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# Pre-competitive Achievement Goals, Stress Appraisals, Emotions, and Coping among Athletes: A Structural Equation Model

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## Abstract

Grounded in Lazarus' (1991, 1999, 2000) Cognitive-Motivational-Relational theory of emotions, we tested a model of achievement goals, stress appraisals, emotions, and coping. We predicted that pre-competitive achievement goals would be associated with appraisals; appraisals with emotions; and emotions with coping in our model. The mediating effects of emotions among the overall sample of 827 athletes and two stratified random sub-samples were also explored. The results of this study support our proposed model in the overall sample and the stratified sub-samples. Further, emotion mediated the relationship between appraisal and coping. Mediation analyses revealed that there were indirect effects of pleasant and unpleasant emotions, which indicates the importance of examining multiple emotions to reveal a more accurate representation of the overall stress process. Our findings indicate that both appraisals and emotions are just as important in shaping coping.


*Keywords:* Achievement Goals, Challenge, Coping, Stress Appraisals, Threat

# Pre-Competitive Achievement Goals, Stress Appraisals, Emotions, and Coping among Athletes: A Structural Equation Model

Participating in competitive sport can be stressful for athletes and is often associated with a range of emotions (Balk, Adriaanse, de Ridder, & Evers, 2013; Moore, Wilson, Vine, Coussens, & Freeman, 2013; Nicholls, Levy, Jones, Rengamani, & Polman, 2011). Coping is a mechanism that an athlete can engage to manage stress (Doron & Gaudreau, 2014; Nicholls, Perry, Jones, Morley, & Carson, 2013; Schellenberg, Gaudreau, & Crocker, 2013). Much of the research on stress, emotions, and coping within the sport literature is grounded in Lazarus' cognitive-motivational-relational theory (CMRT) of emotions (Lazarus, 1991, 1999, 2000). At the present time, however, little is known about the overall sequence of the constructs central to the CMRT emotions. This includes goals to appraisals, appraisals to emotions, and emotions to coping. As such, the purpose of this study was to test a model that included the key constructs from Lazarus' CMRT of emotions.

## The CMRT of Emotion

Lazarus (1991, 1999, 2000) conceived stress as an imbalance between the person-environment relationship. Based upon this conceptualization, Aldwin (2007) defined stress as "the quality of experience, produced through a person-environment transaction, that, through either over arousal or under-arousal results in psychological or physiological distress" (p. 24). In order to judge the person-environment relationship, a person engages in a process known as primary appraisal. As such, an evaluation is made as to whether the environment has endangered or has the potential to endanger personal goals. If a situation has been appraised as endangering personal goals or having the potential to do so, it is regarded as being stressful. When a situation has been evaluated as endangering well-being, or having the potential to do so, one of four primary appraisals (i.e., harm/loss, threat, challenge, or benefit) is made. Harm/loss refers to damage that has already occurred (e.g., opposing team scoring a goal). Threat relates to the

possibility of future harms or losses (e.g., opposing team scoring more goals). Challenge appraisals refer to evaluations of future gains or personal mastery (e.g., chance to impress selectors or to improve on personal best). Finally, benefit appraisals represent gains that have occurred (e.g., playing a full game on return from injury without any problems). Peacock and Wong (1990) proposed another primary appraisal, which was not labeled as such in Lazarus' CMRT, known as centrality. Centrality refers to the perceived importance of an encounter in relation to desires. The concept of centrality is very similar to the construct of motivational relevance, which was proposed by Lazarus (1991). In this paper, the term motivational relevance will be used instead of centrality. Lazarus (1999) also identified another form of appraisal, known as secondary appraisal. This represents an evaluation of the coping options available to the person and the likely outcome of deploying different coping strategies and therefore whether the athlete is able to exert control over the stressor or the emotions experienced.

The inclusion of benefit in Lazarus' (1999) CMRT of emotions as a primary appraisal, along with challenge in his original transactional model of stress and coping (Lazarus & Folkman, 1984), facilitates the assessment of both pleasant and unpleasant emotions that occur during the stress process (Lazarus). Lazarus defined an emotion as "an organized psychophysiological reaction to ongoing relationships with the environment, most often, but not always, interpersonal or social" (Lazarus, 2000, p. 230). Indeed, Lazarus (1999) advocated that appraisals are inherently linked to emotions. A key premise of the CMRT of emotions is that the specific emotion experienced and intensity are the consequences of appraisals relating to encounters with the environment. These appraisals relate to whether the environment has the potential to have a negative or positive significance on well-being (Lazarus, 1991). The emotions generated in a stressful encounter also influence coping (Lazarus, 1999).

Coping refers to thoughts and behavioral efforts to manage external or internal demands

that are appraised as taxing the resources of a person (Lazarus & Folkman, 1984). Lazarus (1991) stated that coping flows from emotion and can be aimed at changing the emotion. In addition to coping flowing from emotion, coping can also directly and indirectly influence future stress appraisals or re-appraisals. If a person makes a threat appraisal, but then copes effectively with the stressor, he or she may no longer re-appraise the same situation as threatening. This is because the threat has been alleviated through coping. In this respect, Lazarus (1991, 1999, 2000) proposed that the CMRT of emotions is recursive because making stress appraisals, feeling emotions, and coping is an ongoing process. Lazarus and Folkman categorized coping within two broad dimensions: problem-focused (e.g., strategies to alleviate the source of stress) and emotion-focused (e.g., strategies that regulate the emotional response caused by stress. More recently, Gaudreau, El Ali, and Marivain (2005) classified coping within three higher-order dimensions: task-, distraction-, and disengagement-oriented coping. Task-oriented coping strategies include conscious attempts aimed directly at changing or mastering aspects of a stressful situation (e.g., logical analysis and mental imagery). Distraction-oriented coping directs one's attention onto unrelated aspects of the task at hand (e.g., mental distraction and distancing). Coping strategies classified within the disengagement-oriented dimension involves disengaging from attempts to attain personal goals (e.g., withdrawal and venting of emotions).

