framework through which individuals process the information (Dweck et al., 1995; Chiu et al., 1997). For instance, an individual who holds an entity theory about intelligence believes it to be a fixed trait that cannot be change. Conversely, an individual that holds an incremental theory believes that intelligence may be malleable and therefore can be improved with effort. Nonetheless, entity and incremental theories can be applied to a wide variety of constructs, such as personality, emotion regulation and self-regulation, among others (Blackwell et al., 2007; Dweck, 1999; Molden & Dweck, 2006; Job et al., 2010; Tamir, John, Srivastava & Gross, 2007).

Generally, individuals who hold incremental theories tend to believe that their attributes are malleable and controllable, which makes them have more flexible and contextualised interpretations of events. These theories also promote efficacy in self-regulation and successful behaviour when facing a challenge. However, individuals holding entity theories tend to see attributes as uncontrollable and fixed, making more stable internal attributions. In challenging situations, these theories are associated with a decrease in motivation to self-regulate and consequently, failure (Dweck, 1996).

Chiu et al. (1997) points out that none of these theories can be considered the “correct

one". Implicit theories are seen as alternative ways of viewing the world, each with costs and benefits associated. For example, holding an entity theory, by centring in static traits, can provide a better knowledge about reality. Nonetheless, this can lead to general trait judgements and maladaptive coping styles. On the other hand, holding an incremental theory provides a more specific process analysis, promoting persistence in the face of obstacles. However, the constant changes also mean that reality can never be fully known. In addition, it is also important to emphasize that an individual may have different theories for the different attributes, although it is possible to have a more generalised theory. For instance, an individual can have an entity theory of intelligence, but an incremental theory of self-regulation. Therefore, implicit theories are not a generalised cognitive style, but a domain-specific conceptual framework (Chiu et al., 1997; Dweck et al., 1995).

In this sense, several studies have attempted to understand the influence of implicit theories on specific traits. Studies on intelligence have generally revealed that individuals holding incremental theories tend to focus more on goals aimed at increasing their ability (Dweck & Leggett, 1988), believe in the potential utility of effort (Hong, Chiu, Dweck, Lin, & Wan, 1999), attribute failures to low effort (Henderson & Dweck, 1990) and tend to increase effort and change strategies when facing obstacles (Robins & Pals, 2002). Furthermore, Henderson and Dweck (1990) reported that students who had an incremental theory were more likely to have better grades in the first year of junior high school. More recently, it was found that an intervention directed at promoting incremental theories of intelligence has led to improvement in college (Aronson, Fried, & Good, 2002) and junior high school students' grades (Good, Aronson, & Inzlicht, 2003). Further support was found in a Blackwell and colleagues' (2007) study, who reported that an intervention to promote incremental theories proved to be successful in increasing students' motivation in maths class comparing to students who were not subjected to any intervention. Besides, those in the intervention group showed no decline in math performance comparing to the control group, who showed a pattern of declining grades.

Implicit theories also influence individuals' perception of emotion and emotion regulation. Although emotional preferences seem to depend on individuals' goals (e.g., Tamir, 2009; Tamir et al., 2008; Tamir & Ford, 2009, 2012), they can also differ even when having the same goals (Gross, 2008a). Tamir and colleagues (2007) predicted that implicit theories of emotion should be related to emotion regulation efficacy. More specifically, individuals with incremental theories

of emotions should believe that emotions are malleable and that they are able to control their emotions. Conversely, individuals with fixed or entity theories would be more likely to believe that they cannot control their emotions. In addition, those with entity theories would be less likely to use antecedent focused emotions regulation strategies, i.e., those that come before the emotional experience, such as cognitive reappraisal. However, those who have fixed theories of emotions would be less prone to attempt to change their emotions by using antecedent focused strategies.

Based on these assumptions, the study of Tamir and colleagues (2007) tested whether implicit theories of emotion are related to emotion regulation efficacy and the use of reappraisal in a sample of first-year college students. This study demonstrated that students differ in their implicit theories of emotion, in which some viewed emotions as fixed (entity theorists) (almost 40%), while others viewed emotions as more malleable (incremental theorists). Individuals with entity theories tended to use cognitive reappraisal more frequently to control their emotions and had a stronger sense of emotion regulation self-efficacy than individuals with entity theories. Additionally, those who held incremental theories of emotion experienced more positive and less negative emotions and received more social support comparing to those with entity theories. In a one-year follow up, students who had incremental theories before college, had had better emotion experiences, higher perception of well-being, less depression, less loneliness and more social adjustment (measured by both self and peer-report) comparing to students with entity theories. These results supported the relevance of implicit theories of emotion and emotion regulation as predictors of important emotional and social outcomes.

With these findings in mind, a similar study (Kappes & Schikowski, 2013) predicted that the more individuals believed their emotions are fixed, the more negative affect they would experience after an aversive event. Supposedly, this would happen because those endorsing in entity theories of emotions tend to use experiential avoidance (taking steps to avoid a particular negative experience) to regulate negative affect, which tends to increase it even more. The results of this study provide further support for the idea that entity theories of emotions lead to poor affective outcomes.

Job and colleagues (2010) also applied the same line of thought to self-control and predicted that individual differences in implicit theories about the availability and depletability of self-control resources would influence individuals' self-control capacity. A series of studies

showed that only individuals who believe or were led to believe that their willpower is a limited resource demonstrated the effects of ego depletion. Conversely, those who thought that their resources were unlimited did not show signs of ego depletion after a demanding initial task. Interestingly, in one of the studies, a former demanding task actually improved the subsequent performance. Besides, the more participants believed in the limited-resource theory, the lower would be their self-control capacity in the real world. Job and colleagues (2010) argue that ego depletion may be the result of individuals' beliefs about the availability of their resources and not the actual lack of resources. Therefore, this suggests that beliefs about willpower can indeed affect self-regulation.

Originally developed by Judge, Locke and Durham (1997), the concept of core self-evaluations arose from the need to find a significant predictor for both job satisfaction and job performance and possibly other achievement contexts. In more broad terms, the concept of core evaluations was defined as a "fundamental, subconscious conclusions individuals reach about themselves, other people, and the world" (Judge, Locke, Durham, & Kluger, 1998b, p.18). Thus, core evaluations are the basis of all the other appraisals and represent basic conclusions and evaluations an individual holds subconsciously. Therefore, situation specific appraisals (for instance, an evaluation of one's work or one's colleagues) are affected by these deeper and more fundamental self-appraisals, although individuals are not aware of their influence on perceptions or behaviour (Bono & Judge, 2003). Evaluations can be negative, for instance "the real me is bad" or positive, such as "It is possible to be happy". Because these evaluations are "core", they have an influence on all the other less fundamental evaluations.

More specifically, core self-evaluations are the most fundamental (core) evaluation individuals can make about themselves (Judge et al., 1997). In the search for the self-evaluation concept, Judge, et al. (1997) browsed the literature looking for traits that met three criteria: be self-evaluative (core traits must involve an evaluation of the self and not a description of oneself or others), fundamentality (core traits should be fundamental and not just surface traits; Cattell, 1965), and scope (core traits should have a wide scope or be cardinal traits; Allport, 1961). These authors identified four main traits that met these criteria, namely, self-esteem, generalized self-efficacy, and neuroticism, and latter added locus of control (Bono & Judge, 2003). Therefore, core self-evaluations are defined as:



*a broad, latent, higher-order trait indicated by four well-established traits in the personality literature: (1) self-esteem, the overall value that one places on oneself as a person (Harter, 1990); (2) generalized self-efficacy, an evaluation of how well one can perform across a variety of situations (Locke, McCleary, & Knight, 1996); (3) neuroticism, the tendency to have a negativistic cognitive/explanatory style and to focus on negative aspects of the self (Watson, 2000); and (4) locus of control, beliefs about the causes of events in one's life - locus is internal when individuals see events as being contingent on their own behavior (Rotter, 1966)" (Judge, Erez, Bono, & Thoresen, 2003, p. 303).*

Self-esteem is perhaps one of the most important appraisals individuals can make about themselves (Judge et al., 1998). Besides, there is strong evidence that suggests that self-esteem is associated to job satisfaction (Locke et al., 1996). On its turn, generalized self-efficacy represents an evaluation of individuals' capacity to mobilize motivation, cognitive resources and actions to exert control over life events (Judge et al., 1997, 1998b). Self-efficacy is considered a core self-evaluation because it represents the perception individuals have of their ability to cope with the exigencies of life. Moreover, since self-efficacy can be seen as a part of self-esteem, it seems that these two constructs should load on the same factor (Judge et al., 1998b). Another related concept is the locus of control, which refers to individuals' beliefs about the controllability of their lives, and can be external (believe that environment or fate controls their lives) or internal (believe that they control their lives) (Rotter, 1966). Those who believe that they can control their environment have more job satisfaction because of their perceived ability to control situations (Judge et al., 1998b). Finally, neuroticism is one of the personality dimensions of the Big Five and can be considered the negative pole of self-esteem. Individuals high on neuroticism tend to be timid, guilty, and insecure (Costa & McCrae, 1988). This concept seems to be associated with negative affectivity, working as a negative "lens" to interpret the world (Judge et al. 1997, 1998b).

Research on core-self evaluations has reported that individuals with positive core self-evaluations tend behave in "a consistently positive manner across situations; such individuals see themselves as capable, worthy, and in control of their lives" (Judge, Van Vianen, & De Pater, 2004, p. 326). Thus, as a common factor, core self-evaluations are associated with important outcomes in work contexts (e. g., Judge, et al. 1998b; Judge et al., 2000). Support for the relationship between relationship between core self-evaluations, job satisfaction and motivation are found in several studies (e.g., Bono & Judge, 2003; Judge, Erez and Bono, 1998a; Judge & Bono, 2001; Erez & Judge, 2001; Judge, Heller, & Klinger, 2008; Judge et al., 2004; Judge,

Bono and Locke, 2000; Srivastava, Locke, Judge, & Adams, 2010).

Additionally, other studies focused on the relationship of core self-evaluation with other variables related to work and life. Judge and colleagues (2002) reported positive associations between core self-evaluations and several traits related to life satisfaction, such as happiness, but negative to stress (self-reported stress on the job) and strain (somatic symptoms). Judge and colleagues (1999) also observed a positive association between core self-evaluations and organizational commitment, salary, and negative to career plateauing. Moreover, Brunborg (2008) reported that core self-evaluations not only showed a negative association with job stress, but were also the single strongest predictor of this stressor.

Furthermore, assuming that core self-evaluations have an influence how individuals appraise stressful encounters, Kammeyer-Mueller, Judge, and Scott (2009) studied the relationship between this construct and coping. It was found that individuals with higher core self-evaluations perceived less stressors, showed less stressful responses and used more problem-focused and less avoidance coping strategies. In a similar study, Harris, Harvey, and Kacmar (2009) found that core self-evaluations buffered the negative effects of social stressors on job satisfaction and turnover intention. These authors suggested that individuals high in core self-evaluations tend to feel less threatened by social stressors and to have more perceptions of control in these situations.

Despite several studies having found that these four core traits load on a single actor (Erez & Judge, 2001; Judge, et al., 1998a, b, 2000), the combined study of these traits remains sparse. Nevertheless, and taking into account that research has provided evidence to support that these traits have conceptual similarities (Judge & Bono, 2001a), Judge and colleagues (2006) developed a self-report measure of core self-evaluations as a common core factor. Generally, it was argued that having high levels on these traits reflects a “broad, general, positive self-regard” (p. 4). Although the four traits are not completely redundant, the core self-evaluations concept helps to explain the conceptual and empirical redundancy observed among these four traits. As a result, instead of aggregating associated traits, the core self-evaluations concept reflects a latent psychological construct that represents the commonality among these four core traits. This measure was shown to be a reliable measure with significant correlations to job satisfaction, job performance and life satisfactions. These findings suggest the potential utility of this measure in applied psychology research (Judge et al., 2003). Overall, core self-evaluations

are a more consistent predictor of job performance and satisfaction, motivation and life satisfaction comparing to the four core traits separately (Erez & Judge, 2001).

More recently, Osório, Sofia, and Cruz (2013) studied the psychometric characteristics of the core self-evaluations scale in two samples of athletes competing from several types of sport. Results from the two samples revealed that core self-evaluations were associated with emotion regulation processes during sport competition, specifically, cognitive-appraising, task-focusing and regaining task-focus processes were positively associated, while emotion-focusing processes were negatively associated. In addition, core self-evaluations were also found to be positively associated to self-control, but negatively with threat appraisals.

## CHAPTER IV

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### Method



## AIMS OF THE THESIS

Because the sport context is a privileged laboratory to study anger and aggression, leading to a better understanding of human aggression (Maxwell & Moores, 2007), this thesis intends to contribute toward a general understanding of the experience of anger and aggression in sports. More specifically, this thesis is guided by the following objectives:

- a) Understand the differences between anger and aggression (and related constructs) according to gender, age category, achievement level and levels of physical contact.
- b) Identify the sources and consequences of anger and aggression in sport.
- c) Explore the individual differences in anger considering its emotional, cognitive and motivational correlates.
- d) Analyse the processes of coping, emotion regulation and self-control implicated in the regulation of anger and aggressive behaviours.
- e) Understand the role of implicit theories of emotion, intelligence/ability and self-regulation, goals for emotion regulation, as well as core self-evaluations, in the processes of anger and aggression regulation.
- f) Explore the different types of aggressive behaviour in sport competition, its main predictors and moderators.
- g) Analyse athletes' perceptions and beliefs about the impact of anger and aggression in sport, as well as its instrumental use for competition.

## PARTICIPANTS

Participants were 269 athletes (28.3% females) ranging between 15 and 39 years old ( $M = 21.73$ ;  $SD = 6.35$ ), from different levels of competition. Specifically, seniors ( $N=149$ , 55.39%), juniors ( $N=69$ , 25.65%) and juveniles ( $N=48$ , 17.84%). These competed in different types of sports, namely, swimming ( $N=8$ , 3%), volleyball ( $N=34$ , 12.6%), roller hockey ( $N=64$ , 23.8%), rugby ( $N=46$ , 17.1%), indoor soccer ( $N=22$ , 7.8%), badminton ( $N=10$ , 3.7%), basketball ( $N=8$ ,

3%), handball (N=23, 8.6%), tennis (N=18, 6.7%), martial arts (N=21, 7.8%), kickboxing (N=2, 0.7%), boxing (N=1, 0.4%) and greco-roman wrestling (N=11, 4.1%).

Overall, these athletes reported having between 0 and 31 years ( $M = 8.44$ ,  $SD = 6.4$ ) and trained an average of 7.16 hours a week ( $SD = 4.40$ ), from minimum of 1.5 to a maximum of 36 hours. Additionally, athletes also competed in national competitions 1 to 60 times a year ( $M = 10.34$ ,  $SD = 12.45$ ) and only a few competed in international competitions, ranging 0 to 8 times a year ( $M = 0.68$ ,  $SD = 1.49$ ).

**Table 9**

*Descriptive statistics of demographic and sport characteristics of the participants*

	M	SD	Min	MAX
<b>Age</b>	21.73	6.35	15	39
<b>Years of experience</b>	8.44	6.4	0	31
<b>Hours of weekly training</b>	7.16	4.40	1.5	36
<b>National competition a year</b>	10.34	12.45	1	60
<b>International competitions a year</b>	.86	1.49	0	8

## INSTRUMENTS

In addition to several self-report measures, a questionnaire was developed including important questions regarding the demographic characteristics and sport history of the athletes. Therefore, all the measures used in this thesis will be described below, as well as the more specific study of their psychometric characteristics. Criteria to include items in a factor were conceptual congruency and a loading above .32 (Tabachnick & Fidell, 2007). By default, reliability levels were considered appropriate when they were above .70 (Nunnally, 1978), unless otherwise specified due to the exploratory nature of the present studies. The presentation of the self-reported measures was counterbalanced.

## Competitive Aggressiveness and Anger Scale

The measurement and definition of aggression in sports has always been surrounded by controversy across the literature in sport psychology (e. g., Kerr, 2008; Maxwell, 2004; Maxwell & Moores, 2007, 2008). In an attempt to overcome these problems with the definition, as well as problems found in previous instruments, Maxwell and Moores (2007) developed a measure based on aggression's most significant antecedents: aggressiveness and anger (Berkowitz, 1993). Aggressiveness refers to a disposition to become aggressive or the acceptance and willingness to use aggression, which has already been shown to increase athlete aggression (e.g. Conroy, Silva, Newcomer, Walker, & Johnson, 2001), while anger refers an emotion. High levels in both these variables are associated with greater propensity to behave aggressively (Farrington, 1978).

A previous study (Sofia & Cruz, 2012) analysed the psychometric properties of the Competitive Aggressiveness and Anger Scale (CAAS) in a sample of Portuguese soccer players, but 3 items (item 7 of the anger scale and items 10 and 11 of the aggressiveness subscale) were removed because they did not load above .30 and their presence decreased the reliability levels. As it was suggested in this previous study, the language of the items revised for the current sample. Results from the exploratory factor analysis with oblimin rotation in this sample (Table 2) revealed a structure consistent with the original version (all items remained in their corresponding scale), with high reliability levels (.83 for aggressiveness and .82 for anger) (KMO = .85; Bartlett's test = 1215.04,  $p < .001$ ).

The CAAS therefore aimed at accessing anger and the acceptance and use of aggression in sports. More specifically, it measures the anger associated with frustration provoked by losing points or games, official's mistakes, and anger reactivity in general (e. g., "I get mad when I lose points") (Anger scale), and the acceptance and willingness to aggress in competition (e. g., "I use excessive force to gain an advantage") (Aggressiveness scale). The CAAS includes a total of 12 items rated on a five-point Likert scale (1=almost never to 5=almost always), each scale with 6 items. The aggressiveness and anger scales' scores are calculated by multiplying the frequency scores by severity scores (obtained in the original study), and then summing the items to generate a total score. A higher score reflects higher levels of aggressiveness and anger in sport competition.



**Table 10***Factor structure of the Competitive Aggressiveness and Anger Scale*

	<b>Aggressiveness</b>	<b>Anger</b>
Item 3	.86	
Item 8	.78	
Item 7	.73	
Item 2	.69	
Item 5	.64	
Item 10	.63	
Item 6		.88
Item 1		.79
Item 12		.72
Item 9		.65
Item 11		.59
Item 4		.48
Variance	41.20	13.87
Cronbach Alpha	.83	.82

### ‘ Sport Anxiety Scale-2

This scale is revision of the Sport Anxiety Scale, originally developed by Smith, Smoll and Schutz (1990). The SAS is based on the three-factor model of anxiety, which conceptualises anxiety as a multidimensional construct including one somatic factor and two cognitive anxiety factors, worry and concentration disruption (Smith & Smoll, 2004; Grossbarda, Smith, Smoll, & Cumming, 2009). Somatic anxiety refers to physiological aspects of arousal, specifically muscle tension and stomach discomfort (Gould, Greenleaf, & Krane, 2002). Worry reflects concerns regarding potential negative personal and social consequences of a poor performance while concentration disruption is defined as difficulties in focusing on task-relevant cues and thinking clearly in the competitive situations.

Smith, Smoll, Cumming, and Grossbard (2006) developed the Sport Anxiety Scale 2 (SAS 2) to adapt and expand this measure also to children, as well as overcome some problems of the original SAS version (conflicting factor loadings in adult samples). The result is a scale suitable for both children and adults with a stronger factorial validity than the original SAS. Another important difference of the SAS 2 was observed on the Concentration Disruption scale,

in which items referring to cognitive interference produced by worrisome thoughts were excluded because they cross-loaded on both the Worry and Concentration Disruption subscales of the original SAS.

The SAS-2 was subsequently translated and adapted to Portuguese (Cruz & Gomes, 2007). The study of its psychometric characteristic in this sample has revealed a structure consistent with the original scale explaining 63.9% of the variance and demonstrating good reliability levels (table 2) (KMO = .87; Bartlett's test = 1911.62,  $p < .001$ ). This scale includes a total of 15 items distributed by 3 subscales (each with 5 items), namely: somatic anxiety (e.g. "I feel tense in my stomach"); concentration disruption (e.g. "I lose focus on the game"); and worry (e.g., "I worry that I will play badly"). Participants rated how they felt before or during competition on a four-point scale (1= not at all; 4=very much so). Each subscale is a result of the sum of the corresponding items and the sum of these sub-scales represents a total score of competitive anxiety. Total scores range from 5 to 20 points indicating "a general indices of anxiety in sport performance" (Smith et al., 2006, p. 487).

**Table 11**  
*Factor structure of the Sport Anxiety Scale 2*

	Concentration Disruption	Worry	Somatic Anxiety
Item 7	.86		
Item 1	.82		
Item 4	.78		
Item 15	.62		
Item 13	.61		
Item 8		-.94	
Item 9		-.92	
Item 3		-.81	
Item 11		-.77	
Item 5		-.69	
Item 6			-.87
Item 12			-.80
Item 14			-.76
Item 2			-.67
Item 10			-.66
<b>Variance</b>	38.70	14.97	10.13
<b>Cronbach's Alpha</b>	.81	.89	.84

## State–Trait Anger Expression Inventory (STAXI-2)

The State–Trait Anger Expression Inventory (STAXI 2) is an expanded and revised version of the original 44-item STAXI. On its turn, the STAXI is a result of the two scales: the State-Trait Anger Scale (STAS; Spielberger et al., 1983) and the Anger EXpression (AX) Scale (Spielberger et al., 1985). Initially, the STAS was developed to assess the intensity of angry feelings (State Anger) and individual differences in anger-proneness (Trait Anger), including a total of 30 items, 15 in each subscale. However, in a subsequent study (Spielberger, 1988), the STAS was reduced to 10 items for each subscale. A factor analysis of the 10 items of the S-Anger revealed a single factor, which represents a unitary emotional state that varies in intensity. Conversely, the same analysis on T-Anger identified two factors: Angry Temperament (T-Anger/T) and Angry Reaction (T-Anger/R). The former reflects individual differences in the disposition to experience anger without any specific provoking circumstances, whereas the later indicates the tendency to react angrily in response to situations that involved frustration and/or negative evaluations.

Based upon advances in research, Spielberger, Johnson, Russell, Crane, Jacobs, and Worden (1985) stressed the importance of distinguishing between the experience of anger and the characteristic ways in which anger is expressed. Anger expression was operationalized as a unidimensional and bipolar construct, “varying from extreme suppression or inhibition of anger to the frequent expression of anger in aggressive behavior” (Spielgerger & Reheiser, 2009, p. 283). In order to assess this construct, Spielberger and colleagues (1985) developed the Anger EXpression (AX) Scale. On the basis of this instrument were the working definitions of anger-in and anger-out, defined in table X. A preliminary version of the 33-items of the Anger AX scale was administered to high school students by Johnson (1984). In this study, the strongest loadings were selected to form two 8-item subscales: AX/In (Anger-in) and AX/Out (Anger-out) (Spielberger et al., 1985). Subsequent studies (Knight, Chisholm, Paulin, & Waal-Manning, 1988; Spielberger, 1988) did not find zero correlations between these subscales, and Jacobs et al. (1988) reported the good consistency and reliability (test-retest) of this scale. This suggests that “the 8-item AX/In and AX/Out subscales are factorially orthogonal, empirically independent, internally consistent, and relatively stable over time” (Spielgerger & Reheiser, 2009, p. 284).

In addition, using the same 33-items Anger AX scale, Pollans (1983) found that three items (“Control my temper”; “Keep my cool”; “Calm down faster”) appeared to form another

important factor, the Anger Control (AX/Con) subscale. A pool of anger control items was then administered to a sample of university students, along with the AX/In and AX/Out scales. The five items with the strongest loading were added to the other 3 items forming another 8-item subscale, the AX/Con subscale. The total scale of 24 items (including the three subscales) was administered to another large sample of university students, demonstrating the same structure of factors (Spielberger, Krasner, & Solomon, 1988).

Finally, the STAS (20 items) and AX (24 items) scales were combined to form the STAXI. This instrument intended to measure the experience, expression, and control of anger (Spielberger, 1988). However, in order to include new research findings, Spielberger (1999) developed a revised version: the STAXI-2. This instrument includes 42 of the 44 original STAXI items, and 15 new items that were developed to measure three components of S-Anger, namely, Feeling Angry (S-Anger/F), Feel Like Expressing Anger Verbally (S-Anger/V), and Feel Like Expressing Anger Physically (S-Anger/P). The STAXI 2 comprised a total of 57 items, and includes the subscales described in table 1.

Generally, the STAXI 2 is similar to the original STAXI, with the Angry Temperament (T-Anger/T) and Angry Reaction (T-Anger/R) scales remaining unchanged from the original STAXI, as well as the AX/Out and AX/In scales. However, an item was excluded, and another replaced, do form a measure of control of anger-out (AX/Con-Out). In addition, a new 8-item scale was constructed to assess the control of anger-in (AX/Con-In). The formula to calculate the total STAXI-2 AX Index (total of anger expression) is computed using the following formula:  $AX\ Index = AX\ Out + AX\ In - (AX\ Con/Out + AxCon/In) + 48$ . Table 4 shows the definitions and provides an example of an item of each subscale.

In the initial study of the Portuguese version of the STAXI-2 (Marques, Mendes & De Sousa, 2007), used in the present study, failed to provide important distinctions in the expression (Anger-In and Anger-out) and control of anger, integrating the 4-factor expression scale into two factors (Anger Expression and Anger Control). Because a preliminary analysis also revealed a similar structure as the original version, it was decided, for the present study, to perform separate exploratory factor analyses for the expression and control of anger. The distinctions provided by the expression scale reflect different types of anger expression styles, which can be both theoretically and empirical useful in the comprehension of individual differences in anger (Spielgerger & Reheiser, 2009, 2010).

Overall, trait anger remained unidimensional, but a total of 7 items were eliminated, 3 from the expression subscale and 4 from the control subscale. Although the Portuguese version (Marques et al., 2007) found the two components of trait anger (Anger temperament and Anger reaction), this version failed to reveal the same structure, both because items did not load on the corresponding factor and because the possible structure demonstrated very low reliability levels (KMO = .74; Bartlett's test = 371.39,  $p < .001$ ). Maxwell, Sukhodolsky, and Sit (2009) also reported a unidimensional factor of trait anger (Table 5).

**Table 12**

*Definitions of the Subscales of the STAXI-2*

<b>STATE–TRAIT ANGER EXPRESSION INVENTORY 2 (STAXI-2)</b>
<p><b>State Anger (S-Anger):</b> A psychobiological emotional state consisting of subjective feelings that vary in intensity from mild annoyance or irritation to intense fury and rage.</p>
<p>a. <i>Feeling Angry (S-Ang/F):</i> Anger ranging from feeling annoyed to furious.</p>
<p>b. <i>Feel like Expressing Anger Verbally (S-Ang/V):</i> (yelling or shouting).</p>
<p>c. <i>Feel like Expressing Anger Physically (S-Ang/P):</i> (hitting someone or breaking things).</p>
<p><b>Trait Anger (T-Anger):</b> Individual differences in the tendency to perceive a wide range of situations as annoying or frustrating and the disposition to respond to such situations with elevations in S-Anger.</p>
<p>a. <i>Angry Temperament (T-Anger/T):</i> Tendency to experience and express anger indiscriminately (“I am a hot-headed person”).</p>
<p>b. <i>Angry Reaction (T-Anger/R):</i> Disposition to express anger when criticized or treated unfairly by others (“When I do a good job and get a poor evaluation, I feel furious”).</p>
<p><b>Anger Expression and Control Scales (AX Index)</b></p>
<p>a. <i>Anger-In (Ax/In):</i> Frequency that angry feelings are held in or suppressed (“When angry or furious, I boil inside but don’t show it”).</p>
<p>b. <i>Anger-Out (Ax/Out):</i> Frequency that S-Anger is expressed in aggressive behavior directed toward other people or objects in the environment (“When angry or furious, I slam doors . . . argue with others . . . say nasty things”).</p>
<p>c. <i>Anger Control-Out (Ax/Con-Out):</i> Individual differences in the frequency that individuals attempt to control the outward expression of angry feelings (When angry or furious: “I control my temper”; “I keep my cool”).</p>
<p>d. <i>Anger Control-In (Ax/Con-In):</i> Individual differences in the frequency that individuals attempt to reduce the intensity of suppressed angry feelings (When angry or furious: “I try to simmer down . . . try to relax . . . try to soothe my angry feelings”).</p>

**Note:** Source: C. D. Spielberger & E. C. Reheiser (2010, p. 410).

With regards to the Expression scale, this analysis revealed a similar 2-factor structure (40.87% of total the total variance), although items 27 and 31 were eliminated from the anger-out expression subscale because they did not load above .32, or cross-loaded (loaded above .32) in the two factors (Table 6). Similarly, item 29 was also removed from the anger-in expression subscale for the same reasons (KMO = .80; Bartlett's test = 638.29,  $p < .001$ ).

**Table 13**  
*Factor structure of trait anger*

	Trait anger
Item 18	.79
Item 16	.79
Item 21	.76
Item 17	.74
Item 22	.72
Item 19	.61
Item 23	.57
Item 24	.56
Item 25	.44
Item 20	.36
Variance	42.42
Cronbach's Alpha	.84

**Table 14**  
*Factor Structure of the Anger Expression Scale*

Item 37	Anger- Out (Ax/Out)	Anger-In <sup>59</sup> (Ax/In)
<del>Item 45</del>	.73	.59
<del>Item 48</del>	.68	.50
<del>Item 43</del>	.65	.50
<del>Item 53</del>	.64	.47
Variance	27.25	13.72
Cronbach's Alpha	.55	.70
<del>Item 41</del>	.73	.77
Item 33		.62

Finally, the anger control scale also revealed a structure consistent with the original (KMO = .90; Bartlett's test = 1046.80,  $p < .001$ ) (Table 7). However, items 30 and 50 were eliminated from the anger control out and items 36 and 52 from the anger control in subscale because they did not load above .32, or cross-loaded (loaded above .32 in the two factors).

**Table 15**  
*Factor structure of the Anger Control Scale*

	<b>Anger Control-Out (Ax/Con-Out)</b>	<b>Anger Control-In (Ax/Con-In)</b>
Item 42	.98	
Item 46	.71	
Item 34	.75	
Item 54	.64	
Item 38	.62	
Item 26	.60	
Item 56		.84
Item 48		.70
Item 32		.67
Item 28		.64
Item 44		.62
Item 40		.46
Variance	43.70	9.44
<b>Cronbach Alpha</b>	.82	.78

Overall, in the current research studies, this measure demonstrated good reliability levels across all the subscales, ranging from .84 to .70. Thus, this version of the STAXI-2 includes the factors of anger expression-in (7 items), anger expression-out (6 items), anger control-in (6 items) and anger control-out (6 items). The trait factor remained the same as in the original Portuguese version (10 items). All items in the STAXI-2 were rated on a four-point scale (1=almost never to =almost always), and the total score of each subscale is computed by summing its corresponding items.

## Emotion Regulation During Sport Competition Scale

The Emotion Regulation During Sport Competition Scale (ERDSCS) was adapted and translated and adapted for sport contexts by Cruz (2008) from a similar instrument that measures emotion regulation during test-taking (ERT), developed by Schutz and colleagues (2004). This original version was based on a definition of emotional regulation during test-taking composed of the following three dimensions: (a) task-focusing processes, (b) emotion-focusing processes, and (c) cognitive-appraising processes.

**Table 16**  
*Factor structure of the Cognitive Appraising Processes*

	Goal Congruency	Problem Efficacy	Agency
Item 20	.86		
Item 35	.84		
Item 32	.78		
Item 38	.77		
Item 8	.73		
Item 14	.62		
Item 21	.52		
Item 16		.76	
Item 2		.75	
Item 23		.66	
Item 1		.62	
Item 10		.61	
Item 15			.85
Item 9			.82
Item 37			.78
Variance	35.87	13.35	8.73
Cronbach Alpha	.87	.73	.78

The sport competition version of this scale includes a total of 42 items distributed by 4 dimensions, each including emotion regulation processes. Following the procedures of the original scale (Schutz et al., 2004), the analysis of the psychometric characteristics of this instrument was performed separately. The first dimension was cognitive appraising processes,



which showed a structure consistent with the original (total variance 57.95%), including the subscales of agency, goals congruency and problem efficacy, all showing appropriate reliability levels (table 8) (KMO = .86; Bartlett's test = 1279.96,  $p < .001$ ). In the dimension of Task-Focusing Processes, a similar single-factor structure was found. Although the reliability level of this subscale is low, it remains similar to the original (.57; Schutz et al., 2004) (KMO = .60; Bartlett's test = 150.02,  $p < .001$ ) (Table 9). In the Regaining Task-Focus Processes, the two factors from the original were also found, both with appropriate reliability levels (Table 10) and explaining a total of 44.13% of the variance (KMO = .70; Bartlett's test = 420.99,  $p < .001$ ). Finally, the dimension of emotion-focused processes is also consistent with the original (Table 11), explaining 45.32% of the total variance and with good reliability levels for both scales (KMO = .77; Bartlett's test = 748.54,  $p < .001$ ).

**Table 17**  
*Factor structure of the Task-focusing Processes*

<b>Task-Focusing Processes</b>	
<b>Item 17</b>	.69
<b>Item 43</b>	.69
<b>Item 3</b>	.57
<b>Item 33</b>	.54
<b>Item 39</b>	.44
<b>Item 27</b>	.42
<b>Item 11</b>	.37
<b>Variance</b>	29.54
<b>Cronbach's Alpha</b>	.56

Overall, the cognitive appraising processes dimension reflects appraisal of the achievement situation, including emotion regulation processes of goal congruence (what is happening congruent with my goals?), agency (perceived control over the situation) and Problem Efficacy (potential to deal with problems arising in the situation). The Task-Focusing Processes reflects emotion regulation processes of focusing the attention on managing the current task. The Regaining Task-Focus Processes dimension reflects attempts to get back on task, including

emotion regulation processes of tension reduction (such as such as trying to slow breathing down) and importance reappraisal (such as emphasising the positive aspects of the situation).

**Table 18**  
*Factor structure of the regaining task-focus processes*

	Importance Reappraisal	Tension Reduction
Item 28	.72	
Item 12	.69	
Item 46	.68	
Item 18	.65	
Item 4	.55	
Item 13		.73
Item 19		.70
Item 29		.64
Item 5		.63
Item 34		.57
Variance	25.75	18.72
Cronbach Alpha	.68	.68

Finally, the Emotion-focusing dimension refers to processes of disengagement from the achievement situation and a focus on thoughts and feelings, including self-blame (criticising oneself for the situation) and wishful thinking (such as hoping the problem will just go away). Athletes were instructed to rate a 5-point Likert scale considering “what generally goes through their minds during the games/competitions”. The score of each emotion regulation process is computed by averaging its corresponding items, in which higher scores reflect more tendency to use that emotion regulation strategy.

### Brief COPE

Within the theoretical background of Lazarus and Folkman’s (1984) conceptual model of stress and coping, and Carver and Scheier’s (1981, 1990) model of behavioural self-regulation, the brief Cope intends to measure coping strategies. Firstly, Caver, Scheier, and Weintraub, (1989) developed the COPE, which incorporated 15 theoretically based and conceptually distinct

subscales, and that were shown throughout research as important tendencies of coping. Therefore, coping strategies included were: active coping, planning, suppression of competing activities, seeking social support for instrumental reasons, seeking social support for emotional reasons, positive reinterpretation and growth, acceptance, turning to religion, focus and venting of emotions, denial, behavioural disengagement, mental behavioural and alcohol and drug disengagement. The COPE included a total 60 items, 4 items for each subscale.

**Table 19**  
*Factor structure of the Emotion-focusing Processes*

	<b>Self-Blame</b>	<b>Wishful Thinking</b>
<b>Item 44</b>	.79	
<b>Item 24</b>	.77	
<b>Item 26</b>	.68	
<b>Item 41</b>	.63	
<b>Item 31</b>	.55	
<b>Item 7</b>	.54	
<b>Item 40</b>		.71
<b>Item 30</b>		.70
<b>Item 36</b>		.70
<b>Item 25</b>		.69
<b>Item 22</b>		.57
<b>Item 6</b>		.57
<b>Variance</b>	28.77	16.55
<b>Cronbach's Alpha</b>	.76	.74

However, Carver et al. (1993) found that patient samples showed some annoyance when completing the full Cope, given its length and redundancy. Consequently, Carver (1997) decided to develop a brief version of the COPE, which only included 14 scales with two items each, namely: active coping, planning, positive reframing, acceptance, humour, religion, using emotional support, using instrumental support, self-distraction, denial, venting, substance use, behavioural disengagement, and self-blame. The brief COPE was found to have a similar structure, consistent with that of the full COPE, as well as adequate internal reliability. In this

sense, the Brief COPE was shown to be a useful instrument “to assess potentially important coping responses quickly” (Caver, 1997, p. 98).

This instrument was translated and adapted to sport contexts originally by Cruz (2003), and its psychometric characteristics have already proven to be adequate (Dias, 2005; Dias, Cruz, & Fonseca, 2009). In this Portuguese version, the Brief COPE includes the same scales and structure of the original Carver's (1997) version. More specifically, it intends to measure the following strategies: Self-distraction (do something not to think about the stressor); active coping (act and make efforts to avoid or deal with the stressor); Denial (attempts to avoid the reality of the stressful event); Emotional support (getting emotional support from others); Instrumental support (getting help, information, and advice about what to do); Behavioural disengagement (giving up the attempt to attain the goals with which the stressor is interfering); Venting of emotions (tendency to focus on the stressor, expressing the negative feelings); Positive reappraisal (reappraising the stressful transaction in positive terms); Planning (plan efforts to cope with the situation); Humour (use humour to deal with the stressor); Religion (seek spiritual and/or religious support); Self-blame (criticizing oneself for the responsibility of the situation); Alcohol and drug consumption (use drugs or alcohol to deal with the stressor); and Acceptance (accept the situation). Because Dias and colleagues (2009) have already established the adequacy and the structure of this measure in a sample of Portuguese athletes, no further analysis will be performed for this instrument. Thus, the total Brief COPE includes 28 items, two items for each scale, answered in a 4-point Likert scale (1 = I haven't been doing this at all to 4=I've been doing this a lot). Each scale is computed by summing the two corresponding items, reflecting the tendency to use that strategy in stressful encounters.

### **Brief Self-control Scale**

This scale was developed by Tangney and colleagues (2004) to measure trait self-control capacity and adapted and translated to Portuguese by Cruz, Sofia, Osório, Valente and Silva (2013). Along with a full version of 36 items, Tangney and colleagues (2004) also developed this brief version selecting 13 items, which showed similar psychometric characteristics and pattern of associations. Specifically, Tangney et al. (2004) also reported that both measures were associated to several adaptive measures, such as academic achievement, better psychological

adjustment (less psychopathology and more self-esteem), less binge eating, less alcohol abuse, better relationships and interpersonal skills, secure attachment, and more optimal emotional responses.

The brief self-control scale has been used and tested in different achievement contexts (e. g., Finkenauer, Engels, & Baumeister, 2005). In Portugal, its initial good psychometric characteristics were reported by Cruz, Sofia, Osório, Valente and Silva (2013), who found a structure consistent with the original, although with the elimination of one item. The study of its psychometric characteristics in this sample has revealed the same structure (KMO = .79; Bartlett's test = 538.85,  $p < .001$ ), with a similar level of reliability (Cruz et al., 2013, .77, current sample, .76).

**Table 20**  
*Factor structure of the Brief Self-control Scale*

<b>Brief Self-control</b>	
Item 12	.68
Item 13	.63
Item 5	.62
Item 10	.60
Item 4	.56
Item 7	.51
Item 11	.49
Item 9	.48
Item 2	.47
Item 8	.45
Item 3	.45
Item 1	.37
Variance	26.47
<b>Cronbach's Alpha</b>	<b>.76</b>

Thus, the Portuguese version includes a total of 12 items (e.g., “ I have a hard time breaking bad habits”) answered on a 5-point 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, ranging between 12 and 60. Higher scores reflect higher levels of trait self-control capacity.

## Anger Rumination Subscale (ARS)

In the search for a shorter alternative to the Anger Rumination Scale (Sukhodolsky, Golub, & Cromwell, 2001), the subscale of anger rumination from the Displaced Aggression Questionnaire (DAQ; Denson, Pedersen, & Miller, 2006) was selected for this thesis. This subscale was originally included in the DAQ because the authors hypothesized that individuals high in trait displaced aggression predominantly use rumination to cope with life's provocations.

