

A path analysis of stress appraisals, emotions, coping, and performance satisfaction among athletes

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Abstract

Objectives

In this study we examined athletes' stress appraisals, emotions, coping, and performance satisfaction ratings using a path analysis model. This is the first study to explore all of these constructs in a single study and provides a more holistic examination of the overall stressful experience that athletes encounter.

Design

Cross-sectional.

Methods

Participants were 557 athletes, aged between 18 and 64 years (M age = 22.28 years, $SD = 5.72$), who completed a pre-competition measure of stress appraisals and emotions. Participants also completed a coping questionnaire and a subjective performance measure after competing, with regards to how they coped during competition and how satisfied they were with their performance.

Results

Path analysis revealed that appraisals of uncontrollable-by-self, stressfulness, and centrality were positively associated with the relational meaning threat appraisals. Threat appraisals were associated with unpleasant emotions, prior to competition, and pre-ceded distraction- and disengagement-oriented coping. The pre-competition appraisals of controllable-by-self, centrality, controllable-by-others, and stressfulness were associated with challenge relational meanings, which in turn were linked to task-oriented coping during competition. Task-oriented coping was positively related to superior subjective performance.

Conclusions

Our findings support the notion that stress appraisals, emotions, and coping are highly related constructs that are also associated with performance satisfaction.

Participating in sport can be a stressful experience (Neil, Hanton, Mellalieu, & Fletcher, 2011), which is often associated with a range of unpleasant emotions such as worry, frustration, and discouragement (Séve, Riab, Poizata, Sauryc, & Durand, 2007). In order to circumvent the negative effects of stress and unpleasant emotions, athletes must cope in order to maximise their sporting performance (Haney & Long, 1995) and emotional well-being (Lazarus, 2000a). Overall, researchers have tended to explore stress appraisals (e.g., Thatcher & Day, 2008), emotions (Dewar and Kavussanu, 2011 and Hagtvet and Hanin, 2007), and coping (Louvet et al., 2009 and Nieuwenhuys et al., 2011) as separate entities. Although these and other studies that have explored one construct in a single study have been very important in increasing our understanding, they fail to capture the entire stressful experience of an athlete that involves appraising stress, feeling an emotion, and attempting to manage the situation through coping. As such, we know little about the overall stressful experience of athletes, and thus the relationship between stress appraisal, emotions, and coping because researchers have focused on one or two constructs. Lazarus' cognitive-motivation-relational (CMR) theory (1999) intimated that there is an inherent relationship between these psychological constructs. Indeed, Lazarus (1999) stated that these constructs "form a conceptual unit, with emotion being the super-ordinate concept because it includes stress and coping" (p. 37). It is important from theoretical perspectives and applied perspectives that researchers and practitioners have a greater understanding of the overall experience of athletes in stressful competitions in order to develop theory-guided interventions.

Lazarus, 1991, Lazarus, 1999, Lazarus, 2000a and Lazarus, 2000b CMR theory states that emotions are generated by the evaluation a person makes about his or her environment in relation to personal goals. This refers to the cognitive element of the CMR theory of emotions. The person-environment relationship generates emotions, which involves evaluations of either harms or benefits - referred to as relational meaning. Emotions are motivational because they are reactions to the status of everyday goals. According to the CMR theory of emotions, coping strategies influence the emotions a person experiences. Furthermore, emotions can also influence how a person copes (Lazarus, 1991, Lazarus, 1999, Lazarus, 2000a and Lazarus, 2000b). However, Lazarus (1999) argued that coping is generally explored in relation to stress, but not emotions, with Lazarus (1999) also arguing that emotion theorists have ignored coping from the emotion process. Lazarus stated that coping is integral to the process of emotional arousal because "judging the significance of what is happening always entails evaluating what might be done about it, which determines whether we react, say, with anxiety or anger" (p. 37). Understanding more about the relationships between these constructs is important for the emotional well-being and performance of people during stressful situations.