Lazarus (1991) indicated that the stress process, which involves goals, appraisals, and coping represent a sequence of events taking place over time. Although not at the same time, each construct can play a different role and be the antecedent, outcome, or the mediating process, which is referred to a reciprocal determinism (Bandura, 1978). Researchers have made theoretical predictions regarding the different relationships between constructs within the CMRT and some scholars have examined these purported associations empirically.

**Achievement Goals and Stress Appraisals**

Any situation in which an individual has a goal at stake, he or she will make an appraisal relating to the significance of what is happening in the environment in regards to that goal (Lazarus, 1999). Ntoumanis, Edmunds, and Duda (2009) predicted that appraisals are shaped by goal striving. In particular, these scholars posited that individuals with self-determined goals are more likely to appraise situations positively (i.e., challenge or benefit appraisals), compared to those with controlled goals who evaluate situations negatively (i.e., harm/loss or threat appraisals). The notion that different goal motives would be related to stress appraisals has been examined empirically. Adie, Duda, and Ntoumanis (2008) assessed the relationship between goal type and coping, based upon Elliot's (1999) 2 x 2 framework. This framework comprises of four types of achievement goals: mastery approach (MAp; e.g., striving to achieve a specific standard of performance), mastery avoidance (MAv; e.g., striving not do worse than a previous performance), performance approach (PAp; e.g., striving to beat opponents), and performance avoidance (PAv; e.g., striving not to be the worst on a team). Adie et al. (2008) found that challenge appraisals were positively associated with MAp, but negatively with PAv. Threat appraisals were positively associated with MAv, PAp, PAv, whereas MAp goals were negatively associated with threat appraisals. Adie, Duda, and Ntoumanis (2010) reported similar findings in their longitudinal study, except challenge was associated positively with PAp goals. More recently, Meijen, Jones, McCarthy, Sheffield, and Allen (2013) did not find any significant relationships between challenge appraisals and achievement goals. However, threat appraisals were negatively associated with MAp goals, but positively associated with MAv and PAv goals. These findings provide some support for the theoretical assertions of both Lazarus (1999) and Ntoumanis et al. (2009) as goals were related to stress appraisals.

**Stress Appraisals and Emotions**

Stress appraisals relate to a person's evaluation of his or her pursuit in achieving desired goals. Lazarus (1991) suggested that a person will experience pleasant emotions from appraisals

of smooth goal progress or goal attainment. That is, when a person feels that he or she is succeeding in achieving a desired goal or perceives a goal as challenging, he or she is likely to experience pleasant emotions. Lazarus also theorized that unpleasant emotions are experienced by people who are struggling in pursuit of their goal. As such, appraisals of threat and harm/loss are likely to result in unpleasant emotions.

Empirical findings from the sport psychology literature support Lazarus' theoretical assertions. With a sample of 11 professional rugby union players, Nicholls et al. (2011) found that gain (i.e., challenge and benefit) appraisals were associated with pleasant emotions, whereas loss (i.e., harm/loss and threat) appraisals were associated with unpleasant emotions. This finding was also replicated with a sample of 557 athletes. Nicholls, Polman, and Levy (2012a) found that pleasant emotions were positively associated with challenge and threat was positively associated with unpleasant emotions.

**Emotions and Coping**

Fredrickson (2000) argued that pleasant emotions should broaden a person's attention on the task at hand, with the athlete attending specifically to aspects of his or her sport rather than on distractions such as coach crticism or crowd. A broader attention on the task at hand may result in more flexible and creative thinking. Greater flexibility and creativity, according to Fredrickson should result in more effective coping.

It could be argued that task-oriented coping strategies such as logical analysis, mental imagery, and planning all require either creativity or flexibility. That is because these strategies require a person to engage in what could be deep cognitive processing. Interestingly, these strategies have been found to be effective among athletic samples. In support of Fredrickson's assertion, Nicholls, Polman, Levy, and Hulleman (2012b) found that pleasant emotions correlated positively with task-oriented coping strategies. These authors also found that unpleasant emotions correlated positively with distancing and resignation, which have been

found to be less effective coping strategies in previous research (Nicholls, Polman, Morley, & Taylor, 2009).

**Summary and Hypotheses**

Our hypotheses are illustrated in Figure 1, with an unbroken line inferring a positive relationship and a broken line representing a negative relationship. We hypothesized that there would be positive paths between MAp and PAp goals and challenge, but a negative path between PAv goals and challenge (Adie et al., 2008; 2010). Although not a significant finding in Adie et al. (2010) study, we predicted a negative path between MAv goals and challenge. In regards to threat appraisals, we predicted that there would be a negative path between M**A**p goals and threat, but positive paths between threat and MAv, PAp, and PAv goals (Adie et al., 2008; 2010). We also predicted positive paths between all achievement goals and motivational relevance, because a higher score on the achievement goals questionnaire represents goal importance (Peacock & Wong, 1990). Based on Lazarus (1991), we also hypothesized a positive path between challenge appraisals and pleasant emotions, but a negative path between challenge appraisals and unpleasant emotions. Further, we predicted a positive path between threat appraisals and unpleasant emotions, in addition to a negative path between threat and pleasant emotions. We also hypothesized that there would be a negative path between motivational relevance and pleasant emotions, but a positive path between this construct and unpleasant emotions. Based on the assertions of Fredrickson (2000), we hypothesized that there would be a positive path between pleasant emotions and task-oriented coping and positive paths between unpleasant emotions and distraction- and disengagement-oriented coping.