In the development of the anger rumination subscale, Denson and colleagues (2006) selected items from pre-existing scales: six from the Anger Rumination Scale (Sukhodolsky, Golub, & Cromwell, 2001), two from the Emotional Control Questionnaire (Roger & Najarian, 1989), and two additional items were originally developed for the DAQ, composing a total of 10 items. These items were selected to reflect the frequency of involvement in anger rumination, answered on a 7-point Likert scale (1 "extremely uncharacteristic of me" to 7 "extremely characteristic of me"). The original subscale showed positive associations to several measures related to anger and aggression, namely, physical and verbal aggression, trait anger and hostility, anger-in, anger-out, and negative associations to anger control. In addition, the reliability of the scale was found to be very high (.93). The study of its psychometric characteristics in this sample showed a consistent single factor structure (KMO = .93; Bartlett's test = 1682.52,  $p < .001$ ), with the same reliability level (.93).

**Table 21**  
*Factor structure of the Anger Rumination Subscale*

<b>Anger Rumination</b>	
<b>Item 3</b>	.86
<b>Item 4</b>	.85
<b>Item 5</b>	.82
<b>Item 2</b>	.81
<b>Item 10</b>	.77
<b>Item 1</b>	.77
<b>Item 6</b>	.73
<b>Item 9</b>	.73
<b>Item 7</b>	.72
<b>Item 8</b>	.71
<b>Variance</b>	60.81
<b>Cronbach's Alpha</b>	.93

## **Goals for Emotion Regulation Scale**

This scale was originally developed by Rusk and colleagues (2011) based on Achievement Goal Scale (Elliot & Church, 1997), which distinguishes between learning goals (or mastery, striving to improve and learn more), performance-approach goals (attempt to prove one's ability) and performance-avoidance goals (avoiding proof of low ability). In order to adapt this measure, the language of the items was adjusted to reflect goals for managing emotions. For instance, the item "I often think to myself, 'What if I do badly in my classes?'" was rephrased as: "I often think to myself, 'What if I can't control my emotions?"". An exploratory factor analysis revealed a structure consistent with the original, although some items were removed. Thus, this version has three subscales: learning or "mastery" goals (5 items); performance-approach goals (4 items); and performance-avoidance goals (4 items).

This scale was adapted and translated to Portuguese, revealing the same structure as in Rusk and colleagues' (2011) study (KMO = .84; Bartlett's test = 1487.33,  $p < .001$ ), with good reliability levels ( $\alpha = .82$  for learning goal,  $\alpha = .86$  for performance-approach, and  $\alpha = .73$  for performance-avoidance) (total variance explained 63.32%) (Table 14). Items were rated on a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree"). The scores for each subscale were computed by averaging the corresponding items, in which higher scores reflect greater tendency to endorse that type of goal.

## **Cognitive Appraisal Scale in Sport Competition – Threat and Challenge Appraisals**

This measure was developed by Cruz (2009), based on the Cognitive Appraisal Scale in Sport Competition – Threat Appraisals (Cruz, 1994, 1996; Dias, Cruz, & Fonseca, 2009). This scale was originally based on Lazarus and colleagues works (Lazarus & Folkman, 1984; Lazarus, 1991) with the intent to assess the general style of primary cognitive appraisal. In other words, it accesses "what is "at stake" in sport competition, from the athletes' perspective, and leads them to experience 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), another subscale of challenge appraisal and perception was included in the original instrument. An

exploratory factor analysis of 15 items found a two-factor 8 items for threat and 5 for challenge appraisals demonstrated the expected two-factor structure (KMO = .84; Bartlett's test = 1125.06,  $p < .001$ ), although two items from the threat appraisals subscales were removed because they loaded in both factors. As can be observed in the table 15, this measure demonstrated appropriate reliability levels and explained a total of 50.32% of the variance.

**Table 22**  
*Factor structure of the Goals for Emotion Regulation Scale*

	Learning goals	Performance-avoidance goals	Performance-approach goals
Item 1	.86		
Item 4	.84		
Item 3	.81		
Item 8	.80		
Item 11	.43		
Item 5		.87	
Item 12		.77	
Item 7		.64	
Item 6		.63	
Item 10			-.91
Item 13			-.81
Item 9			-.79
Item 2			-.67
<b>Variance</b>	38.76	14.17	10.39
<b>Alpha de Cronbach</b>	.82	.73	.86

Therefore, the CASSC-TC includes a total of 13 items, distributed by the subscales of threat perception (8 items) (e.g., "I worry that I might not perform how I wanted") and challenge perception (5 items) (e.g., "I'm motivated to increase effort and give my best"). Items are answered on a five-point Likert scale (1="Not typical of me"; 5="Very typical of me") and the total scores of these subscales result from the sum of the corresponding items, ranging from 8 to 40 for threat appraisal and from 5 to 25 for challenge appraisal.



**Table 23**

*Factor structure of the Cognitive Appraisal Scale in Sport Competition – Threat and Challenge Appraisals*

	Threat Appraisal	Challenge Appraisal
Item 4	.83	
Item 2	.75	
Item 12	.69	
Item 1	.61	
Item 6	.56	
Item 10	.55	
Item 8	.53	
Item 13	.52	
Item 11		.75
Item 7		.74
Item 5		.72
Item 9		.70
Item 3		.48
Variance	35.49	14.83
Cronbach's Alpha	.82	.77

### **Behavioural Inhibition and Behavioural Activation Scales – BIS/BAS**

In order to assess these two motivational approaches, Carver and White (1994) developed the BIS/BAS scales. The BAS measures goal pursuing and is related to approach motivation (appetitive system, incentive), and includes three subscales that have emerged empirically: The Bas drive includes items related to persistence in pursuing desired goals (e.g., “I go out of my way to get things I want”); the BAS Fun seeking reflects a desire for new rewards and willingness to approach potentially rewarding events on the “spur of the moment” (e.g., “I often act on the spur of the moment”); and the BAS Reward responsiveness indicates a focus on positive responses to the occurrence or anticipation of reward (e.g., “When I get something I want, I feel excited and energized”); The BIS is, however, unidimensional and includes items related to the anticipation of punishment, describing behaviours of “avoidance” of something unpleasant (e.g., “I feel worried when I think I have done poorly at something important”).

A preliminary version was translated and adapted to Portuguese by Sofia ans Cruz (2013). This version includes 14 items answered on a 4-point scale (1 = very false for me; 4 =

very true for me) distributed by a total scale of BIS (4 items) and three subscales referring to the BAS: reward responsiveness reflects positive responses to the occurrence or anticipation of reinforcement (5 items); drive indicated tenacity in the persecution of desired goals (2 items); and fun seeking, which reflects the desire for new reinforcements and to search for rewarding situations impulsively (3 items). Thus, each score is calculated by summing the corresponding items, in which higher scores reflect a higher tendency to engage in such behaviours. "). All items are answered on a 4-point Likert scale (1=very true for me; 4=very false for me).

**Table 24**  
*Factor Structure of the BIS/BAS*

	Reward Responsiveness	Drive	BIS	Fun Seeking
Item 7	.78			
Item 14	.71			
Item 4	.65			
Item 18	.62			
Item 23	.54			
Item 3		.78		
Item 21		.77		
Item 8			.82	
Item 24			.61	
Item 13			.57	
Item 16			.52	
Item 5				-.81
Item 10				-.79
Item 20				-.46
<i>Variance</i>	24.77	12.82	9.97	8.17
<b>Cronbach's Alpha</b>	.73	.58	.61	.63

Consistently with the development of the BIS/BAS scales, principal components analysis followed by oblimin rotation was performed to test different possible structures suggested by the literature (2, 3, 4, 5 factors) in this sample. After a detailed analysis of the different structures, the four-factor structure (Table 16) was found to be the more appropriate for this sample. In this sample, exploratory factor analysis revealed a similar unidimensional structure (KMO = .75; Bartlett's test = 701.04,  $p < .001$ ), as found in the Portuguese version (Sofia & Cruz, 2013). Reliability analysis revealed Cronbach's alphas of .71 for Reward Responsiveness .58 for Drive, .61 for BIS and .63 for Fun Seeking. Although somewhat lower, these levels were accepted

considering both the brief dimension of the subscales (Almeida & Freire, 2008) and the similar results found in the original development of the scale.

### **Antisocial Behaviour Towards Opponents and Towards Teammates**

The “Prosocial and Antisocial Behavior in Sport Scale” (PABSS), originally developed by Kavussanu and Boardley (2009). This scale was based upon the Bandura’s (2009) dual conceptualization of morality, according to which it is possible to distinguish between proactive and inhibitive. While proactive morality refers to the ability to behave humanely (engaging in positive social behaviours), inhibitive morality reflects the ability to refrain from behaving inhumanely (avoiding negative social acts). These dimensions of morality have been referred as prosocial behavior (proactive morality) and antisocial behaviour (inhibitive morality). Prosocial behaviour can be defined as a voluntary behaviour with the intent to help or benefit another individual, such as congratulating a teammate for good play. Antisocial behaviour refers to voluntary behaviour with the intent to harm or disadvantage another individual, such as physically intimidating an opponent (Kavussanu et al. , 2006; Sage et al., 2006).

Given that there were no measures to access prosocial and antisocial behaviours in sport competition, Kavussanu and Boardley (2009) developed the PABSS to contribute to the research on social behaviours in this context. The total scales included 20 items distributed in four subscales: antisocial behaviour toward teammates; and antisocial behaviour toward opponents; prosocial behaviour toward teammates; and prosocial behaviour toward opponents. In the present study, only the subscales of reported antisocial behaviour toward teammates (5 items) and opponents (8 items) were used. The items from the antisocial behaviours toward teammates subscale reflect more verbal aggression whereas items from the antisocial behaviours toward opponents subscale include both verbal and physical aggression. Higher scores indicate more involvement in antisocial behaviour.

After the original study of the scale development, a subsequent investigation (including three studies) found further support for the psychometric characteristics of these subscales (Kavussanu, Stanger & Boardley, 2013). Besides good reliability levels, and test-retest validity, convergent validity analysis also revealed that the two antisocial behaviours subscales were positively associated to anger, aggressiveness, verbal and physical aggression, acceptance of cheating, acceptance of gamesmanship (behaviours that are used to increase team performance

by taking an unfair advantage over the opponent), moral disengagement, and ego orientation, and negatively to task orientation. In addition, the correlation between the two antisocial behaviour subscales was consistent and strong across the studies (ranging from .41 to .55).

**Table 25**  
Factor structure of the Antisocial towards Opponents and Teammates Scale

	Opponents	Teammates
Item 26	.79	
Item 11	.76	
Item 7	.75	
Item 15	.71	
Item 5	.65	
Item 23	.65	
Item 2	.64	
Item 19	.63	
Item 16		.83
Item 8		.81
Item 20		.73
Item 12		.53
Variance	35.09	16.37
Cronbach's Alpha	.85	.62

Thus, the Antisocial Behavior in Sport subscales (Kavussanu & Boardley, 2009) were adapted and translated to Portuguese. The antisocial behaviour toward teammates subscale includes 5 items reflecting verbal aggression whereas the antisocial behaviour toward opponents includes 8 items reflecting both verbal and physical aggression. Higher scores in both subscales indicate more involvement in antisocial behaviour. Exploratory factor analysis of these subscales revealed a structure of two factors consistent with the original (KMO = .83; Bartlett's test = 1002.625,  $p < .001$ ), although one item ("Showed frustration at a teammate's poor play) was deleted because it did not load above .30 (Tabachnick & Fidell, 2007) and its presence weakened the reliability of the factor (Table 17). Reliability analysis showed the good psychometric characteristics of the antisocial behaviour toward opponents subscale ( $\alpha = .82$ ). Although the antisocial behaviour toward teammates subscale showed a reliability level slightly below .70 ( $\alpha = .62$ ) (Nunnally, 1978), this level was considered acceptable given the small number of items (only 4) (Duhachek, Coughlan, & Lacobucci, 2005). Scores are obtained by summing the items, in which higher levels reflect more involvement in antisocial behaviour. Items

were all anchored by 1 (Almost never) to 5 (Almost always) to reflect the frequency of involved on the behaviours described in the last 30 days of competition.

### **Aggressive behaviour Scale**

A scale developed specifically for this study to access some aggressive behaviours that are not usually present in other scales. For example, one of the items reflects the deliberate use of aggression to obtain an advantage on the game (“I harmed an opponent to obtain a benefit in the game”). The development of these items considered the some recent studies on anger and aggression in sport (Maxwell, 2004; Maxwell et al., 2009; Maxwell & Visek, 2009). This scale includes a total of 7 items, all loading in the same factor In this sample, exploratory factor analysis revealed a similar unidimensional structure (KMO = .78; Bartlett’s test = 520.38,  $p < .001$ ), and showed a good reliability level ( $\alpha = .74$ ). The total score is obtained by summing the items, in which higher scores reflect more tendency to engage in aggressive behaviour, on a 5-point likert scale, from 1 = “Almost never” to 5 = “Almost always”.

**Table 26**

*Factor structure of the Aggressive Behaviour Scale*

	<b>Aggressive behaviour</b>
<b>Item 14</b>	.83
<b>Item 18</b>	.82
<b>Item 1</b>	.79
<b>Item 6</b>	.71
<b>Item 10</b>	.46
<b>Item 22</b>	.46
<b>Item 25</b>	.36
<b>Variance</b>	43.58
<b>Conbach’s Alpha</b>	.74

## Provocation Scale

Another scale was developed to evaluate how often athletes are provoked during competition by teammates, opponents or referees/judges (e.g., “Opponents used offensive gestures”). Some items of this scale were based on the Provocation in Sport Questionnaire (PSQ) developed by Maxwell and Moores (2006). The provocation subscale includes 6 items. In this sample, exploratory factor analysis revealed a similar unidimensional structure (KMO = .78; Bartlett’s test = 308.42,  $p < .001$ ) with an appropriate reliability level ( $\alpha = .73$ ) (Table 19). The total score is obtained by summing the items, in which higher levels reflect a higher frequency of provocation by others, using a 5-point Likert scale, from 1 = “Almost never” to 5 = “Almost always”.

**Table 27**  
*Factor structure of the Provocation Scale*

	Provocation
Item 4	.79
Item 13	.79
Item 17	.68
Item 24	.63
Item 9	.61
Item 21	.38
Variance	43.63
Conbach’s Alpha	.73

## “White Bear” Suppression Inventory (WBSI)

The “White Bear” Suppression Inventory (WBSI) was originally developed by Wegner and Zakatos (1994) to assess the general tendency to suppress feelings and thoughts. Although this inventory was developed as a single, unidimensional factor, several studies across the world have suggested other structures. These studies have found a factor of suppression, and another named intrusion, or self-distraction (see Schmidt et al., 2009). However, studies using this measure in Portugal (Cruz & Alves, 2006; Cruz et al., 2013) have reported a single factor, with

good psychometric properties of the WBSI in the context of sport. In this sample, although a two-factor structure could also be found, the distribution of the items is not consistent with none of the studies analysed by Schmidt and colleagues (2009). Therefore, principal component analysis also revealed a single factor in this study. In this sample, exploratory factor analysis revealed a similar unidimensional structure (KMO = .91; Bartlett's test = 1974.79,  $p < .001$ ), also with good reliability levels (.88). Therefore, it includes a total of 15 items (e.g., "There are images that come to mind that I cannot erase") rated on a 5-point Likert scale (1 = "Strongly disagree" to 5 = "Strongly agree"). The total score is obtained by the sum of all the items, ranging from 15 to 75. Higher scores reflect a higher tendency to suppression thoughts and feelings.

**Table 28**  
*Factor structure "White Bear" Suppression Inventory*

<b>"White Bear" Suppression Inventory</b>	
Item 6	.83
Item 9	.77
Item 5	.76
Item 3	.75
Item 7	.74
Item 11	.73
Item 13	.72
Item 15	.71
Item 12	.67
Item 10	.60
Item 2	.59
Item 14	.53
Item 1	.43
Item 4	.40
Item 8	.35
Variance	43.03
Cronbach's Alpha	.88

## **Implicit theories of emotions, intelligence/capacity and self-regulation Scale**

In order to assess the different types of implicit theories, specific scales of these measures were adapted and translated and adapted to Portuguese. Tamir and colleagues (2007) developed an instrument to measure implicit theories of emotions, based on the Theories of Intelligence Scale (Dweck, 1999). Thus, this scale includes two incremental items (e.g., “Everyone can learn to control their emotions,”) and two entity items (e.g., “No matter how hard they try, people can’t really change the emotions that they have”). Additionally in this study, a similar measure was also used to measure implicit theories of capacity/intelligence, also based on Theories of Intelligence Scale (Dweck, 1999), including four items (2 for entity theories and 2 for incremental theories (e.g., “To be honest, people can’t really change how intelligent they are”). The total score of each scale is calculated by reversing the two entity items, and then averaging all items. Higher values reflect an incremental theory, whereas lower values indicate an entity theory of emotion

To assess implicit theories about the self-control, some items were selected from a scale originally developed by Job and colleagues (2010) to measure individual differences in implicit theories about the availability and depletability of self-control resources. This scale included two subscales: Strenuous mental activity, which reflects the belief in a limited or unlimited theory of self-control resources (6 items); and resistance to temptations, reflecting another aspect of self-control (6 items). Therefore, this instrument reflects general implicit theories of self-regulation, with two components: resources and resistance to temptation.

In this sense, the scales of implicit theories of capacity/intelligence and emotions were translated and adapted to Portuguese. Four items from the scale used in Job and colleagues’ (2011) study were also adapted and translated. All items from these three scales were alternated and combined into a single scale. Participants rated the items using a 6-points Likert scale (1=strongly agree, 6=strongly disagree), in which higher scores represent a belief in the incremental theory, whereas lower values indicate a belief in the fixed theory.



**Table 29***Factor structure of the theories of emotions, intelligence/capacity and self-regulation Scale*

	Emotions		Intelligence/capacity		Self-control	
Items	Item 9	.80	Item 4	.85	Item 6	.76
	Item 5	.72	Item 12	.85	Item 14	.75
	Item 1	.66	Item 16	.70	Item 13	.56
					Item 11	.41
Variance		52.61		64.55		41.17
Cronbach's Alpha		.55		.72		.61

Separate exploratory factor analyses were performed for the different scales. Some items were deleted both because they did not load above .32 and/or their presence lowered the reliability levels. The implicit theories for emotion (KMO = .64; Bartlett's test = 215.17,  $p < .001$ ), and intelligence/capacity (KMO = .64; Bartlett's test = 180.62,  $p < .001$ ), revealed a structure similar to the original, despite one item of each scale being deleted (Table 21). The exploratory factor analysis of the implicit theories of self-regulation, which originally included the subscales of strenuous mental activity and resistance to temptations, revealed a single factor with the elimination of 4 items (KMO = .60; Bartlett's test = 82.24,  $p < .001$ ). Reliability levels (Table X) of the implicit theories of emotion and self-control scale were considered appropriate given the small number of items and the exploratory nature of these scales.

### Core self-evaluations Scale

Originally developed by Judge et al. (2006), this instrument is a self-report measure of core self-evaluations as a common core factor. Although the four traits are not completely redundant, the core self-evaluations concept helps to explain the conceptual and empirical redundancy observed among the four traits. Higher levels on this scale reflect a "broad, general, positive self-regard" (p. 4). This measure was shown to be a reliable measure (mean alpha of .84) with significant correlations with job satisfaction, job performance and life satisfaction (Judge et al., 2006). In Portugal, a recent study by Osório, Sofia, and Cruz (2013) also reported a single factor structure consistent with the original version, revealing high reliability levels (Cronbach's alpha for sample 1 = .78 and for sample 2 = .77). In this sample, exploratory factor analysis

revealed a similar unidimensional structure (KMO = .81; Bartlett's test = 658.14,  $p < .001$ ). The core self-evaluations scale includes of 12 items rated in a 4-point likert scale. The total score is obtained by the sum of its items, in which higher levels represent higher levels of core self-evaluations.

**Table 30**  
*Factor structure of the Core Self-evaluations Scale*

Core Self-evaluations Scale	
Item 8	.70
Item 7	.64
Item 11	.62
Item 4	.60
Item 2	.55
Item 3	.53
Item 1	.51
Item 10	.51
Item 5	.50
Item 12	.48
Item 6	.43
Item 9	.34
Variance	29.42
Cronbach's Alpha	.73

## PROCEDURES

In the first phase of the data collection, sport institutions and clubs were contacted explaining the aims of this study. After their acceptance to collaborate, a first contact was established with the team coach and/or manager to arrange a meeting with the athletes. Subsequently, and according to the athletes' availability, a meeting was conducted by the research of this study. This meeting was important to explain the aims of the study and ensure the confidentiality of the data. In this phase, the honesty and sincerity in all answers was also reinforced, clarifying that there are no right or wrong answers (Cruz & Viana, 1996). An envelope containing the full questionnaire and an informed consent for the athletes and another for their parents (in case they were younger than 18 years) were distributed, and a day was agreed to collect all the envelopes personally.



## CHAPTER V

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### Empirical Studies



## STUDY 1

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Unveiling anger and aggression in sports: The effects of type of sport, gender, age and level of achievement



## INTRODUCTION

Despite being one of the most experienced emotions in competition (Isberg, 2000; Nicholls et al. 2009), few studies have examined anger in the context of sport. In fact, the literature has recently highlighted the importance of the study of other negative, as well as positive “toned” emotions (e. g., Woodman et al., 2009). Anger can be defined “as an emotional state that varies in intensity, from mild irritation or annoyance to intense fury and rage.” (p. 162), and therefore trait anger reflects the tendency to experience anger state (Spielberger et al., 1983). Further distinctions about the ways in which anger can be expressed were subsequently proposed. Anger-in reflects the tendency to experience anger but suppress it, whereas anger-out reflects how often an individual expresses angry feelings either verbally or physically. However, the expression of anger can be managed by reducing the intensity of the suppressed angry feelings (Anger control-in) or controlling its outward expression (Anger control-out) (Spielberger, 1999; Spielberger et al., 1985).

Although very little is known about how anger unfolds and influences athletes, some studies have already shed light into this topic. It seems that anger has a potential dualistic effect on performance. Specifically, anger can be perceived as helpful for performance, increasing motivation and facilitating the mobilisation of energy, but can also be harmful for performance, leading to unsuccessful generation and utilisation of resources (Ruiz & Hanin, 2004, 2011). Robazza and Bortoli (2007) also found that athletes who felt their angry feelings as under personal control, perceived them as facilitative to performance. Other studies have reported that anger often arises among individuals high in trait perfectionism (Vallance et al., 2006), especially as a reaction to mistakes in competition (Dunn et al., 2006). In addition, Bolgar and colleagues (2008) have found that tennis players with higher levels of reactive anger tended to experience more anger outbursts in the previous week of practice and competition, comparing to those with lower anger reactivity levels.

Nonetheless, aggressive behaviour is perhaps one of the most important consequences of anger in sport (Maxwell & Moores, 2007; Maxwell & Visek, 2009; Maxwell, Visek, & Moores, 2009). Frequently, anger precedes aggression, but not always. For instance, using aggression for



instrumental purposes (instrumental aggression) is not associated with anger, because the ultimate goal is to gain some kind of advantage in the game. Conversely, reactive aggression usually arises as reaction to anger (Husman & Silva, 1984).

The operational definition of aggression in sport is one of the major concerns in the literature dedicated to this phenomenon (e.g., Maxwell & Moores, 2007, 2008; Kerr, 2008). A major problem with the definition is deciding whether aggression includes acts that are accepted within the rules of the game. For Kerr, (1999, 2005) the fact that an aggressive act is accepted by the rules and law of the game does not change the true nature of this behaviour. Additionally, because aggression can only be considered as such if there is intentionality in this act (Baron & Richardson, 1994), accidentally hurting an opponent cannot be considered aggression. Ultimately, only the athlete will know the nature of his or her intentions (Russel, 2008).

In an attempt to overcome these problems, Maxwell and colleagues (2009) adopted the International Society of Sport Psychology (ISSP) definition of aggression as “the infliction of an aversive stimulus, either physical, verbal, or gestural upon one person by another. Aggression is not an attitude but behavior and, most critically, it is reflected in acts committed with the intent to injure” (Tenenbaum et al., 1997, p. 1). In addition, Maxwell and colleagues (2009) asserted that this definition applies to every aggressive act, regardless of being accepted or not according to the rules and laws of the game.

In addition, instead of focusing in the aggressive behaviour itself, Maxwell and Moores (2007) suggested that problems with the definition and measurement of aggression could be avoided by considering its most important antecedents: anger and aggressiveness (Berkowitz, 1993). Aggressiveness refers to the “dispositions to become aggressive or acceptance of and willingness to use aggression” (Maxwell & Moores, 2007, p. 182). Both anger and aggressiveness are stable personality characteristics that are not specific to sports. Individuals high on anger and aggressiveness are more inclined to behave aggressively (Farrington, 1978). In the development of the Competitive Anger and Aggressiveness Scale (CAAS), Maxwell and Moores (2007) found that male and team sports athletes tend to show higher levels on these constructs comparing to female and individual sports athletes, respectively. Another study found higher levels of anger and aggressiveness among rugby players when compared to football and squash players (Maxwell et al., 2009).

Nonetheless, in the analysis of aggression in sport, Maxwell (2004) reported the central role of anger rumination as an antecedent of this behaviour in sport. While anger reflects an emotion, anger rumination is the tendency to repeatedly think about past experiences of anger (Sukhodolsky, Golub & Cromwell, 2001). Some laboratory studies have in fact demonstrated that engaging in ruminative processes can increase the duration and intensity of the experience of anger, potentially increasing aggressive behaviour (e.g., Bushman, 2002; Denson, Moulds, & Grisham, 2012).

Within the antecedents of aggression in sport, provocation has also been consistently reported in the literature (e.g., Maxwell, 2004; Maxwell et al., 2009; Russell, 1974). Indeed, some laboratory studies intentionally provoke participants in order to elicit anger and aggressive responses (e.g., Denson et al., 2010, 2011). Provocation can be defined as any interpersonal behaviour that is perceived by the victim as unpleasant or aversive and can trigger anger, frustration and fear (Maxwell, Moores, & Chow, 2007). Maxwell (2004) as found that team sport athletes tend to be provoked more often than individual sports athletes. Provocation also differs from rugby to football and squash, in which the first show higher levels comparing to the others (Maxwell et al., 2009).

Aggressive behaviour can be reflected in many different aspects in sport competition. Another way to “look” at this problem is to analyse anti-social behaviour in this context. Within Bandura’s (1999) dual conceptualization, there are two sides of morality: proactive and inhibitive. Proactive morality refers to the ability to behave humanely (engaging in positive social behaviours) whereas inhibitive morality reflects the ability to refrain from behaving inhumanely (avoiding negative social acts). These dimensions of morality have been referred as prosocial behaviour (proactive morality) and antisocial behaviour (inhibitive morality). Directly associated with aggression, antisocial behaviour refers to voluntary actions with the intent to harm or disadvantage another individual, such as physically intimidating an opponent (Kavussanu & Boardley, 2009; Kavussanu et al., 2006; Sage et al., 2006). Therefore, Kavussanu and Boardley (2009) highlighted the importance of studying anti-social behaviour, not only directed towards opponents, but also, and frequently forgotten, towards teammates. These authors have found that antisocial behaviour toward opponents is higher among more experienced athletes. More recently, Kavussanu, Stanger, and Boardley (2013) observed that males had higher levels in both anti-social behaviour towards teammates and opponents. Besides, anti-social behaviour was

positively associated to anger and aggressiveness (measured by the CAAS, Maxwell & Moores, 2007), as well as to acceptance of cheating and gamesmanship (actions that do not infringe the rules and laws of the game, but violate the sense of “fair play”).

Therefore, this study intends to analyse the differences according to type of sport (considering different levels of physical contact), age categories, achievement level and gender in several different constructs that reflect the experience and expression of anger and aggression. In addition, the relationship between the emotional, cognitive and behavioural variables involved in aggression in sport will also be explored.

## **METHOD**

### **Participants**

Participants are fully described in Chapter IV – Method

### **Instruments**

Besides a questionnaire containing demographic and sports history questions, this study used the following self-report measures, which were described in Chapter V: a) Competitive Anger and Aggressiveness Scale (CAAS; Maxwell & Moores, 2007; Sofia & Cruz, 2012); b) Aggressive behaviour Scale; c) Provocation Scale; d) Antisocial Behaviour Towards Opponents and Towards Teammates (Kavussanu & Boardley, 2009); e) Portuguese State/Trait Anger Expression Inventory (STAXI-2). (Marques et al., 2009; Spilerberber, 1999); and f) Anger Rumination Subscale (Denson et al., 2006).

### **Procedures**

This study followed the same procedures described in Chapter IV: Method

## **RESULTS**

### **Descriptive Statistics**

Table 1 shows the descriptive statistics (mean, standard deviation, minimum and maximum score), as well as the level of reliability for each subscale. A general analysis suggests that the measures associated to aggression, specifically antisocial behaviour toward

opponents and teammates and aggressive behaviour show mean scores relatively low, which might indicate a possible social desirability effect (Fisher, 1993). Antisocial behaviour scores are also lower than those presented in Kavussanu and colleagues' (2013) (Table 2).

**Table 31**

*Descriptive statistics of the variables in study*

	M	SD	Min.	Max.	$\alpha$
<b>CAAS</b>					
Anger	23.48	7.82	9.87	49.35	.82
Aggressiveness	23.19	9.73	11.69	64.74	.83
<b>Anti-social behaviour</b>					
Towards opponents	1.49	.58	1.00	4.13	.82
Towards teammates	1.27	.44	1.00	3.50	.62
<b>Aggressive behaviours</b>	8.23	3.09	1.00	24.00	.74
<b>Provocation</b>	10.84	4.08	2.00	24.00	.73
<b>Anger Rumination</b>	34.40	13.07	10.00	70.00	.93
<b>STAXI-2</b>					
Trait anger	20.88	5.43	10.00	36.00	.84
Anger-in	16.37	3.88	7.00	26.00	.70
Anger-out	11.43	3.30	6.00	21.00	.73
Anger Control-in	18.63	3.23	7.00	24.00	.82
Anger Control-out	18.23	3.48	6.00	24.00	.78

**Table 2**

*Comparison of the current study with results on antisocial behaviour to the Kavussanu's et al. (2013) study*

	Current Study		Kavussanu et al. (2013)	
	M	SD	M	SD
Anti-social behaviours opponents	1.49	.58	2.39	.65
Anti-social behaviours teammates	1.27	.44	2	.65

## Associations between the variables in study

A Pearson correlation analysis of the measures in study showed an overall pattern of positive associations, except for the subscales of anger control, which showed negative relationships. However, no significant association were found between anti-social behaviours towards teammates and anger rumination ( $r=.06, p>.05$ ) and anger-in ( $r=.09, p>.05$ ). Similarly, the aggressive behaviour subscale was also not significantly associated to anger rumination ( $r=.09, p>.05$ ) and anger control-out ( $r=.09, p>.05$ ). Finally, no significant associations were found between anger-out and anger control-in ( $r=-.09, p>.05$ ) and anger control-out ( $r=-.01, p>.05$ ). Generally, associations ranged from weak to moderate, except for the relationships between anti-social behaviours towards opponents and aggressive behaviour ( $r=.71, p<.001$ ), provocation ( $r=.73, p<.001$ ) and aggressiveness ( $r=.66, p<.001$ ), which showed strong associations. Likewise, strong relationships were also found between the subscales of anger control ( $r=.66, p<.001$ ).

**Table 3**

*Person correlations among the variables in study*

	2	3	4	5	6	7	8	9	10	11	12
<b>CAAS</b>											
1. Anger	.51***	.36***	.21***	.34***	.34***	.32***	.56***	.27***	.47***	-.29***	-.26***
2. Aggressiveness	-	.66***	.25***	.59***	.46***	.14*	.41***	.17**	.49***	-.30***	-.19***
<b>Anti-social behaviour</b>											
3. Towards opponents		-	.24***	.71***	.73***	.15**	.37***	.18**	.42***	-.27***	-.14*
4. Towards teammates			-	.28***	.27***	.06	.20**	.07	.24***	-.13*	-.14*
<b>5. Aggressive behaviours</b>											
<b>6. Provocation</b>											
<b>7. Anger Rumination</b>											
<b>STAXI-2</b>											
8. Trait anger							-	.35***	.63***	-.39***	-.49***
9. Anger-in								-	.36***	-.09	-.01
10. Anger-out									-	-.38***	-.39***
11. Anger Control-in										-	.66***
12. Anger Control-out											-

## Differences across type of sports

To test the effect of type of sport in the variables in study, groups were created according to different levels of physical contact. Specifically, the non-contact group (N=68) included swimming, tennis, badminton and volleyball players; the moderate contact group (N=52) included players from indoor soccer, hockey and basketball; and high contact group included athletes from martial arts, kickboxing, boxing, Greco-roman wrestling and handball. Thus, a multivariate analysis of variance (MANOVA) was conducted to explore the significant differences between the groups. Because the previous correlation analysis showed the presence of multicollinearity between anti-social behaviours towards opponents and aggressive behaviour ( $r=.71$ ), this last variable was removed from the MANOVA.

**Table 4**

*Differences across types of sport*

	No-contact (N = (68)	Moderate contact (N =91)	High contact (N=99)	<i>F</i>	<i>p</i>	Tukey
<b>CAAS</b>						
Anger	21.55 (8.15)	25.36 (7.43)	23.19 (7.08)	5.15	.006	1<2
Aggressiveness	16.85 (4.64)	25.48 (10.14)	25.27 (9.9)	22.34	.000	1<2, 3
<b>Anti-social behaviours</b>						
Towards opponents	1.22 (.29)	1.60 (.63)	1.59 (.62)	11.08	.000	1<2, 3
Towards teammates	1.18 (.35)	1.20 (.30)	1.39 (.56)	6.64	.002	3>1, 2
<b>Provocation</b>	9.13 (3.10)	12.21 (4.27)	10.98 (4.03)	12	.000	1<2,3
<b>Anger Rumination</b>	34.75 (14.33)	35.75 (13.58)	33.25 (11.75)	.87	.420	
<b>STAXI-2</b>						
Trait anger	20.25 (4.99)	21.27 (5.82)	20.97 (5.31)	.70	.496	
Anger-in	15.88 (3.69)	16.86 (3.89)	16.34 (4.06)	1.23	.295	
Anger-out	10.37 (2.44)	12.01 (3.56)	11.70 (3.52)	5.20	.006	1<2, 3
Anger Control-in	19.76 (2.88)	18.30 (3.16)	18.22 (3.39)	5.55	.004	1>2, 3
Anger Control-out	18.63 (3.58)	18.02 (3.41)	18.07 (3.39)	.70	.500	

**Note:** 1= No-contact; 2= Moderate contact; 3= High Contact.

Results showed an overall significant multivariate effect of type of sport (Wilks' Lambda = .72,  $F(22, 488) = 3.95, p < .001$ ). Univariate tests revealed significant differences for anger ( $F(2, 254) = 5.15, p < .01$ ), aggressiveness ( $F(2, 254) = 22.54, p < .001$ ), antisocial behaviours towards opponents ( $F(2, 254) = 11.08, p < .001$ ), antisocial behaviours towards teammates ( $F(2, 254) = 6.64, p < .01$ ), provocation ( $F(2, 254) = 12, p < .01$ ), anger-out ( $F(2, 254) = 5.20, p < .01$ ) and anger control-in ( $F(2, 254) = 5.55, p < .01$ ). Post hoc analyses showed that anger, aggressiveness, antisocial behaviours towards opponents and anger-out levels were significantly lower in no-contact group comparing to the moderate and high contact groups. However, antisocial behaviours towards teammates showed a different pattern, revealing that athletes from high contact sports tended to engage in more of these behaviours comparing to the no-contact and moderate contact groups. Finally, higher levels of anger control-in were found in the no-contact groups comparing to the other groups (Table 4).

### **Differences across age categories**

The differences in age categories, namely, juvenile/junior ( $N=113$ ) and senior ( $N=148$ ) athletes, were tested across the variables in study. The MANOVA revealed a significant multivariate effect of age categories (Wilks' Lambda = .92,  $F(11, 243) = 1.93, p < .05$ ). Univariate tests demonstrated significant differences in anger rumination ( $F(1, 253) = 5.41, p < .05$ ) and anger-out ( $F(2, 253) = 9.36, p < .01$ ). Post hoc tests showed that younger athletes (Juvenile/juniors) tended to engage more in anger rumination than juveniles and seniors. Besides, juvenile/juniors were also more likely to express their anger verbally and physically than seniors (Table 5).

**Table 5***Differences across age categories*

	Juvenile/Junior (N =113)	Senior (N=142)	<i>F</i>	<i>p</i>
<b>CAAS</b>				
Anger	24.36 (8.26)	22.75 (7.05)	2.83	.094
Aggressiveness	23.90 (10.83)	22.45 (8.75)	1.40	.238
<b>Anti-social behaviours</b>				
Towards opponents	1.50 (.63)	1.49 (.54)	.02	.882
Towards teammates	1.23 (.36)	1.29 (.49)	1.38	.242
<b>Provocation</b>	10.82 (4.14)	11 (4.05)	.11	.742
<b>Anger Rumination</b>	36.54 (12.86)	32.73 (13.09)	5.41	.021
<b>STAXI-2</b>				
Trait anger	21.35 (5.27)	20.52 (5.53)	1.45	.229
Anger-in	16.81 (3.79)	16.07 (3.94)	2.35	.126
Anger-out	12.13 (3.35)	10.87 (3.23)	9.36	.002
Anger Control-in	18.40 (3.41)	18.83 (3.10)	1.12	.290
Anger Control-out	18.19 (3.00)	18.19 (3.78)	.00	.992

**Differences across gender**

Because this sample included a larger much larger number of male athletes (N=181) comparing to females (N=76), this analysis included only senior athletes, specifically, 92 males and 50 females. Thus, a significant multivariate effect was observed (Wilks' Lambda = .19,  $F(11, 130) = 3.09, p < .001$ ). Univariate tests showed significant differences in aggressiveness ( $F(1, 140) = 23.90, p < .001$ ), antisocial behaviours towards opponents ( $F(1, 140) = 6.56, p < .01$ ) and provocation ( $F(1, 140) = 5.39, p < .05$ ). These results show that males showed significantly higher levels of aggressiveness, antisocial behaviour towards opponents and provocation than female athletes (Table 6).



**Table 6***Differences across gender*

	Males (N=92)	Females (N=50)	<i>F</i>	<i>p</i>
<b>CAAS</b>				
Anger	23.52 (6.72)	21.34 (7.48)	3.16	.078
Aggressiveness	24.90 (9.30)	17.93 (5.26)	23.90	.000
<b>Anti-social behaviours</b>				
Towards opponents	1.57 (.61)	1.33 (.35)	6.56	.011
Towards teammates	1.34 (.55)	1.21 (.35)	2.51	.115
<b>Provocation</b>	11.57 (4.01)	9.94 (3.93)	5.39	.022
<b>Anger Rumination</b>	31.67 (12.78)	34.68 (13.55)	1.72	.192
<b>STAXI-2</b>				
Trait anger	20.73 (5.89)	20.14 (4.84)	.36	.547
Anger-in	16.38 (3.59)	15.46 (4.50)	1.78	.185
Anger-out	11.24 (3.39)	10.18 (2.83)	3.54	.062
Anger Control-in	18.85 (3.03)	18.80 (3.26)	.01	.930
Anger Control-out	18.48 (3.37)	17.66 (4.42)	1.53	.219

**Differences across achievement level**

In order to test the differences across different levels of achievement, participants were divided into four groups according to the number of self-reported championship titles. Therefore, a group was created with athletes who did not report any titles and those who only reported regional titles (N=161) and another group with those who reported national champion titles, international titles and/or were record holders (N=98). However, neither the multivariate effect (Wilks' Lambda = .97,  $F(11, 246) = .79$ ,  $p > .05$ ), nor the univariate tests were significant (Table 7).