Appraisal occurs when an individual makes an evaluation about his or her environment in relation to personal goals, beliefs, or values (Lazarus, 1999 and Lazarus and Folkman, 1984). Lazarus distinguished between primary and secondary appraisal. During primary appraisal, the individual makes an assessment about goal relevance, values, beliefs and situational intentions (Lazarus, 1999). An individual can make one of three appraisals: (1) irrelevant, (2) benign-positive, or (3) stressful. Secondary appraisal is an evaluation of what a person can do to cope with a stressful encounter and therefore the level of control attained through coping (Peacock & Wong, 1990). Despite the labels given to the two forms of appraisal, Lazarus (1999) suggested that primary appraisal is not always carried out first and nor is it independent of secondary appraisal. As such, the differences in appraisal are not about timing, more about content of the appraisal. Peacock and Wong (1990) developed a questionnaire based on the framework of Lazarus and Folkman (1984) and proposed three

dimensions of primary appraisal (i.e., threat, challenge, and centrality) and three dimensions of secondary appraisal (perceptions of controllable-by-self, controllable-by-others, and uncontrollable-by-anyone). Threat appraisal refers to evaluation of future harm; challenge appraisal occurs when an individual feels joyous about a struggle and perceives a future gain. Interestingly, Lazarus (2000a) labelled both threat and challenge as relational meanings in his CMR model. Essentially, relational meaning is an evaluation of the personal significance of a particular situation for a person, based on the appraisal of importance of what is happening. We view the concepts of threat and challenge as such in the current paper. Finally, centrality refers to the perceived importance of an encounter on a person's well-being. Lazarus and Folkman (1984) suggested that a person has to have a stake in an event outcome to evaluate events as being stressful.

Concerning secondary appraisal, controllable-by-self refers to a person's judgment regarding whether he or she can control the situation. Controllable-by-others refers to whether an individual can rely on other people to help him or her manage the stressor. Uncontrollable-by-anyone refers to appraisals in which the person evaluates that no one can control a stressful situation. Fridja (2007) stated that it is the evaluation of events that generates emotions.

Lazarus (2000a) defined emotions as "an organised psychophysiological reaction to ongoing relationships with the environment, most often, but not always, interpersonal or social" (p. 230). Lazarus reported 15 different emotions that were classified as nasty emotions (e.g., anger, envy, and jealousy), existential emotions (anxiety, fright, guilt, and shame), empathic emotions (gratitude and compassion), emotions provoked by favourable life conditions (e.g., happiness, pride, and love), and emotions provoked by unfavourable outcomes (e.g., relief, hope, and sadness). Other researchers such as Jones, Lane, Bray, Uphill, and Catlin (2005) have found evidence to suggest that classifying emotions as unpleasant (e.g., anger, anxiety, and dejection) and pleasant (happiness and excitement) is more applicable for sporting populations. This classification of emotions refers to the experience of feeling the emotion rather than the impact experiencing an emotion may have on performance. This is because pleasant emotions are not always positively associated with athletic performance and negative emotions are not always detrimental to performance (Hanin, 2007 and Hanin, 2010). Despite the theoretical link between appraisal and emotions, research in this area is scant. Lewthwaite (1990) found evidence to suggest that athletes experience anxiety when there is a degree of uncertainty about the future, which is akin to athletes making threat appraisals about uncertain event outcomes. Nicholls, Levy, Jones, Rengamani, and Polman (2011) explored the relationship between stress appraisals and the emotions generated among a sample of 10 professional rugby union players. The authors of this study categorised appraisals as gains (i.e., challenge and benefit) or losses (threat and loss) in accordance with Lazarus (2000a). The results revealed that threat or loss relational meanings generated predominantly negatively toned emotions such as anger, anxiety or shame; whereas challenge or benefit appraisals generated mainly positively toned emotions such as happiness, pride, or excitement.