Finally, we predicted significant mediation, with emotions being the mediating variable between appraisals and coping. This is because theory and empirical evidence indicate that emotions are related to both appraisals (Lazarus, 1991) and coping (Fredrickson, 2000). More specifically, it was predicted that pleasant emotions would positively mediate the relationship

between challenge appraisals and task-oriented coping and unpleasant emotions would positively mediate the relationship between threat appraisals and both distraction- and disengagement-oriented coping.

## Method

### Participants

Eight-hundred and twenty-seven participants (male *n* = 437, female *n* = 373, unspecified *n* = 17), aged between 16 and 64 years of age (*M* age = 23.64, *SD* = 8.25), with a mean playing experience of 9.57 years (*SD* = 7.16) participated in the study. Participants were from team (*n* = 582) and individual sports (*n* = 245), including both contact sports (*n* = 397) and non-contact sports (*n* = 430). Our sample consisted of 722 Caucasian, 43 Asian, and 42 African-Caribbean, with 21 athletes not reporting their ethnic origin. The athletes in our sample competed at international (*n* = 37), national (*n* = 86), county (*n* = 164), club (*n* = 455), and beginner (*n* = 65) levels. Twenty athletes did not specify their skill level.

### Measures

***Achievement Goals***. The Achievement Goals Questionnaire for Sport (AGQ; Conroy et al., 2003) was used to assess achievement goals. This is a 12-item questionnaire, containing four subscales: (1) MAp, (2) MAv, (3) PAp, and (4) PAv goals. Participants were asked to answer the questions in regards to "how you view this situation right now, in relation to your forthcoming competition." Items include "it is important to me to perform as well as I can" and "my goal is to do better than most other performers," which are answered on a 7-point Likert-type scale anchored at 1 = *not at all like me* and 7 = *completely like me*. Conroy et al. reported Cronbach alpha coefficients ranging from .70 to .87.

***Stress Appraisal Measure***. The Stress Appraisal Measure (SAM; Peacock & Wong, 1990) was utilized to assess stress appraisals. Athletes were asked to "please respond according to how you view this situation right now." The SAM is a 28-item questionnaire in which

participants answer questions such as “does this situation create tension in me?” “Will the outcome of this situation be negative?” The responses on the SAM range from 1 = *not at all* to 5 = *extremely*. It measures two primary appraisals (threat and challenge) and centrality (motivational relevance in the present study) and three secondary appraisals (perceptions of controllable by-self, controllable by-others, uncontrollable). It should be noted that in the present study, only the two primary appraisals and motivational relevance were included in the analyses, with the secondary appraisals being omitted due to an insufficient sample size. Peacock and Wong reported internal consistencies ranging from .65 to .90. It should be noted that the Cronbach alpha score of .65 was for threat, which was reported in one of three studies. In the other two studies within that paper, the Cronbach alphas for threat were.75 and .73.

***Emotion.*** Emotions were assessed using the Sport Emotion Questionnaire (SEQ; Jones, et al., 2005). The SEQ can be used to measure three unpleasant emotions (e.g., anger, anxiety, and dejection) and two pleasant emotions (e.g., excitement and happiness). Participants were asked to “indicate on the scale next to each item how you feel *right now, at this moment, in relation to the upcoming competition*” on a five-point Likert-type scale, anchored from 1 = *not at all* to 5 = *extremely*. Jones et al. reported that Cronbach alpha coefficients ranged between .81 and .87 for the SEQ.

***Coping.*** The Coping Inventory for Competitive Sport (CICS; Gaudreau & Blondin, 2002) was used to assess coping. The CICS examines 10 coping subscales categorized in three second-order dimensions (a) task-orientated coping (thought control, mental imagery, relaxation, effort expenditure, logical analysis, and seeking support), (b) distraction-orientated coping (distancing and mental distraction), and (c) disengagement-orientated coping (disengagement/resignation and venting of unpleasant emotions). Participants were asked to report how their coping “corresponds to what you are doing now.” Questions included “I keep my distance from others” and “I get angry,” which were answered on a five-point scale, ranging

from 1 = *not at all* to 5 = *very strongly*. Gaudreau and Blondin reported Cronbach alpha coefficients for individual coping strategies ranging from .67 to .87.

**Procedure**

A University Ethics Committee granted ethical approval for this study to be conducted. Information letters were distributed to coaches and athletes, which detailed the nature of the study, the requirements of the research, and rights of the participants. If the athletes decided to take part in the study, they signed a consent form. Each participant completed a standardized questionnaire pack within three hours of his or her competition commencing. The questionnaires were completed in the following order: the AGQ (Elliot et al., 2003), SAM (Peacock & Wong, 1990), SEQ (Jones et al., 2005), and finally, the CICS (Gaudreau & Blondin, 2002).

**Data Analysis**

Data from all measures was screened for outliers, normality, and composite reliability. This was preferred to Cronbach's alpha, as Raykov (1997) reported that composite reliability is less likely to underestimate reliability. We conducted structural equation modeling, for the main analysis, using the two-step model building approach advocated by Anderson and Gerbing (1988). All analyses were conducted in Mplus 7 (Muthén & Muthén, 2012). Firstly, we tested the measurement model. Secondly, we examined the structural path model outlined in Figure 1. To assess both the measurement model and the path model, we employed Hu and Bentler's (1999) recommendations for fit indices of CFI > .90, TLI > .90, SRMR < .08, RMSEA < .05 indicating an acceptable model fit, with CFI and TLI > .95 representing an excellent fit of the model and data. However, we also acknowledge the recommendations of Marsh, Hau, and Wen (2004), who advocated more liberal criteria for complex models.