**Table 7***Differences across achievement level*

	No titles/Regional (N =161)	National/ International (N = 98)	<i>F</i>	<i>p</i>
<b>CAAS</b>				
Anger	23.39 (7.75)	23.69 (7.43)	.10	.758
Aggressiveness	22.51 (9.48)	24.08 (10)	1.60	.208
<b>Anti-social behaviours</b>				
Towards opponents	1.47 (.55)	1.54 (.64)	1.02	.313
Towards teammates	1.29 (.45)	1.23 (.42)	1.01	.317
<b>Provocation</b>	10.70 (3.96)	11.26 (4.23)	1.17	.280
<b>Anger Rumination</b>	34.04 (13.15)	35.42 (13.03)	.68	.412
<b>STAXI-2</b>				
Trait anger	20.98 (5.22)	20.80 (5.72)	.07	.797
Anger-in	16.28 (4.08)	16.65 (3.62)	.57	.452
Anger-out	11.33 (3.24)	11.67 (3.49)	.66	.416
Anger Control-in	18.73 (2.99)	18.51 (3.60)	.27	.605
Anger Control-out	18.34 (3.41)	17.98 (3.49)	.68	.410

**Differences across internationalisation**

Participants were also divided into those who reported participating in international competitions (representing the respective national teams) (N=44) and those who only compete at national level (N=103) in order to analyse the differences between these groups. However, no significant multivariate effect (Wilks' Lambda = .91,  $F(11, 133) = 1.22, p > .05$ ), but univariate tests revealed that these participants differ in anger rumination ( $F(1, 143) = 3.81, p < .05$ ), in which those who did not report participating in international competitions tended to engage more in anger rumination than those who competed at an international level (Table 8).

**Table 8***Differences across internationalisation*

	No international Games (n=103)	International Games (42)	<i>F</i>	<i>p</i>
<b>CAAS</b>				
Anger	23.22 (8.02)	22.83 (6.85)	.07	.786
Aggressiveness	24.15 (10.80)	21.20 (9.43)	2.39	.124
<b>Anti-social behaviours</b>				
Towards opponents	1.53 (.60)	1.51 (.72)	.02	.878
Towards teammates	1.27 (.41)	1.25 (.48)	.04	.846
<b>Provocation</b>	11.43 (4.35)	10.43 (4.59)	.74	.390
<b>Anger Rumination</b>	35.00 (13.21)	30.43 (11.69)	3.81	.053
<b>STAXI-2</b>				
Trait anger	21.44 (5.47)	19.50 (5.73)	3.64	.058
Anger-in	16.59 (3.97)	15.93 (3.93)	.84	.361
Anger-out	11.64 (3.60)	10.98 (2.95)	1.12	.291
Anger Control-in	18.49 (3.28)	19.14 (3.45)	1.16	.283
Anger Control-out	18.10 (3.47)	18.43 (4.05)	.25	.620

**DISCUSSION**

The purpose of this study was to explore the relationships between anger, aggressiveness, provocation, anti-social behaviour towards opponents and teammates and the experience and expression of anger, as well as to examine the effect of type of sport, age categories, gender, achievement level and internationalisation across these variables. Overall, results demonstrated a positive relationship between anger, aggressiveness, general aggressive behaviour, antisocial behaviour towards opponents and teammates and the experience and expression of anger. These findings support the widely acknowledged link between anger, aggression, anger rumination and provocation in sports (Maxwell, 2004; Maxwell et al., 2009; Maxwell & Moores, 2007; Maxwell & Visek, 2009). Additionally, these findings are also consistent with those found by Kavussanu, Stanger, and Boardley (2013), suggesting a strong relationship between anger and aggressiveness and antisocial behaviours in sports, both towards opponents and teammates.

Furthermore, provocation and anger rumination were positively associated to aggressiveness, general aggressive behaviour and anti-social behaviour towards opponents,

demonstrating the importance of these variables as antecedents of aggressive behaviour in sport competition (Maxwell, 2004; Maxwell et al., 2009; Russell, 1974). However, antisocial behaviour towards teammates was not associated to anger rumination, which may indicate that anger rumination increases the likelihood of aggression towards opponents, but not towards teammates. Ultimately, this finding also suggest that the contents of anger rumination are perhaps related to incidents of aggression involving opponents or other members present in the competition (e.g., coaches, referees). In addition, antisocial behaviour towards teammates was also not associated to the internalization of anger experience. The differential pattern of associations of antisocial behaviour towards opponents and teammates suggests that these types of behaviour may reflect different experiences of anger, with different antecedents as well. This further supports the importance of considering the differences between the two types of antisocial behaviour (Kavussanu & Boardley, 2009).

In addition, the control scales of anger were negatively (although weakly) associated to all the measures in this study (except the internalization of anger) consistently with the results found by Maxwell and colleagues (2009). These findings suggest that athletes higher in anger control (both internal and external) seem to experience and express less anger and show less aggressive and antisocial behaviour towards opponents and teammates. Indeed, Bolgar and colleagues (2008) also found that athletes with higher levels of anger control tended to appraise situations as more controllable and changeable, which may decrease the likelihood of the occurrence of angry outbursts.

The analysis of the differences across types of sport, reflecting different levels of physical contact, demonstrated that athletes from the non-contact group showed lower levels of anger, aggressiveness, antisocial behaviours towards opponents, anger-out and tended to be less provoked comparing to the moderate and high contact groups (except anger, which only differs in the non-contact and moderate contact groups). In addition, higher levels of anger control-in were found in the non-contact groups comparing to the other groups. This suggests that athletes of non-contact sports tend to be better at controlling their internal anger (e.g., suppression of anger-related thoughts) (Spielberger, 1999) comparing to moderate and high contact sports.

Generally, in this study, aggressive and anti-social behaviour seem to be more frequent among moderate and high contact types of sport comparing to individual sports. Other studies have reported that collective sports, in which there is more contact, tend to show higher levels of

aggression comparing individual sports (with less contact) (Maxwell & Moores, 2007; Maxwell et al., 2009; Guilbert, 2006; Keeler, 2000). However, Maxwell and colleagues (2009) also reported that athletes from collision (rugby) sports had higher levels of anger and aggressiveness comparing to contact (soccer) and individual sports. Although this study reported that moderate and high contact sports did show higher levels on these variables than individual sports, no differences were found between moderate and high contact sports. Thus, it seems that the effect of type of sport in aggression is not always clear. In fact, Keeler (2007) failed to find any significant differences between collision (rugby), contact (soccer) and non-contact (volleyball) sports.

Additionally, antisocial behaviour towards opponents and teammates showed a slightly different pattern. In antisocial behaviour towards opponents, no differences were found among the high and moderate contact groups, but both these groups showed higher levels in these variables than the no-contact group. However, in antisocial behaviour towards teammates, no differences were observed between the low and moderate contact groups, but these groups showed lower levels comparing to the high contact group. Nonetheless, it should be noted that antisocial behaviour towards teammates only includes verbal antisocial acts, and not physical acts (Kavussanu & Boardley, 2009). It seems that high contact sports involve not only aggression towards opponents, but also towards teammates. In addition, because no study has yet analysed the differences in antisocial behaviour towards teammates, these findings highlight the importance of further investigating this topic.

This study has also revealed that juveniles/juniors (younger) athletes tended to engage more in anger rumination than seniors (older), and were more likely to express their anger verbally and physically than seniors. This suggests that anger rumination tends to increase the expression of anger among younger athletes (Bushman, 2002; Deson et al., 2011). However, as Maxwell and colleagues (2009) suggested, older athletes may learn coping skills through experience, allowing them to deal with their emotions and control their behaviours.

Additionally, no differences were found in anger, aggressiveness and antisocial behaviour according to age. However, Visek and Watson (2005) found that perceived legitimacy of aggression increased with age, leading to an increase in aggression. Similarly, Kavussanu and Boardley (2009) also reported that antisocial behaviours towards opponents seem to increase with age, which was not found in this study. Nonetheless, these results do not account for the

influence of the type of sport. Indeed, Maxwell and colleagues (2009) observed that anger and aggressiveness decreased with age for individual and contact sports and increased in collision sports.

Results from analysis of the differences in gender revealed that male athletes reported significantly higher levels of aggressiveness, antisocial behaviours towards opponent and provocation. This finding is consistent with the literature about gender differences in aggression in sports, which systematically reports that males seem to be more aggressive than females in sport (e.g., Coulomb-Cabagno & Rascle, 2005; Maxwell, 2004; Maxwell & Moores, 2007). However, unlike Maxwell and Moores's (2007) study, this analysis failed to reveal any significant differences in competitive anger. Because males and females differ in aggressiveness and antisocial behaviours towards opponent, it was expected that their anger levels would also differ. However, recently, Wilkowski, Hartung, Crowe, and Chai (2008) suggested that gender differences in aggression may not derive from differences in the levels of anger, but from differences levels of revenge motivation (operationalised as the motivation to act aggressively toward the provocative element).

Finally, results also demonstrated that international/national champions did not differ from athletes with no titles or only regional titles. The relationship between aggression and performance is far from simple and has indeed generated some controversy (e.g., Kimble, Russo, Bergman & Galindo, 2010). For instance, Mudimela (2010) reported that aggression was a significant positive predictor of performance. However, Engelhardt (1995), by measuring aggression using the number of fighting penalties, found that the relationship between aggression and performance was negative in some seasons, but not significant in other seasons. Moreover, McGuire, Widmeyer, Courneya, and Carron (1992) found that visiting players tended to be more aggressive in games they lost, while home players were more likely to aggress in games they won. Because results about the impact of aggression in performance remain inconsistent, future studies should focus on the systematic investigation of this relationship.

Nonetheless, an analysis according with the of the differences considering the internationalisation of the athletes revealed that those who competed at an international level tended to engage less in anger rumination than those who did not report participating in international competitions. Although few studies have examined the relationship between anger rumination and performance, a study in academic contexts (Lyubomirsky, Kasri & Zehm, 2003)

showed that rumination undermined students' concentration in academic tasks. This suggests that those competing at a higher level may have learned less costly strategies to deal with anger, such as reappraisal (Mauss, et al, 2007).

Overall, these findings provide an important contribute to the comprehension of anger and aggression experiences in sport competition. As expected, positive associations were found between anger, aggressiveness, antisocial behaviour towards opponents and teammates, general aggressive behaviour, provocation, anger rumination, trait anger and its expression, while anger control scales showed a negative association. Additionally, it was also observed that anger and aggression seem to be more frequent among male athletes from contact sports.

## STUDY 2

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Exploring individual differences in the experience of anger in sport competition: The importance of cognitive, emotional and motivational variables





## INTRODUCTION

Sport competition is the “stage” of the occurrence of multiple emotional experiences (Lazarus, 2000). However, not many studies have focused specifically on anger, which is amongst the most experienced emotions in sport (Isberg, 2000; Nicholls et al., 2009) and can be triggered by a multiplicity of events, external, such as a verbal provocation from the opponent, and/or internal, such as thoughts of revenge and negative self-talk (Maxwell, 2004; Maxwell et al., 2009; Maxwell & Visek, 2009).

Because sport competition often reflects emotions everyday life, the studies should consider the co-occurrence of different emotional experiences, negative and positively toned (e.g., Jones, 2003; Lazarus, 2000). Anxiety is one of the most studied emotions in sport competition (Grossbard et al, 2009; Smith et al., 2006), often arising when athletes feel a threat to their well-being and perceive a lack of personal resources to cope with the situation (Cruz, 1996; Cruz & Barbosa, 1998; Lazarus, 1991, 2000). Despite the potential “destructive” effects of the combination of anger and anxiety (Suinn, 2000), few studies have examined these emotions simultaneously. A series of studies found that anger and anxiety are frequently experienced and associated emotions during test-taking situations (Tanzer & Spielberger, 2005). In the context of sports, Robazza and Bortoli (2007) observed that cognitive anxiety direction (higher values indicate a perception of cognitive anxiety as beneficial to performance) is a significant predictor of internal and external expression of anger, negative reactions to criticism and angry temperament.

Moreover, what determines the emotions individuals feel is the appraisal process (Cruz & Barbosa, 1998; Gross, 2008; Lazarus, 2000; Tatcher & Day, 2008), 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 determines how a stressful encounter is interpreted, and therefore is the basis of individual differences in emotional responses. In similar situations, an individual can experience anger while another can experience anxiety (Lazarus, 1991). Sport competition can be appraised in different ways: as a challenge, a threat and as a loss or harm (Cruz & Barbosa, 1998; Jones et al., 2009; Lazarus, 2000; Skinner & Brewer, 2004). According to Jones and colleagues (2009) athletes can be generally 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). Bolgar and colleagues (2008) explored whether high and low trait anger athletes differed in challenge and threat appraisals styles, but did not find any significant differences.

Additionally, it is also important to consider the processes most frequently involved in the regulation of anger. Anger rumination, which refers repeatedly thinking about the experience of anger (Sukhodolsky et al., 2001), has been systematically reported as an important regulation strategy that increase the duration and intensity of anger experiences, (e.g., Bushaman, 2002; Denson et al., 2012; Mauss et al., 2007). Similarly, thought suppression can, ironically, bring unwanted emotions, which will be experienced with a higher intensity (Wegner, 2009). However, cognitive reappraisal (reevaluating the situation) was found to effectively reduce anger without any cognitive impairment, unlike suppression, which can undermine individuals' cognitive processing (e.g., Denson et al., 2012; Mauss et al., 2007).

On the search for individual differences in anger, it seems that self-control plays a key role (Denson et al., 2011; Wilkowski & Robinson, 2008). Self-control can be defined “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” (Baumeister & Bauer, 2011, p. 65). Several recent studies (e.g., Denson et al., 2010; Dwall et al., 2007; Tangey et al., 2004) have found that self-control capacity enables individuals to restrain their anger-related responses (aggression).

Recently, the construct of core self-evaluations has been raising the attention of the literature, which reflect “fundamental, subconscious conclusions individuals reach about themselves, other people, and the world” and therefore influence how individuals “see” the world. (Judge et al. 1998, p.18). Individuals with higher core self-evaluations tend to generally see themselves in a more positive way and in control of their own lives (Judge et al., 2004). Consistently, Judge and (2008) reported that core self-evaluations are positively associated to positive affect and negatively to negative affect. On the grounds of these findings, it seems that core evaluations may have an important role in the generation of emotional experience, and possibly anger as well.

Another important process in the generation of an emotion is the motivation associated with the stressful encounter (Lazarus, 1999, 1991). Contemporary psychology has been focusing

on the idea that there are two motivational systems that underlie behaviour (Carver, 2006). The approach motivational system (or appetitive) reflects behaviours of approach a desired goal while the avoidance system refers to behaviours 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., Gray, 1990). However, Carver (2004) suggests that positive or negative affects reflect how well the individual is going in the movement toward a goal, or away from an anti-goal (avoidance). Therefore, negative or positive emotions can occur in both motivational systems. Because anger has been consistently related to an approach motivational system (see Carver & Harmon-Jones, 2009), it seems important to explore this association in the context of sport competition.

In this sense, this study intends to explore individual differences in competitive anger by focusing on important processes involved in the process of emotion generation, namely, cognitive appraisals, regulation mechanisms emotion regulation and self-control, as well as motivation. Lazarus (2000) suggests that an emotional experience must be analysed as whole, and not by the sum of its parts. Thus, by combining these variables, this study intends to provide a more thorough understating of the emotional experience of anger.

## **Method**

### **Participants**

Participants are fully described in the Chapter IV: Method

### **Instruments**

Besides a questionnaire containing demographic and sports history questions, this study used the following self-report measures, which were described in the Chapter IV (Method): a) Competitive Anger and Aggressiveness Scale (CAAS; Maxwell & Moores, 2007; Sofia & Cruz, 2012); b) Importance reappraisal (Subscale from the Emotion Regulation During Sport Competition Scale (Cruz, 2008); c) Provocation Scale; d) Antisocial Behaviour Towards Opponents and Towards Teammates (Kavussanu & Boardley, 2009); e) Anger Rumination

Subscale (Denson et al, 2006); f) Sport Anxiety Scale 2(SAS-2) (Cruz & Gomes, 2007; Smith et al, 2006); g) Cognitive Appraisal Scale in Sport Competition – Threat and Challenge Appraisals (CASSC-TC) (Cruz, 1994, 1996; Dias et al., 2009); h) Brief Self-control Scale (Cruz, 2003; Dias et al., 2009); i) "White Bear" Suppression Inventory (WBSI) (Cruz & Alves, 2006; Cruz et al., 2013; Wegner & Zakatos, 1994); j) Behaviour Inhibition System/Behaviour Activation System Scales (BIS/BAS). (Carver & White, 1994; Sofia & Cruz, 2013); and k) Core Self-evaluations Scale (Judge et al., 2006; Osório et al, 2013).

## **Procedures**

This study followed the same procedures described in the Chapter Method

## **RESULTS**

### **Descriptive Statistics**

Table 1 shows the descriptive statistics of the all the variables considered in this study. Overall, anger and aggressiveness show very similar scores, although aggressiveness shows a maximum score much higher. Among the dimension of anxiety, worry seems to be the most preeminent comparing to the others (M = 12.88). Across the BIS/BAS, these athletes the BAS Reward Responsiveness showed relatively higher levels comparing o the other subscales (M= 3.38). It should also be noted that importance reappraisals showed a relatively higher scores (M= 3.71) comparing to self-control (M= 3.57).

**Table 1***Descriptive Statistics of the variables in study*

	<b>M</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
<b>CAAS</b>				
Anger	23.48	7.82	9.87	49.35
Aggressiveness	23.19	9.73	11.69	64.74
<b>SAS-2</b>				
Somatic anxiety	8.71	2.98	5	20.00
Worry	12.89	3.74	5	20.00
Concentration Disruption	8.17	2.58	5	18.00
Anxiety total	29.71	7.28	15	57.00
<b>Antisocial behaviour</b>				
Antisocial Opponents	1.54	.611	1	4.38
Antisocial Teammates	1.27	.437	1	3.50
Provocation	10.84	4.08	2	24
<b>Cognitive appraisals</b>				
Threat Appraisals	23.68	6.77	8	40
Challenge Appraisals	19.59	3.83	7	25
<b>BIS/BAS</b>				
BIS	2.80	.54	1.25	4
Fun Seeking	2.91	.60	1	4
Drive	1.91	.73	1	4
Reward Responsiveness	3.38	.47	1.4	4
Anger Rumination	34.40	13.08	10	70
Thought Suppression	51.37	10.66	21	75
Importance Reappraisal	3.71	.67	2	5
Self-control	3.57	.55	2	4.73
Core Self-evaluations	2.86	.42	1.17	4

**Pearson correlation analysis**

The analysis of the pattern of association between anger and the variables considered in this study (Table 2) demonstrated that this variable is positively associated to aggressiveness ( $r = .51, p < .001$ ), cognitive components of anxiety, namely worry ( $r = .20, p < .01$ ) and concentration disruption ( $r = .16, p < .01$ ), total anxiety ( $r = .19, p < .01$ ), antisocial behaviours towards opponents ( $r = .36, p < .001$ ) and teammates ( $r = .21, p < .001$ ), provocation ( $r = .34, p < .001$ ), threat ( $r = .23, p < .001$ ) and challenge appraisals ( $r = .22, p < .001$ ), BIS ( $r = .18, p < .01$ ), Drive ( $r = .18, p < .01$ ), Fun Seeking ( $r = .17, p < .01$ ), Reward Responsiveness ( $r = .16, p < .01$ ), Thought Suppression ( $r = .15, p < .01$ ), Importance Reappraisal ( $r = .14, p < .01$ ), Self-control ( $r = .13, p < .01$ ), and Core Self-evaluations ( $r = .12, p < .01$ ).

= .23,  $p < .001$ ), anger rumination ( $r = .32$ ,  $p < .001$ ), and thought suppression ( $r = .19$ ,  $p < .01$ ). Conversely, anger was negatively associated to importance reappraisal ( $r = -.19$ ,  $p < .01$ ), self-control ( $r = -.28$ ,  $p < .001$ ) and core self-evaluations ( $r = -.14$ ,  $p < .05$ ).

It is also important to note the differential pattern of associations between antisocial behaviour towards opponents and teammates and anxiety and its components. While antisocial behaviour towards opponents did not show any significant association to anxiety (somatic anxiety,  $r = -.07$ , n.s.; worry,  $r = -.04$ , n.s.; concentration disruption  $r = -.04$ , n.s.; total anxiety,  $r = -.07$ , n.s.), antisocial behaviour towards teammates was positively associated to somatic anxiety ( $r = .17$ ,  $p < .01$ ), concentration disruption ( $r = .13$ ,  $p < .05$ ) and total anxiety ( $r = .16$ ,  $p < .05$ ). In addition, total anxiety and its components were positively associated to BIS (somatic anxiety [ $r = .25$ ,  $p < .001$ ]; worry, [ $r = .44$ ,  $p < .001$ ]; concentration disruption [ $r = .19$ ,  $p < .01$ ] and total anxiety, [ $r = .50$ ,  $p < .001$ ]), anger rumination (somatic anxiety [ $r = .18$ ,  $p < .01$ ]; worry, [ $r = .29$ ,  $p < .001$ ]; concentration disruption [ $r = .24$ ,  $p < .01$ ] and total anxiety, [ $r = .31$ ,  $p < .001$ ]) and thought suppression (somatic anxiety [ $r = .18$ ,  $p < .01$ ]; worry, [ $r = .38$ ,  $p < .001$ ]; concentration disruption [ $r = .23$ ,  $p < .001$ ] and total anxiety [ $r = .35$ ,  $p < .001$ ]) and negatively to self-control (somatic anxiety [ $r = -.24$ ,  $p < .001$ ]; worry, [ $r = -.17$ ,  $p < .01$ ]; concentration disruption [ $r = -.34$ ,  $p < .001$ ] and total anxiety, [ $r = -.30$ ,  $p < .001$ ]) and core self-evaluations (somatic anxiety [ $r = -.30$ ,  $p < .001$ ]; worry, [ $r = -.37$ ,  $p < .001$ ]; concentration disruption [ $r = -.34$ ,  $p < .001$ ] and total anxiety, [ $r = -.42$ ,  $p < .001$ ]).

Self-control was negatively associated to almost all variables, except challenge appraisals ( $r = .06$ , n.s.), BIS ( $r = .06$ , n.s.) and Fun seeking ( $r = -.10$ , n.s.). However, self-control was positively associated to core self-evaluations ( $r = .38$ ,  $p < .001$ ). On their turn, core self-evaluations showed a similar pattern of association, but no significant associations were found to antisocial behaviour (both towards opponents [ $r = -.09$ , n.s.] and teammates [ $r = -.01$ , n.s.]), drive ( $r = -.01$ , n.s.), and reward responsiveness  $r = .06$ , n.s.). Nonetheless, unlike self-control, core self-evaluations were negatively associated to BIS ( $r = -.32$ ,  $p < .001$ ).

**Table 2**

*Pearson correlations among the variables in study*

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
<b>CAAS</b>																				
1. Anger	.51** *	.10	.20**	.16**	.19**	.37***	.21***	.34***	.23***	.22***	.18**	.05	.23***	.10	.32***	.19**	-.19**	-.28***	-.14*	
2. Aggressiveness		.04	.03	.06	.04	.68***	.25***	.46***	.13*	.08	-.06	.01	.33***	-.15*	-.14*	-.01	-.20**	-.35***	-.13*	
<b>Anxiety (SAS-2)</b>																				
3. Somatic anxiety			.42***	.51***	.81***	-.06	.17***	.04	.36***	.05	.25***	.05	.08	.06	.18**	.18**	-.01	-.24***	-.30***	
4. Worry				.33***	.81***	-.06	.06	.13*	.57**	.29***	.44***	.03	-.11	.24***	.29***	.38***	-.03	-.17**	-.37***	
5. Concentration Disruption					.73***	-.04	.13***	.04	.26***	.06	.19**	-.03	.19**	-.02	.24***	.23***	-.10	-.34***	-.34***	
6. Total Anxiety						-.07	.16*	.08	.53***	.20**	.60***	.03	.04	.16**	.31***	.35***	-.04	-.30***	-.42***	
<b>Antisocial behaviour</b>																				
7. Antisocial Opponents							.26***	.68***	.09	.16**	-.07	.05	.28***	-.03	.14*	-.03	-.17**	-.19**	-.07	
8. Antisocial Teammates								.27***	.08	.04	.07	-.01	.12 †	-.05	.07	.02	-.19**	-.19**	-.01	
9. Provocation									.23***	.26***	.07	.02	.15*	.09	.22***	.10	-.12†	-.16*	-.14*	
<b>Appraisals</b>																				
10. Threat Appraisals										.48***	.43***	.14*	-.03	.18**	.26***	.35***	.01	-.18**	-.34***	
11. Challenge Appraisals											.24***	.10	.10	.37***	.12	.20**	.19**	.06	-.02	
<b>BIS/BAS</b>																				
12. BIS												.22***	-.09	.39***	.40***	.38***	.04	-.08	-.32***	
13. Fun Seeking													.19**	.35***	.10	.17**	.18**	-.10	.04	
14. Drive														-.05	.06	-.03	-.09	-.27***	-.01	
15. Reward Responsiveness															.10	.21**	.11	.13*	.06	
<b>Emotion regulation</b>																				
16. Anger Rumination																.51***	-.06	-.31***	-.39***	
17. Thought Suppression																	.01	-.24***	-.42***	
18. Importance Reappraisal																		.17**	.13*	
19. Self-control																				.38***
20. Core Self-evaluations																				-



## Differences between levels of competitive anger

In order to understand the impact of anger in the variables in study, participants were divided into three equal groups according to their levels of competitive anger, namely, low, moderate and high (Table 3). All the variables considered in this study were introduced in the analysis, total anxiety, which were excluded to avoid multicollinearity (total anxiety with its components were highly correlated above .70). Therefore, a multivariate analysis of variance (MANOVA) was conducted to identify differences across the levels of anger, demonstrating a significant multivariate effect (Wilk's  $\lambda = .60$ ,  $F(36,466) = 3.80$ ,  $p < .001$ ). Univariate tests revealed significant differences for aggressiveness ( $F(2,250) = 38.70$ ,  $p < .001$ ), antisocial behaviour towards opponents ( $F(2,250) = 16.90$ ,  $p < .001$ ), antisocial behaviour towards teammates ( $F(2,250) = 5.58$ ,  $p < .01$ ), provocation ( $F(2,250) = 14.69$ ,  $p < .001$ ), threat appraisals ( $F(2,251) = 4.25$ ,  $p < .05$ ), challenge appraisals ( $F(2,251) = 5.70$ ,  $p < .01$ ), BIS ( $F(2,251) = 2.96$ ,  $p < .05$ ), drive ( $F(2,251) = 5.87$ ,  $p < .01$ ), anger rumination ( $F(2,251) = 14.70$ ,  $p < .001$ ), thought suppression ( $F(2,251) = 5.70$ ,  $p < .01$ ), importance reappraisal ( $F(2,251) = 5.19$ ,  $p < .01$ ) and self-control ( $F(2,251) = 7$ ,  $p < .01$ ). Post hoc tests demonstrated that aggressiveness and anger rumination increase from low to high levels of anger. Similarly, antisocial behaviour towards opponents levels were higher among athletes with high as opposed to low and moderate levels. Similarly, participants low in competitive anger were found tend to be less provoked than participants with moderate and high levels of anger. Additionally, participants with lower levels of competitive anger also showed lower levels of antisocial behaviour towards teammates, threat and challenge appraisals and BIS comparing to participants with higher levels of anger. Athletes higher in anger also tended to show higher levels of drive than athletes with low and moderate levels of anger. Levels of thought suppression were lower among participants low in trait anger comparing to those with moderate and high anger. Conversely, self-control showed an opposite pattern, with participants with low levels of anger showing higher levels on this variable comparing to participants with moderate and high anger. Finally, those with lower levels of anger were more likely to use importance reappraisal than those with high levels of anger.

**Table 3***Differences across anger levels*

	Low Anger (N = 85)		Moderate Anger (N = 84)		High Anger (N = 84)		F	p	Tukey
	M	SD	M	SD	M	SD			
Aggressiveness	17.06	4.88	23.34	8.15	28.21	10.72	38.70	.000	1<2<3
<b>SAS-2</b>									
Somatic anxiety	8.49	2.80	8.51	2.70	8.92	3.23	.56	.570	
Worry	12.39	3.33	13.10	3.95	13.40	3.87	1.66	.193	
Concentration Disruption	7.78	2.50	7.99	2.44	8.64	2.68	2.66	.072	
<b>Antisocial behaviour</b>									
Towards opponents	1.21	.33	1.56	.62	1.68	.63	16.90	.000	1<2,3
Towards Teammates	1.17	.35	1.27	.41	1.39	.52	5.58	.004	1<3
Provocation	9.12	3.46	11.60	4.20	12.12	3.85	14.69	.000	1<2,3
<b>Cognitive appraisals</b>									
Threat Appraisals	22.02	6.58	24.02	6.90	24.94	6.48	4.25	.015	1<3
Challenge Appraisals	18.72	4.36	19.55	3.49	20.67	3.35	5.70	.004	1<3
<b>BIS/BAS</b>									
BIS	2.69	.54	2.82	.59	2.89	.49	2.96	.054	1<3
Fun Seeking	2.90	.54	2.86	.67	2.98	.60	.88	.415	
Drive	1.77	.72	1.80	.64	2.11	.76	5.87	.003	3>1,2
Reward Responsiveness	3.33	.50	3.41	.40	3.45	.47	1.34	.265	
Anger Rumination	29.11	12.22	34.29	12	39.54	13.26	14.70	.000	1<2<3
Thought Suppression	48.33	10.84	52.86	10.63	53.27	10.23	5.70	.004	1<2,3
Importance Reappraisal	3.86	.70	3.76	.63	3.53	.66	5.19	.006	3<1
Self-control	3.71	.54	3.62	.56	3.40	.53	7	.001	3<1,2
Core Self-evaluations	2.94	.42	2.81	.40	2.83	.42	2.15	.119	

**Note:** 1=Low anger; 2= Moderate anger; 3= High anger.

### Predictors of competitive anger

Attempting to find the most important predictors of anger in sport, stepwise regression analyses were performed with the variables in study (Table 4). Before performing the analysis, all the variables were inspected for outliers. One of the most effective graphical techniques for determining outliers is the analysis of the box plot provided by SPSS, which classifies as outliers any data more than 1.5 box-lengths away from the edge of the box and as extreme outliers the data more than 3 box-lengths away (Morgan, Leech, & Barrett, 2011). For the purpose of this study, three extreme outliers were removed from the analysis (Tabachnick & Fidell, 2007).

**Table 4***Stepwise regression analysis for predictors of competitive anger*

	<i>B</i>	<i>SE</i>	$\beta$
<b>Anxiety, Appraisals, Core, BIS/BAS</b>			
Challenge appraisals	.32	.13	.16*
Drive	2.36	.64	.22***
Worry	.40	.13	.19**
<b>Antisocial behaviour/ Provocation</b>			
Antisocial opponents	3.43	1.03	3.32**
Antisocial teammates	.32	.15	2.14*
<b>Emotion Regulation and Self-control</b>			
Anger rumination	.13	.04	.26***
Self-control	-2.26	.83	-.18**
Importance reappraisal	-2.48	.71	-.14*
<b>Prediction model</b>			
Anti-social opponents	2.98	.71	.24***
Anger rumination	.11	.03	.19**
Self-control	-2.33	.80	-.17**
Challenge appraisals	.42	.11	.21***
Importance reappraisal	-1.72	.64	-.15**

In the first analysis, variables of anxiety (somatic anxiety, worry and concentration disruption), motivation (BIS, drive, fun seeking, reward responsiveness), appraisals (threat and challenge appraisals) and core self-evaluations were introduced as predictors of anger. Overall, the stepwise regression revealed that challenge appraisals, drive and worry were significant predictors of anger explaining 13% of the variance ( $R^2_{adj.} = .12$ ,  $F(3,252) = 12.23$ ,  $p < .001$ ). In a second stepwise regression analysis, variables of antisocial behaviour (teammates and opponents) and provocation were introduced as predictors. Antisocial behaviour towards opponents and towards teammates were significant predictors of anger and explained 16% of the variance ( $R^2_{adj.} = .15$ ,  $F(3,263) = 16.38$ ,  $p < .001$ ). A third prediction model included the variables of emotion regulation (importance reappraisal, thought suppression and anger rumination) and self-self-control. This analysis demonstrated that anger rumination, self-control, importance reappraisal significantly predicted anger, explaining 20% of the variance ( $R^2_{adj.} = .19$ ,  $F(5,258) = 13.16$ ,  $p < .001$ ). Finally, all the significant predictors found in the previous regression analysis were introduced in a final model of prediction of anger. It was found that anti-social behaviours towards opponents, anger rumination, self-control, challenge appraisals and importance

reappraisal were significant predictors of anger and explained 28% of the variance ( $R^2_{adj.} = .26$ ,  $F(5,250) = 19.17$ ,  $p < .001$ ).

### Discriminant analysis between low vs high anger

After identifying the main predictors of competitive anger, a discriminant analysis was performed to predict low and high trait anger group membership considering these variables (Tabachnick & Fidell, 2007). Participants were divided into two groups of low and high trait competitive anger by subtracting and summing one standard deviation to the mean, respectively. These predictors revealed a significant discriminant function (Wilk's  $\lambda = .52$ ;  $\chi^2 [5] = 44.32$ ,  $p < .001$ ) and the group centroid scores show that this discriminant function separates low trait anger participants (-.95) from high trait anger (.93). All the variables introduced in the analysis contributed significantly to the differences between the groups, especially challenge appraisals, self-control and importance reappraisal, which showed the highest discriminant loadings (Table 5). In addition, a total of 83.3 % of original grouped cases correctly were classified (79.5% for the low trait group and 82.1% for the high trait group) (Table 6).

**Table 5**

*Discriminant analysis for low vs. high anger groups*

Variable	Wilk's Lambda	<i>p</i>	SCDFC*
Antisocial Opponents	.77	.000	.34
Anger Rumination	.65	.000	.37
Self-control	.61	.000	-.46
Challenge	.57	.000	.51
Importance reappraisal	.52	.000	-.43

\*Standardized Canonical Discriminant Function Coefficients

**Table 6**

*Prediction of group membership*

Group	Number of cases	Successful	Unsuccessful
Low trait anger	39	31 (79.5%)	8 (20.5%)
High Trait anger	39	32 (82.1%)	7(17.9%)

83.3% of original grouped cases correctly classified.

## DISCUSSION

The main aim of this study was to explore the individual differences in anger considering its emotional, cognitive and motivational correlates. The analysis of the patterns of correlation of anger has revealed that this emotion is positively associated to the cognitive components of anxiety (worry and concentration disruption). Additionally, worry also emerged as a significant positive predictor of anger in competitive. Although very few studies have centred on the co-occurrence of these potentially “destructive” emotions (Suinn, 2000), a study in the academic setting (Tanzer & Spielberger, 2005) has in fact demonstrated that these emotions seem to arise simultaneously in achievement contexts. Specifically in sports, Robazza and Bortoli (2007) also reported that cognitive anxiety is a significant predictor of variables related to anger, namely, anger-in, anger-out, reactions to criticism and angry temperament. Besides, this relationship between competitive anger and the cognitive dimensions of anxiety also seem to support the idea that anger affects concentration (Ruiz & Hanin, 2004, 2011) and undermines performance in cognitive tasks (Woodman et al., 2009).

As expected, anger was also positively associated to provocation, aggressiveness and antisocial behaviour, both towards opponents and teammates. Results from the analysis of differences between high, moderate and low competitive anger were consistent with these findings, also showing that athletes with higher levels of anger tend to be more provoked and to have higher levels of aggressiveness and antisocial behaviour toward opponents than those with moderate and low levels of anger. However, antisocial behaviour toward teammates only differed among high and low levels of anger. Indeed, the relationship between anger, aggressiveness, provocation and anger rumination in sports has been widely acknowledged across the literature on this subject (e.g. Maxwell, 2004; Maxwell et al., 2009; Maxwell & Visek, 2009). More recently, Kavussanu and colleagues (2013) expanded the knowledge about anger by demonstrating that this emotion is also associated to antisocial behaviour towards teammates and opponents in sport, consistently with the findings in this study.

The appraisals of threat and challenge were both positively associated to anger. Results from the analysis of differences also demonstrated that athletes with high levels of anger tend to appraise competitive situations as more threatening and challenging. Although the theoretical perspectives on these appraisals (Jones et al., 2009; Skinner & Brewer, 2002, 2004) suggest

that positive emotions tend to be experienced in situations appraised as a threat, whereas negative emotions tend to arise in situation appraises as a threat, these same theories also suggest that the opposite is also possible to occur, that is, positive emotions occurring in a situation appraised as a threat and negative emotions in situation appraised as a challenge. Therefore, it seems that anger can occur both in situation appraised as a challenge and as a threat. Indeed, Sofia and Cruz (2013) also found that was associated to both challenge and threat appraisals. Moreover, challenge was a predictor of anger, which suggest that anger often arises in situations appraised as a challenge, which is motivationally related to approach motivation (Jones et al., 2009).

In this sense, the apparent duality of anger can also be found in its relationship with motivational variables. Indeed, anger was found to be associated both to BIS (or avoidance motivation) and to one of the components of the BAS (or approach motivation): drive. In the analysis of differences, it was also found that individuals high in trait competitive anger tend to show higher levels of avoidance motivation and drive. While the more classical perspectives on behavioural activation and inhibition suggest that the first is related to positive affect and the second is associated to negative affect (e.g., Gray, 1990), this study also seems to support the idea that anger can be related to both motivational systems. For instance, Harmon-Jones (2003) has found that trait anger and physical aggression were positively associated to approach motivation. In addition, and consistently with the findings in this study, Smits e Kuppens (2005) found that anger is associated to both approach and avoidance motivation. Similar findings were observed in a recent study in the context of sport (Sofia & Cruz, 2013), which found support for the positive relationship between anger, approach and avoidance motivation. Besides, the fact that the BIS can reflect the personality trait of anxiety (Corr, 2001) provides further support the positive relationship between anger and anxiety in sport competition.

Furthermore, the relationship between anger and drive, which reflects “the persistent pursuit of desired goals” (Carver & White, 1994, p. 322), seems to support the idea that anger can be helpful for goal pursuit behaviour. Thus, besides supporting that anger is an approach-related emotion (Carver & Harmon-Jones, 2009), this finding seems to be consistent with the description of anger as beneficial for performance because it provides additional energy in competition (Ruiz & Hanin, 2004).

Taking into account the findings about the appraisal and motivational systems, it seems that the dualistic view of anger is not just applied to performance (Ruiz & Hanin, 2004, 2011; Robazza et al., 2007; Woodman et al., 2009). Although anger is a negatively toned emotion (Lazarus, 2000), the positive association between challenge appraisals and approach motivation and anger highlights the “uniqueness” of this emotion, which seems to arise in both “the good and the bad”.

It was also observed that anger was positively associated to the emotion regulation strategies of anger rumination and thought suppression. The analysis of the differences also showed that the use of thought suppression and anger rumination tended to increase as the levels of competitive anger increase. In fact, the paradoxical impact of the use of thought suppression as a strategy to reduce undesired emotions and thoughts is very well documented. Besides the cognitive and social costs that using this strategy to regulate emotions can bring (Gross & John, 2003; Richards & Gross, 2006), it can even result, ironically, in an increase in the intensity of the unwanted emotion (Wegner, 2009; Wegner et al., 1997). Similarly, previous studies are consistent in demonstrating that engaging in anger rumination can sustain an increase the experience of anger (Bushman, 2002; Denson, 2013; Sukhodolsky et al. 2001).

Conversely, self-control and importance reappraisal seem to be effective in reducing anger. Participants with low levels of anger also reported higher levels self-control and importance reappraisal. Mauss and colleagues (2007) have found that cognitive reappraisal could help to reduce anger levels and avoid the costs associated with other forms of emotion regulation, such as suppression. Consistently, Denson and colleagues (2012b) also found that participants who used reappraisal to regulate anger were more successful than those who used rumination. Likewise, consistently with the findings of this study, exerting self-control seems to be effective in reducing anger (e. g. Denson et al., 2010, 2011). Indeed, a recent study in the sport context (Cruz et al., 2013) has observed a negative relationship between self-control and anger and anxiety, suggesting the important role of self-control in the regulation of this emotion.