Lazarus and Folkman (1984) defined coping as "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). Compas, Connor-Smith, Compas, Wadsworth, Harding Thomsen, and Saltzman (2001) classified coping strategies within three higher-order dimensions, referred to as task-oriented, distraction-oriented, and disengagement-oriented dimensions of coping. Coping strategies classified within the task-

oriented coping dimension attempt to reduce stress (e.g., mental imagery, effort expenditure, and relaxation). Distraction-oriented coping strategies direct the attention of the person to unrelated aspects of what they are doing and include strategies such as mental distraction and distancing. Finally, disengagement-oriented coping involves a person disengaging from attempts to attain his or her personal goals and includes the coping strategies withdrawal and venting of emotions. This classification system of coping is different to that suggested by Lazarus (1999), but has been used extensively in the psychology literature (e.g., Amiot et al., 2004 and Gaudreau et al., 2005).

Some recent research has directly explored the relationship between coping and emotions. For example, Nicholls, Hemmings, and Clough (2010) explored the emotions generated after appraisal, coping, and event outcome among a sample of 10 international adolescent golfers. The results of this study revealed that coping could generate positive emotions in different stressful situations. A limitation of the Nicholls et al. study was the small and homogeneous sample, which limited the generalisability of the results. It appears that there might be a relationship between emotions and coping among athletes, but more research is required with a larger and more heterogeneous sample of athletes to explore this relationship in more depth.

Athletic performance

Researchers have also explored the relationship between sporting performance and stress appraisals, emotions, and coping. With an all male sample of 118 high-performance golfers Freeman and Rees (2009) found that challenge appraisals were associated with the golfers' better performances, whereas threat appraisals were associated with the players' poorer performances. However, the sample was relatively homogenous, so research is required to explore this phenomenon among team sport and female athletes of varying ages.

The emotion and performance relationship has received varying degrees of attention within the sport psychology literature. Of the 15 emotions reported by Lazarus (1999) or the five emotions reported by Jones et al. (2005), researchers have only adequately explored the relationship between anxiety and performance. Two meta-analyses by Craft, Magyar, Becker, and Feltz (2003) and Woodman and Hardy (2003) suggest that there is a negative relationship between anxiety and sporting performance.

More recently, however, Lane et al. (2010) examined the emotions associated with optimal and dysfunctional performance among a sample of 284 athletes. They found that positive emotions such as happiness, calmness, and vigour were associated with optimal performance, whereas negative emotions such as anger and confusion were associated with dysfunctional performance. To date no study has investigated the possible indirect effects of emotions on performance through the selection of coping strategies.

There have been weak and inconsistent associations between coping and objective indicators of performance such as the numbers of points in a free throw task (Haney & Long, 1995), the seasonal batting average of professional baseball players (Smith & Christensen, 1995), and performances among club golfers (Gaudreau, Nicholls, & Levy, 2010). In the Gaudreau study, task-oriented coping was associated with the golfers' most successful rounds, whereas disengagement-oriented coping was associated with the golfers' poorest performance. However, these inconsistent findings could indicate that these objective indicators of performance were too crude. Indeed, Terry (1995) and Males and Kerr (1996) argued that

sport performance should be categorised subjectively by the performer, because this provides a more sensitive outcome of performance, especially when environmental factors may influence objective measures of performance such as match conditions, weather, or the skill of opponents. Furthermore, using subjective ratings of performance satisfaction allows researcher to compare performance among athletes who compete in very diverse sports and athletes who play in different positions.