This study extends the work of Nicholls et al. (2012a) by examining the mediating role of emotion, which is a significant benefit of structural equation modeling (Iacobucci, Saldanha, & Xiaoyan, 2007). Although scholars have used different approaches to assess mediation, bootstrapping is thought to be the most effective. Unlike other methods, such as Baron and

Kenny's (1986) regression based approach to mediation, it does not have the same assumptions of sampling distribution for indirect effects (Hayes, 2009). Further, bootstrapping quickly generates standard errors and confidence intervals, enabling the researcher to examine invariance within a sample.

## Results

### Descriptive Statistics

Table 1 presents the means, standard deviations, and composite reliability. Less than 0.1% of the data was missing and no troublesome outliers were detected from Q-Q plots. All variables demonstrated satisfactory univariate skewness (< 2) and kurtosis (< 2). Composite reliability estimates were all above .70, with the exception of the threat subscale of the SAM (.63), which was at the lower bound of acceptable reliability (Raykov, 1997).

Inspection of the factor-correlation matrix in Table 1 revealed that MAp goals were positively associated with a challenge appraisal of stress ($r$ = .25, $p$ < .01) and motivational relevance ($r$ = .24, $p$ < .01). Threat appraisal, however, was positively associated with MAv ($r$ = .37, $p$ < .01) and PAv goals ($r$ = .24, $p$ < .01). Of all goal orientations, only MAp positively correlated with pleasant emotions ($r$ = .17, $p$ < .01). MAp ($r$ = .16, $p$ < .01) and MAv ($r$ = .26, $p$ < .01) goals were positively correlated to unpleasant emotions. Pleasant emotions were positively associated with challenge appraisals ($r$ = .42, $p$ < .01), but negatively with threat appraisals ($r$ = -.43, $p$ < .01). Conversely, unpleasant emotions were positively associated with threat ($r$ = .52, $p$ < .01). Motivational relevance correlated positively with unpleasant emotions ($r$ = .43, $p$ < .01) and demonstrated a small negative correlation with pleasant emotions ($r$ = -.13, $p$ < .05). Task-oriented coping was positively associated with all types of goals, though more strongly with approach based goals, in particular, MAp goals ($r$ = .21, $p$ < .01). Distraction-oriented methods of coping were positively correlated to threat appraisals ($r$ = .57, $p$ < .01), motivational relevance ($r$ = .32, $p$ < .01), and unpleasant emotions ($r$ = .32, $p$ < .01) but negatively associated with pleasant emotions ($r$ = -.22, $p$ < .01). Disengagement-oriented coping

correlated positively with threat appraisals ($r$ = .47, $p$ < .01) and motivational relevance ($r$ = .35, $p$ < .01), but negatively associated with challenge ($r$ = -.19, $p$ < .01). Moreover, disengagement-oriented coping was strongly positively associated with unpleasant emotions ($r$ = .52, $p$ < .01) and negatively associated with pleasant emotions ($r$ = -.30, $p$ < .01). Task-oriented coping demonstrated a strong positive correlation with pleasant emotions ($r$ = .54, $p$ < .01).

**Structural Equation Modeling**

Due to the complexity of the model, a full latent analysis was not appropriate for the sample size, as a full disaggregated model would require the estimation of 474 free parameters. Bentler and Chou (1987) recommend at least five cases per estimated parameter to test a hypothesized model. We used a parceling technique (Bagozzi & Edwards, 1988), which involves reducing the number of path coefficients by collapsing items from a scale into multiple composites. To achieve an appropriate number of free parameters for the sample size, we created random parcels for each latent variable in the model so that all latent variables were indexed by two parcels each, with the exception of achievement goals variables, which were each indexed by three indicators. This approach yielded a resultant ratio between participants and free parameters of 5.51:1, which was considered appropriate (Bentler & Chou, 1987).

All parcels were checked for normality, which presented no issues with univariate skewness or kurtosis. However, inspection of Mardia's coefficient value (104.19, $p$ < .001) revealed departure from multivariate normality. Consequently, 5000 bootstrap replications and the robust maximum likelihood estimator (MLR) were used in the analysis. Step 1 of our analysis examined the measurement model and found a good fit to the data: $\chi^2(243) = 674.8$, $p$ < .001, CFI = .96, TLI = .94, SRMR = .04, RMSEA = .05 (90% CI = .04-.05). Factor loadings from the measurement model are presented in Table 2. Stage 2 of our analysis required examination of the structural model, which produced a similarly good fit to the data: $\chi^2(272) =$ 830.2, $p$ < .001, CFI = .95, TLI = .93, SRMR = .06, RMSEA = .05 (90% CI = .045-.06). However, the hypothesized paths from mastery approach to threat (β = -.01), performance

approach to threat (β = .06) and challenge (β = -.00), and performance avoidance to motivational relevance (β = -.07) were not significant and therefore removed from the model.

To determine the mediating role of emotion, we composed a combined effects model to examine direct and indirect effects from achievement goals and stress appraisal to coping strategies. The model fit was slightly improved compared to the model presented in Figure 2, which did not include the direct effects, providing initial support for the mediating role of emotion: $\chi^2(254) = 731.4$, $p < .001$, CFI = .96, TLI = .94, SRMR = .05, RMSEA = .05 (90% CI = .04-.05). A chi-square difference test between the models revealed a significant difference (Satorra-Bentler scaled $\chi^2(18) = 120.12$, $p < .001$). Table 3 presents the direct, indirect, and total effect estimates from this model. Most significantly, pleasant emotions mediated all three stress appraisal paths to task-oriented coping. Unpleasant emotions significantly mediated the relationships from threat to both distraction- and disengagement-oriented coping strategies. Few indirect paths between achievement goals and coping were significant, though pleasant emotions significantly mediated the path between MAp and task-oriented coping.