When considering the emotion regulation strategies included in this study and self-control as predictors of anger, it was found that anger rumination was a positive predictor, whereas self-control and importance reappraisal were negative predictors of anger. These results highlight the importance of anger rumination, reappraisal and self-control as important processes frequently implicated in the regulation of anger, as has been suggested in some recent laboratory studies by

Denson and colleagues (Denson et al., 2010, 2011, 2012a,b).

A final model of regression including all the significant predictors found in the previous analysis showed that antisocial behaviour towards teammates, anger rumination and challenge were positive predictors of anger, whereas importance reappraisal and self-control were negative predictors. A further discriminate analysis demonstrated that these variables were predictors of the differences between two extreme groups of low and high trait competitive anger and correctly classified 83.3% of the cases.

Overall, this study provided further support for the relationship between anger and antisocial behaviour towards opponents (Kavussanu et al., 2013), challenge appraisals (Sofia & Cruz, 2013) and the regulation processes of anger rumination (e.g. Bushman, 2012), reappraisal (Mauss et al., 2007) and self-control (e.g. Denson et al., 2010), suggesting the essential role of these variables as potential antecedents and consequences of the experience of anger in sport competition.





### STUDY 3

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On the search for anger regulation in sports: Combining coping,  
emotion regulation and self-control



## INTRODUCTION

Sports news are constantly filled with stories about athletes that apparently seem to lose control during competition resulting in serious angry outbursts (Russel, 2008). However, despite the importance of this topic, there are not many studies specifically focused on how athletes deal with angry emotional experiences. In this sense, this study intends to shed some light into this issue, by applying new theoretical approaches and recent empirical findings about anger regulation to the context of sport competition.

Dealing with stress and emotion often requires conscious efforts to manage this situation, that is, coping strategies (Lazarus, 1991, 1999, 2000). Studies focused on coping with anger have mainly used Spielberger's (1988, 1999) concepts of control of the expression of anger, namely, control of the internal anger (suppression) and control of the its external expression (verbal and physical), to describe how individuals deal with this emotion (Trnka & Stuchlíková, 2011). However, this dichotomy is too narrow to characterise the many possibilities of dealing with anger (Linden et al., 2003). For instance, Ronan, Dreer, Dollard, and Ronan (2004) found that strategies, such as compromising, describing the problem, accepting responsibility, describing past positive behaviours or paraphrasing/reflecting, were effective coping skills to deal with anger whereas name-calling, describing past negative behaviours, interrupting, complaining, denying responsibility or criticizing were ineffective. Similarly, Maxwell, Maxwell and Siu (2008) reported that taking positive steps to solve a problem or maintaining a positive state of mind (active coping skills) were effective in reducing anger and its expression. In a sports setting, Bolgar and colleges (2008) found that athletes with higher levels of anger control also engaged in more problem- and emotion-focused coping responses.

However, coping skills may be not enough to explain all the processes that athletes have to use in order to regulate anger outbursts. Coping mechanisms take more time to occur, hours and even days, whereas emotion regulation processes occur immediately, within a few minutes or seconds (Gross, 1998, 1999; Gross & Thompson, 2007). This time difference is particularly important in the "heat" and "pressure" of sport competition, where decisions have to be made within seconds. Moreover, coping is primarily focused on decreasing negative affect (Gross & Thompson, 2007), whereas emotion regulation can also include strategies to decrease positive emotions, such as hiding the happiness when an athlete is about to win the game, or increase

negative emotions (Gross, 2008). Additionally, although coping is a wider concept than emotion regulation, coping does not typically include physiological and expressive aspects of emotion regulation (Gross, 1999). For these reasons, it seems crucial to include the study the processes by which athletes influence what emotions they have, when and how they are experienced and expressed (Gross, 2008a, b) toward a better and broader understanding of anger in sport competition.

Another important process involved in the regulation of anger is self-control, which can be operationalised “as the capacity to override natural and automatic tendencies, desires, or behaviors; to pursue long-term goals (Baumeister & Bauer, 2011, p. 65) Some studies (e.g., Denson et al, 2010, 2011) have provided support for the central role of self-control in the regulation of anger and aggression. In the context of sport, Englert and Bertrams (2012) observed that self-control allows athletes to override the negative effects of anxiety and control their attention, leading to a better performance.

Because self-control, emotion regulation and coping seem to rely on the same mental energy (Koole, 2009), it is important to combine the study of these three processes. Specifically, acts of coping and emotion regulation can undermine subsequent acts of self-control (e.g., Gailliot et al., 2006; Dvorak & Simons, 2009), suggesting that exerting coping or emotion regulation can deplete individuals’ limited mental resources (ego depletion). However, Koole (2009) argues that certain emotion regulation can also facilitate self-control by aligning emotional states to favour long-term goals.

Recently, the literature has found that individuals’ implicit theories have an influence on they regulate their emotions. More specifically, implicit theories refer to “two different assumptions people may make about the malleability of personal attributes; they may believe that a highly valuable personal attribute, such as intelligence or morality, is a fixed, non-malleable trait-like entity (entity theory), or they may believe that the attribute is a malleable quality that can be changed and developed (incremental theory)” (Dweck et al.,1995a, p. 267). Tamir and colleagues (2007) found that individuals with entity theories about emotion tend to use cognitive reappraisal more frequently to control their emotions, and had a stronger sense of emotion regulation self-efficacy than individuals holding entity theories. It was also found that participants with incremental theories of emotion experienced more positive and less negative emotions, and received more social support comparing to those with entity theories. Likewise, Job and

colleagues (2010) found similar results when testing the influence of implicit theories on self-regulation. After a first self-control task, these authors observed that participants only showed a decrease in performance in a subsequent task when they believed or were led to believe that their willpower (self-control capacity) is limited, whereas those who thought that their resources were unlimited did not show any decrease.

In the same line, Rusk and colleagues (2011) explored the influence of learning (reflecting the desire to learn as much as possible) and performance goals (wanting to prove one's ability) for emotion regulation on how individuals regulate their emotions. It was found that individuals who strive to improve their ability to deal with emotions (learning goals) were more likely to use cognitive reappraisal (effective in reducing negative emotions, John & Gross, 2004) whereas individuals who wanted to prove their ability to control emotions (performance goals) tended to engage more in rumination of negative emotions and thought suppression, and experienced more depressive symptoms. Additionally, learning goals were a predictor of positive affects, while performance goals were a predictor of negative affects.

In the search of what influences the way individuals deal with stressful encounters, core self-evaluations seem to have an important role (Judge et al., 2004). Core self-evaluations refer to the most "fundamental, subconscious conclusions individuals reach about themselves, other people, and the world" (Judge et al., 1998, p.18), which include four core traits as a single construct: self-esteem, generalised self-efficacy, emotional stability (or neuroticism) and locus of control. In this sense, individuals who have higher core self-evaluations tend to see themselves in a more positive way and to perceive more control over their lives (Judge et al., 2006). This concept was found to be an important predictor of job performance and satisfaction, as well as life satisfaction in general (e.g., Judge et al., 2000). More importantly for this investigation, Kammeyer-Mueller and colleagues (2009) found that individuals with higher core self-evaluations perceived less stressors, showed less stressful response, and used more problem-focused and less avoidance coping strategies.

Drawn upon these findings, this study intends to explore specific coping and emotion regulation strategies used to regulate anger in the context of sport competition, as well as the influence of self-control. Because provocation often precedes anger (e.g., Maxwell, Visek, & Moores, 2009), the potential mediation role of these strategies will also be tested. Additionally,

this study also intends to understand the influence of implicit theories, goals for emotion regulation and core self-evaluations on the athletes' regulation strategies.

## **METHOD**

### **Participants**

Participants are fully described in Chapter IV: Method.

### **Instruments**

Besides a questionnaire containing demographic and sports history questions, this study used the following self-report measures, which were described in the Chapter IV (Method): a) Subscale of Competitive Anger of the Competitive Anger and Aggressiveness Scale (CAAS; Maxwell & Moores, 2007; Sofia & Cruz, 2012); b) Emotion Regulation During Sport Competition Scale (Cruz, 2008); c) Provocation Scale; Anger Rumination Subscale (Denson et al, 2006); d) Brief Self-control Scale (Cruz, 2003; Dias et al., 2009); f) "White Bear" Suppression Inventory (WBSI) (Cruz & Alves, 2006; Cruz et al., 2013; Wegner & Zakatos, 1994); g) Core Self-evaluations Scale (Judge et al., 2006; Osório et al, 2013); h) Performance and Learning Goals for Emotion Regulation Scale. (Rusk et al, 2011); i) Implicit theories of emotions, intelligence/capacity and self-control. (Job et al., 2010; Tamir, et al., 2007)

### **Procedures**

This study followed the same procedures described in Chapter IV:Method

## **RESULTS**

### **Associations between the variables in study**

Because the main aim of this study in centred on anger, this analysis is focused on the patterns of association between this emotion and the regulation strategies considered in this

study. (Tables 1 and 2) Moreover, the relationships between these regulation strategies and the variables that potential influence them will also be explored.

Thus, competitive anger was positively associated to coping strategies of denial ( $r = .24$ ,  $p < .001$ ), behavioural disengagement ( $r = .19$ ,  $p < .01$ ), venting ( $r = .24$ ,  $p < .001$ ), religion ( $r = .14$ ,  $p < .05$ ), self-blame (coping) ( $r = .14$ ,  $p < .05$ ), substance abuse ( $r = .14$ ,  $p < .05$ ) and emotion regulation strategies of self-blame (emotion regulation) ( $r = .22$ ,  $p < .001$ ), wishful thinking ( $r = .16$ ,  $p < .05$ ), anger rumination ( $r = .32$ ,  $p < .001$ ), thought suppression ( $r = .19$ ,  $p < .01$ ). Additionally, it was also positively associated to performance-avoidance goals for emotion regulation ( $r = .17$ ,  $p < .01$ ). Conversely, anger was negatively associated to tension reduction ( $r = -.12$ ,  $p < .05$ ), importance reappraisal ( $r = -.18$ ,  $p < .01$ ), self-control ( $r = -.28$ ,  $p < .001$ ), implicit theories of capacity/intelligence ( $r = -.17$ ,  $p < .001$ ) and core self-evaluations ( $r = -.16$ ,  $p < .01$ )

Implicit theories of emotion were positively associated to active coping ( $r = .20$ ,  $p < .01$ ), emotional support ( $r = .19$ ,  $p < .01$ ), instrumental support ( $r = .24$ ,  $p < .01$ ), positive reframing ( $r = .17$ ,  $p < .01$ ) and self-control ( $r = .20$ ,  $p < .01$ ) and negatively to behavioural disengagement ( $r = -.25$ ,  $p < .001$ ), substance abuse ( $r = -.23$ ,  $p < .001$ ), wishful thinking ( $r = -.27$ ,  $p < .001$ ) and anger rumination ( $r = -.16$ ,  $p < .01$ ). A very similar pattern was also observed in the relationships of implicit theories of capacity/intelligence. Specifically, this construct was positively associated to active coping ( $r = .22$ ,  $p < .001$ ), positive reframing ( $r = .15$ ,  $p < .01$ ), goal congruency ( $r = .24$ ,  $p < .001$ ), self-control ( $r = .27$ ,  $p < .001$ ) and implicit theories of emotion ( $r = .45$ ,  $p < .001$ ), but negatively to denial ( $r = -.18$ ,  $p < .01$ ), behavioural disengagement ( $r = -.31$ ,  $p < .001$ ), substance abuse ( $r = -.20$ ,  $p < .001$ ), wishful thinking ( $r = -.28$ ,  $p < .001$ ) and anger rumination ( $r = -.15$ ,  $p < .05$ ).

On their turn, implicit theories of self-regulation showed a pattern of positive associations to active coping ( $r = .25$ ,  $p < .001$ ), positive reframing ( $r = .24$ ,  $p < .001$ ), planning ( $r = .20$ ,  $p < .01$ ), goal congruency ( $r = .17$ ,  $p < .01$ ), task focus processes, ( $r = .15$ ,  $p < .05$ ), self-control ( $r = .29$ ,  $p < .001$ ) and implicit theories of emotion ( $r = .29$ ,  $p < .001$ ) and capacity/intelligence ( $r = .21$ ,  $p < .01$ ) and negative to behavioural disengagement ( $r = -.23$ ,  $p < .001$ ), substance abuse ( $r = -.17$ ,  $p < .01$ ) and wishful thinking ( $r = -.19$ ,  $p < .01$ ).

Learning goals for emotion regulation were found to be positively associated to self-distraction ( $r = .17$ ,  $p < .01$ ), active coping ( $r = .33$ ,  $p < .001$ ), venting ( $r = .19$ ,  $p < .01$ ), positive reframing ( $r = .21$ ,  $p < .01$ ), planning ( $r = .30$ ,  $p < .001$ ), agency ( $r = .18$ ,  $p < .01$ ), goal congruency



( $r = .35, p < .001$ ), self-blame (emotion regulation) ( $r = .17, p < .01$ ), importance reappraisal ( $r = .19, p < .01$ ), task focus processes, ( $r = .35, p < .001$ ), thought suppression ( $r = .20, p < .01$ ), self-control ( $r = .15, p < .05$ ), implicit theories of emotion ( $r = .16, p < .05$ ), implicit theories of capacity ( $r = .14, p < .05$ ) and implicit theories of self-control ( $r = .31, p < .001$ ). Conversely, learning goals were negatively associated to behavioural disengagement ( $r = -.21, p < .01$ ) and substance abuse ( $r = -.15, p < .05$ ).

Performance-approach goals for emotion regulation were positively associated to self-distraction ( $r = .28, p < .001$ ), active coping ( $r = .18, p < .01$ ), emotional support ( $r = .13, p < .05$ ), venting ( $r = .13, p < .05$ ), planning ( $r = .13, p < .05$ ), agency ( $r = .12, p < .05$ ), goal congruency ( $r = .25, p < .001$ ), problem efficacy, importance reappraisal ( $r = .19, p < .01$ ), task focus processes ( $r = .22, p < .001$ ), anger rumination ( $r = .20, p < .01$ ), thought suppression ( $r = .23, p < .001$ ), implicit theories of self-control ( $r = .16, p < .05$ ) and learning goal ( $r = .53, p < .001$ ).

Additionally, performance-avoidance goals demonstrated positive associations to self-distraction ( $r = .34, p < .001$ ), denial ( $r = .25, p < .001$ ), behavioural disengagement ( $r = .25, p < .001$ ), venting ( $r = .16, p < .01$ ), self-blame (coping) ( $r = .17, p < .01$ ), substance abuse ( $r = .14, p < .05$ ), self-blame (emotion regulation) ( $r = .20, p < .01$ ), wishful thinking ( $r = .22, p < .001$ ), anger rumination ( $r = .35, p < .001$ ), thought suppression ( $r = .48, p < .001$ ), learning goals for emotion regulation ( $r = .26, p < .001$ ) and performance-approach goals ( $r = .38, p < .001$ ) and negative associations to problem efficacy ( $r = -.14, p < .05$ ), self-control ( $r = .21, p < .01$ ) and implicit theories of self-control ( $r = -.13, p < .05$ ).

**Table 32**

*Pearson correlations between the variables in study (part 1)*

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Anger	.08	-.04	.24***	.11†	.11†	.19**	.24***	.10	-.03	-.11	.14*	.14*	.14*	-.10†	-.02	-.01
2. Self-Distraction		.14*	.33***	.20**	.14*	.18**	.21**	-.03	.09	.03	.16**	.21***	.05	-.03	.15*	.07
3. Active coping			-.07	.26***	.28***	-.40***	.21**	.40***	.51***	.03	-.06	.20**	-.39***	.31***	.11†	.31***
4. Denial				.13*	.19**	.37***	.27***	.01	-.02	.02	.36***	.08	.22***	-.14*	.10	-.06
5. Emotional Support					.73***	.01	.20**	.16**	.27***	.07	.17**	.11†	-.08	.07	-.01	.18**
6. Instrumental Support						.05	.25***	.16**	.20**	.07	.12†	.06	-.13*	.01	.03	.10
7. Behavioural disengagement							.05	-.28***	-.26***	-.02	.25***	-.04	.47***	-.25***	-.04	-.23***
8. Venting								.14*	.18**	-.07	.13*	.27***	.04	.08	.08	.07
9. Positive reframing									.44***	.35***	.01	.11†	-.17**	.40***	.03	.19**
10. Planning										.17**	.05	.33***	-.24***	.44***	.09	.22***
11. Humour											.01	-.02	.01	.25***	.03	-.02
12. Religion												-.04	.26***	-.08	-.08	-.01
13. Self-blame (coping)													-.07	.25***	.29***	.01
14. Substance abuse														-.16*	-.09	-.13*
15. Acceptance															.10	.20**
16. Agency																.41***
17. Goal congruency																
18. Problem efficacy																
19. Self-blame (emotion regulation)																
20. Wishful thinking																
21. Tension reduction																
22. Importance reappraisal																
23. Task focus Processes																
24. Anger rumination																
25. Thought Suppression																
26. Self-control																
27. Implicit theories Emotion																
28. Implicit theories Capacity																
29. Implicit theories Self- regulation																
30. Learning goals																
31. Performance-approach goals																
32. Performance-avoidance goals																
33. Core self-evaluations																

**Table 33**

*Pearson correlations between the variables in study (part 2)*

	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1. Anger	.06	.22***	.16*	-.12*	-.18**	-.01	.32***	.19**	-.28***	-.08	-.13*	.07	.01	.06	.17**	-.16**	
2. Self-Distracton	-.05	.23***	.16**	.04	.02	.06	.26***	.39***	-.18**	-.06	-.04	.01	.17**	.28***	.34***	-.23**	
3. Active coping	.12*	.10	-.22***	-.01	.27***	.35***	-.02	.16**	.22***	.20**	.22***	.25***	.33***	.18**	.04	.17**	
4. Denial	-.03	.21**	.37***	.07	-.05	-.07	.34***	.30***	-.20**	-.12†	-.18**	-.01	-.06	.11†	.25***	-.29***	
5. Emotional Support	.03	.06	.04	.01	.09	.16*	.10	.20**	.04	.19**	.12*	.01	.13*	.14*	-.01	-.04	
6. Instrumental Support	.01	.05	.05	-.03	.09	.13*	.14*	.19**	-.01	.24**	.12†	-.01	.05	.03	-.03	-.08	
7. Behavioural disengagement	-.18**	.09	.38***	.06	-.19**	.29***	.26***	.11†	-.35***	-.25***	-.31***	-.23***	-.21**	-.04	.24***	-.44***	
8. Venting	.02	.24***	.10	.03	.14*	.24***	.24***	.24***	-.10	.01	.05	.13*	.19**	.13*	.16**	-.06	
9. Positive reframing	.13*	.01	-.12*	.12†	.32***	.32***	-.13*	.09	.17**	.17**	.15*	.24***	.21**	.04	-.06	.31***	
10. Planning	.17**	.10	-.15*	.03	.29***	.29***	.01	.19**	.19**	.08	.17**	.17**	.30***	.15*	-.02	.15*	
11. Humour	.13*	-.14*	-.01	.23***	.14**	.08	-.01	.04	-.02	.01	-.08	.02	.11†	.03	-.03	.20**	
12. Religion	.01	.04	.27***	.09	.10	-.03	.06	.05	-.02	-.05	-.05	-.01	-.08	-.03	.10	-.17**	
13. Self-blame (coping)	-.14*	.43***	.04	-.09	-.01	.24***	.30***	.33***	-.09	-.12†	-.02	.03	.14*	.10	.17**	-.22***	
14. Substance abuse	.01	.01	.29***	.05	-.08	-.20**	.11†	-.03	-.25***	-.23***	-.20**	-.17**	-.15*	-.10	.14*	-.30***	
15. Acceptance	.13*	.06	-.16*	.12†	.18**	.25***	-.13*	.11†	.14*	.10	.13*	.16*	.20**	.08	-.08	.27***	
16. Agency	.16*	.37***	-.04	.03	.15*	.39***	.15*	.19**	.05	.03	.12†	.09	.18**	.12*	.13+	-.06	
17. Goal congruency	.45***	.13*	-.16**	.02	.30***	.47***	-.02	.03	.23***	.10	.24***	.20**	.35***	.25***	.04	.20**	
18. Problem efficacy		-.06	-.06	.06	.40***	.41***	-.03	-.11†	.10†	-.07	-.01	.17**	.11†	.13*	-.14*	.29***	
19. Self-blame (emotion regulation)			.29***	.03	.07	.31***	.28***	.31***	-.20**	-.03	-.01	.07	.17**	.11†	.20**	-.27***	
20. Wishful thinking				.27***	-.05	.07	.18**	.11†	-.40***	-.27***	-.28***	-.19**	-.10	.02	.22***	-.25***	
21. Tension reduction					.16**	.08	-.05	-.02	.01	-.07	-.11†	.08	.11†	.11†	.09	.19**	
22. Importance reappraisal						.47***	-.06	.01	.18**	.11†	.07	.06	.19**	.19**	.04	.13*	
23. Task focus Processes							.08	.15*	.17**	.08	.12†	.15*	.35***	.22***	.03	.15*	
24. Anger rumination								.51***	-.31***	-.16**	-.15*	-.04	.06	.20**	.35***	-.40***	
25. Thought Suppression									-.24***	.03	.02	-.03	.20**	.23***	.48***	-.45***	
26. Self-control										.20**	.27***	.29***	.15*	.08	-.21**	.38***	
27. Implicit theories Emotion											.45***	.29***	.16*	.11†	-.09	.18**	
28. Implicit theories Capacity												.21**	.14*	.07	-.12†	.20**	
29. Implicit theories Self-regulation													.31***	.16**	-.13*	.31***	
30. Learning goals														.53***	.26***	.10	
31. Performance-approach goals															.38***	.02	
32. Performance-avoidance goals																-.43***	
33. Core self-evaluations																	-

Finally, core self-evaluations were positively associated to active coping ( $r = .12, p < .01$ ), positive reframing ( $r = .31, p < .001$ ), humour ( $r = .20, p < .01$ ), acceptance ( $r = .27, p < .001$ ), goal congruency ( $r = .29, p < .001$ ), problem efficacy ( $r = .27, p < .001$ ), tension reduction ( $r = .19, p < .01$ ), importance reappraisal ( $r = .13, p < .05$ ), task focus processes ( $r = .15, p < .05$ ), self-control ( $r = .38, p < .001$ ), implicit theories of capacity ( $r = .20, p < .01$ ), emotions ( $r = .18, p < .001$ ) and self-regulation ( $r = .31, p < .001$ ). Conversely, core self-evaluations were negatively related to self-distraction ( $r = -.23, p < .01$ ), denial ( $r = -.29, p < .001$ ), behavioural disengagement ( $r = -.44, p < .001$ ), religion ( $r = -.17, p < .01$ ), self-blame ( $r = -.27, p < .001$ ), substance abuse ( $r = -.30, p < .001$ ), self-blame (coping) ( $r = -.22, p < .001$ ), wishful thinking ( $r = -.25, p < .001$ ), anger rumination ( $r = -.40, p < .001$ ), thought suppression ( $r = -.45, p < .001$ ) and performance-avoidance goals for emotion regulation ( $r = -.43, p < .001$ ).

### **Regulation strategies as predictors of competitive anger**

Stepwise regression analyses were performed in order to explore which regulation processes better predict anger in sport competition (Table 3). Before performing these analyses, inspection for outliers has resulted in the elimination of 7 participants (4 the first analysis and 3 in the second analysis). In a first model, all the coping strategies were introduced as predictors (behavioural disengagement, positive reframing, venting, substance use, religion, denial, instrumental support, active coping, self-distraction, humour, self-blame, planning and acceptance). Because emotion support and instrumental support showed a high correlation ( $r = .73, p < .001$ ), emotional support was removed from this analysis to avoid multicollinearity. The final model included coping strategies of denial, venting and behavioural disengagement and explained 11% of the variance ( $R^2_{aj} = .10, p < .001$ ) ( $F(3,258) = 10.11, p < .001$ ).

In a second regression analysis, emotion regulation strategies were introduced, namely, problem efficacy, self-blame, wishful thinking, agency, importance reappraisal, goal congruency, tension reduction, task-focus processes, anger rumination, thought suppression, as well as self-control. The final model included anger rumination, self-control, importance reappraisal, problem efficacy and self-blame, explaining 20% of the variance ( $R^2_{aj} = .19, p < .001$ ) ( $F(5,258) = 13.17, p < .001$ ).

A third analysis combined the prediction from the subsequent analyses to form a composite model of processes implicated in anger regulation. This model included anger rumination, self-control, venting, importance reappraisal, problem efficacy and self-blame and explained 23% of the variance ( $R^2_{aj} = .21$ ,  $p < .001$ ) ( $F(6,252) = 12.48$ ,  $p < .001$ ). Table X present specific unstandardised and standardised coefficients of each analysis.

**Table 3**

*Stepwise regression for anger predicted by regulation strategies*

	<i>B</i>	<i>SE</i>	$\beta$
<b>Coping</b>			
Denial	.98	.33	.18**
Venting	1.35	.41	.20**
Behavioural disengagement	-.76	.35	-.13*
<b>Emotion regulation, Self-control</b>			
Anger Rumination	.13	.04	.22***
Self-control	-2.31	.83	-.17**
Importance reappraisal	-2.47	.71	-.22**
Problem efficacy	1.57	.58	.16**
Self-blame	2.05	.77	.16**
<b>Prediction model</b>			
Anger Rumination	.11	.04	.18**
Self-control	-2.41	.83	-.17**
Venting	1	.09	.15*
Importance reappraisal	-2.72	.72	-.23***
Problem efficacy	2.16	.77	.17**
Self-blame	1.30	.58	.13*

## Mediation analysis of regulation strategies to deal with anger facing provocations

The previous stepwise regression analysis identified the main regulation strategies predicting competitive anger. Subsequently, the potential mediating role of these predictors on the relationship between provocation and anger was tested using multiple mediation analysis. This analysis followed the procedures described by Preacher and Hayes (2008), using the macro they provided (Preacher & Hayes, August, 2013) for SPSS. This macro performs the causal steps criteria for mediation described by Baron and Kenny (1986), the normal theory estimates and 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.

Thus, the potential mediating role of these predictors was explored, revealing that self-control and anger rumination mediated the relationship between provocation and anger. The total model including these two variables explained 22 % of the variance ( $F(3,258) = 23.80, p < .001$ ). Provocation was negatively related to self-control ( $\beta = -.16, p < .01$ ) and positively to anger rumination ( $\beta = .22, p < .001$ ). On their turn, self-control ( $\beta = -.28, p < .001$ ) and anger rumination ( $\beta = .32, p < .001$ ) were negatively and positively related to anger, respectively. The total effect of provocation on competitive anger was also significant ( $\beta = .34, p < .001$ ) and remained significant when controlling for the mediators ( $\beta = .29, p < .001$ ). Indirect effects confirmed the mediating role of self-control (*Indirect Effects (IE)* = .06, 95% CI [.01, .13]), anger rumination (*IE* = .08, 95% CI [.02, .16]) and the total model (*IE* = .13, 95% CI [.06, .24]). Sobel tests were consistent with these results (see Table 4). Because the direct effect remained significant, self-control and anger rumination partially mediated the relationship between provocation and anger (Baron & Kenny, 1986) (Fig. 1)

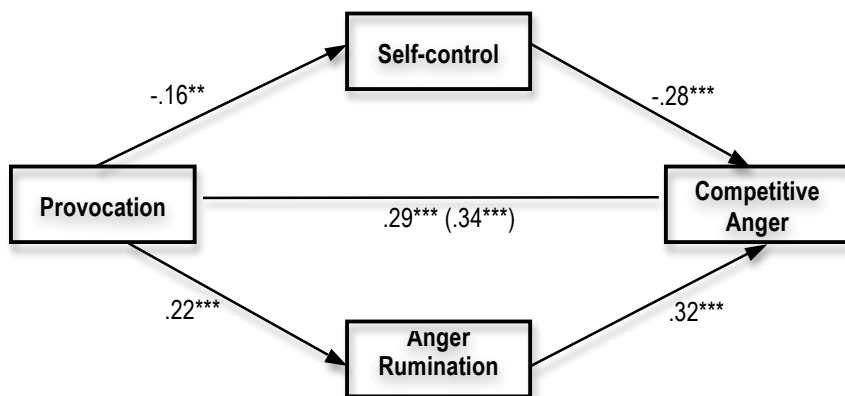
**Table 34**

*Mediation analysis of the relationship between anger and provocation*

	<i>B</i>	SE	$\beta$
<b>IV (Provocation) to Mediators</b>			
Self-control	-.02	.01	-.16**
Anger rumination	.69	.19	.22***
<b>Mediators to DV (Anger)</b>			
Self-control	-3.98	.82	-.28***
Anger rumination	.19	.03	.32***
<b>Total effect of Provocation on Anger</b>	.65	.11	.34***
<b>Direct effect of Provocation on Anger</b>	.54	.11	.29***

<b>Indirect effect of Provocation on Anger via Mediators</b>					
	Point Estimates	SE	Z	CI <sub>Lower</sub>	CI <sub>Upper</sub>
Self-control	.0553	.0272	2.03*	.0135	.1272
Anger rumination	.0772	.0320	2.41*	.0210	.1657
<b>Total</b>	.1324	.0421	3.14**	.0583	.2287



**Fig. 1:** Self-control and anger rumination as mediator of the relationship between anger and provocation

## **Implicit theories, goals for emotion regulation and core self-evaluations as predictors of coping, emotion regulation and self-control**

Separate stepwise analyses were performed for the all coping and emotion regulation strategies in study, as well as for self-control (Table 5). Self-distraction was predicted by performance avoidance and performance approach goals for emotion regulation and by core self-evaluations, explaining 16% of the variance ( $R^2_{aj} = .15$ ,  $p < .001$ ) ( $F(2,263)=16.93$ ,  $p < .001$ ). Active coping, on its turn, was predicted by learning goals for emotion regulation and implicit theories of capacity and self-regulation, which explained 15% of the variance ( $R^2_{aj} = .16$ ,  $p < .001$ ) ( $F(3,263)=16.27$ ,  $p < .001$ ). Denial was predicted by performance-avoidance goals and core self-evaluations explaining 11% of the variance ( $R^2_{aj} = .10$ ,  $p < .001$ ) ( $F(2,263)=15.59$ ,  $p < .001$ ). Regarding emotional support, implicit theories of emotion and performance-approach goals were significant predictors and explained 5% of the variance ( $R^2_{aj} = .04$ ,  $p < .001$ ) ( $F(2,263)=16.20$ ,  $p < .001$ ), whereas instrumental support was predicted only by implicit theories of emotions, which explain 6 % of the variance ( $R^2_{aj} = .05$ ,  $p < .001$ ) ( $F(1,263)=15.93$ ,  $p < .001$ ). Behavioural disengagement was predicted by core self-evaluations, implicit theories of capacity, performance-approach and learning goals for emotion regulation, which explained 27%, ( $R^2_{aj} = .26$ ,  $p < .001$ ) ( $F(2,261) 24.31$ ,  $p < .001$ ). In turn, venting was predicted by performance-approach and learning goals for emotion regulation explaining 5% of the variance ( $R^2_{aj} = .04$ ,  $p < .001$ ) ( $F(2,262)=6.54$ ,  $p < .001$ ).

The coping strategy of positive reframing was predicted by core self-evaluations and learning goals, which explained 14% of the variance ( $R^2_{aj} = .13$ ,  $p < .001$ ) ( $F(2,262)=20.60$ ,  $p < .001$ ). On its turn, planning was predicted by learning goals for emotion regulation and core self-evaluations, which explained 13% of the variance ( $R^2_{aj} = .11$ ,  $p < .001$ ) ( $F(2,262)=17.11$ ,  $p < .001$ ). On the other hand, self-blame (coping) was predicted by core self-evaluations and learning goals, although only explaining 6% of the variance ( $R^2_{adj} = .05$ ,  $p < .001$ ) ( $F(2,263)=8.12$ ,  $p < .001$ ). Substance abuse was predicted by core self-evaluations and implicit theories of emotion, which explained 12% of the variance ( $R^2_{adj} = .11$ ,  $p < .001$ ) ( $F(2,264)=17.99$ ,  $p < .001$ ). Finally, learning goals and core self-evaluations predicted acceptance and explained 11% of the variance



( $R^2_{adj.} = .11$   $p < .001$ ) ( $F(2,262)=16.90$ ,  $p < .001$ ). Humour and religion were not predicted by any of these variables.

Concerning emotion regulation strategies, agency was only predicted by learning goals, explaining only 3% of the variance ( $R^2_{adj.} = .03$   $p < .001$ ) ( $F(1,265)=8.78$ ,  $p < .001$ ). Additionally, goal congruency was predicted by learning goals, implicit theories of capacity and core self-evaluations, which explained 18 % of the variance ( $R^2_{adj.} = .17$   $p < .001$ ) ( $F(3,263)=18.56$ ,  $p < .001$ ). Problem-efficacy was predicted by core self-evaluations, performance and approach goals and implicit theories of emotions, which explained 11% of the variance ( $R^2_{adj.} = .10$   $p < .001$ ) ( $F(3,273)= 11.13$ ,  $p < .001$ ). On its turn, self-blame (emotion regulation) was predicted by core self-evaluations and learning goals for emotion regulation, explaining 11% of the variance ( $R^2_{adj.} = .10$   $p < .001$ ) ( $F(2,264)=16.34$ ,  $p < .001$ ).

Implicit theories of capacity and of emotions, performance-avoidance goals and core self-evaluations predicted wishful thinking and explained 16% of the variance ( $R^2_{adj.} = .14$   $p < .001$ ) ( $F(4,262)=14.07$ ,  $p < .001$ ). Task focus processes were predicted by core-self-evaluations, and learning goals and explained 14% of the variance, ( $R^2_{adj.} = .13$   $p < .001$ ) ( $F(2,264)=20.98$ ,  $p < .001$ ). Importance reappraisal was predicted by learning goals for emotion regulation, which only explained 4% of the variance ( $R^2_{adj.} = .03$   $p < .001$ ) ( $F(2,265)=9.99$ ,  $p < .001$ ). Core self-evaluations, performance-avoidance goals and implicit theories of capacity/intelligence were predictor of tension reductions and explained 9% of the variance ( $R^2_{adj.} = .08$   $p < .001$ ) ( $F(3,263)=8.94$ ,  $p < .001$ ).

Anger rumination was predicted by core self-evaluations, performance-avoidance and performance-approach goals and implicit theories of emotions, which explained 23% of the variance ( $R^2_{adj.} = .21$   $p < .001$ ) ( $F(4,262)=19.14$ ,  $p < .001$ ). Performance-avoidance goals, core self-evaluations, learning goals and implicit theories of capacity/intelligence predicted thought suppression and explained 32% of the variance ( $R^2_{adj.} = .31$   $p < .001$ ) ( $F(4,262)=30.42$ ,  $p < .001$ ). Finally, self-control was predicted by implicit theories of self-regulation and capacity and by core self-evaluations, which explain 21% of the variance ( $R^2_{adj.} = .20$   $p < .001$ ) ( $F(3,263)=22.80$ ,  $p < .001$ ).

Table 35

*Stepwise regression for coping, emotion regulation and self-control*

	<i>B</i>	<i>SE</i>	$\beta$
<b>Self-distraction</b>			
Performance-avoidance goals	.06	.02	.20**
Performance-approach goals	.05	.02	.21**
Core Self-evaluations	-.52	.22	-.15*
<b>Active coping</b>			
Learning goals	.05	.01	.27***
Implicit theories of capacity	.15	.06	.16**
Implicit theories of self-regulation	.20	.19	.13*
<b>Denial</b>			
Core Self-evaluations	-.79	.23	-.23**
Performance-avoidance goals	.04	.02	.16*
<b>Emotional Support</b>			
Implicit theories of emotions	.30	.10	.17**
Performance-approach goals	.03	.02	.12*
<b>Instrumental support</b>			
Implicit theories of emotions	.39	.10	.24***
<b>Behavioural disengagement</b>			
Core Self-evaluations	-1.11	.20	-.33***
Implicit theories of capacity	-.25	.07	-.20***
Learning goals	-.04	.01	-.18**
Performance-approach goals	.03	.02	.12*
<b>Venting</b>			
Learning goals	.03	.01	.15*
Performance-avoidance goals	.03	.01	.13*
<b>Positive reframing</b>			
Core self-evaluations	.97	.18	.30***
Learning goals	.04	.01	.18**
<b>Planning</b>			
Learning goals	.06	.01	.28***
Core-self-evaluations	.47	.17	.16*
<b>Self-blame (coping)</b>			
Core self-evaluations	-.68	.20	-.20**
Learning goals	.04	.02	.16*
<b>Substance abuse</b>			
Core self-evaluations	-.74	.17	-.26***
Implicit theories of emotions	-.26	.08	-.20**

<b>Acceptance</b>			
Core self-evaluations	.77	.16	.28***
Learning goals	.04	.01	.17**
<b>Agency</b>			
Learning goals	.02	.01	.18**
<b>Goal Congruency</b>			
Learning goals	.04	.01	.32***
Implicit theories of capacity	.11	.04	.17**
Core self-evaluations	.22	.10	.13*
<b>Problem efficacy</b>			
Core self-evaluations	.44	.09	.30***
Implicit theories of emotions	.02	.01	.14*
Performance-approach goals	-.09	.04	-.13*
<b>Self-blame (emotion regulation)</b>			
Core self-evaluations	-.54	.11	-.29***
Learning goals	.03	.01	.19**
<b>Wishful thinking</b>			
Implicit theories of capacity	-.11	.05	-.16*
Implicit theories of emotions	-.14	.05	-.16*
Performance-avoidance goals	.02	.01	.13*
Core self-evaluations	-.26	.12	-.14*
<b>Task focus processes</b>			
Learning goals	.03	.01	.34***
Core self-evaluations	.15	.08	.12*
<b>Importance reappraisal</b>			
Learning goals	.02	.01	.19**
<b>Tension reduction</b>			
Core self-evaluations	.56	.12	.31***
Performance-avoidance goals	.03	.01	.19**
Implicit theories of capacity	-.11	.04	-.16*
<b>Anger Rumination</b>			
Core self-evaluations	-9.74	1.94	-.31***
Performance-avoidance goals	.38	.16	.16*
Performance-approach goals	.36	.14	.16*
Implicit theories of emotions	-1.63	.79	-.11*
<b>Thought Suppression</b>			
Performance-avoidance goals	.66	.12	.33***
Core self-evaluations	-8.09	1.50	-.32***
Learning goals	.23	.10	.13*

Implicit theories of capacity	1.04	.52	.11*
<b>Self-control</b>			
Core self-evaluations	.39	.08	.29***
Implicit theories of capacity	.09	.03	.18**
Implicit theories of Self-regulation	.14	.05	.16**

### Emotion regulation strategies as mediators of the relationship between goals for emotion regulation and anger

Rusk and colleagues (2011) tested whether performance goals and depressive symptoms were mediated by rumination (but failed to find any significance). In this study, a similar approach was adopted in relation to anger. Specifically, this study considered learning, performance-approach and performance-avoidance goals for emotions regulation and their relationship with anger. In addition, all the emotion regulation strategies were tested as mediators of these different relationships (learning/performance-approach/performance-avoidance goals and competitive anger). After testing several models using the same procedures described above to test multiple mediation, it was found that anger rumination and self-blame mediated the relationship between performance-avoidance goals for emotion regulation and competitive anger and explained 11% of the variance ( $F(3,263) = 12.29, p < .001$ ) (Table 6). More specifically, performance-avoidance goals was positively related to anger rumination ( $\beta = .36, p < .001$ ) and to self-blame (emotion regulation) ( $\beta = .20, p < .01$ ). Anger rumination ( $\beta = .32, p < .001$ ) and self-blame ( $\beta = .22, p < .001$ ) were also positively related to anger. Finally, the total effect of performance avoidance goals in anger was positive ( $\beta = .17, p < .01$ ), but was not significant when controlling for anger rumination and self-blame ( $\beta = .34, p < .05$ ). The total indirect effect demonstrated that both self-blame and anger rumination were mediators of the relationship between performance-avoidance goals and anger ( $IE = .19, 95\% \text{ CI } [.10, .27]$ ). In addition, specific indirect effects of anger rumination ( $IE = .13, 95\% \text{ CI } [.06, .22]$ ) and self-blame ( $IE = .19, 95\% \text{ CI } [.01, .11]$ ) were also significant. Sobel tests confirmed these results, except for self-blame, which was only significantly marginal ( $z = 1.91, p < .10$ ). However, because the bootstrapping method was suggested to be superior to the sobel test (Preacher & Hayes, 2008), self-blame was still considered a significant mediator. Lastly, given that the direct effect was not significant, there is evidence to concluded

that anger rumination and self-blame fully mediate the relationship between performance-avoidance goals for emotion regulation and anger (Fig. 2).