The purpose of this paper was to examine the relationship between stress appraisals, emotions, coping, and subjective performance among athletes and thus provide a more holistic analysis of the stressful experiences in sport. We illustrate our hypotheses in Fig. 1, with a plus sign inferring a positive relationship and a minus sign inferring a negative relationship. We hypothesized that: (1) athletes would make relational meanings of threat or challenge when the event was perceived as being important to the athletes, referred to as centrality, and stressfulness. In addition, we predicted that higher levels of stress would be more likely to result in a threat relational meaning as opposed to a challenge relational meaning, based on Lazarus (1999) assertion. (2) Athletes would perceive a stressful event as a challenge when they perceived more control over the situation (controllable-by-self) or when others could control the event (controllable-by-others). We also predicted that the athletes would make threat appraisals when they perceived the event as being uncontrollable-by-anyone or when the athlete perceives that he or she has little control over the event (controllable-by-self). This is because people are more likely to perceive a situation as challenging when they have the resources to manage a situation and thus control it. Conversely, athletes experience threat when they have no control (Blascovich & Mendes, 2000) or have a degree of uncertainty (Lewthwaite, 1990). (3) Threat relational meaning would be associated with unpleasant emotions, whereas challenge relational meaning would be associated with pleasant emotions. Previous research with professional rugby union players suggested that loss relational meanings, such as threat relational meaning generated mainly negative emotions, whereas challenge appraisals generated pre-dominantly positive emotions (Nicholls et al., 2011). (4) Unpleasant emotions would have a direct negative effect on subjective performance as well as an indirect effect through distraction-oriented and disengagement-oriented coping. We predicted that pleasant emotions would have a direct positive influence on subjective performance and an indirect effect through task-oriented coping. This is because Lane et al. (2010) found that positive emotions were associated with optimal performance, whereas negative emotions were associated with poor performance. Additionally, task-oriented coping has been positively associated with performance, whereas disengagement coping has been negatively associated with performance (Gaudreau et al., 2010).

Insert figure 1 here

Method

Participants

Participants were 557 athletes (male $n = 418$; female $n = 139$; M age = 22.28 years, $SD = 5.72$) who competed at international/national ($n = 68$), county ($n = 151$), club/university ($n = 318$), or beginner ($n = 20$) level. The sample consisted of 488 athletes from team sports and 69 athletes from individual sports. Five hundred and thirty-five of the athletes were

Caucasian, 12 were Asian, and 10 were Black in ethnic origin. All of the participants received an information letter and signed an informed consent form prior to participating in this study.

Questionnaires

Stress appraisal and relational meaning

The Stress Appraisal Measure (SAM; Peacock & Wong, 1990) assessed the athletes' appraisals and relational meaning prior to competing. The SAM is a 28-item questionnaire that examines six dimensions of appraisal, including both primary and secondary appraisal. Two components of the SAM measure relational meaning: threat (i.e., future harms or losses), challenge (i.e., anticipated gain in the future). One-component measures stress appraisal: centrality (i.e., perceived importance in relation to one's well-being). Additionally, the SAM examines secondary appraisal, categorised into the higher-ordered dimensions: controllable-by-self (i.e., whether the individual can cope with or manage the situation), controllable-by-others (i.e., whether the person can turn to others for help to manage the situation) and uncontrollable-by-anyone (i.e., neither the person nor his or her support network can manage the situation). In addition to the SAM measuring relational meaning, primary, and secondary appraisal it also measures the overall perceived stress the person is encountering, referred to as stressfulness. Participants answered questions in relation to the following instructions "This questionnaire is concerned with your thoughts about the forthcoming sport competition. There are no right or wrong answers. Please respond according to how you view this situation right now." All items were rated on a 5-point Likert-type scale anchored at 1 = "not at all" and 5 = "extremely." Peacock and Wong (1990) reported that the Cronbach's alpha coefficients for the SAM ranged from .74 to .90. The Cronbach alpha coefficients in the present study ranged from .64 to .88 (see Table 1).

Table 1.

Mean and standard deviations for the variables used in the study and the Cronbach's alpha coefficient.