To examine the extent to which the model is replicable, we tested model invariance by splitting the overall sample into two stratified random sub-samples by gender, team or individual sport, and contact or non-contact sport athletes. The two sub-samples were then tested on increasingly constrained models to assess invariance of the measurement model and the structural model. Model invariance was deemed to be supported if ΔCFI was less than or equal to 0.002 (Meade, Johnson, & Braddy, 2008). Results from the multi-group SEM supported the baseline measurement model (configural invariance) by presenting an acceptable model fit: $\chi^2(486) = 1117.5$, $p < .001$, CFI = .94, TLI = .91, SRMR = .05, RMSEA = .06 (90% CI = .05-.06). We then tested the measurement model further, sequentially constraining the factor loadings across sub-samples (metric invariance), item intercepts (scalar invariance), and factor means (residual invariance). Measurement invariance was supported throughout (Table 4). We then assessed the same SEM model (see Figure 2) among both sub-samples. This presented a

reasonable fit: $\chi^2(544) = 1308.6$, $p < .001$, CFI = .93, TLI = .91, SRMR = .07, RMSEA = .06 (90% CI = .06-.07). Finally, we created constrained factor loadings, item intercepts to examine scalar invariance, and placed equality constraints on all structural paths in the model. Model invariance was supported through with $\Delta$CFI < 0.01 between models (Table 4).

## Discussion

The aim of this paper was to assess a model that contained the key psychological constructs in Lazarus' (1991, 1999, 2000) CMRT theory of emotions. To our knowledge, this is the first study that has examined a model that contains achievement goals, appraisals, emotions, and coping. The strong model fit for the overall sample and sub-samples provides support for Lazarus' claim that these constructs exist within a conceptual unit. Although Lazarus (1991) alleged that appraisal is the most important construct in his CMRT theory of emotions, the indirect effects of this study illustrate that emotions are just as important as appraisals in shaping coping.

Our hypotheses regarding the paths between achievement goals and appraisals were generally supported. In accordance with Adie and colleagues (Adie et al., 2008, 2010), there were positive paths between MAp goals and challenge appraisals, in addition to positive paths between MAv and PAv goals and threat. Given that scholars such as Moore, Vine, Wilson, and Freeman (2012) reported that challenge appraisals generated pleasant emotions and threat appraisals unpleasant emotions, it could be argued that sport psychologists could encourage athletes to develop MAp goals as opposed to either MAv or PAv goals. Increasing MAp goals among athletes may increase the likelihood of athletes appraising stressful situations as a challenge and therefore experience more pleasant emotions as a consequence. Increasing the occurrence of pleasant emotions should enhance resilience among athletes, according to the broaden-and-build theory (Fredrickson, 1998). The broaden-and-build theory of positive emotions states that experiencing unpleasant emotions reduces the number of thoughts and behaviors that the individual has the urge to do, to those that were ancestrally associated with

survival. Conversely, experiencing pleasant emotions widens the behavioral and thought repertoire to resolve a particular situation. A wider repertoire allows the individuals to create and develop new solutions in addition to enhancing personal resources, which support coping and resilience. Future research could assess the applicability of the broaden-and-build theory in sport settings by exploring the effects of pleasant emotions on coping and resilience. Additional research could also assess whether pleasant emotions mediate the relationship between coping strategies and performance. Indeed, Tenenbaum et al. (2009) propounded that an increased spectrum of information attended to will prompt novel coping strategies, which is likely to have a positive impact on performance.

The paths between challenge and threat appraisals with emotions, along with the paths between emotions coping were similar to those observed in Nicholls et al. (2012a). However, Nicholls et al. did not explore the paths between motivational relevance and emotions. Furthermore, Nicholls and colleagues did not explore the mediating effects of emotions. With regards to the former, and in partial support of our hypotheses, we found a negative path between motivational relevance and pleasant emotions. We did not, however, find a positive path between motivational relevance and unpleasant emotions. These findings are contrary to Graham, Kowalski, and Crocker (2002) who found that important goals were associated with unpleasant emotions. Our study suggests that although events that are deemed highly important might not generate negative emotions, athletes are less likely to experience pleasant emotions during such events. Future research could examine the relationship between motivational relevance and emotions using experimental designs in order to establish causality. From an applied perspective, practitioners could help athletes generate pleasant emotions in stressful encounters by encouraging them to be realistic about the importance of particular event. Rationalizing the importance of an event has been found to be effective among international youth golfers (Nicholls, Holt, & Polman, 2005).

As Nicholls et al. (2012a) did not explore the mediating effects of emotions; these authors may have missed some key relationships, which were identified in the present paper. Task-oriented coping was not directly associated with challenge appraisals, but when positive emotions were taken into account, challenge appraisals positively influenced pleasant emotions, which in turn, positively influenced task-oriented coping. From a theoretical perspective, this demonstrates the importance of emotions in stressful encounters. Further, there was a direct relationship between threat and distraction-oriented coping, but not threat and disengagement-oriented coping. However, when unpleasant emotions were taken into account, threat appraisals positively influenced unpleasant emotions, which in turn, positively influenced both distraction- and disengagement-oriented coping. Although this study is cross-sectional in nature, the findings infer that it could be unpleasant emotions in response to threat appraisals that generate disengagement-oriented coping. Experimental research, in which the environment is shaped to influence appraisals in order to assess the effects on emotions and coping, is warranted to establish causality within the overall stress process. From an applied perspective, these findings have important implications. Teaching athletes to generate positive appraisals may lead to more positive emotions being experienced (i.e., Nicholls et al., 2011), which may result in more task-oriented coping strategies being deployed. This may be beneficial to performance given that task-oriented coping was found associated with better performances among golfers (Gaudreau, Nicholls, & Levy, 2010). Furthermore, athletes could be taught to recognize unpleasant emotions, including as anger or anxiety, as a cue to initiate coping attempts.