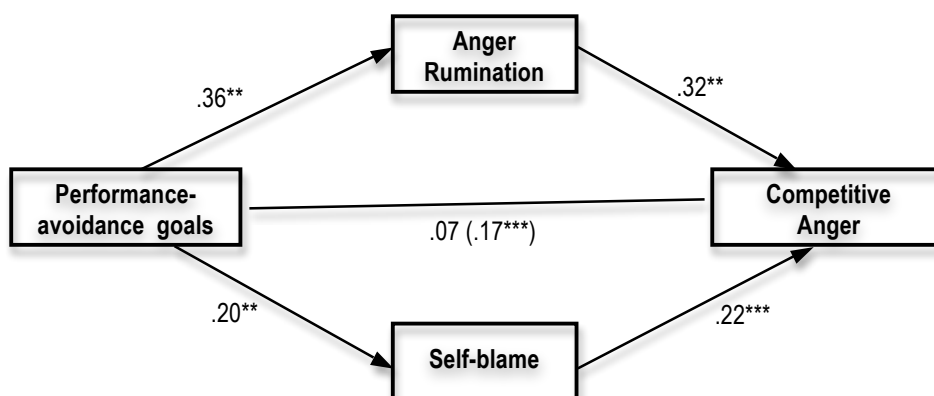
**Table 6**

*Mediation analysis of the relationship between performance avoidance goals for emotion regulation and anger*

	<i>B</i>	<i>SE</i>	$\beta$
<b>IV (Performance-avoidance goals) to Mediators</b>			
Anger rumination	.87	.14	.36***
Self-blame	.03	.01	.20**
<b>Mediators to DV (Anger)</b>			
Anger rumination	.19	.04	.32***
Self-blame	2.21	.59	.22***
<b>Total effect of Performance-avoidance goals on Anger</b>	.25	.09	.17**
<b>Direct effect of Performance-avoidance goals on Anger</b>	.07	.09	.05

<b>Indirect effect of Performance-avoidance goals on Anger via Mediators</b>					
	<b>Point Estimates</b>	<b>SE</b>	<b>Z</b>	<b>CI<sub>Lower</sub></b>	<b>CI<sub>Upper</sub></b>
Anger rumination	.1343	.0272	2.03*	.0636	.2264
Self-blame	.0407	.0213	1.91†	.0060	.1078
<b>Total</b>	.1750	.0429	4.08***	.1001	.2747



**Fig. 2:** Self-blame and anger rumination as mediators of the relationship between performance avoidance goals for emotion regulation and anger

## DISCUSSION

The main aim of this study was to explore the strategies involved in the regulation of anger in sports. Within an integrative perspective, this study combined the processes of coping, emotion regulation and self-control. Indeed, these processes seem to depend on the same source of energy that can be depleted (e.g., Baumeister, 2002). As found in laboratory studies, exerting emotion regulation or coping can decrease participants' capacity of self-control for subsequent tasks (Tice et al., 2001; Muraven & Baumeister, 2000). Generally, this study demonstrated that all these processes seem to be implicated in the regulation of anger in sport competition.

Specifically regarding the coping processes, it was found that denial, behavioural disengagement, venting, religion, self-blame (coping) and substance abuse. Moreover, results from the regression analysis revealed that denial and venting positively predicted anger while behavioural disengagement was a negative predictor. These results seem to be consistent with previous studies that suggest the association between the use of emotion-focused and avoidance coping and negative affect (e.g., Ntoumanis & Biddle, 1998; Ntoumanis, Biddle, & Haddock, 1999). In fact, other studies have also demonstrated positive associations between anxiety and the use of self-blame, substance use and denial (Hammermeister & Burton, 2001; Ntoumanis & Biddle, 2000; Dias et al., 2012).

Additionally, in this study, no significant associations were found between anger and coping strategies more problem-focused (e.g., active coping, instrumental support, planning). However, outside of the sport context, Maxwell and Siu (2008) found that active coping was effective in reducing anger, but passive coping was not associated to anger. The inconsistency between the current and Maxwell and Siu's (2008) study can be partially explained by the fact that the latter used a sample of Chinese participants. Indeed, cultural differences seem to influence how athletes deal with stressful encounters in sport competition (Anshel, 2010; Anshel et al., 1997).

Furthermore, the topic of coping effectiveness has fuelled some controversy throughout the literature in sport psychology (Richards, 2012). However, recent findings by Nicholls and colleagues (e.g. Nicholls et al., 2005, 2006; Nicholls & Polman, 2007b) seem to converge to the idea that a coping strategy could either be effective or ineffective, because it depends on multiple factors. In fact, this study, it was also found that behavioural disengagement negatively predicted

anger. It seems that this avoidance coping strategy (Carver & Scheier, 1994) appeared to be effective in reducing anger.

With regards to emotions regulation strategies, anger was positively associated to self-blame (emotion regulation), wishful thinking, anger rumination and thought suppression and negatively to tension reduction and importance. Martin and Dahlen (2005) found similar pattern, observing that trait anger was positively associated to self-blame, blaming others, rumination, catastrophizing and acceptance and negatively to putting into perspective, positive refocus, refocus on planning, positive.

Furthermore, despite the lack of comparative studies, a study (Scutz et al., 2004) on emotion regulation during test taking has revealed that emotion regulation strategies of wishful thinking and self-blame were positively associated to anxiety. Additionally, in a sample of adolescents, Hart (1991) reported that engaging in wishful thinking to deal with anger-inducing situations can lead to an increase in anger reactivity. Moreover, anger was also positively associated to thought suppression. Consistently with the Ironic processes theory (e.g., Wegner et al., 1987; Wegner, 1994, 2009), thought suppression often results, ironically, in the opposite of its goal. Indeed, consistently with this study, Wegner and colleagues (1997) found that engaging in thought suppression to deal with anxiety resulted in the contrary, increasing the intensity of the anxiety experience.

When considering emotion regulation strategies and self-control as predictors of anger, anger rumination, self-blame and problem efficacy were found to be positive predictors of this emotion whereas importance reappraisal and self-control were negative predictors. Martin and Dahlen (2005), when considering only emotion regulation strategies, also found that trait anger was predicted by rumination and low positive reappraisal. Although self-blame did not predict anger, these authors also found a positive association between self-blame and anger. Furthermore, Lazarus (1991) suggests that anger often arises from blame, either from others or from the self.

Specifically, regarding anger rumination, some studies have shown that engaging in this process of regulation can prologue and intensify the experience of anger (e.g., Bushman, 2002; Denson et al., 2012). Conversely, engaging in reappraisal seems to be effective in reducing individual's levels of anger (Mauss et al., 2007; Denson et al., 2012). Therefore, the current

study seems to support these previous findings about the relationship between anger rumination, reappraisal and the experience of anger.

Additionally, although problem efficacy was not only significantly associated to anger, it was a positive predictor of this emotion. As surprising as this relationship may appear, it can also contribute the singularity of the emotion of anger. Problem efficacy is an appraisal that reflects the “potential to deal with any problem that occurs” (Schutz & Davis, 2000, p. 247). Indeed, some authors (Fridja, 1986; Lazarus, 1991; Scherer, 2001) argue that anger arises when individuals feel that they are able to deal with the situation.

As expected, self-control was a significant negative predictor of anger. Consistently with several previous findings (e.g., Tangney et al., 2004; Denson et al., 2010, 2011), high self-control capacity seems to help individual retrain their angry feelings. Therefore, it is important to note that both importance reappraisal and self-control were negative predictors of competitive anger, which suggests that both this processes are essential to reduce athletes' anger levels.

Overall, the final prediction model, including the previous significant predictors revealed that the most important processes involved in the regulation of competitive anger were anger rumination, self-control, venting, importance reappraisal, problem efficacy and self-blame. While engaging in anger rumination, venting, problem efficacy and self-blame increased anger levels, exerting self-control and reappraisal decrease anger.

Furthermore, although only partially, this study found that anger rumination and self-control were mediators of the relationship between provocation and competitive anger. This finding demonstrated the importance of these processes in the experience of anger in sport competition. Besides, it also provides support for the Integrative Cognitive Model of Trait Anger and Reactive Aggression (Wilkowski & Robinson, 2008a, b) within the context of sport, demonstrating that attention to ruminative thoughts increases anger whereas exerting effortful control decreases the experience of this emotion.

This study also explored the role of implicit theories of emotion and capacity/intelligence and the emotion regulation goals in the use of coping, emotion regulation strategies and self-control. An analysis of the pattern of association between these implicit theories and strategies of coping and emotion regulation and self-control suggests that the more individuals believe that they can control their emotions, capacity/intelligence and self-regulation (incremental theories), the more they are likely to use more approach coping strategies and more adaptive emotion



regulation strategies and tend to use less avoidance coping strategies and maladaptive emotion regulation strategies. More specifically, commonly across the implicit theories considered in this study, positive associations were found to active coping, positive reframing and self-control and negative to behavioural disengagement, substance abuse and wishful thinking.

Indeed, incremental theories are associated to several positive outcomes (e.g., Aronson et al., 2002; Blackwell et al., 2007; Good et al; 2003) and are specifically linked to more positive and less negative emotions, as well as more perceived social support (Tamir et al., 2007). Therefore, it seems that individuals holding incremental theories also tend have more positive and less negative emotions because they use more adaptive strategies and less maladaptive strategies. In sports, less adaptive coping strategies of regulation are associated to negative affect (e.g., Ntoumanis & Biddle, 1998; Ntoumanis, et al., 1999).

When analysing the implicit theories as predictors or the use of emotion regulation, coping and self-control, a similar pattern was also found, although more disperse comparing to the associations analyses. Specifically, implicitly theories of emotion were a negative predictor of substance abuse, wishful thinking, anger rumination and a positive predictor of emotional and instrumental support and problem efficacy. On their turn, implicit theories of capacity/intelligence were a positive predictor of active coping, goal congruency, thought suppression and self-control and negative predictor of behavioural disengagement, wishful thinking and tension reduction. Unlike the other types of implicit theories, implicit theories of self-regulation were only a positive predictor of the use of active coping and self-control. Nonetheless, these results seem to suggest that incremental theories predicted the use of more adaptive strategies. More specifically, across all the types of theories, it seems that those who held incremental beliefs tend to have higher levels of self-control, which has been linked to several positive outcomes (e.g., Duckworth, & Seligman, 2005; Smith & Baumeister, 2006; Tangney et al, 2004). However, incremental theories of capacity/intelligence were related to thought suppression, contrarily to what was found by Tamir and colleagues (2007). It seems that athletes who believe that they can increase their capacity/intelligence also tend to use thought suppression. Nonetheless, this strategy is not always ineffective, Wegner (2009) refers that if individuals have enough time and resources, it is possible to effectively block thoughts.

Because the application of the implicit theories concept to emotions (Tamir et al., 2007) and self-regulation (Job et al., 2010) is relatively new, there is almost no comparative data to

analyse the results of this study. Nonetheless, this study seems to demonstrate the large influence of implicit theories in athletes' regulation strategies. Additionally, it is important to note that anger was found to be negatively associated to implicitly theories of capacity, suggesting that individuals who hold entity theories about their capacity/intelligence tend to experience more anger. In fact, individuals holding entity theories tend to see attributes as uncontrollable and fixed, which in challenging situations, is associated to a decrease in motivation to self-regulate and failure (Dweck, 1996). Therefore, it seems that the athletes holding entity theories may fail to regulate their anger, thus are more likely to experience more this emotion.

Another aim of this study was to explore the influence of goals for emotion regulation on the regulation strategies. For this purpose, three types of goals were considered, namely, learning goals (wanting to learn more about emotions and emotion regulation), performance approach goals (seeking to prove ability comparing to others) and performance-avoidance goals (seeking to avoid proof of low ability). In achievement situations, performance avoidance goals have been linked to the defensive strategies (e.g., rumination, self-blame) whereas learning goals are associated to more constructive strategies for dealing, such as increasing effort, task persistence and seeking help (e.g., Elliot, McGregor, & Gable, 1999; Sideridis, 2005).

The results from this study seem to be consistent with the idea that learning goals are associated with more adaptive strategies whereas performance-avoidance goals are associated to maladaptive strategies. Similar findings were found by Rusk and colleagues (2011), who observed that learning goals were associated to cognitive reappraisal whereas both performance approach and avoidance goals were related to thought suppression and rumination. However, this study found that thought suppression and self-blame (emotion regulation) were positively associated to learning goals. In addition, performance approach and learning goals showed a similar pattern, with positive associations to more adaptive strategies (e.g., active coping, planning, importance reappraisal, task focus processes). However, in Rusk and colleagues's (2011) study, cognitive reappraisal (adaptive strategy) was only associated to learning goals, and not performance goals. In addition, self-blame and thought suppression, as less adaptive strategies (Wegner, 2009; Westermann, Boden, Gross, & Lincoln, 2013), should not be associated to having learning goals for emotion regulation. This can be partially explained with the specificity of the sports domain. It seems that athletes who believe what to learn about their emotions tend to engage in more thought suppression and self-blame. However, these strategies

may be effective depending on the context, the appraisals involved and the athletes' personal goals (Nicholls & Polman, 2007b; Richards, 2012)

Nonetheless, when considering emotion regulation goals as predictors of coping, regulation and self-control, it was found that learning goals were a positive predictor of active coping, venting, positive reframing, planning, self-blame (coping and emotion regulation), acceptance, agency, goal congruency, importance reappraisal, task focus processes and thought suppression and negative of behavioural disengagement. On their turn, performance-approach goals were a positive predictor of self-distraction, emotional support, anger rumination and negative of behavioural disengagement and problem efficacy. Additionally, performance-avoidance goals were a positive predictor of self-distraction, denial, venting, wishful thinking, tension reduction, anger rumination and thought suppression. Although learning goals predicted self-blame (coping and emotion regulation), results from the regression analysis seem to be consistent with the idea that learning goals are related to more adaptive strategies whereas performance goals are related to maladaptive strategies (Rusk et al., 2011). Additionally, these findings also suggest that individuals who want to learn more with their emotional experience tend to use more self-blame as a coping and emotion regulation strategy.

More importantly, performance-avoidance was found to be positively associated to anger, as well as a positive predictor of this experience. Rusk et al. (2007) also found that performance avoidance goals for emotion regulation were linked to depressive symptoms. Therefore, in this study, the potential mediating role of emotion regulation on the relationship between anger and performance-avoidance goals was tested. This analysis revealed that this relationship appears to be fully mediated by anger rumination and self-blame (emotion regulation). Therefore, it seems individuals with avoidance goals for emotion regulation tend to use less maladaptive strategies (Mikolajczak, Petrides, & Hurry, 2009; Westermann, Boden, Gross, & Lincoln, 2013), which in turn increases their anger levels. In fact, Rusk and colleagues (2011) suggest that performance-avoidance goals for achievement can “lead to lack of effort on achievement tasks, shallow processing of content, and negative emotions” (p. 455).

Core self-evaluations were negatively associated to anger, consistently with previous findings that suggest that individuals with higher core self-evaluation tend to experience less negative affects (e.g., Judge et al., 1998). This can be partially explained by the fact that individuals with higher core self-evaluations seem to use more problem-focused coping strategies

(Kammeyer-Mueller et al., 2009; Låstad, Berntson, & Näswall, 2013) and less avoidance coping strategies (Kammeyer-Mueller et al., 2009). Indeed, this study found that core self-evaluations were positively associated to more adaptive coping and emotion regulation strategies (e.g., importance reappraisal, task focus processes) and negatively to maladaptive coping and emotion regulation strategies (e.g., anger rumination, thought suppression). Further evidence for these results was found when using core self-evaluations as a predictor of coping, emotion regulation and self-control. Specifically, core self-evaluations were a positive predictor of positive reframing, planning, tension reduction, problem efficacy, goal congruency, task focus processes, acceptance and self-control and negative of self-distraction, denial, behavioural disengagement, self-blame (coping and emotion regulation), substance abuse, wishful thinking and thought suppression. It is also important to note that core self-evaluations were associated to incremental theories of emotion, self-regulation and negatively to performance-avoidance goals for emotion regulation. In fact, individuals holding incremental theories tend to believe in the potential utility of effort (Hong, Chiu, Dweck, Lin, & Wan, 1999), attribute failures to low effort (Henderson & Dweck, 1990), and change strategies when facing obstacles (Robins & Pals, 2002), which seems consistent with the characteristics of individuals with higher core self-evaluations, such as motivation, persistence in solving problems and more efficacy in overcoming obstacles (e.g., Bono & Judge, 2003; Erez & Judge, 2001). These din

Overall, these findings highlight the importance of considering processes of coping, emotion regulation and self-control. It seems that the main predictors of this emotion were anger rumination, self-control, venting, importance reappraisal, problem efficacy and self-blame. Furthermore, it was also found evidence for the partial mediation role of anger rumination and self-control in the relationship between provocation and anger.

Additionally, regulation strategies appear to be largely influenced by implicit theories and goals for emotion regulation. More specifically, entity theories of capacity/intelligence, emotion and self-regulation, performance-avoidance goals for emotion regulation and lower core self-evaluations were linked to the use of less adaptive strategies (e.g., self-blame, anger rumination) whereas incremental of capacity/intelligence, emotion and self-regulation, learning goals for emotion regulation and higher core self-evaluations were associated to more adaptive regulation strategies (e.g., importance reappraisal, active coping). Moreover, self-blame and anger rumination were found to fully mediate the relationship between performance-avoidance goals for

emotion regulation, which supports the impact of goals for emotion regulation on emotion through influencing individuals styles of emotion regulation.



## Study 4

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Toward a better understanding of aggressive behaviour in sport: An integrative study of its main psychological correlates





## INTRODUCTION

The problem of athletic aggression has always been a concern and focus of interest throughout the sport psychology literature (Russel, 2008). Although research on this topic lacks more consistent theoretical and methodological approaches (Kimble, Russo, Bergman, & Galindo, 2011), some findings have established important constructs that seem to be associated with this behaviour in sport. For instance, aggression has been found to be positively related to provocation (Harrell, 1980; Maxwell, 2004; Maxwell, et al. 2009), perceived legitimacy of the use aggression (Bredemeier, 1985; Maxwell et al., 2009), sport professionalization (Coulomb & Pfister, 1998; Maxwell & Visek, 2009), athletic identity (Maxwell & Visek, 2009; Visek et al., 2009), masculinity (Weinstein et al., 1995), obsessive passion (Donahue, Rip, & Vallerand, 2009) and ego or performance motivational orientation (athletes attempt to be better and show a superior ability comparing to others) (Rasclé, et al., 1998, 2005).

Despite the link between anger and aggression in sport being widely acknowledged (e.g., Maxwell & Moores, 2007; Maxwell et al., 2009; Kerr, 2006), very little is known about what moderates this relationship. However, some recent theoretical models have attempted to provide some knowledge as to what would “turn” anger into an aggressive response in sport competition. For instance, The Integrative Cognitive Model of Trait Anger and Reactive Aggression (Wilkowski & Robinson, 2008a, b) suggests that effortful control processes are essential to the control of angry responses, whereas attention to thoughts of anger (rumination) would increase the likelihood of an aggressive response. Similarly, the “I cubed theory” (Denson ET AL., 2012A; Slotter & Finkel, 2011) suggests that when self-control capacity is stronger than the combination of aggressive traits (e.g., trait anger) and instigation events (e.g., provocation), aggression is less likely to occur.

Because aggression can itself be a coping response to anger (Trnka & Stuchlíková, 2011; Kuppens ET AL., 2004), this study will focus more on the processes that occur between the generation of anger and the acts of aggression. Therefore, emotion regulation strategies to deal with anger may be important moderators of this relationship, by either increasing or decreasing the likelihood of aggression. Although reappraisal seems to be effective in reducing anger (Mauss et al, 2007), according to the General model of aggression (Anderson & Bushman, 2002; Anderson & Canagey, 2004) this process can increase the aggressive response. By recruiting

past memories or making the damage to one's social image more noticeable, reappraisal can result in a highly aggressive response, either cold and calculated, or hot and affective.

Additionally, it is important to explore the relationship between aggression and anxiety in sport competition. Anxiety is one of the most experienced emotion in sport (e.g., Nicholls et al, 2009) and has been associated to anger in academic settings (Tanzer & Spielberger, 2005) In sports, Robazza and Bortoli (2007) found that perceiving cognitive anxiety is a significant predictor of anger experience and expression (both external and external). In this sense, it is also important to further explore the relationship between anxiety and anger and aggression.

Similarly, while thought suppression can act as a mechanism to control aggression (Wilkowski & Robinson, 2008a), engaging in this process often leads to the exact opposite response individuals are trying to suppress (Wegner, 1994). However, if individuals have enough time and cognitive resources to actively suppress their thoughts, this strategy can be effective. In the context of sport, instructing athletes to attempt to avoid a certain specific mistakes has been found to undermine their performance (Bakker et al., 2006; Beilock et al., 2001). More recently, Cruz and colleagues (2013) found that thought suppression was positively associated to threat perception, somatic anxiety, worry (a cognitive dimension of anxiety) and thoughts of escape, and negatively to concentration skills.

Another important process of anger regulation is anger rumination, which refers to constantly and continuously thinking about an experience of anger (Sukhodolsky, Golub, and Cromwell, 2001). Studies have found that individuals who tend to ruminate on their anger responses are more likely to show an aggressive response when given the opportunity (Bushman, 2002; Denson et al., 2011b). In the specific context of sport, Maxwell (2004) has also highlighted the importance of anger rumination as an antecedent of athletic aggression.

As opposed to anger rumination, self-control seems to act as a buffer, enabling athletes to retrain their aggressive tendencies and comply with the norms and rules of the competition. In fact, Denson and colleagues (2011) have found that engaging in anger rumination decreases individuals' capacity to exert self-control, increasing their aggressive responses. However, high self-control capacity seems to be one of the most important processes in the control of aggression (DeWall et al, 2011). For instance, in a series of experimental studies, DeWall, Baumeister and colleagues (2007) concluded that the ability to restrain aggressive behaviours

(exert self-control) depends on a resource energy that can be depleted. Thus, previous acts of aggression control would decrease the self-control energy for subsequent acts. When this happens, the aggressive impulses result in more violent actions than they would otherwise.

Furthermore, Gottfredson and Hirschi (1990) proposed that low self-control is a major cause of criminal and violent activity. Subsequent empirical studies have provided support for this idea, demonstrating that poor self-control leads to aggression and antisocial behaviour (e.g. Pratt & Cullen, 2000; Tittle & Botchkovar, 2005). More recently, a longitudinal study by Kemp and colleagues. (2009) with a sample of early adolescents revealed that higher levels of self-control are associated with less antisocial behaviour. Therefore, self-control also appears to be an important predictor of antisocial behaviour.

Moreover, the appraisal process underlies what the sport competition means for the personal well-being and goals of athletes (Cruz, 1996; Cruz & Barbosa, 1998; Lazarus, 2000). Athletes can generally be divided into those who appraisal sport competition more positively, as a challenge, and those who view it as more negatively, as a threat (Jones et al., 2009). Therefore, appraisals of threat and challenge can also be important to explain aggression in sport. Although positive emotions are more likely to occur in situation appraised as a challenge whereas negative emotions tend to occur in situations appraised as a threat, either positive or negative emotions can occur in both states (Skinner & Brewer, 2002; Jones et al., 2009). In this sense, anger can arise in both situations appraised as a threat or as a challenge. Because these different types of appraisals are associated with different cognitive, emotional, and physiological aspects (Jones et al., 2009), these appraisals can have an impact on athletes' behaviour (Blascovich & Mendes, 2002), and possibly aggression as well. Additionally, core self-evaluation, which reflect the most important evaluations an individual can make about himself (Judge et al., 1998), also appear to influence how individual appraise the different situations (Judge et al., 2006, it seems also important to consider this variable towards the comprehension of aggression in sport.

Furthermore, another variable that seems to influence aggression is motivation (e.g., Rascle et al., 1998, 2005). Two important typologies of motivation are the approach and avoidance motivation (Carver, 2006). While approach motivation reflects actively pursuing a goal, avoidance motivation refers to avoiding an "anti-goal" (an undesired outcome) (Carver & White, 1994). Recently, it has been suggested that approach motivation is associated to anger and aggression (e.g., Carver & Harmon-Jones, 2009; Smits, et al., 2004; Smits & Kuppens, 2005).

Therefore, this study will also explore the influence of these motivational variables.

Surprisingly, in the analysis of aggressive behaviour in sport, not many studies have focused on the relationship between aggression and sports fouls (i. e., behaviours that fall outside of the sport rules). Some studies have actually considered sports penalties as a measure of aggression. For instance, Russel and Russel (1984) used data derived from the official records of all games of the Western Hockey League during the 1978-79 season to measure aggressive behaviour. In each game, 19 infractions were scored individually, excluding nonaggressive penalties (e. g., playing with a broken stick). They concluded that penalties were a valid measure for aggressive behaviour in sport. Later, Vokey and Russel (1992) replicated the study, with the same 19 infractions, and resulting in the same conclusion.

A study by Bidutte, Azzi, Raposo, and Almeida (2005) with 18 Portuguese soccer teams found that the number of yellow and red cards was positively associated with athletes' aggressiveness levels. That is, high levels of both instrumental and hostile aggression were positively associated with players' number of cards (both yellow and red). On the other hand, Jones, Paul, and Erskine (2002) found that referees attributed more yellow and red cards to teams with a reputation of being more aggressive.

In conclusion, the apparent "obscurity" about what happens between anger and aggression can be attributed to multiple variables. Firstly, this study will attempt to develop a new measure that considers different types of aggression during sport competitions. Secondly, this study intends to analyse the predictors of these aggressive behaviours considering related constructs (such as provocation), cognitive appraisals, processes of regulation (emotion regulation and self-control) and motivational variables. In addition, and more importantly, this study aims to explore the potential moderators between anger and aggression in an attempt to provide a deeper understanding of the processes involved in aggression, as well as the individual differences in this behaviour. Finally, the differences in aggressive-related variables will be explored considering athletes penalties.

## **METHOD**

### **Participants**

Participants are fully described in Chapter IV: Method

## **Instruments**

Besides a questionnaire containing demographic and sports history questions, this study used the following self-report measures, which were described in Chapter IV: a) Competitive Anger of the Competitive Anger and Aggressiveness Scale (CAAS; Maxwell & Moores, 2007; Sofia & Cruz, 2012); b) Antisocial behaviour towards opponents and teammates scale (Kavussanu et al, 2013; Kavussanu & Boardley, 2009); c) Provocation Scale; d) Aggressive Behaviour Scale; f) Emotion Regulation During Sport Competition Scale (Cruz, 2008); g) Anger Rumination Subscale (Denson et al, 2006); h) Brief Self-control Scale (Cruz, 2003; Dias et al., 2009); i) "White Bear" Suppression Inventory (WBSI) (Cruz & Alves, 2006; Cruz et al., 2013; Wegner & Zakatos, 1994); and j) Core Self-evaluations Scale (Judge et al., 2006; Osório et al, 2013).

## **Procedures**

This study followed the same procedures described in Chapter IV: Method

## **RESULTS**

Attempting to provide a further understanding of aggression and antisocial behaviour in sports, items from antisocial behaviour towards opponents and teammates subscales originally developed by Kavussanu and Boardley (2009) were alternated with additional items specifically formulated for this study, included in the Aggressive Behaviour scale. These items were based on Maxwell and colleagues studies (Maxwell, 2004; Maxwell et al., 2009; Visek & Maxwell, 2009) on aggression in sport and intent to address other sport-specific situations not included in previous measures of this construct. Therefore, the exploratory factor analysis revealed a structure of three factors, which explain 57.09% of the variance ( $KMO = .87$ , Bartlett's test = 2707.28,  $p < .001$ ) (Table 1). Some items were removed for not loading above .32 and/or for loading in a factor not theoretically consistent. The first factor was named retaliation towards opponents and describes acts of provocation and retaliation behaviours towards opponents and referees, as well as behaviours against the implicit rules of fair play. The second factor was named retaliation towards teammates and describes verbal provocations directed towards teammates. Finally, the third factor, physical aggression, reflects specifically acts of physical aggression during sport

competition towards opponents. All the factors showed appropriate reliability levels, .83 for retaliation towards opponents, and .86 for physical aggression. A total score aggression was created including all the items in this scale, also showing a good reliability level (.89) (Nunnally, 1978). Despite retaliation towards opponents showing a lower reliability level, this was considered aggression given the exploratory nature of this scale.

**Table 1**

*Exploratory factor analysis of a new measure for aggression*

	Provocation and Retaliation Opponents	Verbal Aggression Teammates	Physical Aggression
Item 11	.85		
Item 10	.80		
Item 26	.77		
Item 2	.64		
Item 5	.60		
Item 19	.51		
Item 23	.48		
Item 16		.83	
Item 8		.80	
Item 20		.73	
Item 12		.53	
Item 14			-.91
Item 18			-.85
Item 1			-.79
Item 7			-.73
Item 6			-.46
<b>Variance</b>	34.87	12.57	9.64
<b>Cronbach's <i>Alpha</i></b>	.83	.62	.86

Additionally, in order to create a more “pure” measure of aggression, 5 items describing acts of aggression were selected and their psychometric characteristics were further analysed. This analysis demonstrated a four-item index of aggression that reflects acts of aggression in competition, with a good reliability levels (.82). An item was eliminated because it lowered the reliability level of the scale and it did not load above .32 (Tabachnick & Fidell, 2007).

## Pearson correlation analysis

Because this study is specifically dedicated to aggressive behaviours, this analysis is focused more on the patterns of association of retaliation toward opponents and teammates, as well as physical aggression, aggression index and the total of aggression. In addition, specific behaviours of the aggression index were considered separately in order to provide a further analysis of the patterns of association with different types of aggression. Therefore, the behaviours included were the following: “I used physical strength against the opponent just to hurt or injure him”; “I engaged in violent behaviours, using extreme physical strength”; “I engaged in aggressive behaviours, such as, tackling or kicking the opponent”; and “I hit the opponent just to obtain a some benefit in the game/competition”.

Overall, results from the analysis of correlation revealed a pattern of positive relationships among the variables of anger, aggressiveness and provocation and retaliation towards opponents and teammates, physical aggression, total aggression and the aggression index, as well as the specific behaviours considered in this study, ranging from strong ( $r=.70$ ,  $p<.001$ ) to low ( $r=.20$ ,  $p<.01$ ). Considering anxiety and its components, it was found that retaliation towards teammates was positively associated to total anxiety ( $r=.16$ ,  $p<.05$ ) and concentration disruption ( $r=.14$ ,  $p<.05$ ). The specific behaviour of engaged in aggressive behaviours, such as, tackling or kicking the opponent” was negatively associated to worry ( $r=-.13$ ,  $p<.05$ ).

Challenge appraisals were positively related to retaliation opponents ( $r=.17$ ,  $p<.01$ ) and total aggression ( $r=.14$ ,  $p<.05$ ), whereas threat did not show any significant associations. Furthermore, the analysis of the motivational variables of BIS and BAS demonstrated that all measures of aggressive behaviour were positively related to drive, except retaliation towards teammates, whereas the behaviour “I hit the opponent just to obtain a some benefit in the game/competition” was negatively associated to BIS ( $r=-.15$ ,  $p<.05$ ).

In terms of emotion regulation strategies, importance reappraisal showed negative relationship with all the types of aggression, except with two specific behaviours (“I engaged in violent behaviours, using extreme physical strength” [ $r=-.10$ ,  $p>.05$ ] and “I hit the opponent just to obtain a some benefit in the game/competition” [ $r=-.10$ ,  $p>.05$ ]). On its turn, goal congruency was negatively associated to retaliation toward teammates ( $r=-.13$ ,  $p<.05$ ) while problem efficacy was positively related to retaliation towards opponents ( $r=.23$ ,  $p<.001$ ), physical

aggression ( $r=.14$ ,  $p<.05$ ), total aggression ( $r=.17$ ,  $p<.01$ ) and the behaviour “I hit the opponent just to obtain a some benefit in the game/competition” ( $r=.14$ ,  $p<.05$ ). Wishful thinking was positively associated to retaliation towards opponents ( $r=.14$ ,  $p<.05$ ) and teammates ( $r=.14$ ,  $p<.05$ ), total aggression ( $r=.16$ ,  $p<.06$ ) and the behaviour “I hit the opponent just to obtain a some benefit in the game/competition” ( $r=.16$ ,  $p<.05$ ). Retaliation toward opponents was negatively associated to tension reduction ( $r=-.13$ ,  $p<.05$ ) but positively to task focus processes ( $r=.12$ ,  $p<.05$ ). Additionally, anger rumination was positively associated to retaliation opponents ( $r=.16$ ,  $p<.05$ ) and thought suppression to the behaviour “I engaged in aggressive behaviours, such as, tacking or kicking the opponent” ( $r=-.13$ ,  $p<.001$ ). Finally, self-control was found to be negatively associated to retaliation towards opponents ( $r=.19$ ,  $p<.01$ ) and teammates ( $r=-.19$ ,  $p<.01$ ).

### **Differences between low and high aggression levels**

After dividing participants in two groups according to their levels of aggressive behaviour (considering the total of aggression scale), a MANOVA was performed to test the differences in the groups across the variables in study (Table 3). This analysis demonstrated a general significant multivariate effect (Wilk's  $\lambda = .54$ ,  $F(24,225) = 7.88$ ,  $p<.001$ ). Univariate tests revealed that these participants differ significantly in their levels of anger ( $F(1,248) = 30.84$ ,  $p<.001$ ), aggressiveness ( $F(1,248) = 110.67$ ,  $p<.001$ ), provocation ( $F(1,248) = 195.70$ ,  $p<.001$ ), drive ( $F(1,250) = 5.64$ ,  $p<.05$ ), problem efficacy ( $F(1,248) = 7.02$ ,  $p<.01$ ), wishful thinking ( $F(1,248) = 7.75$ ,  $p<.01$ ), importance reappraisal ( $F(1,248) = 5.69$ ,  $p<.05$ ), anger rumination ( $F(1,248) = 12.09$ ,  $p<.01$ ) and self-control ( $F(1,248) = 16.96$ ,  $p<.001$ ). More specifically, those who reported higher levels of aggression tended to have higher levels of anger, aggressiveness, provocation, drive, problem efficacy, but lower levels of importance reappraisal and self-control.



**Table 2**

*Pearson correlations for the variables in study*

	Retaliation opponents	Retaliation teammates	Physical aggression	Aggression Index	Total aggression	"I used physical strength against the opponent just to hurt or injure him"	"I engaged in violent behaviours, using extreme physical strength"	"I engaged in aggressive behaviours, such as, tackling or kicking the opponent"	"I hit the opponent just to obtain a some benefit in the game/competition"	"I used physical strength against the opponent just to hurt or injure him"
Anger	.38***	.21**	.27***	.25***	.38***	.21**	.23***	.18**	.20**	.21**
Aggressiveness	.65***	.25***	.60***	.57***	.67***	.52***	.42***	.41***	.46***	.52***
Provocation	.70***	.27***	.38***	.34***	.60***	.34***	.27***	.25***	.28***	.34***
Somatic anxiety	-.03	.17**	-.01	.00	.03	-.04	.09	.04	-.06	-.04
Worry	-.03	.06	-.11†	-.11†	-.05	-.09	-.07	.13*	-.08	-.09
Concentration Disruption	-.03	.13*	-.05	-.05	.01	-.02	-.04	-.03	-.08	-.02
Anxiety total	-.04	.16*	-.08	-.08	-.01	-.07	-.01	-.07	-.10	-.07
Threat Appraisals	.09	.08	.10	.11†	.12†	.10	.09	.09	.05	.10
Challenge Appraisals	.17**	.04	.08	.07	.14*	.07	.11†	-.02	.06	.07
Core Self-evaluations	-.08	-.01	-.02	-.01	-.05	-.02	-.02	-.02	.05	-.02
BIS	-.05	.07	-.10	-.09	-.05	-.04	-.01	-.11†	-.15*	-.04
Fun Seeking	.06	-.001	.05	.03	.05	.09	.03	-.05	.03	.09
Drive	.25***	.12†	.27***	.25***	.28***	.20**	.18**	.23***	.20**	.20**
Reward Responsiveness	-.01	-.05	-.12†	-.12†	-.08	-.11†	-.06	-.12†	-.08	-.11†
Agency	.05	.04	.04	.04	.06	.05	.05	-.01	.01	.05
Goal Congruency	.12†	-.13*	.09	.08	.05	.05	.11†	.05	.05	.05
Problem efficacy	.23***	-.01	.14*	.12†	.17**	.09	.08	.07	.14*	.09
Self-blame	.11†	.08	.02	.03	.09	-.03	.01	.02	.09	-.03
Wishful thinking	.14*	.14*	.11†	.11†	.16**	.07	-.01	.11†	.16**	.07
Tension reduction	-.13*	-.01	-.06	-.05	-.10	-.07	-.04	.01	-.06	-.07
Importance reappraisal	-.15*	-.19**	-.16*	-.15*	-.21**	-.13*	-.10	-.14**	-.10	-.13*
Task focus processes	.12*	-.05	.01	.02	.05	-.01	.05	-.004	.06	-.01
Anger Rumination	.16*	.07	.02	.004	.11†	.01	.09	-.06	-.04	.01
Thought suppression	.02	.02	-.09	-.09	-.03	-.05	-.03	-.13*	-.09	-.05
Self-control	-.19**	-.19**	-.09	-.06	-.19**	-.05	-.05	-.03	-.05	-.05

**Table 336**

Differences between low and high anger

	Low Aggression (N=123)		High Aggression (N=127)		F	<i>p</i>
	M	SD	M	SD		
<b>CAAS</b>						
Anger	20.86	7.11	25.98	7.46	30.84	.000
Aggressiveness	17.48	5.28	27.85	9.62	110.67	.000
Provocation	8.64	2.489	13.11	4.15	105.70	.000
<b>SAS-2</b>						
Somatic anxiety	8.66	2.75	8.54	3.10	.11	.740
Worry	12.94	3.61	12.96	3.84	.00	.957
Concentration Disruption	7.98	2.54	8.26	2.59	.77	.382
<b>Cognitive appraisals</b>						
Threat Appraisals	22.85	6.95	24.38	6.50	3.21	.075
Challenge Appraisals	19.29	4.12	19.91	3.55	1.63	.203
Core Self-evaluations	2.89	.43	2.84	.40	.89	.346
<b>BIS/BAS</b>						
BIS	2.82	.57	2.78	.52	.44	.510
Fun Seeking	2.91	.59	2.91	.63	.00	.997
Drive	1.78	.72	2.00	.72	5.64	.018
Reward Responsiveness	3.44	.44	3.35	.45	2.16	.143
<b>Emotion regulation</b>						
Agency	3.90	.89	3.96	.70	.36	.550
Goal Congruency	3.75	.71	3.81	.70	.35	.553
Problem efficacy	3.40	.65	3.60	.59	7.02	.009
Self-blame	3.27	.82	3.38	.76	1.08	.300
Wishful thinking	2.06	.78	2.32	.70	7.75	.006
Tension reduction	2.98	.86	2.85	.68	1.85	.176
Importance reappraisal	3.81	.67	3.61	.67	5.69	.018
Task focus processes	3.65	.55	3.68	.54	.11	.736
Anger Rumination	31.40	12.96	37.10	12.98	12.09	.001
Thought suppression	51.29	11.00	51.52	10.62	.03	.868
Self-control	3.73	.52	3.45	.56	16.92	.000

## Predictors of aggression

In order to search for the main predictors of aggressive behaviour in sport, several stepwise regression analyses were performed. The same procedures were conducted for retaliation toward opponents and teammates and physical aggression. An inspection of the outlier led to the removal of two participants in this analysis. Firstly, emotional and aggression-related variables were introduced as predictors, namely, anger, aggressiveness, provocation and the components of anxiety. The total anxiety was not included in this analysis to avoid multicollinearity. A second predication model was composed of appraisal and motivational variables, including threat and challenge appraisals, core self-evaluations, BIS and Bas scales. A subsequent prediction model included emotion regulation (anger rumination, thought suppression, goal congruency, task focus processes, problem efficacy, importance reappraisal, wishful thinking, self-blame, tension reduction and agency) and self-control. Finally, after revealing the predictors found in the previous stepwise regression analyses, another analysis was performed including all the significant predictors.