Variable	Mean	SD	α
Centrality	10.61	3.89	.84
Stressfulness	10.02	3.07	.68
Controllable-by-self	15.90	2.69	.80
Controllable-by-others	13.24	3.76	.88
Uncontrollable-by-anyone	6.54	2.55	.64
Threat	7.83	2.62	.77
Challenge	14.01	2.98	.73
Unpleasant emotions	9.66	7.75	.84
Pleasant emotions	16.64	7.18	.88
Distraction-oriented coping	13.25	4.59	.73
Disengagement-oriented coping	16.42	6.07	.82
Task-oriented coping	49.27	10.06	.87
Performance satisfaction	67.44	17.54	

Emotion

The Sport Emotion Questionnaire (SEQ; Jones et al., 2005) was used to measure pre-competition emotions. The SEQ examines five emotions which can be grouped into two higher-order dimensions: (1) unpleasant emotions (anxiety, dejection, and anger), and (2) pleasant emotions (excitement and happiness). The SEQ contains 22 items that are scored on a 5-point Likert-type scale ranging from 0 = "Not at all" to 4 = "Extremely." Jones et al. (2005) reported excellent reliability for the SEQ scales (Cronbach's alpha between .81 and .90).

Coping

The Coping Inventory for Competitive Sport (CICS; Gaudreau & Blondin, 2002) assessed how the athletes coped during competition. The CICS examines 10 coping subscales, categorised into 3 s-order dimensions. These dimensions are: (1) task-oriented coping, which includes the coping strategies thought control, mental imagery, relaxation, effort expenditure, logical analysis, and seeking support; (2) distraction-oriented coping, which includes the coping strategies distancing and mental distraction; (3) disengagement-oriented coping includes the coping strategies disengagement/resignation and venting of unpleasant emotions. The CICS contains nine four-item subscales and one three-item subscale. All items of the CICS are rated on a 5-point Likert-type scale, ranging from 1 = "does not correspond at all" to 5 = "corresponds very strongly." Gaudreau and Blondin (2002) reported that the CICS had adequate reliability, with internal consistency ranging from .67 to .87. Furthermore, support has also been provided for the assessing coping at 3-higher order dimension level, as task- ($\alpha = .87$), distraction- ($\alpha = .73$), and disengagement-oriented coping ($\alpha = .82$) demonstrated adequate levels of reliability in this sample.

Performance satisfaction

Participants subjectively rated their athletic performance satisfaction following the competition by responding to the question "Please rate how satisfied you were with your sporting performance, by circling the appropriate number." The scale ranged from 0 = "totally dissatisfied" to 100 = "totally satisfied," as used by Pensgaard and Duda (2003).

Procedure

Athletes received an information letter that detailed the nature of the study and a consent form. Athletes who wished to participate signed the consent form and returned it to a research assistant. Participants completed the SAM (Peacock & Wong, 1990) and then the SEQ (Jones et al., 2005) within 1 h of a competitive sport event starting. The CICS (Gaudreau & Blondin, 2002) and the subjective performance scale (Pensgaard & Duda, 2003) were completed in relation to the competitive event and within 1 h of a competitive event finishing. To ensure that all questionnaires were completed at the required times, all athletes completed their questionnaire in the presence of a researcher.

Data analysis

The proposed path analysis model containing appraisals, relational meaning, emotions, coping, and subjective performance was tested in a structural equation modelling programme (Amos 18; PASW Statistics, Chicago) using the maximum-likelihood method of parameter estimation. This method allows for simultaneous examination of multiple direct and indirect predicted paths and provides global indices of the fit between the theoretical model and data (Holmbeck, 1997). The following variables were included in the model: Stressfulness, centrality, controllable-by-self, controllable-by-others, uncontrollable-by-anyone, challenge, threat, unpleasant emotions, pleasant emotions, distraction-oriented coping, disengagement-oriented coping, task-oriented coping, and performance satisfaction.

A number of fit indicators are reported. The chi-square statistic reflects the discrepancy between the observed covariance matrix derived from the data and the predicted covariance matrix by the model. The chi-square statistic is dependent on sample size, model complexity, and deviation from multivariate normality in the data (Hu & Bentler, 1998). In addition, a model is only an approximation of reality. Testing whether the observed and predicted covariance matrices are identical is too strict a criterion. We therefore reported the root-mean-square error of approximation (RMSEA). The RMSEA provides an estimate of the average absolute difference between the model covariance estimates and the observed covariance. A value of $<.06$ for the RMSEA indicates a close fit whereas a value $<.08$ is considered an acceptable fit (Browne & Cudek, 1993). Vandenberg and Lance (2000) have suggested that a cut-off value of $.10$ for the RMSEA is still acceptable. We also calculated the comparative fit index (CFI; Bentler, 1990). The CFI provides an indication of how the theoretical model better fits the data in comparison to a base model constraining all constructs to be uncorrelated with one another. The CFI is a more robust statistic than chi-square for deviations from multivariate normality. A CFI value of $.95$ or above is considered a good fit (Hu & Bentler, 1998). A CFI of $>.90$ is considered acceptable (Bentler, 1990 and Vandenberg and Lance, 2000).