A limitation of this paper relates to the exclusion of secondary appraisals from the model. Based upon Bentler and Chou's (1987) recommendation of five participants per free parameter, we would have needed a minimum of 1140 participants to be able to include secondary appraisals due to the complexity of our model. From a theoretical point of view, secondary appraisal relates to an evaluation of the coping options available to a person. Although we did not assess secondary appraisals, we measured the participants' actual coping

responses. Another limitation of this paper is that we did not address the recursive nature of the constructs. Longitudinal research is required to assess the recursive nature of these constructs, although this could be onerous for participants who would have to complete several questionnaires across different time points. Future research could also develop appraisal questionnaires that include harm/loss, threat, challenge, and benefit to facilitate a more thorough examination of primary appraisals, as conceived by Lazarus (1999).

In summary, we found support for our model, which contained the key psychological constructs outlined in Lazarus's (1991, 1999, 2000) CMRT of emotions. This study also illustrates the benefits of using structural equation modeling, because we identified indirect effects of emotions that might have been missed with less sophisticated statistical analyses. In order to help athletes manage stress more effectively, practitioners could encourage athletes to focus on MAp goals, potential gains in stressful encounters, and use rationalization coping strategies.

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Table 1

*Descriptive Statistics, Composite Reliability, Normality, and Factor Correlations*

| Variable | *M* | *SD* | Skew | Kurt | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Mastery approach | 6.17 | .90 | -1.14 | .95 | (.71) | | | | | | | | | | | |
| 2. Mastery avoidance | 4.91 | 1.54 | -.47 | -.51 | .27** | (.91) | | | | | | | | | | |
| 3. Performance approach | 4.60 | 1.48 | -.37 | -.44 | .28** | .11** | (.87) | | | | | | | | | |
| 4. Performance avoidance | 4.06 | 1.70 | -.05 | -.99 | .06 | .38** | .40** | (.88) | | | | | | | | |
| 5. Threat | 2.16 | .76 | .46 | -.42 | .01 | .37** | .11* | .24** | (.63) | | | | | | | |
| 6. Motivational Relevance | 2.53 | .87 | .21 | -.62 | .24** | .14** | .26** | .06 | .59** | (.77) | | | | | | |
| 7. Challenge | 3.51 | .79 | -.40 | -.24 | .25** | .12* | .18** | .06 | .01 | .42** | (.72) | | | | | |
| 8. Pleasant emotions | 3.30 | 1.00 | -.63 | -.32 | .17** | .01 | -.05 | -.09* | -.43** | -.13** | .55** | (.83) | | | | |
| 9. Unpleasant emotions | 1.90 | .62 | .94 | .68 | .16** | .26** | .08* | -.17** | .72** | .43** | -.05 | -.24** | (.81) | | | |
| 10. Task coping | 3.06 | .66 | -.16 | .02 | .21** | .12** | .20** | .15** | .02 | .16** | .66** | .54** | -.02 | (.89) | | |
| 11. Distraction coping | 2.01 | .73 | .77 | .07 | -.06 | .16** | .07 | .15** | .57** | .32** | -.07 | -.22** | .55** | .06 | (.81) | |
| 12. Disengagement coping | 2.03 | .76 | .74 | .23 | .02 | .10* | .15** | .09* | .47** | .35** | -.19** | -.30** | .52** | -.11** | .51** | (.81) |

*Note.* ** Statistically significant at $p < .01$, *$p < .05$. The first four variables were measured on 7-point scales, whereas the last eight variables were measured on 5-point scales. Composite reliabilities shown in parentheses. Factor correlations were taken from the measurement model.

Table **2**

*Factor Loadings from Measurement Model*

| Indicator | Factor | Loading |
|---|---|---|
| Parcel 1 | Mastery Approach | .85 |
| Parcel 2 | Mastery Approach | .71 |
| Parcel 3 | Mastery Approach | .83 |
| Parcel 1 | Mastery Avoidance | .77 |
| Parcel 2 | Mastery Avoidance | .93 |
| Parcel 3 | Mastery Avoidance | .89 |
| Parcel 1 | Performance Approach | .74 |
| Parcel 2 | Performance Approach | .99 |
| Parcel 3 | Performance Approach | .79 |
| Parcel 1 | Performance Avoidance | .85 |
| Parcel 2 | Performance Avoidance | .93 |
| Parcel 3 | Performance Avoidance | .69 |
| Parcel 1 | Challenge | .72 |
| Parcel 2 | Challenge | .80 |
| Parcel 1 | Motivational Relevance | .75 |
| Parcel 2 | Motivational Relevance | .84 |
| Parcel 1 | Threat | .77 |
| Parcel 2 | Threat | .74 |
| Parcel 1 | Pleasant Emotions | .93 |
| Parcel 2 | Pleasant Emotions | .97 |
| Parcel 1 | Unpleasant Emotions | .88 |
| Parcel 2 | Unpleasant Emotions | .86 |
| Parcel 1 | Task Coping | .92 |
| Parcel 2 | Task Coping | .88 |
| Parcel 1 | Distraction Coping | .91 |
| Parcel 2 | Distraction Coping | .71 |
| Parcel 1 | Disengagement Coping | .76 |
| Parcel 2 | Disengagement Coping | .97 |