Therefore, in the first analysis of the physical aggression (Table 4), aggressiveness, worry and provocation were found to be significant predictors, explaining 38 % of the variance ( $R^2_{ajd.} = .38$ ,  $F(3,248) = 51.36$ ,  $p < .001$ ). When considering appraisal and motivational variables, only drive was a significant predictor of physical aggression, which explained 7 % of the variance ( $R^2_{ajd.} = .07$ ,  $F(1,255) = 19.30$ ,  $p < .001$ ). From the emotion regulation processes and self-control analysis, it was found that importance reappraisal and problem efficacy were significant predictors, explaining 8 % of the variance ( $R^2_{ajd.} = .07$ ,  $F(3,254) = 7.90$ ,  $p < .001$ ). The final model combining all the significant predictors revealed that the main predictors of physical aggression are aggressiveness, provocation and worry, which explained 43% of the variance ( $R^2_{ajd.} = .42$ ,  $F(3,252) = 61.97$ ,  $p < .001$ ).

**Table 4***Stepwise regression for physical aggression*

	<i>B</i>	<i>SE</i>	$\beta$
<b>CAAS, Provocation, Anxiety</b>			
Aggressiveness	.033	.003	.553***
Worry	-.020	.008	-.127**
Provocation	.017	.008	.115*
<b>BIS/BAS, Appraisals, Core</b>			
Drive	.19	.04	.27***
<b>Emotion regulation, Self-control</b>			
Importance reappraisal	-.184	.051	-.237***
Problem efficacy	.179	.057	.208**
Wishful thinking	.092	.042	.132*
<b>Prediction model</b>			
Aggressiveness	.029	.003	.536***
Provocation	.026	.007	.197***
Worry	-.016	.007	-.116*

Additionally, it was found that aggressiveness, provocation and worry were significant predictors of retaliation towards opponents (Table 5) explaining a total of 62 % of the variance ( $R^2_{\text{ajd.}} = .62$ ,  $F(3,250) = 135.59$ ,  $p < .001$ ). The second stepwise regression analysis revealed that drive and challenge are significant of predictors retaliation towards opponents and explain 8 % of the variance ( $R^2_{\text{ajd.}} = .08$ ,  $F(2,256) = 11.50$ ,  $p < .001$ ). Taking into account emotion regulation strategies and self-control, it was found that problem efficacy, importance reappraisal, self-control and task focus processes, were significant predictors of retaliation towards opponents explaining 17 % of the variance ( $R^2_{\text{ajd.}} = .16$ ,  $F(4,255) = 13.18$ ,  $p < .001$ ). Finally, when all the significant predictors were introduced in the analysis, aggressiveness, problem efficacy and provocation were found to be the main predictors, explaining a total of 63 % of the variance of behaviour related of retaliation and provocation towards opponents ( $R^2_{\text{ajd.}} = .63$ ,  $F(3,253) = 18.51$ ,  $p < .001$ ).

**Table 5***Stepwise regression for retaliation towards opponents*

	<i>B</i>	<i>SE</i>	$\beta$
<b>CAAS, Provocation, Anxiety</b>			
Provocation	.075	.006	.521***
Aggressiveness	.025	.003	.407***
Worry	-.014	.006	-.089*
<b>BIS/BAS, Appraisals, Core</b>			
Drive	.185	.048	.229***
Challenge	.024	.009	.155*
<b>Emotion regulation, Self-control</b>			
Self-control	-.246	.062	-.232***
Problem efficacy	.253	.062	.263***
Importance Reappraisal	-.260	.058	-.298***
Task focus processes	.194	.073	.178**
<b>Prediction model</b>			
Provocation	.073	.006	.506***
Aggressiveness	.024	.003	.398***
Problem efficacy	.101	.037	.106**

In the search for the predictors of retaliation towards teammates (Table 6), the first model of anxiety and aggression-related variables revealed that provocation, somatic anxiety and aggressiveness were significant predictor and explained 12 % of the variance ( $R^2_{adj} = .11$ ,  $F(3,250) = 11.65$ ,  $p < .001$ ). In the second analysis, there were no significant predictors among motivational and appraisal variables. However, considering emotion regulation and self-control, it was found that importance reappraisal and self-control significantly predicted retaliation and provocation towards teammates and explained 6 % of the variance ( $R^2_{adj} = .06$ ,  $F(2,257) = 8.77$ ,  $p < .001$ ). The final model with all the significant predictors demonstrated that provocation, importance reappraisal and somatic anxiety were the main predictor of these behaviours, explaining 12 % of the variance ( $R^2_{adj} = .11$ ,  $F(3,253) = 11.32$ ,  $p < .001$ ).

**Table 6***Stepwise regression for retaliation towards teammates*

	<i>B</i>	<i>SE</i>	$\beta$
<b>CAAS, Provocation, Anxiety</b>			
Provocation	.021	.007	.190**
Somatic Anxiety	.027	.009	.175**
Aggressiveness	.008	.003	.164**
<b>Emotion regulation, Self-control</b>			
Self-control	-.133	.049	-.169**
Importance reappraisal	-.104	.040	-.160**
<b>Prediction model</b>			
Provocation	.025	.006	.233***
Importance reappraisal	-.106	.039	-.163**
Somatic anxiety	.024	.009	.160**

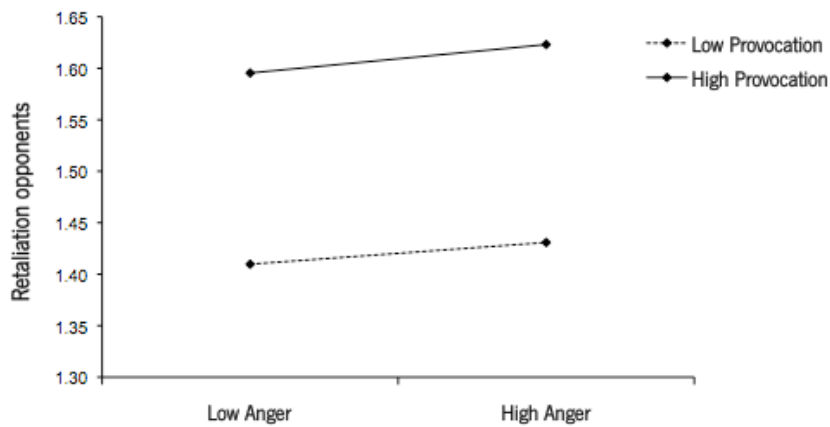
### Moderators between anger and aggressive behaviour

Multiple hierarchical regression analyses were conducted to find the potential moderators between anger and retaliation towards opponents and teammate and physical aggression, following the procedures for moderation analysis described by Dearing and Hamilton (2006). Thus, all the variables introduced in the equation were centred and the interaction was obtained by multiplying the moderator and the independent variable, which was introduced in step two of the hierarchical regression analysis.

Firstly, the potential moderating role of the predictors used in the previous stepwise regression analyses on the relationship between anger and retaliation and provocation towards opponents was tested (Table 7). It was found that the interaction term between anger and provocation explained significant increases in the variance ( $\Delta R^2 = .009$ ,  $F(1,259) = 4.82$ ,  $p < .05$ ). Post hoc simple slope testes (Aiken & West, 1991) demonstrated that both the low provocation ( $t=2.87$ ,  $p < .01$ ) and high provocation groups ( $t=3.81$ ,  $p < .01$ ) slopes were significant, but the effect of the interaction is stronger in the high provocation group (Fig. 1).

**Table 7***Moderation for the relationship between anger and retaliation towards opponents*

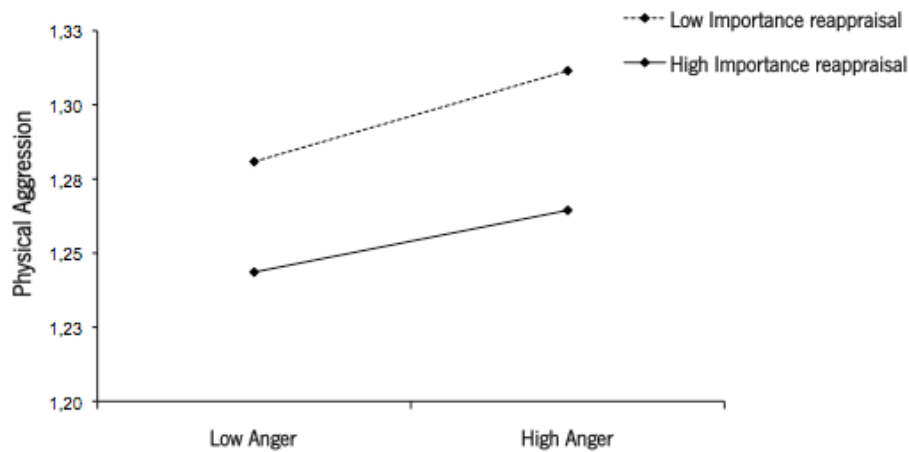
	<i>B</i>	<i>SE</i>	$\beta$
Anger	.01	.00	.16**
Provocation	.09	.01	.64***
Anger x Provocation	.00	.00	.10*

**Figure 6 Provocation as a moderator between anger and retaliation towards opponents**

The same procedures were conducted for the relationship between anger and physical aggression (Table 8). The interaction term between anger and importance reappraisal contributed significantly to increases in the variance ( $\Delta R^2 = .014$ ,  $F(1,256) = 3.77$ ,  $p < .05$ ). Subsequent post hoc simple slope tests indicated that both the low importance reappraisal ( $t=3.53$ ,  $p < .01$ ) and high importance reappraisal groups ( $t=2.35$ ,  $p < .01$ ) slopes were significant, but the effect of the interaction is stronger in the low importance reappraisal group (Fig. 2).

**Table 8***Moderation for the relationship between anger and physical aggression*

	<i>B</i>	<i>SE</i>	$\beta$
Anger	.013	.004	.185**
Importance reappraisal	-.021	.010	-.134*
Anger x Importance reappraisal	-.002	.001	-.117*



**Figure 7** Importance reappraisal as a moderator between anger and physical aggression

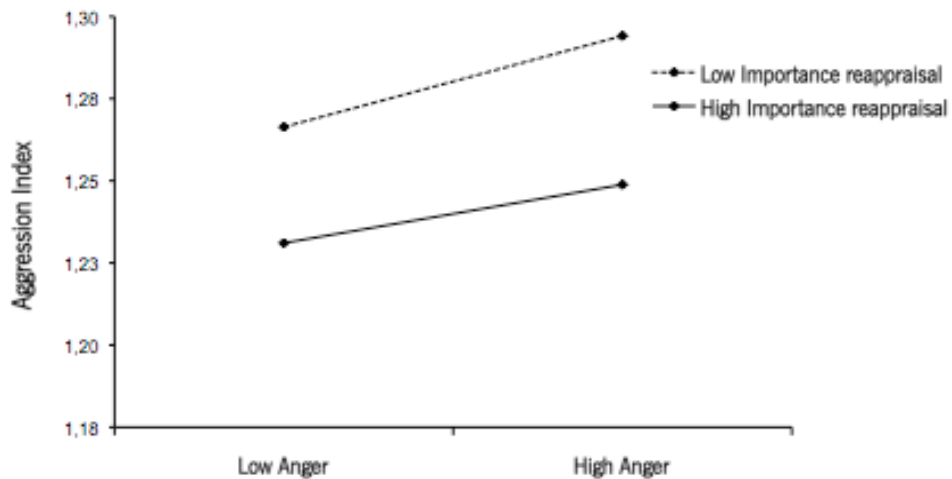
Additionally, no variable moderated the relationship between anger and retaliation and provocation towards teammates. However, when considering the index of aggression, importance reappraisal was also a significant moderator of the relationship between anger and aggression (Table 9), contributing to a significant increase in the variance ( $\Delta R^2 = .015$ ,  $F(1,256) = 4.12$ ,  $p < .05$ ). Simple slope tests revealed tests indicated that that both the low importance reappraisal ( $t=3.17$ ,  $p < .01$ ) and high importance reappraisal groups ( $t=1.99$ ,  $p < .01$ ) slopes were significant and the effect of the interaction is stronger in the low importance reappraisal group (Fig 3).

**Table 9**

*Moderation for the relationship between anger and aggression index*

	<i>B</i>	<i>SE</i>	$\beta$
Anger	.011	.004	.165**
Importance reappraisal	-.020	.010	-.129*
Anger x Importance reappraisal	-.002	.001	-.123*





**Figure 8** Importance reappraisal as a moderator between anger and aggression index

### Sport Penalties differences

Participants were asked to indicate how many times they had been excluded from the game for serious reasons in using the following scale: never; 5 to 10 times; and more than 6 times. The analysis of the athletes' responses revealed that most of them had never been excluded for serious reasons (74.4%), while 22.4% were expelled between 5 and 10 times, and only 3.6% more than 6 times. Therefore, the differences between those who had never been expelled and those who had been expelled more than 1 time were analysed. Because these groups are uneven, participants who had never been expelled were randomly selected to even the groups (Tabachnick & Fidell, 2007). Although the MANOVA (Table 10) did not indicate a significant multivariate effect (Wilk's  $\lambda = .86$ ,  $F(12,114) = 1.53$ ,  $p < .05$ ), univariate tests revealed that these participants differ significantly in their levels of retaliation towards opponents ( $F(1,125) = 11.17$ ,  $p < .01$ ), physical aggression ( $F(1,125) = 5.19$ ,  $p < .01$ ), aggressiveness ( $F(1,125) = 11.03$ ,  $p < .01$ ) and provocation ( $F(1,125) = 5.19$ ,  $p < .05$ ). Therefore, those who were excluded more than one time tended to show higher levels of retaliation towards opponents, physical aggression, aggressiveness and provocation.

**Table 10***Differences across exclusion groups*

	Never excluded for serious reasons (N = 62)		One or more Exclusions for serious reasons (N = 65)		F	p
	M	SD	M	SD		
<b>Aggression</b>						
Retaliation opponents	1.45	.53	1.83	.73	11.17	.001
Retaliation teammates	1.29	.41	1.38	.50	1.14	.287
Physical aggression	1.25	.52	1.47	.57	5.19	.024
<b>CAAS</b>						
Anger	23.09	8.50	25.33	7.36	2.53	.114
Aggressiveness	21.83	8.49	26.80	10.78	8.29	.005
Provocation	10.74	3.67	13.08	4.22	11.03	.001
Drive	1.94	.81	1.98	.74	.09	.766
Problem efficacy	3.45	.60	3.60	.52	2.16	.145
Wishful thinking	2.24	.86	2.29	.71	.14	.705
Importance reappraisal	3.75	.64	3.58	.67	1.98	.162
Anger rumination	33.52	13.26	35.80	12.54	1.00	.320
Self-control	3.56	.57	3.44	.55	1.55	.215

The differences between being penalized for using physical aggression and for other reasons, such as breaking the rules of the game and arguing with the referee were also tested. Specifically, most participants reported being penalized for engaging in aggressive behaviours (49%), while others mentioned verbal aggression (36%) and rule breaking behaviours (14.8%). Therefore, two groups were created: those who were penalised for physical aggression and those who were penalised for other reasons. An analysis of the difference between these groups revealed a multivariate significant effect was observed (Wilk's  $\lambda = .52$ ,  $F(12,45) = 3.41$ ,  $p < .01$ ), and univariate tests revealed that these participants differ significantly in their levels of retaliation towards opponents ( $F(1,56) = 6.64$ ,  $p < .05$ ), physical aggression ( $F(1,56) = 17.40$ ,  $p < .001$ ), aggressiveness ( $F(1,56) = 19.99$ ,  $p < .001$ ), importance reappraisal ( $F(1,56) = 8.19$ ,  $p < .01$ ) and self-control ( $F(1,56) = 10.86$ ,  $p < .01$ ) (Table 11). Individuals penalized for using physical aggression showed higher levels of retaliation towards opponents, physical aggression, aggressiveness and wishful thinking and less problem efficacy, importance reappraisal and self-control.

**Table 11***Differences across reason for penalties*

	Penalties for breaking rules (N = 24)		Penalties for aggressive acts (N = 34)		F	p
	M	SD	M	SD		
<b>Aggression</b>						
Retaliation opponents	1.9	.54	2.11	.87	6.64	.013
Retaliation teammates	1.38	.55	1.41	.50	.053	.819
Physical aggression	1.18	.37	1.81	.67	17.40	.000
<b>CAAS</b>						
Anger	26.45	8.89	27.30	7.81	.149	.701
Aggressiveness	22.11	7.23	32.62	10.90	17.00	.000
Provocation	12.00	3.82	13.89	4.70	2.63	.111
Drive	2.06	.68	2.06	.76	.00	.985
Problem efficacy	3.75	.54	3.51	.58	2.54	.117
Wishful thinking	2.13	.62	2.29	.66	.90	.348
Importance reappraisal	3.81	.55	3.35	.63	8.19	.006
Anger rumination	34.42	14.42	35.79	11.23	.17	.684
Self-control	3.75	.44	3.31	.54	10.86	.002

## DISCUSSION

This study is mainly centred in the analysis of aggression in sport in order to provide a deeper understanding of this issue. One of the most serious problems in the study of aggression is its measure (Maxwell, 2004; Maxwell & Moores, 2007; Stephens, 1998). Specifically, there is some controversy regarding what type of acts can be considered aggression (Tenenbaum et al., 1997). Kerr (1999, 2002, 2008) suggests that aggression is an integral part of sports and should be accepted as such. However, the fact that an act is “accepted” in sport does not change its aggressive nature (Maxwell & Moores, 2008). Therefore, Maxwell and Moores (2007) have suggested that in order to overcome the problems associated with the measurement of aggression in sport, studies should focus on its main antecedents, anger and aggressiveness (Berkowitz, 1993). While anger is an emotion, aggressiveness can be defined as “the disposition to become aggressive or acceptance of and willingness to use aggression” (Maxwell & Moores, 2007, p. 182).

Nonetheless, this study firstly addressed this issue by combining a recent measure in

antisocial behaviour in sport (Kavussanu & Boardley, 2009) and some new items based upon Maxwell and colleagues' (Maxwell, 2004; Maxwell et al., 2009; Visek & Maxwell, 2009) recent studies on aggression. An exploratory analysis found a three-factor structure for this new measure of aggression, including the following factors: retaliation towards opponents, which reflect actions of retaliation through gestures, revenge and verbal provocation; retaliation towards teammates, reflecting acts of verbal aggression and provocation towards teammates; and physical aggression, indicating acts of physical aggression and violence.

This new measure includes a distinction between physical and other types of aggressive behaviour, similarly to the Buss and Perry's (1992) Aggression Questionnaire, which includes dimension of verbal and aggression, hostility and anger. Additionally, in the analysis of the language of the items, the distinction between instrumental and reactive aggression (Husman & Silva, 1984) was avoided. Although the Bredemeier Athletic Aggression Inventory (BAAGI; Bredemeier, 1975) includes this distinction, it is not always clear whether the ultimate goal of an act of aggression is to obtain a benefit in the game (instrumental) or if this act was originated by angry feelings (hostile aggression) (Anderson & Bushman, 2002).

Moreover, a further analysis found an additional index of aggression, which only includes items pertaining to acts of physical aggression and violence. These items were also analysed separately to found differential patterns of correlation among the different types of aggression. In this sense, consistently across all the factors related aggression in this study, namely, retaliation towards opponents and teammates, physical aggression, index of aggression, total aggression and the specific behaviours, it was found that all were positively associated to anger, aggressiveness and provocation. Additionally, individuals with higher levels of aggression also reported higher levels of anger, aggressiveness and provocation. Aggressiveness and provocation were also positive predictors of both retaliation directed to opponents and physical aggression in the final model. However, aggression towards teammates was only predicted by provocation in the final model, although both provocation and aggressiveness were significant predictors in the first regression analysis (considering anger, anxiety, aggressiveness and provocation). Nonetheless, this supports the relevance of these constructs as important antecedents of aggression in sport competition (Harrell, 1980; Maxwell, 2004; Maxwell & Moores, 2007, 2008; Maxwell et al., 2009; Maxwell & Visek, 2009; Russell, 1974). Further support for provocation as an important antecedent of aggression was also found in its moderating role between the relationship anger and retaliation towards opponents. It seems that athletes that are more provoked tend to be more aggressive. A possible explanation for this finding can be self-control failure. That is, as

athletes are being constantly provoked, they may lose their self-regulatory resources, which are limited (e.g., Baumeister et al., 2007) and engage in aggression.

Most studies on aggression in sport tend to focus on anger as an emotional precedent of this behaviour (e.g., Maxwell & Moores, 2007; Kerr, 2006), and therefore the relationship between anxiety and aggression is less explored. This study analysed the different patterns of association between anxiety (and its components) and the different types of aggressive behaviour. Retaliation towards teammates was positively associated to total anxiety and the cognitive component of concentration disruption. Consistently, in the regression of the predictors of retaliation towards teammates, somatic anxiety was a positive predictor, both when considering emotional and behavioural predictors and in the final prediction model. These results highlight the importance of considering the role of anxiety in aggression in sport, specifically directed towards teammates. Dias and colleagues (2012) suggested that individuals with higher levels of anxiety tend to use less adaptive coping strategies, which can partially explain these findings. Perhaps athletes with higher levels of anxiety “turn” their aggressive behaviour towards the teammates instead of actively confronting the opponents. Consistently, worry, a cognitive component of anxiety (Smith et al., 2006), was negatively associated to the specific behaviour of “I engaged in aggressive behaviours, such as tackling or kicking the opponent”. Worry was also a negative predictor of both physical aggression and retaliation towards opponents. This again supports the idea that anxiety seems to lead to more aggression towards teammates, but less towards opponents.

When considering the relationship between aggression and approach (BAS) and avoidance motivation (BIS), the literature has suggested that this behaviour is positively associated to actively pursuing a goal (approach motivation) and negatively to avoiding an “anti-goal” (BIS) (Smits et al., 2004; Smits & Kuppens, 2005). Other studies were more specific and demonstrated that approach motivation is positively associated to offensive aggression (Harmon-Jones & Sigelman, 2001), as well as physical aggression (Harmon-Jones, 2003). Conversely, the BIS has been negatively linked to physical aggression (Harmon-Jones, 2003). This study seems to support the idea of aggression as an approach related behaviour, as indicated by the positive association between drive, a component of the BAS that reflects persistence in the pursuit of desired goals, and all the measures of aggression, except retaliation towards teammates. The regression analysis also revealed that drive predicted both retaliation towards opponents and physical aggression when considering cognitive appraisal and motivational variables as predictors. Drive was also higher among those who reported being more aggressive. Additionally,

and also consistent with previous findings (Smits et al., 2004; Smits & Kuppens, 2005), the specific behaviour of “I hit the opponent just to obtain a some benefit in the game/competition” (indicated physical aggression towards opponents) was negatively associated to BIS. Because the dimension of BIS can represent anxiety (Corr, 2001), it seems that, as Smits and Kuppens (2005) suggested, anxiety (measured by the BIS) suppresses the expression of aggression. Thus, by differentiating aggression towards teammates and opponents, this study found evidence to support the idea that anxiety decreases aggression towards opponents, but can increase aggression directed to teammates.

Furthermore, total aggression and aggression towards opponents were positively associated to challenge appraisals. These appraisals were also an important predictor of retaliation towards opponents. According to Jones and colleagues (2009) challenge appraisals can represent a motivational state characterised by approach motivation. Therefore, these results suggest that aggression often occurs when individuals actively pursuit their goals, rather than avoiding the situation, which would lead to anxiety (Jones and et al., 2009).

Within the emotion regulation strategies, importance reappraisal showed a negative association with all the types of aggression, as well as to two specific aggressive behaviours. Across all the different types of aggression, importance reappraisal was a negative predictor, and was found to be lower among the more aggressive players. Additionally, moderation analysis revealed that importance reappraisal moderated the relationship between anger and physical aggression, as well as between anger and the aggression index. This suggests that those who use less reappraisal tend to show more aggression. Indeed, reappraisal is an effective emotion regulation strategy to reduce anger (Mass et al., 2007; Denson et al., 2012), which can in turn reduce the likelihood of aggressive responses.

Other emotion regulation strategies were also linked to a decrease in aggression. Specifically, appraising competition as helpful to achieve goals (goal congruency) (Schutz et al, 2004) leads to less aggression towards teammates, as well as aggression in general. Additionally, using strategies to reduce tension (tension reduction) can also reduce retaliation towards opponents. By “cooling down” after provocations, athletes can reduce their anger and engage in less aggressive behaviours. Joseph and Cramer (2011) also found that cricket players use self-talk as a form of calming down after provocations. Lastly, although thought suppression is often ineffective (Wegner, 2009), it was found that this emotion regulation strategy decreased the likelihood of engaging in a specific act of physical aggression towards opponents, which includes tackling and kicking him.

Conversely, other emotion regulation strategies appear to increase the tendency to engage in aggression. Problem efficacy reflects appraising the potential to deal with problems that occur (Schutz & Davis, 2000), which suggests those who feel that they can deal with any problems in competition tend to be more aggressive. Consistently, problem efficacy was also higher in players that reported being more aggressive. This emotion regulation strategy was also a positive predictor of both physical aggression and retaliation towards opponents when considering emotion regulation and self-control strategies, and remained a significant predictor for retaliation towards opponents in the final regression model. This suggests that problem efficacy increases aggression towards opponents, but not towards teammates.

Likewise, wishful thinking was positively associated to retaliation towards opponents and teammates, total aggression and the specific aggressive behaviour "I hit the opponent just to obtain a some benefit in the game/competition". Additionally, it was also a positive predictor of physical aggression. Overall, the analysis of differences between athletes high and low in aggression also demonstrated that more aggressive athletes engage more in wishful thinking. Although few studies have explored this relationship, Hart (1991) had observed that wishful thinking as a strategy to deal with anger can increase its intensity. Finally, focusing on the competition (task focus processes) also increases the retaliation towards opponents, as shown by the positive association between retaliation towards opponents and task focus processes, and the fact that task focus processes positively predicted this behaviour.

Anger rumination has been acknowledged as an important antecedent of aggression in general (e.g., Denson et al., 2010, 2011) and in sports as well (e.g., Maxwell, 2004). This study showed that anger rumination was positively related to retaliation towards opponents. Moreover, athletes with higher levels of aggression also tended to engage more in this emotion regulation strategy. Because anger rumination was specifically associated to retaliation towards opponents, this suggests that the contents of the athletes' rumination might be related to incidents involving opponents, such as provocations and aggressions.

Lastly, self-control was found to be negatively associated to retaliation towards opponents and teammates and total aggression, but not to physical aggression and to the index of aggression (including the specific behaviours). Additionally, self-control was a negative predictor of both retaliation towards opponents and teammates, and differentiated athletes with high and low aggression, suggesting that those with a higher capacity of self-control tend to be less aggressive. Studies showing the relationship between aggression and self-control (e.g., Denson et al., 2010, 2011) are mainly performed in laboratory settings, and do not account for the different

types of aggression. This study appears to suggest that self-control may not influence physical aggression, perhaps because other processes, such as provocation and aggressiveness (e.g., Maxwell & Moores, 2007), have a more important role in this relationship. Additionally, physical aggression might be premeditated and associated to revenge feelings (Anderson & Carnagey, 2009) and not be caused by a decrease in self-regulatory resources (Baumeister et al. 1998)

Unlike some archival studies (Russel, 1984, 1993) that used penalties as a measure of aggression, this study used a self-report measure of aggression and tested its effect on sport penalties. In the analysis of the differences considering sport penalties, regardless of the reasons for being excluded, it was observed that those who were excluded more than one time tend to engage in more retaliation towards opponents, physical aggression, and have higher levels of aggressiveness and provocation. These results support those reported by Bidutte and colleagues (2005), who found that both instrumental and hostile aggression were associated with players' number of cards (both yellow and red). However, it highlights the importance of provocation as an important factor in sport penalties. Additionally, retaliation towards opponents failed to discriminate these athletes. Because this type of aggression is more verbal, it may reflect that referees are more willing to accept such behaviours and/or do not pay attention to them.

When considering the same variables to distinguish between those who were penalised for using physical aggression and those who were penalised other reasons, such as breaking the rules of the game, it was observed, as expected, that athletes with aggressive penalties tended to have higher levels of retaliation towards opponents, physical aggression, aggressiveness and wishful thinking and less problem efficacy, importance reappraisal and self-control. The differences in the variables of aggression were similar to the groups of exclusions groups. However, provocation failed to discriminate athletes with different types of penalties. This may suggest that provocation can lead athletes to both aggressive and non-aggressive penalties. Furthermore, this analysis also demonstrated the negative impact of wishful thinking as an emotion regulation strategy that may lead to anger (e.g., Hart, 1991). Conversely, it highlights the importance of self-control (e.g., Tangney et al., 2004) and importance reappraisal (Mauss et al., 2007) in control of anger and aggression.

This study has revealed several important findings with theoretical and practical implications. A broad analysis of the most important results of this study suggests the importance of considering different types of aggression, especially distinguishing between aggression towards teammates and towards opponents. In fact, anxiety seems to lead to more aggression towards teammates, but suppresses the aggressive responses towards opponents.



Generally, it is also important to note that emotion regulation strategies of problem efficacy, task focus processes and wishful thinking tend to lead to more aggression, whereas tension reduction, self-control and importance reappraisal lead to less aggression. Additionally, the measures of aggression distinguished athletes who were more frequently excluded from the game and/or those who were penalised for aggressive reasons. However, aggression towards teammates failed to distinguish athletes according to their penalties, which suggests that this type of aggression is more “accepted” and/or “overlooked” in sport competition.



## STUDY 5

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Perceptions and beliefs about anger and aggression in sports: A  
qualitative study with male hockey players



## INTRODUCTION

Although the study of aggression remains a topic of interest in sport psychology (Russel, 2008), research is somehow disperse through different theoretical and methodological approaches (e.g., Kimble et al., 2010). Therefore, because qualitative research approaches provide a more in-depth understanding of the topic in study (Biddle et al., 2001), this study will employ this methodology in order to analyse athletes' perceptions and beliefs about aggressive behaviour in sport.

Despite the increase in qualitative methodologies in sport psychology investigations (see Streat, 1998), a literature review on qualitative studies about aggression in sport or related constructs (e. g., anti-social behaviour, violence, moral reasoning) has produced very few results. However, more recently, some studies have used qualitative designs to investigate this issue, although following different theoretical backgrounds. A study by Pappas, Mackenry and Catlett (2004) studied the phenomenon of aggression within the context of ice hockey, considering aggressive behaviour both outside and in the rink. This study found that interpersonal aggression is an integral part of ice hockey players' lives, present both in their everyday life and inside the rink. Among the reasons to explain such behaviour, players indicated aggressive tendencies and the sport socialisation process, which not only tolerated but also encouraged violence and aggression. Another factor that contributed to their aggressive behaviour was the culture of masculinity that promotes masculine expression. This culture of masculinity reflected not only worries about achievement, but also a need to be perceived by others as "tough" through fighting or risk-taking. In addition, alcohol consumption was the main reason suggested by the players to explain off-rink aggression.

Within the moral reasoning perspective (Bredmeier & Shiels, 2001), Long and colleagues (2006) performed a qualitative study with sample 10 young elite athletes. It was observed that antisocial behaviour was perceived to depend on several factors, such as individual characteristics of the players, the social environment of the sport contexts (such as the pressure from the coach and the team norms), the rewards that may come from sports (such as financial rewards) and the values and ethic associated to sports (such as fair-play). Similarly, Corrion and colleagues (2009) also explored basketball and Taekwondo athletes' transgressive behaviour. Results of the interviews demonstrated that athletes engaged in several transgressive behaviours,

such as using the rules of the game for their own benefit, simulating an injury or provocation to make the opponent suffer a penalty. Athletes also mentioned that physical aggression is directed towards opponents, while verbal aggression can be directed towards both opponents and referees. In addition, it was also mentioned that aggressive acts could also be accidental. Moreover, the mechanisms of moral disengagement described by Bandura, Barbaranelli, Caprara, and Pastorelli (1996) were used to justify these transgressive behaviours.

Another qualitative study by Grange and Kerr (2009) applied the definition of aggression proposed by Kerr (2005) to analyse qualitative interviews. According to this author, there are four types of aggression in sports: play aggression, which refers to the aggression that is accepted by the rules and norms of the game; power aggression, reflecting a behaviour used to exert domination and superiority over the opponents; anger aggression, which corresponds to the aggression that derives from anger and is often an impulsive act in response to a provocation or an aggression; and thrill aggression, which represents aggressive acts that do not have a specific purpose and occur because it provides a “pleasure” feeling to the athlete. The analysis of the speeches of 8 Australian football players demonstrated that these types of aggression could be identified in their descriptions of aggressive behaviour in sport. In addition, the perceptions about the recent changes in the Australian football rules were also explored (more strict rules regarding aggression and more severe punishment). Generally, players found these changes positive because the game became faster and more athletic and aggressive behaviour diminished.

More recently, a qualitative study (Joseph & Cramer, 2012) explored the sledging behaviour (verbally provoking an opponent) among cricket players. Specifically, this study explored the effects of being verbally provoked during competition. Most athletes mentioned an altered perception of the self, causing emotional instability and insecurity and thus affecting confidence. It was also suggested that being sledged can lead to an altered state of mind, leading to a loss of concentration. In addition, it also increases physiological arousal, which was found to lead to a decrease in players’ performance. In order to deal with sledging, the coping strategy most mentioned by the athletes was self-talk, including both spoken words and cognitions. However, other strategies were also reported, such as cognitive imagery, showing frustration, avoidance coping, relaxation, routines and external support.

Despite these efforts to qualitatively analyse aggression in sports, several important constructs related to this behaviour must be included to better understand this issue. Because

provocation and anger rumination have been consistently found to be important predictors of aggressive behaviour in sport (Maxwell, 2004; Maxwell & Moores, 2007; Maxwell & Visek, 2009; Maxwell, Visek & Moores, 2009), this study will also take in consideration these constructs.

Following the recent instrumental perspectives on emotion (e.g., Tamir, 2009), it is also important to explore the perceived impact of anger, as well as of aggression, on sports performance. Previous studies have reported the dualistic effects of anger in performance, which can be beneficial, providing additional energy and motivation, or harmful, affecting athletes' concentration (Ruiz & Hanin, 2004, 2011). Recent studies on the emotion regulation of anger have also suggested the positive impact of anger on confrontational takes (e.g., Tamir et al. 2008), as well as on physical, but not cognitive, performance (Woodman et al., 2009).

Because anger is one of the most important antecedents of aggression (e.g., Maxwell & Moores, 2007; Maxwell et al., 2009; Kerr, 2006), it is also important to consider the processes implicated in the generation of this emotion. According to Lazarus (1991, 1999, 2000), the generation of an emotional experience depends on an appraisal process, which reflects the personal meaning of the situation to the individual. Therefore, this study will also attempt to explore the different appraisals associated with the experience of anger.

Consequently, because there are multiple responses to anger, including aggression (Kuppens et al., 2004), the processes of regulation of this emotion must also be taken into account. Therefore, three main processes were found to be important in the regulation of anger and appear to complement each other (Koole, 2009), namely coping processes (e. g. Bolgar, Janelle, & Giacobbi, 2008; Grange & Kerr, 2011; Joseh & Cramer, 2012), emotion regulation strategies (e.g., Tamir, 2009; Gross, 2008a, b) and self-control (e.g., Denson et al, 2010, 2011).

Therefore, this study intends to explore hockey players' beliefs and perceptions about anger and aggression in sport. In addition, it also aims to analyse players' perceptions about the potential impact of anger and aggression on sports performance, as well as the processes implicated in their regulation. Finally, this study will also attempt to, from a more practical standpoint, provide measures to prevent aggression in sport according to the athletes' own "point of view".

## METHOD

### Participants

This study included 8 male hockey players from two clubs, ranging from the ages of 21 to 38 years ( $M=27.8$ ). All participants are seniors and play in different positions, such as goalie (2), defenseman (3) and forward (3). In addition, they have an average of 10.8 years of experience, from 3 to 27 years, and reported being excluded from the game for serious reason in the last season an average of 3.4 times, ranging from a minimum of 0 to a maximum of 6 times. Table 1 shows some demographic and sports data about these athletes.

**Table 1**

*Demographic and sport characteristics of the participants*

<b>Athlete</b>	<b>Age</b>	<b>Years of Practice</b>	<b>Position</b>	<b>Exclusions</b>
1	38	6	Goalie	3
2	24	4	Defenseman	5
3	38	9	Defenseman	6
4	22	13	Goalie	0
5	22	3	Forward	1
6	33	27	Forward	4
7	21	12	Defenseman	6
8	24	15	Forward	2

### Instruments

In order to “capture” personal and subjective experiences, as well as individual perceptions of anger and aggression in sports, the semi-structured interview was found to be the most adequate method. Indeed, several authors (e. g., Araújo, Cruz, & Almeida, 2011; Biddle et al.; Côté, Ericson, & Law, 2005; Matos, 2011) have suggested that the qualitative interview provides more detailed information and a further understanding of the issue in study.



Given the scarce number of qualitative studies on anger and aggression in sports, and the diversity of theoretical approaches among these studies, the development of the interview guide relied mostly on an extensive literature review on the subject, as well as on previous interview guides from other studies with similar theoretical approaches (Dias et al., 2009a; Matos, 2011). Additionally, besides considering the specific literature on sports, more recent perspectives brought from general psychology were also included.

Therefore, this interview guide is divided into four main subjects (Appendix X):

a) Perception of anger and aggression in sports. This part explores athletes' perceptions about anger (Ruiz & Hanin, 2004, 2011) and aggression in sports (Visek & Watson, 2005; Maxwell, Visek & Moores, 2008).

b) Control of anger and aggression, including the processes of coping (e.g., Bolgar, Janelle, & Giacobbi, 2008; Joseh & Cramer, 2012), emotion regulation (e.g., Tamir, 2009; Gross, 2008a, b) and self-control (e.g., Dewall et al., 2007). In this part of the interview, and in order to explore the experience of anger since its generation to its regulation, participants were asked to describe an angry situation. This situation was explored with some questions based on the Emotion Regulation Interview (ERI; Werner, Goldin, Ball & Gross, 2011), which includes the appraisal and regulation processes of an emotion.

c) Beliefs about the impact of anger and aggression on performance. This section explored the instrumental use of aggression in sports and the athletes' perception of its impact (e.g., Maxwell, 2004; Maxwell & Moores, 2007; Tamir, 2009), as well as the perception of anger (e.g., Tamir et al., 2008).

b) Prevention of aggression. Although not very significant in the literature review, the interview guide also intended to explore how can aggression and violence in sports can be prevented "in the eyes" of the athletes.

## **Procedures**

Participants were contacted about the participation in the current study and after their agreement, a meeting was arranged according to their availability. All the interviews were

conducted by the main researcher of this study in a place indicated by the athletes (e.g., their house, rooms in the hockey club and university). Before each interview, the aims of this research were explained and data confidentiality was ensured. This first phase allowed the establishment of a trusting relationship with these athletes, which is of extreme importance in qualitative research (Giacobbi et al, 2004). Afterwards, athletes completed an informed consent form, as well as a questionnaire including demographic and sports history questions. After this procedure, athletes were asked if the interview could be taped using an audio recorder, to which all 8 participants gave their consent. Each interview lasted for an average of 30 minutes, from a minimum of 20 minutes to a maximum of 45 minutes.

## **Data analysis**

All the interviews were transcribed resulting in 58 pages of text. Because the methodology employed in this study was the content analysis, in the first phase of the study, a coding protocol was developed in order to organise the emerging categories (Patton, 2002; Schilling, 2006; Coutinho, 2011). Therefore, this study was performed according to two different approaches. The deductive approach reflects the elaboration of a previous coding protocol based upon a literature review on the topic while the inductive approach reflects the inclusion of categories that were empirically identified in the players' speeches. In this sense, the initial coding protocol was systematically rearranged over the course of the data analysis.