Testing the fit of the hypothesized model

Prior to data analysis, we recalculated the task-oriented coping variable. The correlations between the strategies that make up this variable showed that two strategies, seeking support ($r = .02$; $P = .64$) and relaxation ($r = .06$; $P = .15$), were not associated with performance satisfaction. As such, the new task-oriented coping variable consisted only of mental imagery, effort expenditure, thought control, and logical analysis. All of these coping strategies correlated significantly with performance satisfaction.

Results

For means and standard deviations for the scales as well as the Cronbach's alpha coefficients, see Table 1. Table 2 provides an overview of the bivariate correlations between the variables in the path model. All predicted relationships between the variables were observed.

Table 2.**Bivariate correlations between the variables entered in the hypothesised model.**

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Centrality												
2. Stressfulness	.48*											
3. Controllable-by-self	.22*	-.11*										
4. Controllable-by-others	.27*	.15*	.30**									
5. Uncontrollable-by-anyone	.13*	.26*	-.25*	-.08								
6. Threat	.45*	.66*	-.28**	.01	.34*							
7. Challenge	.64*	.32*	.40**	.38*	-.02	.20**						
8. Unpleasant emotions	.19*	.38*	-.17**	.03	.32*	.36**	.12*					
9. Pleasant emotions	.31*	.01	.32**	.22*	.05	.01	.41*	-.15**				
10. Distraction-oriented coping	.22*	.27*	-.23**	-.01	.24*	.36**	-.01	.27**	-.02			
11. Disengagement-oriented coping	.16*	.28*	-.16**	.03	.16*	.35**	.06	.38**	-.13**	.28**		
12. Task-oriented coping	.44*	.29*	.37**	.29*	-.04	.10*	.42*	.01	.33**	.05	-.04	
13. Performance satisfaction	.15*	.08*	.37**	.20*	-.08	-.15**	.21*	-.24**	.31**	-.15**	-.33**	.40*

* $P < .05$; ** $P < .01$.

To examine the overall fit of the hypothesised model we tested the model shown in Fig. 1 (note, the antecedents to threat and challenge were allowed to inter-correlate with each other). The fit of the model approached acceptability, $\chi^2(47 N = 502) = 302, P < .001$; CFI = .926,

and RMSEA = .099. We made a number of modifications to the model based on theory and modification indices provided by AMOS (Schumacker & Lomax, 2004). Modifications were only made if they were theoretically sound and did not change the general thrust of the model. The following changes were incorporated in the model. Both stressfulness and uncontrollable-by-anyone construct were allowed to have direct effects on unpleasant emotions. That is, although these variables influence unpleasant emotions indirectly via threat perceptions they also appear to have a direct effect on the experience of unpleasant emotions. In addition, stressfulness and controllable-by-self were allowed to have direct effect on task-oriented coping. Theoretically, it is plausible that these variables exert direct and indirect effects. The revised model (see Fig. 2a for threat and 2b for challenge) provided a better and acceptable fit, $\chi^2(43, N = 502) = 190, P < .001, CFI = .950,$ and RMSEA = .079.

Insert figure 2 here

Discussion

In this paper, we developed a path analysis model to explore the relationships between stress appraisals, emotions, coping and subjective performance among athletes. We made some modifications to the model, which included removing seeking support and relaxation. The revised model provided an acceptable fit and thus provides support for the theoretical application of Lazarus, 1991, Lazarus, 1999, Lazarus, 2000a and Lazarus, 2000b assertion that stress appraisal, emotion, and coping are highly related constructs.