Table **3**

*Direct, Indirect, and Total Effects in the Combined Effects Model*

| Effect | Direct path estimate | Indirect effect estimate (pleasant emotions) | Indirect effect estimate (unpleasant emotions) | Total indirect effect | Total effect estimate |
|---|---|---|---|---|---|
| Mastery approach → Task coping | .09 (-.03 to .21) | .05** (.01 to .09) | .00 (-.00 to .00) | .08** (.01 to .14) | .17** (.04 to .30) |
| Mastery avoidance → Task coping | -.01 (-.14 to .13) | -.02 (-.02 to .05) | -.01 (-.05 to .03) | .02 (-.05 to .08) | .01 (-.12 to .14) |
| Performance approach → Task coping | .09* (.02 to .20) | -.02** (-.04 to -.00) | -.00 (-.00 to .00) | .00 (-.05 to .05) | .09* (.01 to .19) |
| Performance avoidance → Task coping | .12** (.01 to .22) | .01 (-.01 to .02) | -.01 (-.02 to .01) | -.00 (-.06 to .05) | .11* (.00 to .23) |
| Mastery approach → Distraction coping | -.14** (.02 to .26) | .01 (-.02 to .01) | -.00 (-.02 to .01) | -.01 (-.04 to .03) | -.14** (-.26 to -.03) |
| Mastery avoidance → Distraction coping | -.01 (-.13 to .11) | -.01 (-.01 to .00) | .06** (.02 to .11) | .17** (.08 to .25) | .15** (.04 to .27) |
| Performance approach → Distraction coping | .04 (-.07 to .15) | -.01 (-.02 to .01) | .00 (-.01 to .02) | .01 (-.03 to .06) | .05 (-.05 to .15) |
| Performance avoidance → Distraction coping | .02 (-.10 to .13) | -.00 (-.00 to .01) | .03* (.00 to .06) | .07* (.00 to .15) | .08 (-.04 to .21) |
| Mastery approach → Disengagement coping | -.04 (-.16 to .07) | -.00 (-.02 to .01) | -.01 (-.02 to .01) | -.03 (-.09 to .03) | -.08 (-.19 to .04) |
| Mastery avoidance → Disengagement coping | .00 (-.13 to .13) | -.00 (-.01 to .02) | .07** (.02 to .12) | .09* (.00 to .19) | .09 (-.03 to .22) |
| Performance approach → Disengagement coping | .10* (.00 to .21) | -.00 (-.02 to .01) | .00 (-.01 to .02) | .06** (.01 to .11) | .16** (.06 to .26) |
| Performance avoidance → Disengagement coping | -.03 (-.15 to .09) | -.02 (-.06 to .03) | .03* (.00 to .06) | .02 (-.06 to .10) | -.01 (-.13 to .11) |
| Challenge → Task coping | .05 | .21** | .00 | .21** | .30* |

| | | | | | |
|---|---|---|---|---|---|
| | (-.27 to .37) | (.11 to .36) | (-.01 to 0.2) | (.11 to .37) | (.01 to .56) |
| Challenge → Distraction coping | -.15 (-.36 to .11) | .07 (-.08 to .23) | -.03 (-.07 to .02) | .04 (-.12 to .21) | -.11* (-.25 to -.01) |
| Challenge → Disengagement coping | -.37** (-.63 to -.10) | .04 (-.09 to .19) | -.03 (-.08 to .02) | .01 (-.13 to .17) | -.36** (-.52 to -.16) |
| Motivational relevance → Task coping | .10 (-.17 to .36) | -.08** (-.17 to -.02) | .00 (-.02 to .01) | -.08** (-.18 to -.02) | -.00 (-.26 to .26) |
| Motivational relevance → Distraction coping | .06 (-.14 to .29) | -.03 (-.09 to .03) | .02 (-.04 to .08) | -.01 (-.09 to .08) | .05 (-.16 to .29) |
| Motivational relevance → Disengagement coping | .35** (.08 to .55) | -.02 (-.08 to .04) | .02 (-.04 to .09) | .00 (-.09 to .09) | .36** (.10 to .54) |
| Threat → Task coping | .11 (-.16 to .39) | -.09** (-.17 to -.02) | -.03 (-.17 to .09) | -.11 (-.29 to .03) | -.02 (-.22 to .19) |
| Threat → Distraction coping | .38** (.07 to .64) | -.03 (-.09 to .03) | .19** (.08 to .33) | .16** (.02 to .33) | .54** (.32 to .74) |
| Threat → Disengagement coping | .08 (-.18 to .36) | -.02 (-.07 to .03) | .22** (.08 to .36) | .20** (.04 to .37) | .29** (.09 to .49) |

*Note.* Direct path estimate refers to the path from the left most variable, to the right most variable without mediation. The indirect path indicates the strength of the relationship when mediated by the mediating variable, which is why a path estimate is provided for both pleasant and unpleasant emotions. Achievement goal total indirect effects include stress appraisal mediators, which are not reported here.

95% confidence intervals presented in parentheses.