In order to clarify the more specific procedures in this study, some points that guided the analysis must be pointed out. The meaning unit refers to the text selected in the process of codification of a category. In this study, the meaning unit was a single word, parts of a sentence, a whole sentence or a paragraph. The inclusion of a wider quantity of text was considered necessary in order to make each unit of meaning understandable when isolated from the rest of the text. In addition, the same unit was coded in two or more categories, according to their content. This decision was based on the fact that human experiences are intertwined and may not allow the creation of mutually exclusive categories (Graneheim & Lundman, 2004).

Therefore, following a deductive and inductive approach, categories were integrated in specific dimensions, which were then included in more general dimensions. When considered necessary, subcategories were also created in order to better explain the content of the

categories (Coutinho, 2011). This analysis was performed using the qualitative analysis software NVivo 10 (QSR International Pty Ltd, 2013).

## RESULTS

The analysis of the 8 interviews has resulted in a total of 397 codifications, distributed by 5 general dimensions, which were created in order to organise the data, namely: emotional experiences, anger experience, characterisation of aggressive behaviours, control of anger and provocation and beliefs about the impact of anger and aggression in performance. For each general dimension, a summary table will be presented describing its specific dimensions, categories and subcategories. To clarify the coding process, each category and/or subcategory will be described and exemplified with a quotation from the interviews.

### Emotional experiences

**Table 2**

*General dimension of emotional experiences*

Specific Dimension	Categories	Subcategories
Negative emotions (29, 74.36%)	Anxiety (15, 51.72%)	Anxiety before games (2, 66.66%) Experience decreases anxiety (1, 33.33%)
	Anger (9, 31.03%)	
	Sadness (4, 13.79%)	
	Guilt (1, 3.45%)	
Positive emotions (10, 25.64%)	Joy (7, 70%)	
	Happiness (2, 20%)	
	Pride (1, 10%)	

This general dimension includes the athletes' descriptions of their "emotional experiences" (39, 9.82%) during sport competition (Table 2). An analysis of the frequencies of the citation of each emotion reveals that anxiety is the most experienced, followed by anger and joy. Overall, it can also be observed that these athletes describe more negative than positive emotions.

Specifically in the dimension of “positive emotions”, it was possible to identify the emotions of “joy” (“The feeling of joy when I win”, Athlete Cesar), “happiness” (“Yes, because we are doing what we like and especially when we are successful there is always, and you can always tell in the faces of the players, an immense feeling of happiness for achieving your goals”, Athlete 2) and “pride” (“The positive emotions you feel more is when you feel like you are the best player of the world, when a person scores and important point or wins an important game and did it, feels useful, in these positive situations you feel proud”, Athlete 6).

Similarly, in the category “negative emotions”, reports of experience of “anxiety” were the most mentioned (“The anxiety because of the games’ emotion, of wanting to win and being in the game”, Athlete 5) followed by anger (“When there is a situation with the opponent, we want to jump on him, and also on the referee, when he makes a decision that we think is not fair, we feel anger”, Athlete 4). In addition, it was also possible to identify “sadness” (“There is the sadness of not being able to do what we wanted” Athlete, 1) and one reference of “guilt” (“I feel guilty”, Athlete 1). Furthermore, the category of anxiety included the specific experience of “anxiety before games” (“In the more important games that we have to win or cannot lose, and those initial minutes, we have to deal with the anxiety before the games, it is a little bit difficult because we feel pressured”, Athlete 8) and the belief that anxiety experiences decrease with athletes’ experience level, forming the subcategory “Experience decreases anxiety” (“The main emotion is the anxiety, although throughout the years it is decreasing”, Athlete 7).

## **Anger experiences**

The general dimension of “anger experiences” (54, 13.60%) includes the descriptions of the factors associated to the experience of anger during sport competition (Table 3). This dimension includes the specific dimensions of sources of anger, appraisals in anger and anger rumination. In the sources of anger, several categories were identified within the participants’ descriptions of what makes them angry. The most mentioned were the mistakes in the game, included the category of “mistakes”. This category was further subdivided into three subcategories in order to identify the specific types of mistakes, namely, “from others” (“There are some teammates that make me angry. I always want to do things right and feel that my teammates should also do the same, and sometimes I get a little mad with that”, Athlete 3),

“from self” (“Making a mistake that gives a point to the opponent team, this makes me angry and annoyed”, Athlete 8) and “from referees” (“...I felt anger because the decision was against us, and I had to control my emotions because otherwise I would have suffered an even worse penalty”, Athlete 4).

Another source of anger is “being aggressed”, which represents the reports of experiencing anger after being victim of an aggression (“...anger is an emotion that I feel very often, in some moments of the game, for instance, when someone hits me on purpose” Athlete 6). The category of “loosing” was created to include the descriptions of anger experiences after losing points during a game (“...it is losing, without a doubt” Athlete 8). Descriptions of acts of provocation from the opponents were also identified as sources of anger in the category of “Opponents’ provocations” (“There are those players that purposely tackle just to provoke a person, and a person, in the first times, gets angry...” Athlete 5).

In a similar vein, reports about watching a teammate being victim of an act of aggression were coded in the category of “Teammates being aggressed” (“I get really angry when I see someone hitting one of my teammates, that makes me angry, but that’s normal”, Athlete 1). The perceived pressure from the coach to play tougher and better also seems to increase players’ anger, represented in the “coach pressure” category (“I felt anger...when we got the intermission the coach was always criticising me, it was the worst situation that I’ve ever been in”, Athlete 7).

Finally, two additional categories were created to include the description of an athlete who felt anger because his teammates were not making enough effort in the game, i.e., “Lack of effort from teammates” (“The lack of effort from my teammates, if I see my teammates without motivation and effort, this really makes me angry.”, Athlete 7) and the experience of anger that had stemmed from a previous history of provocation and confrontation with an opponent, that is, “History with opponent” (“I feel a mild irritation, when there is a confrontation, especially with an opponent that I don’t like for several reasons...”, Athlete 2).

In addition, although the processes of cognitive appraisals were difficult to identify in the players’ speeches, the specific dimension of “appraisals in anger” includes some of the appraisals reported by these participants. Thus, the category “motivational relevance” was the most mentioned and includes the description of experiencing anger in critical and important situations for the athletes’ personal goals (“...I was angry, a lot of things were at stake, being national champion.”, Athlete 6 ). On its turn, “unfairness” reflects the descriptions about

situations that were perceived as unfair by the athletes and consequently led to the experience of anger (“Yeah, in unfair situations, I feel anger, at the end of the game I feel a little....” Athlete 6). The category “external blame” describes the reports of attributing the blame of the anger-inducing event to external factors (“It was the other player, who was not calm, and did not let me get the ball.”, Athlete 6). Finally, the category “uncontrollable” included reports about anger occurring in a situation that was not under the players’ control and they did not feel capable of dealing with it (“It was not under my control, he came at me, I could have moved away, but...”, Athlete 4).

**Table 3**

*General dimension of anger experiences*

Specific dimension	Categories	Subcategories	
Sources of anger (24, 44.44%)	Mistakes (8, 33.33%)	From others (4, 50%)	
		From self (3, 37.50%)	
		From referees (1, 12.50%)	
	Being aggressed (6, 25%)	Losing (4, 16.67%)	Opponents’ provocations (2, 8.33%)
			Teammates being aggressed (2, 8.33%)
			Coach pressure (1, 4.17%)
Lack of effort from teammates (1, 4.17%)			
Appraisals in anger (15, 27.78%)	Motivational relevance (4, 26.67%)	External blame (4, 26.67%)	
		Unfairness (4, 26.67%)	
		Uncontrollable (3, 20%)	
Anger rumination (15, 27.78%)	After games (5, 33.33%)	No anger rumination (3, 20%)	Affect concentration (3, 50%)
			Learning experience (2, 33.33%)
	Perception of anger rumination (6, 40%)		Decrease with age (1, 16.67%)

The dimension “anger rumination” includes reports about the experience of repeatedly thinking about past episodes of anger, either during competition or after the games. Thus, the category “after games” includes the reports of engaging in anger rumination after the games, i.e., thinking about episodes of anger that had occurred during the games (“It is very common, I feel it at the end of the games, I go home thinking about what have happened e and still think

about it in the next day...", Athlete 7). However, the category "no anger rumination" includes reports of not engaging in this process ("No, I think about it in the moment, but then I focus on the game and after 5 minutes I don't even remember what had happened.", Athlete 5). These athletes also mentioned some beliefs about this process, included in the category of "perception about anger rumination". It was referred that this process can affect players' concentration ("affects concentration"), affecting their performance in the game ("In certain situations yes, depending on the situation, If they provoke me a lot, a person can lose focus on the game...", Athlete 5).

However, it was also suggested that it is possible that engaging in anger rumination can be a "learning experience", indicating that remembering past episodes of anger can help athletes to learn with this experience ("I think it can even teach us not to repeat the same mistake the next time.", Athlete 4). In addition, it was also mentioned that the tendency to ruminate on anger episodes "decreases with age" ("When I started playing, this affected me a lot, I would think about these situations, but now I don't, with age and experience from the game" Athlete 8).

### **Characterisation of aggressive behaviour**

The general dimension of "characterisation of aggressive behaviour" (132, 33.25%) includes the descriptions, from the players' perspective, of aggressive behaviours in sports. Firstly, the specific dimension of "perception about aggression" includes athletes' reports about how they perceive this phenomenon in sport (Table 4).

The category that was most referred by these athletes was aggression as a "normal part of the game", which includes their reports about aggression being considered a normal and common part of the game and sports in general ("It is part of the of the game, and it depends on the type of aggression, but if there is no aggression, if there is no moderate confrontation that cannot be extreme, sports would not be the same, it wouldn't have emotion, it would be monotonous and not fun.", Athlete 5). This category was followed by the perception of aggression as "part of individual's personality", which includes descriptions about aggression resulting from an intrinsic personality characteristic, suggesting that athletes are aggressive because this behaviour is part of their personality ("That depends on the characteristics of person's personality ...it depends on their personality and the way they perceive sports.", Athlete 2).

**Table 4***General dimension of characterisation of aggressive behaviour*

Specific Dimension	Categories	Subcategories
Perception about aggression in sport (35, 26.52%)	Normal part of the game (12, 34.29%)	
	Contact sports are more aggressive (9, 25.71%)	
	Part of individual's personality (7, 20%)	
	Individual sports are less aggressive (3, 8.57%)	
	Influenced by rules of the game (2, 5.71%)	
	Lower age categories are more aggressive (1, 2.86%)	
	Stick makes hockey more aggressive (1, 2.86%)	
Types of aggression (17, 12.88%)	Instrumental aggression (6, 35.29%)	
	Aggression with intent to harm (4, 23.53%)	
	Verbal aggression/Provocation (4, 23.53%)	
	Accidental aggression (2, 11.76%)	
Provocation (14, 10.61%)	Premeditated aggression (1, 5.88%)	
	Provocation game tactic (9, 35.71%)	
	Provocation from others (3, 21.43%)	
	Provocation legitimate (1, 7.14%)	
Coach influence (13, 9.85%)	Others' provocations increases motivation (1, 7.14%)	
	Promotes aggression (7, 53.85%)	
	Different opinions about aggression (2, 15.38%)	
	Disapproves aggression (2, 15.38%)	
	Promotes more contact (1, 7.69%)	
Consequences (17, 12.88%)	Instructs to simulate injuries (1, 7.69%)	
	Being aggressed (14, 82.35%)	Injuries (12, 85.71%) Disregarding injuries (2, 14.29%)
Antecedents (10, 7.58%)	Being aggressive (3, 17.65%)	Penalties (3, 100%)
	Revenge feelings (5, 50%)	
	Unfairness (2, 20%)	
	Tied game (1, 10%)	
	Anger (1, 10%)	
Frequency (4, 3.03%)	Provocation (1, 10%)	
	Verbal more frequent (3, 75%)	
Reasons to avoid aggression (3, 2.27%)	Physical less frequent (2, 50%)	
	Injuries (2, 66.67%)	
Measures to prevent aggression (19, 14.39%)	Penalties (1, 33.33%)	
	Severe punishment (8, 42.11%)	
	Education from young age (4, 21.05%)	
	More surveillance (4, 21.05%)	
	Psychological interventions (2, 10.53%)	
	Impartiality (1, 5.26%)	



Another category of “contact sports more aggressive” was created to include reports suggesting that contact sports tend to be more aggressive because they imply more physical contact (“There are types of sport more aggressive than others, although aggressiveness has to be present in all types of sport, but in a contact sport there is much more aggression.”, Athlete Andre), whereas the category “non-contact sports less aggressive” includes reports about non-contact sports being less aggressive (“For instance, volleyball is not an aggressive type of sport because there is no physical contact...”, Athlete 1).

In addition, it was also mentioned that aggression is “influenced by the rules of the game” in the sense that players tend to use aggression up until the point that is allowed by the rules of the game (“I think hockey players tend to be more aggressive than soccer and basketball, for instance, basketball has a lot of rules and every little contact is considered a penalty, one cannot be aggressive, but in soccer one can be more aggressive or so...”, Athlete 5). Among the perceptions about aggression, it was also mentioned that “Lower divisions are more aggressive”, suggesting that athletes in the lower divisions are more aggressive comparing to other athletes (“In the first division, this type of violence and swearing is less common, so as one goes down in the division level, the frequency of aggression increases...”, Athlete 7). Finally, another player mentioned that the “Stick makes hockey more aggressive” (...but in hockey, the game is much faster, and it has a stick and the players can learn some tricks to provoke the opponents with a little tackle with the stick and because of that it has the tendency to be more aggressive.”, Athlete 5).

Considering the “types of aggression”, this specific dimension includes the different kinds of aggressive behaviours that these athletes identified, used by themselves or by their opponents. The category most mentioned was “instrumental aggression”, which represents the use of aggression to attain a benefit in the game (“I always give my best and sometimes it reflects in some toughness, but not with the intent to be violent, but to play hard.”, Athlete 3). “Aggression with intent to harm” includes reports of aggressive acts with the intent to harm the opponent (“There are some players that try to hurt others to prevent them from playing.”, Athlete 5). In the “verbal aggression/provocation” category, reports of athletes’ acts of verbal aggression and/or provocation of opponents were included (“I say a lot of things in the game that outside I would think: you should not say that...”, Athlete 7). The category of “accidental

aggression” refers to the acts of aggression that have occurred accidentally during the game (“...there are a lot of situations that happen indivertibly, without intention. For instance, one can hit the opponent with the ball, there is no intention, but one can hurt the opponent.”, Athlete 1). A final category of “premeditated aggression” was created to include a report of an aggressive act that was intentional and planned before competition (“I can say that I punched a player inside the field in front of the referee, but I as not angry, I was calm, I knew what I was doing” Athlete 2).

The specific dimension of “provocation” includes athletes’ descriptions about provocation in sport competition. This dimension was divided into four categories. The first one is “provocation as a game tactic”, which includes athletes’ use of provocation as a game strategy (“I took advantage of that, because some people get intimidated and do not perform the way they should, or are able to.”, Athlete 6). Furthermore, “provocation from others” includes reports of being aim of provocation during competition (“In hockey game, all the players had been provoked, from opponents, public, they always get you for something...” Athlete 5). In addition, it was also mentioned that provocation is a “legitimate” and accepted behaviour in sports (“...it is legitimate, it is only a provocation, or staying really close to him to make him uncomfortable” Athlete 3) and that “others’ provocations increases motivation”, suggesting that provocation from others increases the player’s motivation (“Sometimes it even makes me play even harder because of what they do.”, Athlete 5).

In addition, the specific dimension of “coach influence” was created to include the reports of the perceived influence of the coach in the players’ aggressive behaviours. The category of “promotes aggression” is the most reported by these athletes and suggests that the coaches reinforce and promote the use of aggression during competition (“Some coaches have asked me to try to hurt a certain player that was dangerous or to try to provoke him to get him excluded from the game.”, Athlete 7). Another category, “promotes more contact”, although with only one unit of meaning, refers to the coach’s reinforcement of more physical contact during the game, but not aggression (“There are coaches that like to see a more aggressive defence, a little more contact, but asking to aggress someone to get a benefit has never happened.”, Athlete 4). “Different opinions about aggression” includes the reports about the fact these players have played with coaches with different perspectives about aggression, either promoting or discouraging such behaviours (“There are different coaches, the ones that promote it, but there

are coaches that not... some teams play using that strategy of provocation and try to tackle opponents, but there are others that are very calm.”, Athlete 7). Finally, another category named “instructs to simulate injuries” was reported by an athlete describing that his coach instructs players to simulate an injury in order to obtain benefits in the game (“In terms of simulating an injury...you throw yourself to the floor...there are coaches that give a sign to tell me to do it, and I say - oh, that hurts.”, Athlete 1).

In the specific dimension of “consequences” and with the intent to organise the data, the athletes’ reports were divided into the consequences of “being aggressed” and the consequences of using aggression (“being aggressive”). Within the consequences of being aggressed, most players referred “injuries”, that is, a situation in which they were physically harmed as a consequence of an aggression (“In almost every game, I get hit with a stick, with a ball, sport is like that...”, Athlete 8). In addition, another subcategory of “disregarding injuries” was created to reflect the players’ descriptions of underestimation of injuries (“It all ended well, a few with injuries and so, but nothing much” Athlete 6). The category of “being aggressive” only encompasses one subcategory, “penalties”, reflecting the penalties that athletes had suffered as a result of an aggressive act (“...I got a red card, or both of us, I think they were a little severe” Athlete 7).

Similarly, athletes also described several antecedents of aggression in sport, included in the specific dimension of “antecedents of aggression”. However, most of its categories only include a single unit of meaning. Nonetheless, “revenge feelings”, which reflects the reports of aggressive acts that were mainly caused by a desire for revenge, (“I may not react to a provocation, but if I have the opportunity to aggress him latter, I try to do it” Athlete 7) was the most mentioned antecedent of aggression. The other categories, although only including one unit of meaning each, also describe important antecedents of aggression, namely: “Tied game”, which reflects the tendency to aggress when the game scores from both teams are equal (“That depends on the game results, if we are wining by 10 points we don’t care, but in a tied game, there’s more aggression, there’s more...”, Athlete 7); “Unfairness”, which reflects being aggressive after a situation perceived as unfair (“The referee looked at it and did nothing, not a yellow card, not a blue, not a red, he did nothing. In those situations there is a lot of aggression...”Athlete 2); “anger”, suggesting that angry feelings are precursor of aggression (“Being angry in the sport field is very extreme and can lead to acts that are... are not nice to

see.”, Athlete 2); and lastly, “Provocation”, which includes a description of an aggressive act following an opponent’s provocation (“It all starts with a few tackles, that sometimes are enough, and sometimes not. I’ve been involved in serious fights...”, Athlete 6).

In order to account for the descriptions of frequency of aggressive behaviour, the specific dimension of “frequency” was created, which includes the category of “physical less frequent”, including a report that physical aggressive acts are less frequent in sport (“Very, very few aggressive acts, I know that we are protected.”, Athlete 1) while “Verbal more frequent” encompasses reports about verbal aggression as more frequent in competition (“...more verbal, verbal aggression is..., there are no players that do not use it.”, Athlete 4)

Additionally, the specific dimension of “Reasons to avoid aggression” includes descriptions of the reasons to avoid engaging in aggression. These include the category of “injuries”, which accounts for reports of avoiding aggression in order to prevent injuring an opponent or a teammate (“It is always bad because I can also hurt someone, hit the head and then the problem is more serious, not only in the moment, but can leave a mark forever” Athletes 5). Another reason reported by an athlete was to avoid being penalised, creating the category “penalties” (“I try to avoid as much as I can, it can be penalised and jeopardize the team” Athlete 5).

These players have also suggested some measures that, in their opinion, could help reduce the frequency of aggressive behaviours in sport competition. In this dimension, there are included categories reflecting athletes’ descriptions of what could be done to avoid such behaviour. “Severe punishment”, which suggests that punishments for aggressive acts should be tougher and more severe, was the most mentioned measure (“I think if the punishment was more severe, with the accumulation of aggressive acts...”, Athlete 5). It was also suggested that prevention of aggression should start from a young age (“education from young age”), by teaching young athletes not to use this type of behaviour (“A lot has to do with the education that is provided to the kids by the coaches”, Athlete 6).

It was also suggested that “more surveillance”, meaning more referees in the game, as well as filming the game, could help reduce aggression in sport (“It would be one of the first measures, filming the games, because hockey is a fast sport, and sometimes one cannot see everything, and punishments could be given by analysing these films.”, Athlete 4). Psychological interventions, that is, the intervention of a psychologist in the team was also a suggestion to

diminish aggression (“A team with a psychologist, it is very important, not only to prevent aggression but also for performance. The team would function better, psychologically...” Athlete 8). Finally, an athlete also suggested “impartiality”, reporting that referees should be more impartial in their decisions, and therefore preventing unfair and confrontational situations that could potentially lead to aggression (If the referees’ impartiality was higher, I think that aggressing would decrease. If you would have a red card after an aggression, you wouldn’t do that again”, Athlete 8)

### **Beliefs about impact on performance**

In the general dimension of “beliefs about impact on performance” (52, 13.10%) it was possible to integrate the perceptions of the impact of anger and aggression in sports performance (Table 5). Specifically in the case of the anger, the category of “beneficial for performance” was the most mentioned and reflects reports of anger as helpful for performance. Within this category, the subcategory of “additional energy” refers to the reports of anger as a source of additional energy in the game (“In physical terms I think that sometimes it’s good because you can give everything you have, you can run a little more, you can hit the ball harder because you have more strength, I don’t know how to explain what is anger, but anger makes a person stronger, more capable, that’s what I think.”, Athlete 8).

Likewise the subcategory of “increased motivation” includes the descriptions of anger as a positive motivational variable (We can turn anger to a more positive thing, we can take the advantage of the anger inside us and the motivation to win and play better, for instance, transform the anger in motivation to win and do better.”, Athlete 4). Conversely, the category “harmful for performance” reflects the descriptions of anger as detrimental for performance. This category includes the reasons to consider this emotion negative for performance, namely, “affects concentration” (“I lost my focus and we cannot have the same performance afterwards, during the game.”, Athlete 1), “impairs decision making” (“I can get that irritation that makes me nervous or that makes me think with my heart, so to speak, rather than reason...”, Athlete 2), leads the athletes to potentially negative “impulsive reactions” that can lead to penalties and aggression (“It is exactly a negative reaction, if you are provoked and react stupidly attributing more importance to the provocation, I think that’s a negative reaction that anger has.”, Athlete

7). However others considered that anger has a “dualistic effect on performance”, considering that this emotion can be both bad and good for performance (“I would give it 50/50 between the harmful and the beneficial because you can create some barriers to the defence, it is just the way you finish your plays.”, Athlete 2).

In the specific dimension of “aggression”, it was also possible to identify different perspectives regarding the potential impact of aggressive behaviour in sport. Specifically, most of the athletes viewed this behaviour as an important “game tactic”, revealing that it could help them to attain their goals (“It is a good aggressiveness, I can use it to take the game and I will be aggressive in the way I lead the game. And instead of jinking, I could use the strength, I become more aggressive, but not a mean aggression because I have no intention of hurting someone.”, Athlete 1). However, while some described aggression as “beneficial for performance” (...it is that positive aggression that we can use to prevent the ball from getting in. That is a good and healthy aggression, for your own benefit.”, Athlete 2), others considered it to be “Harmful for performance” (“In extreme cases it can be harmful, leading to penalties, or even without cards...aggressive behaviour can destabilise the game...and that can be bad for the team.”, Athlete 6).

**Table 5**

*General dimension of beliefs about the impact on performance*

Specific dimension	Categories	Subcategories
Anger (33, 63.46%)	Beneficial for performance (22, 66.67%)	Additional energy (12, 54.55%)
		Increased motivation (10, 44.45%)
	Harmful for performance (9, 27.27%)	Affects concentration (4, 44.44%)
		Impairs decision making (3, 33.33%)
Dualistic effects (2, 6.06%)	Impulsive reactions (2, 22.22%)	
Aggression (19, 36.54%)	Game tactic (13, 68.42%)	
	Aggression beneficial (4, 21.05%)	
	Aggression harmful (2, 10.53%)	
	Harmful for performance (2, 10.53%)	

## Dealing with anger and provocations

**Table 6**

*General dimension of dealing with anger and provocations*

Specific Dimension	Categories	Subcategories
Coping (43, 35.83%)	Ignore (14, 32.56%)	Angers opponents (2, 14.29%)
	Active coping (10, 23.26%)	
	Humour (7, 16.28%)	
	Self-distraction (4, 9.30%)	
	Emotional support (4, 9.30%)	
	Planning (2, 4.65%)	
	Behavioural disengagement (1, 2.33%)	
Emotion regulation (32, 26.67%)	Acceptance (1, 2.33%)	
	Task focus processes (14, 43.75%)	
	Reappraisal (8, 25%)	
	Suppression (3, 9.38%)	
	Tension reduction (3, 9.38%)	
	Situation selection (3, 9.38%)	
Self-control (8, 6.67%)	Regulation of others (1, 3.13%)	
Beliefs about regulation (12, 10%)	Learning with experience (6, 50%)	Reappraisal (2, 66.67%)
	Effective Strategies (3, 25%)	Emotional support (1, 33.33%)
	Depends on emotional state (2, 16.67%)	
	No single effective strategy (1, 8.33%)	
Self-control failure (17, 14.17%)		Ego depletion (2, 28.57%)
	Causes (7, 41.18%)	Provocation (2, 28.57%)
		Impulses (2, 28.57%)
		Seeing a significant other in danger (1, 14.29%)
	No consequences (6, 35.29%)	
Emotion regulation activities (8, 6.67%)	Consequences (4, 23.53%)	Aggression (3, 75%)
		Displaced aggression (1, 25%)
	No regulation (5, 62.50%)	
	Relax before games (3, 37.50%)	

This general dimension comprises the reports about processes by which these players “deal with anger and provocations” (120, 30.23%) either from the public, from the opponents and from the teammates (Table 6). Therefore, the specific dimension of “coping processes” includes all the reports about the use of coping to deal with anger and provocations. The strategy most referred by these players was “ignore” and includes processes of ignoring the provocation

and events that may lead to anger (“Basically I just ignore, I don’t pay attention and try to control myself, it is really ignoring what they are saying, because that is negative for us” Athlete 4). A subcategory was also created in this category, namely, “Angers opponents”, to describe the fact that ignoring opponents’ provocations can induce or “fuel” their anger (“Ignoring provocation... can even make the ones who are doing it angrier, because if you don’t care, if you are superior to what people are saying, it makes those people angry because theirs strategies are not working.”, Athlete 2).

The category of “active coping” was also amongst the most mentioned, which refers to engaging in an active response or confrontation following a provocation or an anger-inducing event (“Against the opponent... I confront him, if we don’t confront them and keep our position, we can be eaten, between brackets, they feel superior. A person inside the field cannot do that” Athlete 6). In the category “humour” are included all the descriptions of making jokes, or simple smiling after a provocation or an anger episode (“I was wearing pink roller skates and they started provoking me, but I always laughed, this is the best way to shut them up, the only way that I can get to override this, to avoid a bad reaction.”, Athlete 5). “Self-distraction” reflects the reports about moving away from the provocation and anger event by intentionally engaging in distracting processes (“It depends, because there are games in which I know that’s part of the opponent’s strategy. There are games that I know that they want to provoke me. When I know that I try to abstract from it.”, Athlete 7).

Another coping process identified was the “emotional support, in which players describe situations where players sought emotional support to deal with anger-related events (“I felt the support of my teammates and I think that was the best strategy. It was the support of my friends that made me calmer, that’s it...”, Athlete 7). Another strategy identified was “planning”, which consisted on planning ahead how to deal with anger and provocations (“Often, I would think before, if this happens, what can I do? Also taking into account past experiences and not repeating the same mistakes.”, Athlete 3). It was also mentioned by one athlete the strategy of avoiding the game and disengaging from the situation as a response to anger-inducing event, as shown in the category “Behavioural disengagement” (“I was angry in the beginning of the game and I did not feel like playing, I just got the ball and let it go to another players and did not bother...”, Athlete 7). Similarly, it was also possible to identify the use of “acceptance” in one athlete’s speech, who mentioned just simply accepting the provocation and moving on. (“It is



trying to think that it all went away. It is the way things work. It's done, we can't go back.", Athlete 1).

The "emotion regulation processes" specific dimension included the descriptions about employing emotion regulation strategies to deal with the anger and provocations. Most of the athletes mentioned avoiding anger by focusing on the game, forming the category "task focus processes" ("They start picking on you or provoking you. You can focus on the game because you know you can do it, but they will try to provoke you either way...", Athlete 5).

The category "reappraisal" was also amongst the most mentioned and reflects the description of situations in which the athletes reevaluated the anger-inducing event ("If I lose my mind and hit someone with the stick, I can get a card, and be 2 minutes away from the game, so I think about the team and the fact that I can risk my career, and may not contribute to the team, so I don't do it" Athlete 8). In addition, the category "suppression" included attempts to suppress angry feelings generated by provocations ("I just suppress it and leave, I don't have that feeling of trying to hurt somebody and thinking "You hit, so I'll hit you, hurt you.", Athlete 1).

In the "tension reduction" category were included the descriptions about attempting to "calm down" and avoiding the physiological tension caused by anger ("I asked to be replaced, to leave the game for a while to try to calm down outside, spend a few minutes outside to rest and clear my mind...", Athlete 6). The "situation selection" category was created to include the reports about situations in which players actively avoided a situation and/or a specific person to prevent anger ("I try to avoid an opponent as much as I can and don't even tackle him. I try to avoid him as much as I can.", Athlete 4). Lastly, it can also be included in this dimension the category of "regulation of others", which consists of a report about helping teammates to deal with their emotions ("When I see a friend involved in some situation, I go there to try to cool things down and finish the conflict." Athlete 1).

Similarly, the specific dimension of "self-control" encompasses reports of engaging in self-control processes, such as actively attempting to control behaviour, thoughts and emotions or having a high capacity of self-control ("If they are provoking me or whatever, that does not bother me, I try to control myself. It's not typical in me to be aggressive and answer to provocation.", Athlete 2)

Another specific dimension was created in order to include the athletes' beliefs and perceptions about the regulation of anger and provocations. Most participants mentioned that

experience has allowed them to be better at dealing with anger and provocations, creating the category of “Learning with experience” (“Throughout life we grew, and matured, and the experience allowed us to deal better with these things in one way or another” Athlete 6).

In addition, the category “Depends on emotional state” includes descriptions about how strategies to deal with anger depend on the athletes’ emotional state in that moment (“I think that depends on the emotional state. If I am in a bad mood I think I would get there and if someone hits me, probably, I would answer. If I am in a calm day I may get in there and think to myself - I’m not going to react - That depends, it depends on a lot of variables”). In addition, an athlete mentioned that there is no strategy that can be considered effective to deal with anger, forming the category of “No single effective strategy” (“There are no strategies. There is no effective strategy. There is what we can do by ourselves.”, Athlete 6).

However, some athletes considered some strategies effective, creating the category of “effective strategies” Thus, the subcategory of “Reappraisal effective” includes two descriptions of reappraisal as an effective strategy to deal with anger (“I think so [reappraisal], without a doubt, thinking about the team. At least in my team we have a goal and a mistake from me, caused by anger, get a card, will disfavour the team and we might not achieve our goals.”, Athlete 8), and likewise, the subcategory of “Emotional support effective” includes a report about emotional support being effective in reducing anger (“What saved me was the support from my teammates, the union and understanding of my teammates, and the my teammates’ attempt to solve and calm down things, that was it.”, Athlete 7)

The specific dimension of “self-control failure” includes the reports about episodes of self-control failure described by these players. Thus, the category “causes” comprises the perceived causes of the episode of self-control failure identified by these athletes. Therefore, “ego-depletion” reflects the description of a state of physical and mental tiredness that has led to a decrease in the capacity to exert self-control (“...everything was going wrong from the beginning of the day we were late for the game, travelling, and a late lunch, and things were not going right. And besides, an opponent was always provoking me. There was a penalty and he hit me with the stick, and I reacted...”, Athlete 5).

“Provocation” from opponents or public was also mentioned as an event that leads to self-control failure (“I was aggressed by an opponent in the last game and he was a player that was always provoking me and he was being rough with me and at the end I lost my control, and it

was an aggression”., Athlete 3). Similarly, the subcategory “impulses” includes description about feeling an impulse to aggress (“It was a situation in which I acted on an impulse and regretted it right in that moment.”, Athlete 8). Finally, it was also reported that “seeing a significant other in danger” was a cause of self-control failure (“I remember one day I was playing and heard a conflict from public and my father was there, I completely lost control, I was playing and even had the ball with me, but I went there and tried to help my father...”, Athlete 7).

Surprisingly, most descriptions of self-control failure episodes did not include any consequences, creating the category “no consequences” (“I was lucky, it did not had any serious consequences, neither for me, nor for the team, but I could have suffered a red card. Several players could start a conflict, but nothing happened, with luck nothing happened.”, Athlete 6). However, among the descriptions of the “consequences” of self-control failure, it was identified the subcategory of “aggression”, which reflects that the lack of self-control capacity has led to an aggressive act (“I am aggressive when I lose control and this is not a game tactic...”, Athlete 4), while it was also mentioned “displaced aggression”, that is, reacting aggressively towards other targets not involved in the provocative situation (“A teammate broke my teeth, but not on purpose, but I turned back and hit a member of the other team. It was the only time that I completely lost control over the situation.”, Athlete 6).

Finally, “emotion regulation activities” reflects athletes’ attempts to regulate their emotions before competition. However, several reports indicated “no regulation” activity or attempts to control emotions before competition (“I don’t do anything. Everything is normal. The day of the game is normal. I wake up, do what I have to do, and go to the game, I don’t do anything.”, Athlete 7), while it was also referred attempts to “relax before games” (“I try to relax as much as I can, I drink a coffee to relax, I sit there for a while, resting, relax above all, take my mind of what happens in the field and start preparing for the game.”, Athlete 4).

## DISCUSSION

The main aim of this study was to explore hockey players’ perceptions and beliefs about anger and aggression. First, the analysis of the general emotional experiences has revealed that anxiety is the most mentioned emotion, followed by anger and joy. Other negative and positively toned emotions were also mentioned, such as sadness, guilty, happiness and pride. These

emotional experiences are consistent with those suggested by Lazarus (2000) in his adaption of the cognitive-motivational-relational theory of emotion to competitive settings. Similarly, Ruiz and Hanin (2004b) also found the same emotions suggested this author in a qualitative study with Karate athletes.

Anxiety and anger were the most cited emotions, and generally, these athletes reported more negative emotions than positive. Likewise, similar results were also found by Nicholls and colleagues (2009) in a sample of rugby players, who have also observed that anxiety and anger are the most experienced emotions, and that negative emotions were more frequently experienced than positive emotions both in training and in competition. However, others studies have found that positive emotions were more frequent (Dias, 2005; Nicholls, Hemmings, & Clough, 2010). Nonetheless, these findings may reveal that emotional experiences may vary according to the types of sport. While Dias (2005) used a multy-sport sample (handball, volleyball and hockey), both the current study and Nicholls and colleagues' study (2009) used a sample of high contact types of sport.

More specifically regarding the experience of anger, it was possible to identify several sources that seem to precede this emotion according to these athletes' perspectives. The most referred source of anger was the mistakes, from the self, the teammates and the referees. Indeed, previous studies on anger in sports (Dunn et al., 2006; Vallance et al., 2006) have also suggested that anger is often a reaction to mistakes, especially in athletes with higher levels of trait perfectionism. Players also mentioned that being aggressed and provoked triggered angry feelings, which have already been acknowledged as important antecedents of anger in sport (Maxwell, Moores, Visek, 2009; Maxwell & Visek, 2009). It was also mentioned that watching a teammate being aggressed triggered anger. This is consistent with the core relational meaning of anger proposed by Lazarus (1991, 1999, 2000), which suggests that anger arise from "a demeaning offense against me and mine" (Lazarus, 2000, p. 234). Additionally, coach pressure was reported as an antecedent of anger. Indeed, Dunn and colleagues (2006) also found that high perceived coach pressure was significantly correlated with competitive trait anger. Finally, because anger often arises when an important goal is obstructed (Berkowitz, 1993), it seems that perceiving that the teammates are not making enough effort to attain a player's goals would also lead to anger, as was indicated by one athlete in this study. Similarly, it was also mentioned

that losing points elicited anger, which is also consistent with this idea of goal obstruction as a precursor of anger.

This study also explored the appraisals associated with the experience of anger in sport. Amongst the appraisals identified, motivational relevance of the situation was the most mentioned. Several accounts on appraisals of anger agree that motivational relevance, or goal relevance, is essential for the generation of anger (e.g., Lazarus, 1991, 1999; Scherer, 2000). Consistently with this idea of motivational relevance, Berkowitz and Harmon-Jones (2004) suggests that anger arises when an important goal is obstructed. However, other approaches (e.g., Frijda, 1993; Scherer, 2001) suggested that anger can arise when goals involved are not particularly relevant, but are personally significant in some way. Indeed, Anderson and Anderson (1998) reported that relatively trivial physical discomfort, such as cold or hot, can lead to anger experiences.

Another appraisal identified in these players' speeches was the external blame, in which anger was experienced as a result of a situation that was perceived to be caused by another person or an external agent. This appraisal has also fuelled some controversy in the literature dedicated to anger. For some authors, anger occurs when someone, or something, is held responsible for the negative event (e.g., Lazarus, 1991; Scherer, 2001; Kuppens et al., 2003). However, Berkowitz (2011) demonstrated that aversive conditions can cause anger even though there was no external agent. Thus, Berkowitz and Harmon-Jones (2004) suggest that "the external agent's judged responsibility for the incident, may intensify the anger reaction rather than being necessary for this emotion to occur " (p. 115).

In addition, perceiving a situation as unfair was also pointed as an appraisal involved in the experience of anger. Indeed, the perception that the situation was unfair, illicit, or improper, is also often associated to anger (e.g., Berkowitz, 2011; Berkowitz & Harmon-Jones, 2004). However, Roseman, Antoniou, and Jose (1996) suggested that illegitimacy may be typical, but not necessary for anger to occur.

Lastly, these participants referred that anger occurred in situations in which they had no perceived control, which is inconsistent with the idea that anger often occurs when individuals feel that they can change and control the situation (Frijda, 1986; Lazarus, 1991; Scherer, 2001). However, other authors (Berkowitz & Harmon-Jones, 2004; Berkowitz, 2011) suggest that, because anger often involves a rapid impulse to react, or "involuntary urges" (Berkowitz, 2011,

p. 276), individuals do not have time to appraise the controllability of the situation. Additionally, since anger involves these impulses to react, it seems more plausible that athletes would perceive anger-related situations as controllable.

Overall, the appraisals found in this study were motivational relevance, unfairness, external and uncontrollability. Although several accounts (Fidja, 1986; Lazarus, 1991; Smith & Lazarus, 1993) suggest that some specific appraisals are necessary for anger to occur, recent research has demonstrated that there are no specific appraisals considered necessary or even sufficient (Kuppens et al., 2003; Kuppens & Van Mechelen, 2007). It seems that anger can arise with a multiplicity of different combinations of appraisals. Thus, the appraisals found in this study can be interpreted as important to anger according to these athletes' subjective experiences.

As a significant mechanism of anger regulation (e.g., Bushman, 2002), these athletes also mentioned engaging in anger rumination, although some referred that they did not ruminate over anger situations. It was also found that engaging in this process was perceived as factor that affected athletes' concentration. Indeed, rumination seems to impair concentration, as it was observed by Lyubomirsky, Kasri and Zehm (2003), who reported that rumination undermined students' concentration in academic tasks. In addition, it was mentioned that the tendency to ruminate on anger decreases with age. This finding is consistent with Maxwell and colleagues' (2009) idea that more experienced athletes tend to learn better strategies to deal with anger and aggression. Because constantly focusing on angry events can lead to an increase in the intensity and duration of anger (Bushman, 2002), it seems that with experience, these athletes may learn to avoid using this strategy.

Surprisingly, other athletes indicated that anger rumination can be positive, because they could learn with their past mistakes. Denson (2013), within an evolutionary perspective, mentioned that anger rumination could sustain anger for long periods of time. This author argues that anger rumination is the basis of intergenerational violence and premeditated aggression, sustaining anger until the best opportunity to retaliate. Therefore, another advantage of anger rumination could also be this learning experience. By sustaining memories of past mistakes, athletes may learn to avoid repeating them again.