In accordance with our first hypothesis, competitive events appraised as being threatening or challenging were also perceived as being both stressful and important to the athlete. This finding provides empirical evidence for the work of Lazarus (Lazarus, 1999 and Lazarus and Folkman, 1984), who argued that challenge and threat relational meanings are stress appraisals that indicate an individual is experiencing stress. In addition, when the athletes reported the competitive event as being more stressful they were more likely to appraise the competitive event as being a threat as opposed to a challenge. This finding has practical applications, as it would appear that stress management techniques might influence how an individual appraises a sports event and the emotions generated.

The findings supported our second hypothesis, as appraisals were related to perceptions of controllability. Challenge was associated with perceived controllability and threat appraisals were associated with the athletes having a lack of control, which is in agreement with Blascovich and Mendes (2000) and Lazarus (1999). Lazarus stated that “threat appraisals tend to be subordinated to challenge when our state of mind is sanguine about our resource to effect the desired outcome” (p. 79). Coping self-efficacy training has the potential to increase an athlete’s perception of their ability to take control of stress and thus alter his or her appraisal of stressful events and is a useful tool for sport psychologists. Indeed, Feltz, Short, and Sullivan (2008) suggested that the sport psychologist could ask an athlete imagine himself or herself coping effectively with stress in sport. The findings from this study indicate that the sport psychologist could enhance this process by encouraging the athlete to imagine him or herself using mental imagery, effort expenditure, thought control, or logical analysis coping strategies, with a view to the athlete using these strategies in competitive events.

The third hypothesis was supported, as there was a strong relationship between threat relational meanings with unpleasant emotions and challenge relational meanings with pleasant emotions. This provides support for previous research, which suggested that loss relational meanings were associated with unpleasant emotions among professional rugby union players (Nicholls et al., 2011). Although we made no hypotheses regarding the relationship between the four other components of appraisal and either pleasant or unpleasant emotions, modifications were made to the model. These modifications indicated that stressfulness and the uncontrollable-by-anyone construct had direct effects on unpleasant emotions. Interestingly, none of the five component parts of appraisal, other than challenge, had a direct effect on pleasant emotions. Our finding that both stressfulness and uncontrollable-by-anyone had a direct effect on unpleasant emotions is consistent with theory and research from the sport psychology literature. When an event is deemed completely out of a person's control there is uncertainty over what is going to happen, and anxiety can be experienced when there is event uncertainty (Lazarus, 1999 and Lewthwaite, 1990). The finding that none of the component parts of appraisal, other than challenge, had a direct effect on pleasant emotions is consistent with Lazarus (1999), because it is only challenge that is associated with feelings such as joy, whereas the other parts of appraisal are not associated with pleasant feelings.

Our final hypothesis was supported, as positive emotions were positively associated with subjective performance, whereas negative emotions were negatively associated with subjective performance. Furthermore, positive emotions had an indirect positive influence on performance via task-oriented coping, whereas negative emotions had a negative indirect effect on performance via distraction- and disengagement-oriented coping. With the exception of anxiety, research concerning the relationship between performance and emotions is scant. Our finding that unpleasant emotions are negatively associated with performance supports previous meta-analyses by Craft et al. (2003) and Woodman and Hardy (2003) who found a negative relationship between performance and pre-competition anxiety. The notion that unpleasant emotions have a negative indirect influence on subjective performance via distraction- and disengagement-oriented coping is partially supported by existing research. In particular, disengagement-oriented coping has been associated with poor performance among golfers (Gaudreau et al., 2010). Our finding that pleasant emotions directly, and indirectly through task-oriented coping, are associated with higher subjective performance can also be explained with existing literature. For example, Lane et al. (2010) found that there was a positive correlation between pleasant emotions and subjective performance, whereas other studies have found a positive relationship between task-oriented coping and performance in golf (e.g., Gaudreau et al., 2010). Our findings indicate the importance of assessing both coping and emotions when exploring stressful events and examining both direct and indirect effects on performance.