*Statistically significant at $p < .05$; **$p < .01$

**Table 4**

***Fit indices for multi-group structural equation models***

| Model | $\chi^2$ | *df* | $\Delta\chi^2$ | $\Delta df$ | CFI | TLI | SRMR | RMSEA (90% CI) |
|---|---|---|---|---|---|---|---|---|
| *Measurement Model* | | | | | | | | |
| Configural invariance | 1117.5 | 486 | - | - | .940 | .914 | .050 | .058 (.054-.063) |
| Metric invariance | 1131.0 | 507 | 13.5 | 21 | .941 | .918 | .051 | .057 (.052-.061) |
| Scalar invariance | 1143.7 | 522 | 12.7 | 15 | .941 | .921 | .051 | .056 (.051-.060) |
| Residual invariance | 1149.7 | 534 | 6.0 | 12 | .942 | .924 | .051 | .055 (.050-.059) |
| *Structural Model* | | | | | | | | |
| Configural invariance | 1308.6 | 544 | - | - | .928 | .907 | .068 | .061 (.056-.065) |
| Metric invariance | 1320.9 | 565 | 12.3 | 21 | .929 | .911 | .069 | .059 (.055-.063) |
| Scalar invariance | 1333.6 | 580 | 12.7 | 15 | .929 | .914 | .069 | .058 (.054-.062) |
| Structural invariance | 1345.4 | 604 | 11.8 | 24 | .930 | .919 | .070 | .057 (.053-.061) |

*Note.* Configural invariance was examined by replicating the model of both groups. Metric invariance was examined by constraining factors. Scalar invariance was examined by constraining factors and item intercepts. Residual invariance was examined by constraining factors, item intercepts, and factor means. Structural invariance was examined by constraining the structural paths on the model, while maintaining scalar invariance on the measurement model.

**Figure 1.** Hypothesized Model

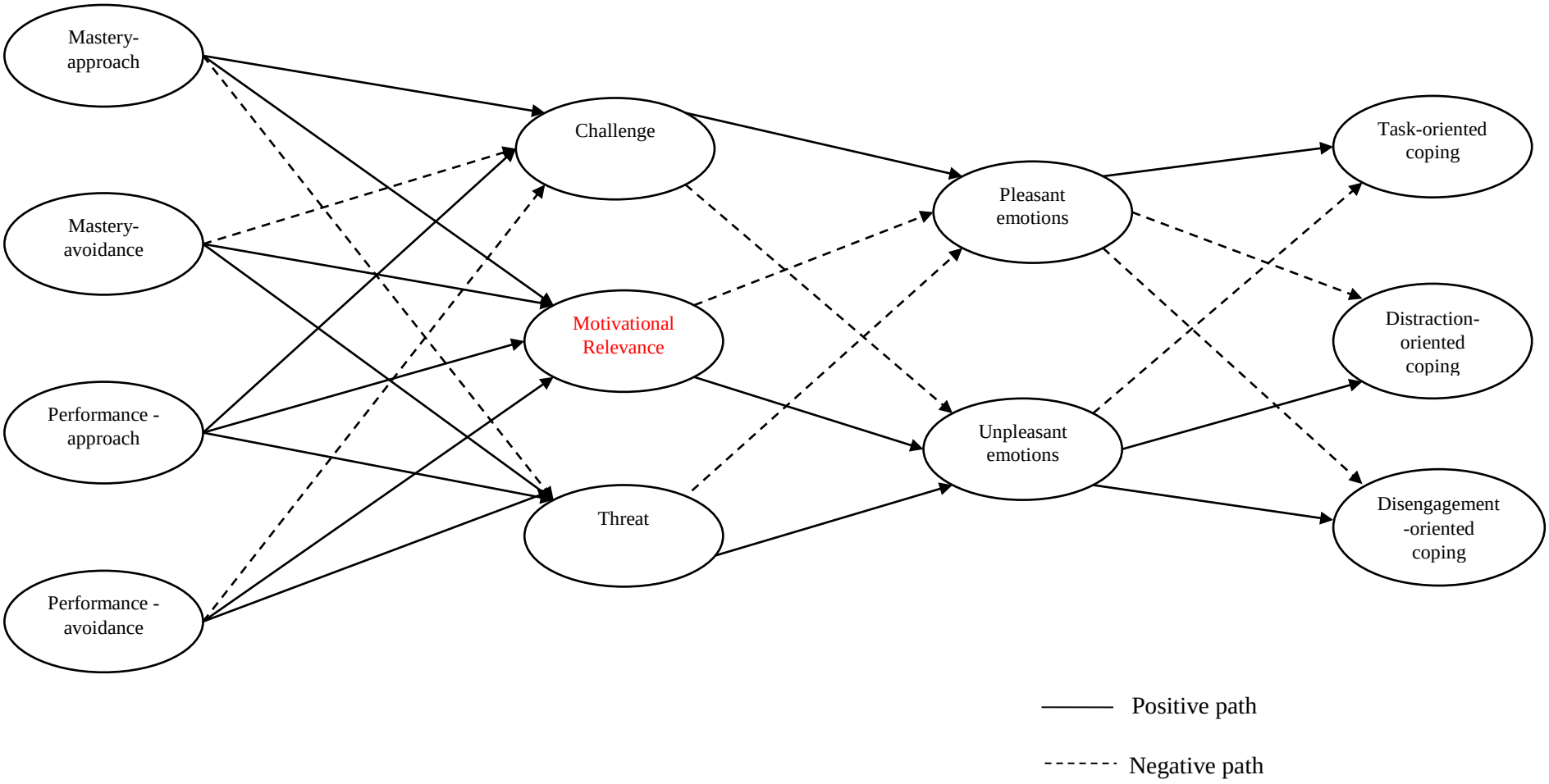

**Figure 2.** Revised Structural Equation Model for Achievement Goals, Stress Appraisal, Emotion, and Coping. All paths shown are significantly different from zero ($p < .05$).