Furthermore, the analysis of the descriptions about the subjective experiences of aggression allowed to identify some of these athletes' beliefs and perceptions about the use of aggression in sport competition. One of the most mentioned was the idea that aggression is an

integral and normal part of sport competition. This perception has already been suggested as one of the main reasons sustaining aggressive behaviour in sport competition (Kerr, 1999, 2005; Pappas et al., 2004; Russel, 2012). Consistently, other authors (e.g., Maxwell et al., 2009; Maxwell & Visek, 2009) also suggested that the perceived legitimacy of this behaviour is an important predictor of aggression in sport. Moreover, these players believe that contact sports are more aggressive than non-contact sport. Indeed, research has been consistently reporting that more physical contact leads to more violence (e.g., Maxwell, 2004; Maxwell & Moores, 2007; Maxwell et al., 2009). Another perception mentioned by these athletes that seems to be consistent with previous research findings is that aggressive behaviour decreases with the competitive level (e.g., Maxwell et al., 2009).

Similarly to what was found by Long and colleagues (2006), these athletes also believe that aggression is largely influenced by the individuals' personality characteristics, suggesting that some athletes are more inclined to be aggressive than others because of their personality characteristics. Interestingly, one athlete mentioned that hockey may be more aggressive because of the use of stick. This perception appears to be consistent with the "weapon effect", originally suggested by Berkowitz and LePage (1967), who argued that the presence of a gun increases aggressive behaviour. Finally, it was also mentioned that aggressive behaviour is influenced by the rules of the game, in the sense that athletes use aggression up to the point that is allowed. In Grange and Kerr's (2009) study with Australian football players, it was similarly reported that a recent change in the rules of the game has decreased athletic aggression.

Different types of aggression in sport competition were additionally identified. Firstly, the classic distinction between instrumental and hostile aggression (Husman & Silva, 1984) was identified in the categories of "instrumental and aggression" and "aggression with the intent to harm". However, because this distinction has raised some critics, specifically because hostile aggression, which reflects the aggression that derives from anger, can also bring benefits to the game (Anderson & Bushman, 2002), it was decided to name the category related to hostile aggression as "aggression with the intent to harm". In addition, it seems that two of the four types of aggression identified by Kerr (2005) can also be found in this study. Instrumental aggression can reflect play aggression because both types involve using aggression to obtain a benefit in the game. Consistently, aggression with intent to harm may also reflect power

aggression, because it implies using aggression to hurt opponents, therefore exerting domination and superiority over them.

Additionally, another type of aggression also identified was verbal aggression/provocation, consistently with Corrion and colleagues' (2009) study, which also identified verbal aggression as a behaviour commonly observed among athletes. Corrion and colleagues' (2009) study is also in agreement with the frequency dimension found in this study, which indicated that verbal aggression is more frequent than physical aggression. This finding may also suggest that verbal aggression seems to be more acceptable than physical aggression. Indeed, these participants were more willing to admit engaging in verbal aggression than physical aggression.

Another type of aggression identified was "accidental aggression", which reflects acts of aggression that occur accidentally. Corion and colleagues (2009) also found descriptions about accidental acts of aggression. However, according to Baron and Richardson (1994), inherent to the definition of aggression is the notion of intention, therefore accidentally aggressing someone cannot be theoretically considered aggression. In fact, one of the most serious problems with the identification of aggressive acts in sport is determining whether that acts were intentional (Kerr, 2008). However, it was decided to keep this category because it reflects athletes' perception of a type of aggression in sport.

Provoking the opponents in order to obtain a benefit was also a behaviour described by these players. Most referred to provocation as a game tactic that they used in order to intimidate the opponents. An athlete even considered this behaviour to be a legitimate part of the game. Similar findings were also reported in Joseph and Carmes's (2012) qualitative study, which described sledging (provoking the opponent) as a frequent strategy that athletes use to make opponents lose concentration in the game. Surprisingly, despite being considered harmful for performance (affecting concentration and increasing physiological arousal) in the Joseph and Carmes's (2012) study, in the current investigation, an athlete has suggested that being provoked increased his motivation in the game.

It was possible to identify some antecedents of aggressive behaviour. One of the most mentioned by these athletes was having revenge feelings toward an opponent. Similarly, Maxwell (2004) also considered revenge thoughts as important predictors of aggression in sports. In addition, revenge thoughts can often be a result of engaging in anger rumination, which sustain



anger for longer periods of time (Bushaman, 2001; Sukhodolsky et al., 2001). Following revenge feelings, the next most frequently mentioned antecedent (although only two times) was unfairness. Because unfairness often leads to anger (e.g., Berkowitz, 2011; Berkowitz & Harmon-Jones, 2004), it appears that anger has led to aggression. On their turn, anger and provocation, as expected, were also identified among the athletes' descriptions of the antecedents of aggression, consistently with previous findings (e.g., Maxwell & Moores, 2007; Maxwell et al, 2009). Finally, an athlete has also mentioned that aggression is more likely to occur when a game is tied. Although there is some controversy in the literature regarding the relationship between aggression and game results, Gee and Sullivan (2006) have also found that aggression increased when score differential was small.

Studies regarding aggression and antisocial behaviour in sport have demonstrated the large influence of the coach in this behaviour. For instance, Chow and colleagues (2009) reported that coaches with higher self-efficacy beliefs tend to consider aggression as a legitimate strategy to obtain benefits in the game. Likewise, Guivernau and Duda (2002), found that athletes' perceptions of their coach norms for cheating and aggression were strong predictors of aggression. Kavussanu and colleagues (2002) also observed that athletes who perceived that their coaches emphasise normative success tend to believe that their coach encourages this behaviour. With this in mind, this study also observed athletes perceptions about the influence of their coach about aggression. Most of them mentioned that their coach promotes aggression as a game tactic. One athlete has mentioned that his coach promotes more contact, but not aggression. However, disapproving aggression was mentioned only two times. It was also indicated that coaches may have different opinions about the use of aggression, some promoting it, and others disapproving it. Finally, one athlete mentioned that his coach has taught him to simulate an injury in order to obtain a benefit in the game. Such behaviours were also mentioned by the athletes in Corrion and colleagues' (2009) study.

When considering players' suggestions to prevent aggression, the most mentioned was a more severe punishment for breaking the rules. In fact, as mentioned before, players in Grange and Kerr's (2009) study mentioned being less aggressive after a change in the rules of the game, which included more severe punishment. Another interesting measure was the increase in surveillance, such as filming the games and/or having more referees watching the game. Indeed, it seems that this measure could be effective in reducing aggression, since about 81% of the

aggressive actions are not noticed by the game official, as observed by Gee and Sullivan (2006). Other measures suggested was having a team psychologist that could help athletes deal with their aggressive tendencies, as well as the prevention of aggression from a young age. These measures would help to counteract the development of a perceived legitimacy of aggressive acts, which is positively related to professionalization (Visek & Watson, 2005). Overall, the measures suggested by these players seem to be consistent with those suggested by Tenenbaum and colleagues (1997), who also pointed out education, more severe punishment and rule change to prevent aggression in sport.

In the consequences dimension, athletes only refereed penalties as a consequence of aggression, which was also mentioned as a reason to avoid aggression. It is interesting to note the lack of consideration for the others' well being and other interpersonal consequences of aggression which would be considered in "real life" contexts. This finding supports the notion of "bracketed morality" proposed by Bredemeier and Shields (1996), according to which athletes seem to have a different morality only applied to the context of sport. In addition, injuries were mentioned as a reason to avoid aggression and as a consequence of being aggressed. Nonetheless, these athletes tend to not attribute much importance to their injuries and even accept them as a normal part of the game. Indeed, according to Kerr (1999, 2008), athletes are well aware of the possibility of injuries and are willing to accept them as an integral part of the game.

To explore the strategies that these athletes use to deal with anger and provocation, three types of regulation processes were analysed separately. Firstly, in terms of coping strategies, the most cited strategy was active coping, followed by ignoring the situation or using humour to deal with anger situations and provocations. Other strategies used by these athletes were self-distraction and emotional support, and less frequently cited, planning, behaviour disengagement and acceptance. Although studies focused on how athletes cope with anger and provocation are scarce, some studies on coping with emotions have also reported that athletes use a wide variety of coping strategies to manage their emotions (e.g., Nicholls et al. 2009; Nicholls et al., 2010). Thus, it seems that these athletes use both problem and emotion focused coping, consistently with Bolgar's and colleagues' (2008) study, which suggested that athletes with higher levels of anger control used both more problem and emotion-focused coping strategies. It is also important to highlight that ignoring opponents' provocations was reported as

a tactic to increase opponents' anger. Therefore, ignoring can also be considered a game tactic, used to increase opponents' anger levels to affect their performance.

Emotions regulation strategies were also identified in this study. The most frequently cited was focusing on the game (task-focus processes) followed by reappraisal. Other less frequently cited were suppression and tension reduction. Joseph and Crame (2012) also found similar strategies to deal with provocation, such as relaxation, positive self-talk and control of attention. Avoiding a specific opponent to prevent potential anger episodes and provocations (situation selection) was also found to be a strategy to regulate anger (Goss & Thompson, 2007; Gross, 2008a, b). Additionally, although not necessarily involved in the regulation of anger, it was decided to include in this dimension the regulation of other's emotions, because it can also be considered a form of emotion regulation (Gross, 2008). An athlete in this study has reported helping his teammates deal with their emotions, which is a strategy that can be particularly relevant in sports.

Furthermore, according to the instrumental account on emotion regulation, individuals prefer to feel emotions that are more useful for their goals, even if they are unpleasant (Tamir, 2009). However, most of the athletes in this study did not report engaging in any activity to regulate emotions before games, while some cited trying to relax before games.

The central role of self-control in the regulation of anger and aggression has been suggested by both theoretical perspectives (Anderson & Bushman, 2002; Wilkowski & Robinson, 2008a; Dwall et al., 2011) and empirical studies (e.g., Denson et al., 2010, 2011). This study also identified the use of self-control to restrain aggressive responses following an anger-inducing event or a provocation in the athletes' speeches.

However, some athletes also reported situations in which their self-control capacity had failed and led to aggression or displaced aggression, which consists of aggression directed towards another person that was not responsible for the situation (Denson, Pedersen, & Miller, 2006). Among the reasons pointed out to justify this self-control failure, athletes mentioned ego depletion. This reflects a temporary state in which the self-control energy is depleted (Baumeister et al., 1998; Muraven et al., 1998), increasing the likelihood of aggression (Dwall et al., 2007). In addition, provocation and impulses were also mentioned as contributing to athletes' failure in self-control. In fact, according to the "I cubed theory", individuals tend to engage in aggression when instigation factors, such as provocation, and impelling forces, such as impulses, are

stronger than the self-control capacity (Slotter & Finkel, 2011). Consistently, it seems that seeing a significant other in trouble was also an instigation force for an athlete in this study.

Additionally, these athletes also have some beliefs and perceptions about the regulation of anger and aggression. Firstly, most believe that sport experience can teach them better strategies to deal with anger and provocations, as it was suggested by Maxwell and colleagues (2009). These athletes also indicated that coping depends on their emotional state. Indeed, several studies have demonstrated that athletes tend to use different strategies to cope different emotions (e.g., Nicholls et al., 2009, 2010; Nicholls, Levy, & Polman, 2012). Moreover, each coping strategy can be effective for a given situation, suggesting that there are no strategies that can be considered effective in all situations (Richards, 2012), as it was reported by an athlete in this study.

These hockey players were also asked about their perceptions of the potential impact of anger and aggression in performance. Specifically about anger, it was found that this emotion can be both harmful and beneficial for performance, or have dualistic effects, as was suggested by two athletes. This idea of dualistic effects of anger on performance is consistent with previous research findings (e.g., Ruiz & Hanin, 2004, 2011; Woodman et al., 2009). Among the reasons to consider anger beneficial, athletes indicated that this emotion provides additional energy and increased motivation. Conversely, anger can be harmful for performance because it affects concentration, impairs decision-making and can lead to impulsive reactions. Ruiz and Hanin (2004) also found very similar results, in which athletes also considered that anger could provide additional energy but also affects their concentration. Woodman and colleagues (2009) have found that anger can be helpful for physical tasks, but may have a negative impact on cognitive tasks. The descriptions about the impact of anger in this study seem to be consistent with these findings. According to these athletes, anger affects concentration and other cognitive processes, while it can be physically useful, providing more energy and “power” in the game.

Likewise, it seems that aggression can also be viewed as both harmful and beneficial for performance. Nonetheless, most athletes agree that aggression can be considered a game tactic, characterised by a tougher and stronger game, with more physical contact and energy, but without the intent to harm the opponent. Although the relationship between aggression and performance is still controversial (Kimble et al., 2010), Maxwell and Moores (2007) highlight the importance of considering the “tactical use of aggression (or planned instrumental aggression)”

as a mean to “intimidate an opponent with the intent of regaining competitive dominance” (p. 190). Thus, it seems that athletes still believe that being aggressive is a game tactic that can bring benefits for their performance.

Overall this study demonstrated that anger is a frequently experienced emotion in sport, originated by a multiplicity of events, such as mistakes, being aggressed or provoked, the lack of effort from the teammates, losing, coach pressure and seeing a teammate being aggressive. This emotion is perceived as both harmful and beneficial for performance. However, despite considering that this emotion can be beneficial, no athletes mentioned engaging in activities to trigger this emotion.

In addition, aggressive behaviour is still an accepted and promoted part of sports. This belief is also present in the fact that injuries resulting from aggression in sports seem to be accepted as a normal part of the game. While some perceived this behaviour to be harmful for performance, most demonstrated that aggression is a game tactic frequently used in the game to obtain benefits. These beliefs can partially explain the persistence of aggression in sport.



## Chapter VI

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### General Discussion





The topic of aggression in sport has always raised the attention of the public in general, as well as of researchers. However, studies dedicated to this issue have failed to provide systematic empirical investigations based on solid theoretical backgrounds. Research on aggression in sport is mainly characterised by a disperse number of studies that seem to follow different perspectives, and a great number of them are atheoretical. The same seems to happen with studies aiming to study anger in sports. Although recently, a number of studies have started to focus on this emotion (e.g., Ruiz & Hanin, 2004, 2011; Maxwell & Moores, 2007; Maxwell et al., 2009; Maxwell & Visek, 2009), research specifically dedicated to anger in sports is still sparse. Nonetheless, the recent instrumental perspectives on emotion (e.g., Tamir, 2009; Tamir et al., 2007) have highlighted the potential utility of this emotion in confrontational situations (e.g., Tamir et al., 2008). Indeed, Lane and colleagues (2011) have demonstrated that athletes may want to feel angry before competition because they believe this emotion could be helpful for their performance.

Therefore, the main aim of this thesis was to provide a deeper understanding of anger and aggression in competitive sports. To attain this goal, recent theoretical perspectives on aggression (Anderson & Bushman, 2002; Finkel & Slotter, 2011; Wilkowski & Robinson 2008), as well as recent theoretical and empirical advances on emotion were taken into account (Gross, 2008a, b; Tamir, 2009; Schutz et al., 2004). In this sense, several variables suggested by the literature were included in this study. By integrating several theoretical models and important constructs suggested by the literature, it was intended to contribute to a significant advance on the topic of anger and aggression.

Overall, the Study 1 of this thesis focused on the differential patterns of anger and aggression, as well as other aggression-related constructs, across different types of sport (with different levels of physical contact), achievement level, gender and age. Generally, results were consistent with the literature by suggesting that aggression seems to be more frequent among athletes from contact sports (e.g. Maxwell & Moores, 2007; Maxwell et al., 2009; Guilbert, 2006; Keeler, 2000). Consistently, anti-social behaviour, both towards teammates and opponents was higher among athletes from contact sports. Male athletes also demonstrated to have higher levels of aggression and anti-social behaviour towards opponents, consistent with the literature (Maxwell & Moores, 2007; Kavussanu et al., 2013). However, unlike what Kavussanu and colleagues (2013) reported, no differences were found across different age categories.

Additionally, this first study did not find differences in anger and aggression among athletes with different achievement levels (measured by sport performance achievements), although it was found that athletes who played at an international level tend to engage less in anger rumination. In fact, engaging in ruminative processes seems to undermine concentration (Lyubomirsky et al., 2003), which may partially explain such findings. Consistently, some athletes in Study 5 (qualitative) also reported that anger rumination affected their performance.

Specifically considering individual differences in anger (Study 2) and the processes implicated in its regulation (Study 3), results seems to suggest that anger, unlike other negatively toned emotions (Lazarus, 2000), has several particularities that contribute to the “uniqueness” of this emotion. Carver and Harmon-Jones (2009) provided a thorough review demonstrating that anger is an approach-related emotion that leads individuals to pursuit of their goals. In this investigation, anger was indeed found to be positively associated to drive, a component of the BAS that reflects persistence in goal pursuit. Similarly, athletes in Study 5 also reported that anger can provide additional energy as well as motivational “power” to keep playing and “give their best”.

Another interesting finding was that, although anger was associated to both appraisals (threat and challenge), only challenge appraisals were a positive predictor of this emotion. Theoretical models on threat and challenge appraisals in sport (Jones et al., 2009; Skinner & Brewer, 2002, 2004), suggest that negative emotions are more likely to occur in situations appraised as a threat whereas positive emotions are more likely to occur in situation appraised as a challenge, but also argue that the opposite is also possible. This is precisely what seems to be the case of anger, which seems to occur in situations that athletes believe they can overcome (Lazarus, 2000; Cruz, 1996). Challenge appraisals can also be viewed as motivational states (Blaschovich & Mendes, 2000), consistent with approach motivation perspective (Jones et al., 2009). In fact, Ford and colleagues (2010) found that anger increases visual attention to rewards, but not to threats, suggesting that emotions are motivationally driven.

Finally, another finding that makes anger such a unique emotion was its positive association to the appraisal of problem efficacy, (emotion regulation strategy), and the fact that problem efficacy was also an important predictor of anger, both when only considering self-control and emotions regulation strategies, as well as in a final prediction model. Problem efficacy reflects the potential to deal with any problem that occurs in an achievement situation,

such as sport competition (Schutz & Davis, 2000). Therefore, it seems that athletes who perceived that they can deal with the problems of competition tend to feel more anger. In the academic contexts, however, Schutz and colleagues (2004) observed that feeling of anxiety tended to be associated to with less problem efficacy. Nonetheless, these findings seem to be consistent with the idea proposed by several accounts (Fridja, 1986; Lazarus, 1991; Scherer; 2001), which propose that anger occurs in situations individuals feel that they can control and deal with (coping potential). Indeed, for Lazarus (1991) “if coping potential favors attack as viable, then anger is facilitated” (p. 226).

It is also important to note that the coping strategies of denial, venting and behavioural disengagement positively predicted anger. Specifically, denial and venting increased anger levels. This is consistent with the idea that the use of emotion-focused strategies leads to more negative affect (e.g., Ntoumanis & Biddle, 1998; Ntoumanis et al., 1999). Results from Study 2 seem to suggest that anger is an approach-related emotion, leading to the active pursuit of goals. This justifies the fact that behavioural disengagement, reflecting giving up the pursuit of the goals (Caver, 1997), was a negative predictor of anger.

Across Studies 2 and 3, importance reappraisal and self-control were negative predictors of anger. In Study 5, athletes also mentioned reappraising the situation and self-control as strategies to reduce their anger when facing provocation. In addition, in Study 4, importance reappraisal and self-control appear to effectively reduce aggression behaviour as well. Indeed, importance reappraisal acted as a moderator between the relationship between anger and physical aggression. It appears that both these types of regulation can help deal and control athletes' anger and aggression (Deson et al., 2010, 2011; Denson, Moulds et al., 2012; Mauss et al., 2007). In fact, Wilkowski and Robinson (2008a, b) in their Integrative Cognitive Model of Trait Anger and Reactive Aggression (ICM), suggest that individuals often engage in effortful processes to reappraise the situation and avoid anger and reactive aggression. However, self-control was not related to physical aggression. It seems that there may be other processes involved in this type of aggression. Indeed, physical aggression can be premeditated and triggered by revenge feelings (Anderson & Carnagey, 2009), and not a temporary lack of self-control (ego depletion) (e.g., Baumeister et al., 1998).

Likewise, the role of anger rumination in prolonging and intensifying the experiences of anger has been consistently observed (e.g., Bushman, 2002; Deson, 2013; Denson, Denson,

Pedersen, & Miller, 2006; Sukhodolsky et al., 2001). Both Studies 2 and 3 found that anger rumination is an important predictor of competitive anger. Furthermore, a multiple mediation analysis of the relationship between provocation and anger demonstrated that both self-control and anger rumination were significant mediators. Besides highlighting the importance of these processes in the experience of anger, this finding is consistent with the ICM (Wilkowski and Robinson, 2008a, b), which suggests that attention to ruminative thoughts increase anger, whereas effortful control processes decrease this emotion. Moreover, it also seems to support the recent Multiple Systems Model of Angry Rumination (Denson, 2013), according to which “people with poor executive control may have difficulty inhibiting anger-related thoughts and switching their attention away from angry thoughts” (p. 104). Specifically, because both these processes were mediators simultaneously, it appears that anger rumination can decrease the ability to exert self-control, and in turn, self-control capacity can counteract the negative effects of anger rumination, as was previously suggested (Denson et al., 2011). Consistently, Study 4 also found support for the idea that anger rumination is an important antecedent of anger in sport (Maxwell, 2004). However, by considering different types of aggression, it was found that anger rumination is associated to retaliation towards opponents. This finding sheds some light into the contents of anger rumination, which may be more related to revenge thoughts after provocations (Sukhodolsky et al., 2001)

Recent research findings have been suggesting important constructs that influence how individuals regulate their emotions, such as implicit theories of emotions (Tamir et al., 2007; Kappes & Schikowski, 2013) and self-regulation (Job et al., 2010). Rusk and colleagues (2011) also demonstrated the influence of performance and learning goals for emotion regulation on these processes. Additionally, research has suggested that individuals with higher core self-evaluations are more likely to use more problem-focused coping strategies (Kammeyer-Mueller et al., 2009; Låstad, Berntson, & Näswall, 2013), but are less likely to use avoidance coping strategies (Kammeyer-Mueller et al., 2009). Overall, findings in this thesis seem to converge to the idea that individuals holding incremental (malleable) theories of emotions, ability/intelligence and self-regulation, learning goals for emotion regulation and reported high levels of core self-evaluations tend to engage in more adaptive regulations strategies (e.g., reappraisal, active coping), whereas those holding more entity (fixed) theories of emotions, ability/intelligence and self-regulation, have performance-avoidance goals for emotion regulation and low core self-

evaluations tend to use less adaptive strategies (e.g., self-blame, anger rumination). Furthermore, performance goals were found to be positively associated to the experience of competitive anger, and this relationship is fully mediated by self-blame and anger rumination. This suggests that athletes with performance-avoidance goals for emotion regulation tend to use more defence emotion regulation strategies (Rusk et al, 2011), which potentially lead to the experience of anger.

Suinn (2001) described anger and anxiety as the “terrible two” to suggest their potentially negative impact on health. In this sense, it is also important to underline that results reported that these two emotions are associated. Specifically, competitive anger was associated to the cognitive dimensions of anxiety (worry and concentration disruption) and was positively predicted by worry. It appears that the concerns about performing poorly and its negative consequences (Smith et al., 2006) can increase competitive anger.

In all the empirical studies that form this thesis, the link between anger and aggression (e.g. Maxwell & Moores, 2007; Maxwell et al., 2009; Maxwell & Visek, 2009; Visek, Hurst, Maxwell, & Watson, 2008) was clearly consistent. Therefore, although anger is undoubtedly amongst the most frequent antecedents of aggressive behaviour in sport competition, the roller hockey players in Study 5 reported more frequently revenge feelings as an antecedent of anger. This finding is particularly relevant because the literature concerned with aggression in athletic context seems to have forgotten that athletes may anticipate and “plan ahead” their aggressive acts.

Furthermore, and intrinsically related to the idea of premeditated aggression, findings from Study 5 suggest a general acceptance and a willingness to acknowledge this behaviour as a normal part of aggression. Aggression was also described as a “game tactic” that athletes may use to achieve their goals. This perceived legitimacy of the use of aggression appears to allow the perpetuation of such antisocial behaviours in sport competition (Bredemeier & Schields, 1986; Maxwell et al., 2009; Visek & Watson, 2005). This acceptance is even more “visible” in the fact that players perceive injuries resulting from aggression as normal and tend to undermine their negative effects. Athletes seem to be willing to accept aggression that would not be consented outside of sport contexts (Russel, 2008).

In Study 4, a preliminary measure for aggression was developed, based in Kavussanu and Boardley’s (2009) antisocial towards opponents and teammates subscales, as well as on

Maxwell and colleagues' studies (Maxwell, 2004; Maxwell et al., 2009; Maxwell & Visek, 2009). This measure distinguishes between physical aggression and retaliation towards teammates and opponents. Besides moving away from the classical distinction between instrumental and hostile aggression (Husman & Silva, 1984), and most importantly, this included the aggression directed towards teammates. Recently, Kavussanu and colleagues (Kavussanu & Boardley, 2009; Kavussanu et al., 2013) have argued that such aggressive behaviour directed to teammates does happen during competition and should be acknowledged by researchers in this field.

Indeed, this distinction between aggression directed towards opponents and teammates was very useful in the comprehension of this behaviour by providing some new insights (Study 4). Firstly, the differential pattern of relationship between these types of aggression with anxiety is worthy to further explore. Retaliation towards opponents and physical aggression were negatively predicted by worry (a cognitive component of anxiety) whereas retaliation towards teammates was positively predicted by somatic anxiety. On one hand, this suggests that more anxious athletes are more likely to aggress their teammates. This behaviour may be seen as maladaptive coping behaviour as a response to anxiety (Dias et al., 2012). On the other hand, anxiety, and particularly worries about the competition seem to suppress both physical aggression and retaliation towards opponents (Smits & Kuppens, 2005).

The analysis of the relationship between aggression and approach and avoidance motivation also supports the findings related to anxiety. Specifically, aggression directed towards opponents and physical aggression were positively predicted by drive, which reflects the active persecution of goals (Carver & White, 1994), confirming that this type of aggression seems to be a result of goal pursuit behaviour (Harmon-Jones, 2003; Harmon-Jones & Sigelman, 2001; Smits et al. 2004; Smits & Kuppens, 2005). Consistently, avoidance motivation, which can also reflect anxiety (Corr, 2001), was negatively associated to a specific behaviour of physical aggression ("I hit the opponent just to obtain a some benefit in the game/competition"). Overall, this suggests that anxiety suppresses aggressive behaviour towards opponents (Smits & Kuppens, 2005), but may increase aggression towards teammates. Additionally, because challenge appraisals are related to approach goals (Jones et al., 2009), its positive association between total aggression and aggression towards opponents, but not retaliation towards teammates, also supports the idea of aggression directed to opponents as a goal pursuit behaviour.

As suggested across these studies, anger and aggression appear to be related to active pursuit of goals, often occurring in situations perceived as both a challenge and in which individuals feel they overcome potential problems (problem efficacy). Indeed, this may partially explain the instrumental benefits of anger in confrontational tasks (Tamir et al. 2005; Woodman et al., 2009). Players in Study 5 considered anger as positive because it provided additional energy and increased motivation. However, anger can be harmful for performance and can lead to unwanted aggressive impulses and decreases in concentration (Woodman et al., 2009), as reported by these players. These findings are consistent with those reported by Ruiz and Hanin (2004, 2011), according to which anger can be beneficial for performance, leading to more energy and motivation, but can also be harmful, affecting athletes' concentration. This "dualistic" view on anger was also found for aggression in Study 5, in which some athletes reported its "double" effects.

The Cognitive-Affective-Processing System (Mischel & Shoda, 1995; Smith, 2006) generally proposes that individuals differences can be explained by cognitive and affective units, including encodings and personal constructs (cognitive appraisals), beliefs and expectancies (e.g., self-efficacy, locus of control), affects (and the appraisals and physiological processes associated), skills and self-regulatory competencies (regulation strategies to attain goals) and goals and values (motivations and moral values), which interact "continuously with the social world, generating the person's distinctive patterns of behavior, or behavioral signatures" Smith, 2006, p. 6). The observed associations, individual differences and prediction analyses in anger and aggression across cognitive (appraisals), emotional (anxiety) and motivational variables (approach and avoidance), beliefs (implicit theories) self-regulation (coping, emotion regulation and self-control) seem to support the complex nature of individual differences in sport and highlight the potentially utility of this model as an integrative framework to explain emotions and related behaviours in sport.

Additionally, results across these studies may contribute to a "new vision" of anger in sport competition. Anger can be very useful in sport competition, as an approach-related emotion, increasing motivation and energy in favour of desired goals (Carver & Harmon-Jones, 2009). At the same time, it can be quite destructive, leading to feelings of anxiety and aggressive acts that can jeopardise game results. Therefore, several directions for future studies, as well as implications for practice can be drawn based on these findings. The following section will be

dedicated to, firstly, describing directions for future studies, as well as pointing out the limitations of these studies, and finally, the implications for sport professionals that deal with athletes' anger and aggression daily.

### **Future directions and limitations**

Although these studies provided a great advance in the empirical knowledge about anger and aggression in competitive sports, there is still a long pathway to unveil all the complex processes and structures involved in these constructs. Therefore, there are some limitations that must be pointed out. Additionally, based on these findings, several directions for futures studies can be suggested, in an effort to expand the comprehension of the emotional experience of anger and aggressive behaviour.

First of all, despite the sample being relatively large, it did not allow to analysis the differences in age categories throughout the different types of sport. For instance, Maxwell and colleagues (2009) have found anger and aggression tend to decrease in low contact types of sport and increase in high contact sports, where this behaviour is promoted and because it is related to a better performance. Thus, future studies should further explore this differential pattern.

All these studies were cross-sectional, and do not allow to fully understand how anger and aggression evolve over time. Additionally, it was also not possible to understand how athletes evolve in the way they deal with anger. Therefore, future longitudinal studies could help learn more about individual experiences in anger, as well as the processes involved in its regulation. Because emotions fluctuate throughout competition (Lazarus, 2000), another limitation of these studies was the lack of state measures. It would also important to explore state anger in order to better understand its antecedents and consequences.

The retrospective nature of the self-report measures may also be a limitation in this study. These measures are subjected to memory decay associated to recalling previous experiences. In this sense, future studies should also consider using diaries or think aloud protocols to capture the dynamic nature of emotional experiences, emotion regulation, coping and self-control (Nicholls & Ntoumanis, 2010).



Similarly, future studies should explore the psychological variables that influence the regulation of anger and aggression. Study 4 found that emotion regulation, coping and self-control are influenced by implicit theories, goals for emotional regulation and core self-evaluations. Besides further exploring the mechanisms through which this influence occurs, other variables should also be accounted for, which have been suggested across the literature, such as personality (Davis et al., 2010; Kaiseler et al., 2010; Tamir, 2009b), gender (Hoar et al., 2010; Nicholls & Polman, 2007b), age (Bebetsos & Antoniou, 2003; Nicholls & McKenna, 2009) and motivation (Harwood & Chan, 2010; Kim & Duda, 1995).

According to the General Model of Aggression (Anderson & Bushman, 2002), reappraisal can also lead to an increase in motivation, “cold” and premeditated. Across these studies, the use of this emotion regulation strategy was associated with a decrease in anger and aggression. Nonetheless, in Study 5, premeditated aggression was also a type of aggression mentioned by the athletes. In this sense, future studies should analyse this type of aggression as a relevant part of sport competition. Consistently, a higher self-control capacity was linked to less anger and aggression, but physical aggression was not associated to self-control. These findings may suggest, again, that this type of aggression may be premeditated. Therefore, in future studies, a better understanding of this emotion can be achieved with the use of objective measures of physical aggression.

In Study 4, anger rumination was only associated to retaliation towards opponents, which may suggest that athletes ruminate about past provocation and aggression, and therefore tend to retaliate. Previous studies on anger rumination and aggression (Bushman, 2002; Maxwell, 2004; Deson et al., 2012) have not explored the contents of the ruminative thoughts, which will be an interesting pathway to explore the impact of rumination on athletic aggression.

Furthermore, Study 4 attempted to develop a preliminary measure of aggression in sport. However, the reliability level of the relation towards teammates subscale was low (below .70). In addition, other types of aggression, such as premeditated aggression, were not represented in this scale. Hence, future studies should revise the language of the items, as well as develop more items, in an effort to represent all the types of aggression.

Another important aspect that must be further explored is the relationship between anxiety, anger and aggression. The findings in these studies seem to suggest that anger is related to worries about the competition. However, both physical aggression and retaliation towards

opponents decrease when athletes worry about problems in competition whereas retaliation towards teammates seems to increase in the presence of somatic anxiety. Future investigations should therefore understand this interesting and differential relationship, as well as the mechanisms that may explain it. For instance, avoidance motivation is related to anxiety (Corr, 2001), which may explain why this emotion suppresses aggressive responses towards opponents.

Finally, because both anger and aggression were positively associated to challenge, approach motivation and problem efficacy, it seems that both are related to goal pursuit and coping potential (belief in the ability to deal with the situation), which can explain the instrumental benefits of anger (Tamir et al., 2005; Woodman et al., 2009; Ford et al., 2010). In this sense, it seems important to explore the relationship between anger and aggression and performance outcomes in sport. A limitation of Study 1 was the lack of balance between the groups created according to the self-reported sport achievements. Future studies should systematically compare different levels of achievement in order to clarify the potential benefits of anger in performance.

## **Practical implications**

There are several practical implications that can be drawn from the present research Studies. In fact, some suggestions for psychological interventions in sport contexts have been offered by recent research and some techniques that have been suggested by the literature to help athletes control and regulate their anger. Based upon the findings of these studies, as well as some research on interventions to manage anger, some practical suggestions are made to professionals working in sport settings. It should be noted, however, that anger is necessary for sport success and may have instrumental benefits for performance. In this sense, these strategies are directed to providing the athletes with the “power” to control and take advantage of its positive aspects, and not just simply reducing it.

Abrams and Hale (2005) suggested that one of the most problems that lead to anger and aggression are cognitive distortions and erroneous thinking patterns. In this sense, these authors suggested the application of the ABC model to help athletes reevaluate the situation and focus on how to solve problems. Athletes have to be trained to identify the antecedents (A) and consequences (C) of aggressive behaviour (B), which can “de-escalate the situation” and prevent

aggression.

For example, a study by Deffenbacher, Dahlen, Lynch, Morris and Gowensmith (2000) applied the cognitive behaviour therapy, in which participants were asked to monitor their anger to become more aware of this emotion. Additionally, participants were also taught to formulate alternative solutions for anger-inducing situations and to use visualization and role-playing for this purpose. It was found that their anger levels reduced in a follow-up study after 15 months. Consistently with this intervention, Brunelle and colleagues (1999) tested the efficacy of two interventions for regulating anger: awareness, which promoted athletes' awareness of the conditions surrounding the anger-inducing events; and role-playing, consisting in "acting out" possible scenarios of common anger-inducing situations. These authors found that although anger awareness intervention was effective in decreasing angry behaviour, the role-playing training was more effective in the over time. Considering the relevance of importance reappraisal found in this study in the prediction of anger and aggressive behaviour, it seems that these cognitive-based interventions can help athletes reevaluate the situation and therefore restrain and control their anger and aggression.

Similarly, because anger rumination was an important predictor of anger, psychological interventions should also focus on how to stop such undesired cognitive processes. Koole, Smeets, Knippenberg and Dijksterhuis (1999) observed that the use of self-affirmation was effective in reducing their participants ruminative thoughts. Consequently, it seems that teaching athletes to use self-affirmation techniques to "block" their ruminative thoughts could be helpful in reducing anger.

Although these studies did not measure specifically the physiological responses to anger, relaxation techniques are also useful in reducing anger. In the progressive muscle relaxation technique, athletes learn to improve muscular control by tightening and relaxing each muscle group systematically. However, athletes should also learn to recognize the bodily reactions to anger, such as an inclination of the upper body toward the target of anger, a tightened brow, clenched fists and a stiffening of the jaw and neck. After recognizing these signals, athletes may use relaxation to control their anger. Another strategy to help athletes relax and counteract the physiological responses to anger is to use imagination. For instance, they may be taught to imagine themselves in a tranquil and calm place, such as a beach or the top of mountain. Additionally, listening to music can also be useful to reduce anger, by allowing athletes to "cool

down” and reduce their anger (Abrams & Hale, 2005).

Additionally, because self-control was found to have important role in the regulation of anger and aggression, psychological interventions should focus on promoting athletes’ self-control capacity. Baumeister and colleagues (2007) suggested that self-control, as a muscle, can be trained. Indeed, Muraven and colleagues (1999) found that daily exercises of self-control, such as controlling the posture, regulating humour and monitoring and recording eating improved self-control capacity. Denson and colleagues (2011) also found that asking participants to use their non-dominant hand, improved their self-control, which has reduced their aggressive responses. Additionally, Webb and Sheeran (2003) reported that the implementation of intentions strategy (“if-then” statements) can increase performance in self-control tasks. In this sense, it seems that exercises to help athletes improve their general self-control capacity, as well as planning their actions before the games/competitions by anticipating problems, could help them reduce their anger and subsequent aggression and particularly refrain premeditated attempts of aggression.

Implicit theories, specifically believing in the ability to control emotions and self-regulation, as well as that ability/intelligence can be improved (incremental theories) were associated to the use of more adaptive coping and emotion regulation strategies. Previous studies (Blackwell et al., 2007; Dweck, 1990; Good et al., 2003) have found that interventions to promote incremental theories of intelligence improved students’ academic performance. In this sense, it seems that psychological interventions in sport should also encourage athletes to develop incremental theories about the capacity to regulate their emotions, which will ultimately lead to a more effective and flexible emotion regulation during competition.

Finally, a model of psychological intervention on anger based on the oriental philosophy strategies (e.g., mindfulness and meditation approaches) is proposed because it includes several of the techniques mentioned above, such as the awareness of the cues associated to anger, the importance of formulating alternative solutions, the use of relaxation and more importantly, the use of self-control training to manage angry feelings. In this sense, according to Leifer (1999), Buddhism suggests that individuals can control their anger by increasing their knowledge about this emotion because anger arises from the mind, rather than external circumstances or physiological processes. The treatment proposed by Leifer (1999) is a step-by-step process that can be applied in the contexts of sport. The first step proposed by this author is accepting the

responsibility for the feelings of anger. Indeed, in Study 5, players attributed their anger to others. However, this attribution of responsibility to others only increases its intensity. In the second step, because the healing process implies becoming “familiar” with anger, individuals should be able to identify and recognise the sources of anger by looking within their minds and examining them logically and empirically. After becoming aware of the causes of anger and taking responsibility for these feelings, step 3 involves understanding the causes of anger. According to Leifer (1999), individuals must learn that being rigid about getting what they want only makes them more vulnerable to become angry and aggressive. Therefore, individuals should learn to be more flexible and accept that there are things that cannot be changed. In step 4, individuals are asked to reflect about anger incidents and visualise the situation. Leifer (1999) suggests “healing anger requires opening to them [frustration, vulnerability, helplessness and fear], becoming aware of them, accepting them” (p. 346). Helplessness is of particular concern for anger, because it leads to the fight-flight response. Subsequently, step 5 involves the development of self-control, awareness and self-discipline and channeling anger to other alternative responses. Finally, in step 5, individuals learn relaxation techniques to “turn down” the fight-flight response that leads to anger. Relaxation can help reduce the physiological aspects of anger through a biofeedback mechanism. Firstly, individuals may start by learning how to relax their body when not feeling angry. After this technique is mastered, they can apply it to anger situations, especially after finding an alternative response.

Some recent research on Mindful Sport Performance Enhancement (MSPE) (e.g., Kaufman, Glass & Arnkoff, 2009), as well as other mindfulness and acceptance-based interventions (see Gardner & Moore, 2012, for a recent review of advancement), offer evidence for its application in sport contexts, namely as a “promising intervention for athletic performance enhancement” (Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011, p. 114).

In this sense, there is an array of techniques and strategies that can be used to help athletes control their anger. Psychological interventions should therefore attempt to integrate these suggestions in an effort to provide athletes the necessary tools to control this emotion in sport, potentially leading to a better experience and well-being in sport competition, but also toward performance promotion and enhancement.



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