A limitation of this study relates to the timing of the pre-competition measures of both appraisal and emotions. Although measures of these constructs were administered within an hour of the competitive events commencing, we did not measure the emotions the athletes experienced during those few seconds immediately before the event commenced, due to ethical reasons (Tenenbaum, Lloyd, Pretty, & Hanin, 2002). Furthermore, it could be argued that we have not explored all components of Lazarus, 1991, Lazarus, 1999, Lazarus, 2000a and Lazarus, 2000b CMR theory of emotions, because we only measured two of the four relational meanings proposed by Lazarus and thus did not measure either harm or benefit relational meanings. It would be really interesting to explore these relational meanings and the associated emotions after a competition has ended, because one suspect this is when

athletes would appraise whether they have gained from a sports event or experienced a harm. There are no psychometrically valid questionnaires that include all four relational meanings of threat, harm, challenge, and benefit, which is something researchers could address. Additionally, it might appear we have not explored the motivational element of Lazarus's model, which he stated means the "acute emotions and moods are reactions to the status of goals" (Lazarus, 2000b, p. 41). However, the SAM (Peacock & Wong, 1990) does contain items relating to whether the event has important consequences, whether the event has implications, and whether there are long-term consequences, all of which will be in response to the athletes' goals, whatever they may have been. So although goals were not measured, such as whether the athletes wanted to score, win, or not be substituted, the SAM measures the underlying properties of goals and thus the motivational element of the CMR model proposed by Lazarus, 1991, Lazarus, 1999, Lazarus, 2000a and Lazarus, 2000b. Finally, this study was cross-sectional so we cannot infer causality, but Crocker, Mosewich, Kowalski, and Besenski (2010) argued that cross-sectional research is required when little is known about a phenomenon to guide experimental research. Experimental research could assess the causality between appraisals, emotions, coping, and performance.

This paper makes some novel contributions to the sport psychology literature in addition to having some important applied implications. This study is the first to indicate that there are associations between stress appraisals, emotions, coping, and subjective performance satisfaction among athletes. As such applied practitioners need to be aware that if they work with an athlete on stress appraisal training, for example, this is likely to influence the emotions he or she experiences, how he or she copes, and performance satisfaction. Previous research has indicated that performance is associated with coping strategies from the task-oriented dimension (e.g., Gaudreau et al., 2010), with this study replicating that finding, but also extending the literature by indicating a possible reason for this finding. Task-oriented coping was associated with pleasant emotions and previous research indicates that pleasant emotions are associated with success in sport (Lane et al., 2010).

Previous research has indicated that athletes use strategies from task-oriented coping dimensions and refrain from using strategies from the distraction- or disengagement-oriented strategies to maximise performance (e.g., Gaudreau et al., 2010). Although the findings from this study support this contention, our results extend the guidelines for practitioners by indicating that only mental imagery, effort expenditure, thought control, and logical analysis could be taught and that appraisal training should supplement coping training. Appraisal training could involve players being encouraged to focusing on what can be gained from a stressful situation (e.g., securing professional contract, national selection, or winning a championship). Using mental imagery, effort expenditure, thought control, and logical analysis coping strategies and appraising stressful situations as challenging have the potential to generate positive emotions during stressful encounters (Nicholls et al., 2010).

In conclusion, this paper illustrates how stress appraisals, emotions, coping, and performance satisfaction are all related. Our results provide an acceptable fit for our proposed path model. We have found support for Lazarus, 1991, Lazarus, 1999, Lazarus, 2000a and Lazarus, 2000b contention that these constructs are related. In order to advance our understanding further, future research could explore some of the underlying mechanisms such as how coping self-efficacy or personality influences appraisals, coping, and emotions. This study also has a number of findings that are relevant to applied practitioners. For example, practitioners could employ appraisal training along with coping interventions to generate pleasant emotions and improve performance.

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